



Digitized by the Internet Archive
in 2010 with funding from
University of Toronto



4
FORTY-NINTH QUARTO VOLUME

229
From July 1, 1910 to December 31, 1910

Railway Age Gazette

A CONSOLIDATION OF THE RAILROAD GAZETTE AND THE RAILWAY AGE

(Established in April, 1856)

117264
13 | 7 | 11
FIFTY-FIFTH YEAR

NEW YORK

CHICAGO

CLEVELAND

LONDON

1910
SECOND HALF

TF

1

R2

0.49

INDEX

Forty-ninth Quarto Volume—July 1, 1910, to December 31, 1910

AUTHORS

- Adams, Guy A., 409
Alden, C. L., 15
Arkenburgh, W. H., 5
Arnold, Bion J., 159
- Ballantine, N. D., 112
Barker, Samuel H., 350
Basford, George M., 746, 1080
Becker, H. G., 870, 1054
Been, W. E., 303
Beeson, Richard, 629
Bentz, Fred, 658
Berg, C. P., 31
Best, Otto, 79
Black, George, 1056
Bohon, W. J., 213
Breithaupt, W. H., 309
Bronson, Miles, 274
Brown, T. H., 1107
Brownson, Howard G., Ph.D., 6
Bucket, Dope, 15
Buzzell, O. D., 415
- Carr, R. F., 573
Caruthers, C. H., 582
Clark, R. W., 242
Coes Wrench Co., 1052
Cook, F. J., 657
County, A. J., 181
Crowley, C. J., 397
- Dedge, G. G., 181
Deming, Clarence, 495
Dixon, Frank Haigh, 688
Dougherty, N. F., 151
Dowe, E. S., 1106, 1178
Drury, C. J., 409, 849
Dunn, Samuel O., 303
- Eddy, W. J., 851
Edmiston, H. C., 834
Elliott, Howard, 744
Evans, G. I., 246
- Faulkner, E. O., 305
Fay, T., 1107
Feely, Joseph J., 192
Forbes, Edgar Allen, 359
Forman, H. W., 494
Forsyth, William, 183, 244
- Fowler, George L., 574, 645
Frey, Benjamin, 417
- Gaines, F. F., 225
Gardner, Henry A., 507
Gardner, J. E., 1140
Gest, Alex. P., 5
Gross, E. G., 400
Gulick, Henry, 916
- Hale, Arthur, 387, 1041
Harding, H. M'L., 71
Higgins, S., 1038
Hinckley, B. S., 537
Hines, Walter D., 1107
Howe, John, 656
Hunt, R. A., 1083
- Irving, J. Logan, 1038
- Job, Robert, 222
Johnson, A. W., 450, 573
- Kean, A. H., 1057
Kelly, J. W., 1000
- Lamcool, K. J., 406
Latimer, J. B., 697
Leach, Wilbur F., 628
Le Compte, John V., 405
Leech, C. C., 1055
Lightfoot, S. S., 411
Lindgren, C. J., 632
Lister, F. E., 855, 1059
- Macnichol, Charles, 81
McCrea, James, 739
M'Eldowney, W. E., 396
M'Pherson, Logan, G., 190, 214,
452, 585, 797, 996, 1045, 1267
M'Sweeney, J. T., 415
M'Veigh, E. J., 396
Macalister, Walter, 1052
Maier, Charles, 845
Mellen, W. S., 927
Mercur, R. J., & Co., 842
Moore, George F., 535, 687
- Nichols, S. F., 917
Norris, George L., 312, 1052
Nowell, F., 632
- Parker, F. A., 971
Patenall, F. P., 303
Pearson, Henry G., 1039, 1188
Perritt, J. F., 848
Peters, Dr. W., 1150
Pomeroy, L. R., 643
Porter, A. D., 846
- Radcliffe, W. H., 1117
Redfern, Joseph N., 388
Reeves, W. W., 847
Reyer, William G., 242, 402
Ripley, William Z., 732, 778
Robbins, Charles, 16
Roberts, George H., 1057
Roberts, L. D., 450
Rowe, Theodore, 635
Rudd, A. H., 1179
- Schneider, Herman, 122
Soley, C. A., 84
Shaver, A. G., 5
Sheafe, J. S., 844
Shearing, J. H., 958
Simms, William H., 348
Simpson, A. F., 1106
Snyder, W. H., 241, 842
Spidy, E. T., 1053
Soubllette, Eduardo, 834
Sprague, Frank J., 688
Sterling, E. A., 456
Stevenson, James, 410
- Tapley, F. B., 309
Taylor, Dr. G. H., 973
Thompson, M'Leod, 1043
Totten, Robert C., 536
- Van Langendonck, C., 82
Vaughan, H. H., 183
- Wechmann, Wilhelm, 545
Westbrook, M. H., 1056
Westinghouse, George, 66, 121
Wickhorst, M. H., 74
Wild, M. B., 66
Wilkinson, C. P., 634
Williams, Charles H., 1138
Willard, A. S., 408
Wilson, L. W., 1140
Wilson, William Bender, 467

GENERAL INDEX

[Illustrated articles are indicated thus*; Editorials thus†; Letters to Editor thus‡.]

A

Aberthaw Construction Co.:
Concrete Construction Plant on a Short Time Job, 194
Abrasives (See Machine Tools; also Shop Kinks)
Acetylene (See Iron and Steel; also Welding)
Accident:
Automobile Accident, 487†, 834†
Automobiles at Crossings, 702
Car Ferry Disaster on Lake Michigan, 513
Chicago & North Western, Campaign Against Accidents, 391
Chicago, Rock Is.—l & Pacific, Wreck at Clayton, Kan., 589
C. C. & St. L. Collision, Middletown, Ohio, 92, 147†
Collision at Saunon, France, 323
Fort Wayne & Wabash Valley, 563, 563†
Grand Trunk Collision at Durand, Mich., 431
Great Britain, Accidents in 1909, 390
Illinois Traction Collision, 662
Indiana Union Traction, 589, 614†
Interstate Commerce Commission Blanks, 299†
Interstate Commerce Commission Bulletin No. 35, 276; No. 36, 923
Introduction of All-Steel Cars, 1117
London, Brighton & South Coast, 589
Men Killed in Coupling, 147†
Monorail Accident, 166
Monthly Summaries: June, 1910, 121; July, 313, 450†; Aug., 543; Sept., 795; Oct., 1013, 1107†; Nov., 1192
Motion-Picture Photographs, 92, 147†
N. Y. C. & H. R. Explosion at the Grand Central Terminal, 1193
Northwestern Pacific Collision at Ignacio, Cal., 287
Accounting (See also Association of Transportation and Car Accounting Officers):
Classification of Expenditures for Additions and Betterments, 133
Deductions for Obsolescence Justified, 1093
Depreciation Reserves, 661
Operating Revenues and Expenses of Carriers by Water, 488†
Ton-Mile Statistics, 186
Value of American Railway Statistics, 181
Adreon Mfg. Co.:
Clarke Tension Set Tie Plate, 605*
Aeroplanes:
Five Passengers, 431
Flights, 134, 336, 1208, 1272
Tournament Near New York City, 800
Air Brake (See Brake)
Air Compressor (See Compressed Air; also Shop Kinks)
Airship:
Attempt to Cross the Atlantic, 740
American Association of Railway Superintendents:
Meeting, 500*
American Car & Foundry Co.:
Chair Car, C. B. & O., 157*
American Hoist & Derrick Co.:
Freight Derrick, 59*
American Locomotive Co.:
Mallet Articulated, Chesapeake & Ohio, 1144*
Mallet Articulated, St. Louis & San Francisco, 1144*
American Railway Association:
Fall Session, 975
American Railway Bridge & Building Association:
Convention, 786
American Rolling Mill Co.:
Ingot Iron, 574*
American Saw Mill Machinery:
Portable Saw Bench, 267*
American Society for Testing Materials:
Report on Protective Qualities of Pigments, 179†
American Society of Engineer Draftsmen:
Organization, 488†
American Society of Mechanical Engineers:
English Engine House Practice, 841†
American Street & Interurban Railway Accountants' Association:
Convention, 727†, 916
American Street & Interurban Railway Claim Agents' Association:
Convention, 727†, 916
American Street & Interurban Railway Engineering Association:
Convention, 727†, 916
American Street & Interurban Railway Transportation & Traffic Association:
Convention, 727†, 916
American Tool Works Co.:
Four-Speed Belt Variator, 62*
Andresen-Evans Co.:
Grab Bucket, New Form, 525*
Angle Bar (See Rail Joint)

Annual Reports (See also Names of Companies; also Financial); Review of 1910, 1245*
Apprentice (See Employee)
Arbitration (See Employee)
Arch (See Bridge)
Ash Pan (See Locomotive Firebox)
Association of Railway Electrical Engineers:
Annual Convention, 590
Convention, 663
Association of Transportation and Car Accounting Officers:
Report Fair Rentals for Passenger Cars, 578*
Semi-Annual Meeting, 1187
Atlanta, Birmingham & Atlantic:
Mikado Locomotive, 282*
Atchison, Topeka & Santa Fe:
Annual Report, 616†, 677
Atlantic Type Locomotives, 1189*
Converted Automobile Motor Car, 468*
Fair Attitude Towards the Public, 1107
Land Show at Chicago, 1119
Red Ball System of Handling Freight, 365
Tool Room Practice, 238, 873*
Train Resistance Experiments, 354
Western Air Dump Cars, 604*
Atlantic Coast Line:
Self-Dumping Ashpan, 218*
Steel Underframe Passenger Cars, 338*
Auditing (See Accounting)
Austria-Hungary:
Transportation and Traffic, 797
Autogenous Welding (See Welding)
Automatic Stops (See Safety Appliances)
Automobile:
Football at New Haven and the Automobile, 1103†, 1111
Automobile & Accessories Mfg. Co.:
Norwood Vehicle Castor, 178*
Axles:
Heat Treatment, 916†
Improved Steel Axle, 268*

B

Baldwin Locomotive Works:
Atlantic Type Locomotives; Atchison, Topeka & Santa Fe, 1189*
Converted Mallet Locomotives; Chicago Great Western, 867*
Mikado Locomotive for the Atlanta, Birmingham & Atlantic, 282*
Pacific Type Locomotive; Central Railroad of Brazil, 795*
Baltimore & Ohio:
Annual Report, 775†, 815
Freight House at Frederick, Md., 1194*
Baltimore & Ohio Southwestern:
Installation of Block Signals, 300†
Bascule (See Bridge)
Bearing (See Shop Kinks)
Belt (See also Shop Kinks):
Maintenance of Leather Belting, 846*
Berlin (See City and Belt Railroad)
Bills of Lading:
Cotton Bills of Lading, 119, 175, 179†, 200, 367, 523, 554, 878
Blacksmith Tools, 420*
Block (See Signal, Block)
Blue Island Car & Equipment Co.:
Car Repair Fraud (See also Illinois Central, 1085)
Blueprint:
Trimming Table, 604*
Boiler (See Locomotive Boiler)
Bolt (See Rail Joint)
Boston & Albany:
Electrification Estimates, 930
Boston & Maine:
Annual Report, 684†
Electric Locomotives in the Hoosac Tunnel, 549
Milk Rate, 257, 527†, 878
New Hampshire Legislature, Relations with Boston & Maine, 801
President Tuttle, Retirement, 529†
Brake (See also Coupling; also Hose; also Safety Appliances; also Shop Kinks):
High Speed Brake Beams, 337
Bridge (See also American Railway Bridge and Building Association; also Grade Separation):
Concrete Work on the Northern Pacific, 1147*
Contract for Siamese Bridge, 78
Double Track Truss Bridge with Suspended Tracks, 72*
Electrical Operation of Drawbridges, 917*
International Railway Congress Report, 280
Mission Bay Viaduct; Southern Pacific, 314*
Pecos River Viaduct, Southern Pacific, 693*
Pocatello, Idaho, Viaduct and Subway, 283*
Preserving Metal in Old Trestle, 448†, 461*
Quebec Bridge, 527†
Waterproofing of Bridge Floors, 212†

Brooklyn Rapid Transit:
Annual Report, 346†, 379
Discipline of Employees, 1119
Increase of Wages, 1087, 1119
Brown, Joseph M.:
Painting of Steel Cars, 146
Buckwalter, T. V.:
Buckwalter Electric Baggage Trucks, 892*
Bu-a Co.:
Inspection Car, 210*
Buffalo, Rochester & Eastern:
Hearing Before New York Public Service Commission, 563, 587, 1123
Buffalo, Rochester & Pittsburgh:
Annual Report, 347†, 377
Bureau of Mines, 199
Bureau of Railway Economics, 177, 197, 256
Business Men's League of St. Louis:
Committee on Eastbound Rate Matters, 135
Business Situation (See Finance; also Railway Business Association)

C

Cable (See Wire)
Cambria Steel Works:
Plant, 316*
Canada:
Canadian Railway Situation, 180†
Canadian Pacific:
Car Wheel Foundry, 626†, 645*, 842†
Mallet Articulated Locomotive, 224†, 246*
Perry-Prentice Automatic Stop, 1158
Canadian Railway Club:
Chemistry of Iron Castings, 1051
Canton Culvert Co.:
Acme Culverts in South America, 1027
Capitalization (See Finance)
Car (See also Shop Kinks):
Air Dump Cars, 604*
All-Steel Business Cars, 840†
All-Steel Cars, Introduction of, 1117
Cars Built in 1910, 1218†
Cars Ordered in 1910, 1218†, 1257
Chair Car, C. B. & O., 157*
Cleaning (See Sanitation)
Combination Buffet, Baggage and Mail Car, 460*
Composite Gondola Car; Gilmore & Pittsburgh, 499*
Door (See Door)
Gasolene (See Motor Car)
Gondola, C. M. & St. P., 185*
Illinois Central Car Repair Frauds (See Illinois Central)
Inspection (See Motor Car)
Interchange (See Car Service)
Journal (See Bearings)
Lighting (See Lighting)
Machine Car; North Coast Railroad, 312*
Motor (See Motor Car)
Painting of Steel Cars, 146
Perishable Freight, 220
Rail Motor (See Motor Car)
Standard Height of Drawbars, 1086
Steel for Freight and Passenger Cars, 189
Steel Car Department, 840†
Steel Frame Tank Cars, 108
Steel Tank Car, Chicago Steel Car Co., 116*
Steel Underframe Passenger Car; Atlantic Coast Line, 338*
Truck (See Truck)
Wheel (See Wheel)
Car, Freight:
C. M. & St. P. Gondola, 185*
Gilmore & Pittsburgh Composite Car, 499*
Steel in Freight Car Construction, 84*
Car, Passenger:
Atlantic Coast Line Steel Underframe, 338*
C. B. & O. Chair Car, 157*
N. Y. C. & H. R. Combination, 460*
Interior Finish of Passenger Cars, 430
Southern Pacific Lunch Counter Cars, 1085
Steam Auxiliaries for Passenger Service, 726†
Car Service (See also Interstate Commerce Commission Rulings):
Car Distribution, 112
Car Efficiency, 749
Car Surplus and Shortages Bi-Weekly Car Loading, 79
Demurrage on Private Cars, 667
Demurrage Bureaus, 467, 573†, 929
Efficiency Methods and Rates, 1035†, 1101†
Fair Rentals for Passenger Cars, 578*
Freight Car Balance and Performance Monthly, 136*
Freight Car Situation, 715, 1041
Junction Cards at Interchange Points, 450†
Marking Tare on Cars, 453*
Redball Freight on A. T. & S. F., 365
Rules of Interchange, 493
Switching Advances to Shippers, 1090
Switching Rate Agreement at Chicago, 698, 979

GENERAL INDEX—Continued.

[Illustrated articles are indicated thus*; Editorials thus†; Letters to Editor thus‡.]

Engineering and Maintenance of Way Association (See Am. Ry. Eng. and Maintenance of Way Association)
 Engine House (See Shops)
 England:
 British Railway Contributions to Benevolent Objects, 771†
 Transportation and Traffic in, 996, 1045, 1267
 Exports and Imports:
 Trade of the United States in 1910
 Exhibits (See names and subjects)
 Exposition (See names and subjects)
 Express (See names of companies; also Earnings; also Interstate Commerce Commission Rulings; also State Commission Rulings):

F

Fare (See Passenger Rates)
 Fast Trains and Runs:
 Michigan Central Run for the Brotherhood of Locomotive Engineers, 287
 Jersey City to Washington, 1193
 Federal Bureau of Mines, 164
 Filing (See Mail)
 Finance (See also Accounting; also Commission on the Issuance of Railway Securities):
 Bond Market, 15, 487
 Capital and Capitalization, 732, 778, 1178‡
 Changes in Railway Ownership and Control, 1242
 Co-operation Between Government and the Railways, 981
 Dividend Changes in 1910
 Federal Regulation of Securities, 931
 Foreign Market, 991†
 L. C. C. Orders for Detail Figures for Capitalization, Operation and Maintenance, 911†
 Receiverships and Foreclosure Sales, 1123†
 President Ripley on Railway Capitalization, 588, 883
 Securities Issued in 1910, 1248
 Voluminous Annual Reports, 1120
 Wider Diffusion of Railway Securities, 179†, 345†, 828†
 Yale Investments, 681†

Fire:
 Effect of Fire on Concrete, 877
 Forest Fire Losses, 802
 Losses by Fire in October, 929
 Protection for Wooden Bridges, 1015
 Firebox (See Locomotive Firebox)
 Flange (See Wheel)
 Forest Preservation (See Fire)
 Forgings (See Iron and Steel)
 Foundry (See Shops)
 Flood (See Maintenance of Way)
 Florida East Coast:
 Storm at Key West, 1119
 Forbes, John M.:
 Relations With the Michigan Central, 1039, 1188
 Fort Wayne & Wabash Valley:
 Collision, 563, 566†
 Freight (See American Assoc. of Local Freight Agents' Assoc.; also Car Service):
 Tracing Shipments, 927
 Freight (Lumps See Lumps)
 Freight (Lump Association)
 Annual Meeting, 126
 Freight Rates (See also Freight Rate Reductions; also Freight Rate Increases; also Interstate Commerce Commission Rulings; also State Commission Rulings):
 Differentials at St. Louis, 94
 Making Rates for a New Railway, 1154
 Missouri River Rates, 48
 New Theory of Reasonable Rates, 384
 President Ripley on Railway Capitalization and Rates, 883
 "Up Rates" Allowances, 588, 715, 887†
 Freight Methods, also Interstate Commerce Commission Rulings; also State Commission Rulings):
 Analysis of the Cost of Operation, 1101†, 1108, 1115†
 A. T. & S. F. Fair Attitude, 1107
 Central Freight Association, 17
 Coal, 874, 1036, 1094, 1132, 1136, 1127
 Coal Engaged for Eastern Shoppers, 443
 Dividend Responsibility for Railway Management, 772†
 Eastern Hearings, 300†, 480, 517, 552, 715, 752, 991†, 1026, 1035†, 1052†, 1085, 1089, 1099, 1101, 1136†
 Efficiency Methods and Rates, 1043†
 Freight Rate Advances:
 Efficiency Versus Prices, 682†
 Grain and Meats, 909†, 937
 Illinois Manufacturers' Association and Western Freight Rate Hearing, 489†, 540, 567†, 614†, 1131†
 Live Stock and Packing House Products, 48
 Lumber from Portland to San Francisco, 592

President McCrea on Railway Finances, 739
 Misrepresentation of Railway Affairs, 1102†
 Misstatements in regard to Earnings, 325
 Ohio Increases Postponed, 803
 Paddling Expense Accounts, 297
 Pennsylvania, 292
 Railway Business Association Addresses, 992†
 Smalley on the Question of "Should Railway Rates be Increased?" 725†
 Wages, Prices and Freight Rates, 466*
 Western Hearing (See also Ill. Cent. Mfg. Assoc. above) 64†, 291, 435, 443, 475, 485, 554, 563, 594, 603, 666, 813
 Western Hearing:
 Governor Stubbs' Testimony, 827†
 Freight Rate Reductions (See also Interstate Commerce Commission Rulings; also State Commission Rulings):
 Back Haul Tariffs Suspended, 289
 Citrus Fruits, 664
 Fruit from Towns in Georgia, 135
 Milk, 577, 527†, 552, 878
 Minnesota, 563, 565†
 Morgan Line, 527
 Tonopah & Tidewater, 1275
 White Pass & Yukon, 552
 Freight Traffic (See Traffic)
 Freight Yards (See Yards and Terminals)
 Fuel (See also International Ry. Fuel Assoc.; also Coal):
 Locomotive Fuel Economy, 224†

G

Gage:
 Klinger Type Self-Adjusting Reflex Water Gage, 676
 Galena Signal Oil Co.:
 Galena Safety Oil "B," 716
 Gage (See also Machine Tools)
 Gantry (See Hoisting and Conveying)
 Gardner, William A., 784*
 Gasolene Car (See Motor Car)
 Gas (See Fuel; also Lighting)
 General Electric Co.:
 Demurrage on Private Cars, 667
 Electrification of C & O. Shops; Huntington, W. Va., 267*
 Germany (See also subjects and names of railways):
 Electric Railways, 545*
 Five Years' Development of German Railways, 1150*
 Gilmore & Pittsburgh:
 Composite Gondola Car, 499*
 Gould Coupler Co.:
 Improved Steel Axle, 268*
 Government Ownership:
 Austria and Ireland, 299†
 Government Regulation (See also Interstate Commerce Commission; also State Railway Commissions):
 Attorney General Wickersham on, 48
 Connecticut New Commission, 951†
 Effect on Stockholder, 565†
 Inconsistent Federal Regulation, 150†
 Interest on the Money Invested, 527†
 President Taft's Message, 1110
 Railway Outlook, 272†
 Valuation of Railways, 567†
 Private and Public Elements of Railways, 212†
 Grade Revision (See Construction, New)
 Grade Separation:
 Clearances, 309
 Grain (See Crop Conditions; also Freight Rates; also Interstate Commerce Commission Rulings; also State Commission Rulings)
 Grand Trunk:
 Canadian Railway Situation, 180†
 Collision at Durand, Mich., 431
 In New England, 1148†
 Great Britain (See England; also names of railways)
 Great Northern:
 Annual Report, 1037†
 Minnesota Freight Rate Reductions, 563, 565†
 Grinding (See Machine Tools; also Shop Kinks)

H

Hamd Co. (See Car)
 Hanna Engineering Works:
 Pneumatic Riveter, 270*
 Harbison, James I., 1186*
 Harbin & Hailuoguo Railway Corporation:
 New Car Shop, 893*
 Harriman Lines (See also separate companies):
 North Coast Lumber Co., 1043†
 Headlight (See Lighting)
 Heating:
 Hot Water Boilers for Heating Passenger Cars, 841*
 Hicks Locomotive & Car Works:
 Steel Underframe Passenger Car, Atlantic Coast Line, 128*

Highway Crossing (See Grade Crossing)
 Hill, James J.:
 On the Outlook, 1086
 Hill, W. H.:
 Steel Tie Fastener, 1134*
 History (See subjects and names)
 Hooking Valley:
 Annual Report, 956†, 1033†
 Hoisting and Conveying:
 Air-Electric Hoist for Lonsda Valley Shops at Sayre, Pa., 870*
 Air Rail Loader, 218*
 Car-Traversing Ballast Loader, 743*
 Cyclone Chain Hoist, 1100*
 Freight Derrick, 59*
 Grab Bucket, New Form, 525*
 Mechanical Transference of Water-Borne Freight, 71
 Removing Trucks from Heavy Passenger Cars, 840†
 Unloading Coal with Ballast Spreader, 799
 Holland:
 Transportation and Traffic, 190
 Honorary Degree to Railway Men, 6*
 Hose (See also Shop Kinks):
 Non-Freezing Air-Brake Hose, 396
 Hostility (See Public, The Railways' Relations with)
 Hours of Labor (See Employee)
 Hudson & Manhattan:
 Proposal to Operate Tri-Borough Subway, 515, 1016, 1020
 Hughitt, Marvin, 783*, 958†
 Hydraulic (See Shop Kinks)

I

Idaho & Washington Northern:
 Description, 959*
 Illinois:
 Railway Education in Illinois, 962
 Illinois Central:
 Annual Report, 615*†
 Car Repair Frauds, 92, 365, 431, 473, 488†, 512, 527†, 661, 702, 750, 1085
 Profits of American Railways, 6
 Suit Against the Directors, 1118
 Illinois Manufacturers' Assoc. (See also Freight Rate Increases):
 Valuation of Railways, 566†
 Illinois Traction:
 Collision at Staunton, Ill., 662
 Indiana:
 Railway Convention, 969
 Refusal to Carry Drunken Passengers, 109†
 Indianapolis Switch & Frog Co.:
 R-N-R Manganese Frog, 524*
 Indiana Union Traction:
 Collision near Tipton, Ind., 589, 614†
 Injunction (See Legal Decisions)
 Ingersoll-Rand Co.:
 History of the Rock Drill, 59
 Inspection Car (See Motor Car)
 Institution of Mechanical Engineers:
 English Engine House Practice, 841†
 Insulation (See Refrigeration)
 Interborough Rapid Transit:
 Attitude Towards the Public, 1173†
 Subway Bids, 140*
 Third Tracks, 1158
 Interchange (See Car Service)
 Interlocking (See Signals, Interlocking)
 International & Great Northern:
 Unsecured Claims, 471
 International Railway Master Blacksmiths' Association:
 Convention, 394†, 420*, 636
 International Railway Congress:
 Berne Congress Proceedings, 186, 279
 Reports on Tunnel Construction, 220
 Reports on Improvements in Locomotive Boilers, 220
 Reports on Perishable Freight, 220
 International Railway General Foremen's Association:
 Convention, 13†
 Inter Ocean Steel Co.:
 Steel Tire, 99†
 Interstate Commerce Commission (See also Interstate Commerce Law; also Accounting; also Freight Rates Increases):
 Appointments, 1136†
 Attitude Towards Railways, 46
 Accident Billings, 776, 923
 Added Authority Given by the New Law, etc.
 Annual Report, 1264
 Attorney, 884, 981
 Commerce Court, 116*
 Detail Figures for Operators and Main Tenants, 941†
 Ex-Like Rate Hearings, 1200
 General Conference, 613†
 Impossible Task, 531†
 Joint Control of International Freight and Passenger Rates, 1127
 Long and Short Haul Clause, 681†, 981, 1089
 Overloaded with Work, 879
 Questions in regard to Capitalization, 911†

[Illustrated articles are indicated thus*; Editorials thus†; Letters to Editor thus‡.]

Passenger Rate Reduction (See also Interstate
 Commerce Commission Rulings; also State
 Commission Rulings):
 Pullman Rates, 976, 1102†, 1122, 1123, 1157
 Passenger Traffic:
 Discontinuance of a Train, 951†, 982
 Football at New Haven, 1103†, 1110
 Collection of Old Railway Passes, 1272
 Pay (See Employee)
 Pearson-Farquhar Syndicate:
 Sale of Securities, 211†
 Pease, C. F., Co.:
 Blueprint Trimming Table, 604*
 Pennsylvania Railroad:
 Boiler Shop at Renova, Pa., 871*
 Capitalization, 739
 Employee Wage Increases, 143
 Engine House Practice, 244*
 New Time-Table, 1014, 1087
 Passenger Tariffs to Its New Station in New
 York, 883
 Premiums to Trackmen for 1910, 588
 Relief Department, 256
 Self-Cleaning Front Ends, 124*
 Shareholders, 1086
 Station at New York, 255
 Submarine Cables, 676
 Telegraph School, 701
 Station in New York, 1087
 Pension (See Employee)
 Pere Marquette:
 Annual Report, 683†, 717
 Permanent Way (See Maintenance of Way)
 Philippine Railway:
 Construction of, 579*
 Piece Work (See Employee)
 Pilliod Co.:
 Baker-Pilliod Valve Gear, 1210*
 Pipe (See Also Hose and Shop Kinks):
 Dirt Cautions and Flanges, 178*
 Gasless Flange Unions, 989*
 Swing Union, 337*
 Pit (See Shops)
 Pneumatic Tools (See Machine Tools; also Shop
 Kinks)
 Poor's Manual for 1910, 460
 President Taft's Message, 1110
 Price (See Business Situation)
 Proprietary Devices:

Proprietary Devices: 413
 Descriptions of, in a Journal of a National
 Association of Railway Officers, 613f.
 725f.
 Prosperity (See Business Situation)
 Public Documents:
 How to Get Public Documents, 196
 Public, Railways' Relations with (See Finance)
 A. T. & S. F. Fair Attitude, 1107
 Cooperation Between Government and the
 Railways, 981
 Election and the Railways, 953f.
 Enlightening (?) the Public, 1494
 How to Avoid Difficulties in the Railway Situa-
 tion, 931
 Inter-Board Notes on the Railways, 449f.
 Interborough Rapid Transit, 1173f.
 Making Formal Complaints, 771f.
 Management of the Railways, 1021
 National Railways, 444-453, 484-451f.
 New York and New Jersey, 445-453, 484-451f.

Public's Investment in Railways, 748
"Railroad Day" at Denver, 366
Addresses,

Railway Company v. The M.I. Co., 126
Railway Owner and Railway User, 744
Stulwell's, A. E., Plans, 931
Stockholder Behind the Corporation, 565
The American National Bank v. The Service,
101

Reductions in Rates, 137, 11024, 11025, 11026
 Union Pacific, 11026, 11027, 11028
 Interstate Commerce Commission, 11026, 11027, 11028
 537

Q

Quinn, J. M., 11027
 Quinlan, J. M., 11027, 11028, 11029, 11030, 11031, 11032, 11033, 11034, 11035, 11036, 11037, 11038, 11039, 11040, 11041, 11042, 11043, 11044, 11045, 11046, 11047, 11048, 11049, 11050, 11051, 11052, 11053, 11054, 11055, 11056, 11057, 11058, 11059, 11060, 11061, 11062, 11063, 11064, 11065, 11066, 11067, 11068, 11069, 11070, 11071, 11072, 11073, 11074, 11075, 11076, 11077, 11078, 11079, 11080, 11081, 11082, 11083, 11084, 11085, 11086, 11087, 11088, 11089, 11090, 11091, 11092, 11093, 11094, 11095, 11096, 11097, 11098, 11099, 11100, 11101, 11102, 11103, 11104, 11105, 11106, 11107, 11108, 11109, 11110, 11111, 11112, 11113, 11114, 11115, 11116, 11117, 11118, 11119, 11120, 11121, 11122, 11123, 11124, 11125, 11126, 11127, 11128, 11129, 11130, 11131, 11132, 11133, 11134, 11135, 11136, 11137, 11138, 11139, 11140, 11141, 11142, 11143, 11144, 11145, 11146, 11147, 11148, 11149, 11150, 11151, 11152, 11153, 11154, 11155, 11156, 11157, 11158, 11159, 11160, 11161, 11162, 11163, 11164, 11165, 11166, 11167, 11168, 11169, 11170, 11171, 11172, 11173, 11174, 11175, 11176, 11177, 11178, 11179, 11180, 11181, 11182, 11183, 11184, 11185, 11186, 11187, 11188, 11189, 11190, 11191, 11192, 11193, 11194, 11195, 11196, 11197, 11198, 11199, 11200, 11201, 11202, 11203, 11204, 11205, 11206, 11207, 11208, 11209, 11210, 11211, 11212, 11213, 11214, 11215, 11216, 11217, 11218, 11219, 11220, 11221, 11222, 11223, 11224, 11225, 11226, 11227, 11228, 11229, 11230, 11231, 11232, 11233, 11234, 11235, 11236, 11237, 11238, 11239, 11240, 11241, 11242, 11243, 11244, 11245, 11246, 11247, 11248, 11249, 11250, 11251, 11252, 11253, 11254, 11255, 11256, 11257, 11258, 11259, 11260, 11261, 11262, 11263, 11264, 11265, 11266, 11267, 11268, 11269, 11270, 11271, 11272, 11273, 11274, 11275, 11276, 11277, 11278, 11279, 11280, 11281, 11282, 11283, 11284, 11285, 11286, 11287, 11288, 11289, 11290, 11291, 11292, 11293, 11294, 11295, 11296, 11297, 11298, 11299, 11300, 11301, 11302, 11303, 11304, 11305, 11306, 11307, 11308, 11309, 11310, 11311, 11312, 11313, 11314, 11315, 11316, 11317, 11318, 11319, 11320, 11321, 11322, 11323, 11324, 11325, 11326, 11327, 11328, 11329, 11330, 11331, 11332, 11333, 11334, 11335, 11336, 11337, 11338, 11339, 11340, 11341, 11342, 11343, 11344, 11345, 11346, 11347, 11348, 11349, 11350, 11351, 11352, 11353, 11354, 11355, 11356, 11357, 11358, 11359, 11360, 11361, 11362, 11363, 11364, 11365, 11366, 11367, 11368, 11369, 11370, 11371, 11372, 11373, 11374, 11375, 11376, 11377, 11378, 11379, 11380, 11381, 11382, 11383, 11384, 11385, 11386, 11387, 11388, 11389, 11390, 11391, 11392, 11393, 11394, 11395, 11396, 11397, 11398, 11399, 11400, 11401, 11402, 11403, 11404, 11405, 11406, 11407, 11408, 11409, 11410, 11411, 11412, 11413, 11414, 11415, 11416, 11417, 11418, 11419, 11420, 11421, 11422, 11423, 11424, 11425, 11426, 11427, 11428, 11429, 11430, 11431, 11432, 11433, 11434, 11435, 11436, 11437, 11438, 11439, 11440, 11441, 11442, 11443, 11444, 11445, 11446, 11447, 11448, 11449, 11450, 11451, 11452, 11453, 11454, 11455, 11456, 11457, 11458, 11459, 11460, 11461, 11462, 11463, 11464, 11465, 11466, 11467, 11468, 11469, 11470, 11471, 11472, 11473, 11474, 11475, 11476, 11477, 11478, 11479, 11480, 11481, 11482, 11483, 11484, 11485, 11486, 11487, 11488, 11489, 11490, 11491, 11492, 11493, 11494, 11495, 11496, 11497, 11498, 11499, 11500, 11501, 11502, 11503, 11504, 11505, 11506, 11507, 11508, 11509, 11510, 11511, 11512, 11513, 11514, 11515, 11516, 11517, 11518, 11519, 11520, 11521, 11522, 11523, 11524, 11525, 11526, 11527, 11528, 11529, 11530, 11531, 11532, 11533, 11534, 11535, 11536, 11537, 11538, 11539, 11540, 11541, 11542, 11543, 11544, 11545, 11546, 11547, 11548, 11549, 11550, 11551, 11552, 11553, 11554, 11555, 11556, 11557, 11558, 11559, 11560, 11561, 11562, 11563, 11564, 11565, 11566, 11567, 11568, 11569, 11570, 11571, 11572, 11573, 11574, 11575, 11576, 11577, 11578, 11579, 11580, 11581, 11582, 11583, 11584, 11585, 11586, 11587, 11588, 11589, 11590, 11591, 115

Railway Automobile Mail Service Co.
Automatic Mail Catcher, 267
Railway Bureau Association
Dinner, 99, 1, 100
Railway Commission (See State Railway Commission)
Railway Commission of Canada
Joint Control of International Freight and Passenger Rates, 147
Railway Pictorial, 97
Railway Signal Association
Annual Meeting, 513, 7, 50, 734
Descriptions of Proprietary Devices, 613, 7, 59
Early Days, 716
Railway Telegraph Superintendents
Annual Convention, 69
Railway Tool Technicians
Convention, 37
Rate Law (See Interstate Commerce Law)
Reinforced Concrete (See Concrete)
Reports, Annual (See Annual Reports, also by Committee, also Names of Companies)
Retirements, 63
River (See Waterways)
Riveter (See Machine Tools, also Shop Kinks)
Review of 1910, 1234
Roadbed (See Maintenance of Ways)
Roadmasters' and Maintenance of Way Association
Annual Convention, 540
Rochester Boring Machine Co.
Horizontal Boring Machine, 896
Roofing
Corrugated Iron Roof, 486
Roosevelt, Theodore
Megalomaniac, 952
Rotterdam-The Hague-Scheveningen Railway, 82
Roundhouse (See Shops)
Rules (See Employees)
Russia
Costly Government Railways, 70
Transportation and Traffic, 114

S

St. Louis & San Francisco
Annual Report, 829, 97, 906
Mallet Articulated Locomotive, 1144
Traffic Agreement with Harriman Lines, 518
Traffic Interchange with the National Railways of Mexico, 978
St. Louis Terminal Controversy, 48, 303
St. Louis Terminal Railroad (See Terminal Railroad Association of St. Louis)
Safety Appliances
Exposition of Safety Devices, 1084
Perry Prentice Automatic Stop, 1158
Safety Appliance Law, 343, 356
Action by Railway, 728
Conference on, 618
Car Clearance, 1149
Interstate Commerce Commission Order, 682, 7, 748
Interstate Commerce Commission Standards, 910, 1038
Safety Car Heating & Lighting Co.
Electric Fixture, 526
Salt Lake
Water Level, 1015
Sanitation
Coach Cleaning, 628
Duplex Stationary Vacuum Cleaner, 891
Salary (See Employees)
Sault Ste. Marie Canals
Traffic in July, 1910, 328
School (See Education; also Names)
Screw Spikes (See Maintenance of Ways)
Section Car (See Car; also Motor Car)
Securities Commission
Confers with Railway Presidents, 662
Securities Issued in 1910, 1248
Semaphore (See Signal)
Shear (See Machine Tools)
Shed (See Station)
Shipper (See Car Service)
Shippers' Association
Function of, 664
Shops (See also Machine Tools)
Brewster Shops of the Wheeling & Lake Erie, 34
Cambria Steel Company Works, 316
Canadian Pacific Car Wheel Foundry
Practice, 645, 842
Car Repair Shop Notes, New York Central & Hudson River at East Buffalo, 231
Car Wheel Foundry Methods, 626
Drop Pig for Engine House, 1082
Economics, 991
Efficiency Methods and Rates, 241, 1101, 1052
Electric Driving of Machine Tools, 643
Electrification of Chesapeake & Ohio Shops, Huntington, West Virginia, 267
Engine House Kinks, 626
English Engine House Practice, 844
Harlan & Hollingsworth New Car Shop, 893
Heating System, 444
How the Foreman Can Promote Shop Efficiency, 15
Increasing Shop Output, 625
Lehigh Valley, at SAULT, Pa., 870
Locomotives and Car Shops of the National Trans-Continental, 154
Locomotives Replaced in Road Running
June, 429
Machine Co. North East Railroad, 417
Office of the Road Locomotive at Sault, 866
Operation and Organization of the East Atlantic Engine House, 347
Pennsylvania Railroad at Reading, Pa., 217
Selection and Maintenance of Machine Tools, 1033
Smith Shop Tools, 896
Steel Car Department, 810
Union Pacific Locomotive Shop, Omaha, Neb., 1084
Shop Kinks (See also Hoisting and Conveying)
Shop Kinks, 13, 17, 157, 391, 602, 656, 885, 1059
Adjustable Boring Tool, 30
Air Brake Hose Clamp, 659
Air Hammer for Driving Out Bolts, 631
Air Hammer, Long Stroke, 656
Air-Operated Press, 402
Air Pump Hoist, 632
Air Pump Valve and Seat, Manufacture of, 225
Back Facing Tool, 658
Belmont, 600
Bending Brake Hangers, 1059
Bending Main Rod Straps, 1060
Bending S-Hooks, 1062
Bending Staples, 1060
Bending Tandem Drawbar Yokes, 1059
Gracksmith Tools, 420
Blade Bender, 409
Road Showing the Condition of Engines, 634
Boiler Check Reamer, 658
Boiler Testing, 635
Bolt Driver, 398
Bolt Wagon, 227
Bolts, Cart Used in the Manufacture of, 228
Boring Bar, 407
Boring Bar for Bell Frames, 229
Boring Cylinders and Cylinder Bushings, 1076
Boring Head for Drill, 399
Boring and Turning Tool, 408
Boyer Speed Recorders, Testing, 25
Brake Beam Hanger, 865
Brake on Boring Mill, 31
Brake Rigger, Rack for Driver, 227
Bull Ring, Removing, from Piston Spider, 26
Car Department Competition, 1049
Car Draw Truck, 234
Cart for Handling Bar Iron, 234
Cart for Transporting Long Material, 633
Car Wheel Presses, Hand, 399
Castle Nut Dies, 1060
Changing Piston Rod and Valve Stem Packing, 637
Check Valves, Device for Reseating, 409
C. & N. W., 21
Chip Box, 1075
Chucks for Drilling and Reaming Bushings, 398
Chuck, Driving Box Brass, 397
Chuck for Milling Reamers, 30
Chucks for Planing Cylinders, 397
Chuck for Truck Pedestals, 227
Chuck for Turning Switch Stand Stems, 399
Cinder Cart, 635
Clamping Press, 1065
Cleaning Interior Coach Fittings, 1064
Clinker Bar Handles, Bending, 24
Coal Gate Hook Former, 657
Collar Eye Bolt, 865
Competition
Car Repair Kinks, 223, 625, 839, 1049
"Care and Selection of Machine Tools and Shop Equipment," 223, 394, 625, 839, 844, 1053
Engine House Kink Competition, 223, 625
General Shop Kink Competition, 839, 1049
"How a Foreman Can Promote Shop Efficiency," 394, 413
"Locomotive Shop Output," 13, 626, 627, 839, 1049
Contact Shoe Dies, 858
Crack Glass Manufacture, 1065
Crane Facilities, 236
Crate for Handling Boiler Tubes, 1079
Crosshead Shoes, Rabbeting, 629
Cutter Head for Drilling, 399
Cutting Heavy Iron, 228
Cylinder Cock Top Piece, 865
Cylinder Head Dogs, 855
Cylinder Head Truck, 410
Cylinder and Reservoir Windless, 409
Cylinder Saddle Bolt Holes, 227
Depth Gauge for Center and Side-Bearing, 410
Detachable Reamer, 659
Dies for Bending Coal Car Hopper Carriers
Irons, 1061
Dies for Piston Swab Holders, 631
Dies for Sill Step Bending, 657
Dies for Stamping Press, 23
Dinner Rack, 1063
Dope Truck, 236
Dress Turning and Counterboring Tools, 368
Drill Guide, 856
Drill Head, 399
Drill Press for Car Shop, 400
Drilling Angle Gun Cutter, 406
Drilling Tool, 400
Drilling Hole in the Piston Rod, 400
Drilling Journal Boxes, 1066
Drilling in a Ring Box, 400
Drilling Box Cutter, 400
Driver Brake Rigger, 865
Driving Out Broken Bolts, 633
Dynamic Springs, Reaming and Turning, 632
Driving Wheel, Checking Location of, on Axle, 25
Dyeing Plush Seats, 1064
Dyeing Blade and Locomotive, 865
Eccentric Cam Chuck, 859
Eccentric Chuck, 400
Eccentric Mandrel, 400
Eccentric Mandrel, 405
Eccentric Strap Chucks, 855
Engine Frame, Repairing, 230
Expansion Chuck, 858
Flanging Attachment for Shears, 404
Flue Cutter, 24, 404
Flue Cutter, 407
Flue Handling, 863
Forging Die, 864
Gasket Punch, 1073
Gas Tank, Portable, 1066
Glue Pot, 1065
Grate Trunion Bar Head, 866
Grease Molding for Driving Box Cells, 631
Grinder for Milling Cutters, 230
Gang Tool for Milling, 403
Gasket Cutter, 411, 630
Hack Saw, Portable, 631
Handle Gauge, 410
Handling Cylinders, 1077
Handling Small Stock, 1076
Handling Steel Cars, 1078
Hoist for Car Wheel and Axle, 406
Hydraulic Press, Portable, 401
Hydraulic Testing Pump, Portable, 401
Indicator of Wear on Crank Pins, 30
Injector Water Nuts, Milling Grooves in, 631
Insulating Pin Dies, 865
Jack Buggy, 657
Jack for Pedestal Braces, 1079
Jack for Wheel and Axle, 407
Journal Packing, Cleaning, 236
Jack Valve Facer, 658
Keyway Slotting Tool, 30
Lathes, End Tools for, 229
Lining Up Guides, 29
Link Bushing Mandrel, 408
Link Planer and Grinder, Cockfield & Howe, 656
Locking Valves, 633
Locomotive Frame Truck, 1077
Lye Vat, 1079
Machine Forgings, 1062
Machining a Grate Bearer Cross-Tie, 1073
Molding Grease for Rod Cups, 411
Molding Machine, Guard on, 236
Oil Bearer, 407
Oil Cellar Boring Chuck, 406
Oil Crucible Furnace, 862
Oil Tank for Spring Shop, 238
Old Man for Boiler Shop, 405
Packing Ring Expander, 412
Packing Rings for 90 Inch Air Pump, 21
Paint Shop Balcony, 1062
Passenger Car Repair Board, 1066
Piston Extractor, 410
Piston Ring Tools, 26
Piston Rod Oil Heater, 1071
Piston Valve Kinks, 27
Piston and Valve Rod Packing, 860
Piston Vibrating Cups and Packing Rings, 1073
Planing Crosshead Shoes, 1068
Planing and Drilling Eccentrics, 1068
Planing Shoes and Wedges, 1067
Pneumatic Hammer, 408
Pneumatic Lathe for Chasing Follower
Bolts, 26
Punching Dies for Brake Rod Ends, 1061
Reaming Guide Bolt Holes, 29
Rivet Force, Portable, 1079
Rivet Heating Furnace, 234
Rod Brass Chuck, 27
Rod Bushing Reamer, 402
Running Boards, Stamping Steel, 228
Safety Chain Hanger, 865
Sand Box Repairing, 629
Sash Rack, 1063
Scaffold Bracket, 866
Setting Tires, 632
Shaper Chuck, 859
Shaper Radial Chuck, 397
Shoe and Wedge Chuck, 858
Shop Window Cleaning, 410
Slab Milling Machine Cutters, 24
Slotter Bar, 858
Slotter or Lathe Brake, 405
Spring Hanger, Crib Dies, 1061
Stack Crane, 408
Staybolt Breaker, 1080
Staybolt Breaker, Pneumatic, 859
Staybolt Chuck, 411
Staybolt Sleeve Cap, Flexible, 865
Steel Rim on a Driving Wheel Lathe, 860
Step Brackets for Putting Up Binders, 30
Stud Wrench, 408
Template for Drilling Hub Plates, 404

[Illustrated articles are indicated thus*; Editorials thus†; Letters to Editor thus‡.]

- **Bituminous Coal Rate Increased, 1993, 1126**
- **Bituminous Lignite Rate Reductions, 413**
- **Boxcar Annual Report, 136**
- **Freight Rates, General and Special Rates, 93**
- **Grain Rates, Low Price Factors, 294**
- **Interstate Message Book on Lumber, 95**

283*
 Surplus Tests (See Employees, Discipline)
 Surveying:
 Remaining Car Track Centers, 194
 Switch (See also Signal, Interlocking):
 Numbers on Switch Logs²⁸, 1130*
 Switching Allowances to Shippers, 1090
 Switzerland:
 Transportation and Traffic in, 585

Tablet Exchanger, 501*
Tank (See Water Service)
Tap Line:
 Division Freight Rates Abolished, 447*
 Grievance, 436
Tarpaulin (See also Lumber Rates, also Passenger Rates):
 Growth of the Expense of Propelling Earths, 111*
Taxation (See also Legal Documents):
 Post Office, Railway Earnings, and Taxes, 115*
Telegraph (See also Assoc. of Ry. Tel. Supts., also Operators, also Wires):
 Telegraph Operator (See Employees)
Telephone (See also Train Despatching):
 Pay for Use of Telephone, 128*
 Standard List of Railway Telephone Agreement, 163
 Telephone (See Handling and Conveying)
 Telephone and News and Telegrams

Tests: Limit of Elasticity, 1011*
Tests for Color Sense, 973*, 1138†
Testing Department: Control of the Testing Department, 536†, 537
Texas: Earnings and Expenses of Railways, 517
Texas Central: Present of a Month's Salary to Employees, 164
Texas & Pacific: Station at Grand Prairie, 459*
Ticket (See Passenger Rates)
Reporting Revenue on Exchange Ticket Orders, 834‡, 958‡
Ties and Timber (See also Fire; also Lumber): Crude Oil Treatment, 305
Rail Fastenings and the Life of Ties, 216
Tie Fastener (See Maintenance of Way)
Tie Plate (See Maintenance of Way)
Ties and Timber: Eucalyptus Obliqua, 1193
Preservation of Wood, 456, 507
Tests of Timber Beams, 92
Tire (See Wheel)
Titanium (See Rail)
Toledo & Ohio Central (See Hocking Valley)
Tonnage Record, 971*
Tool (See Machine Tools): Case of Pneumatic Tools, 238
Tool Holder: Lang Tool Holder, 898*
Tool Room Check System, 224†
Track (See Maintenance of Way; also Construction, New): Ballast in Track Design, 384†
Double-Track Railways in Alabama and Florida, 922*
Double-Track Railways in Delaware, Maryland and the District of Columbia, 79*
Double-Track Railways in Georgia and Florida, 797*
Double-Track Railways in Illinois, 1011*
Double-Track Railways in Indiana, 216*
Double-Track Railways in Iowa, 1150*
Double-Track Railways in Kentucky, 498*, 747
Double-Track Railways in Michigan, 280*
Double-Track Railway in Mississippi, 922*
Double-Track Railways in North Carolina, 543
Double Track in Ohio, 162*
Double Track in South Carolina, 455*
Double-Track Railways in Tennessee, 747*
Double-Track Railways in Virginia, 310*
Double-Track Railways in West Virginia, 747
Double-Track Railways in Wisconsin, 972*
Locating the Point of Frog, 511*, 1106†
Reunning Curve Track Centers, 194
Strengthening of Track; International Railway Congress Report, 189
Track Bolt (See Rail Joint)
Track Construction (See Grade Separation)
Track Supply Association: Organization, 562
Tractive Power (See Locomotive Performance)
Trade Unions (See Employee)
Traffic (See also Freight Traffic; also Passenger Traffic; also Business Situation)
Train (See also Schedule; also Fast Trains and Runs):
Train Despatchers' Association: Twenty-Third Convention, 76
Train Despatching: A B C Rules on the Northern Pacific, 74
Telephone: Grand Trunk, 701
Illinois Central, 1085
Michigan Central, 1193
History of Telephone Train Despatching, 801
Louisville & Nashville, 587, 801
Pere Marquette, 587
Omaha & Great, 875
Southern Pacific, 920
Train Ferry (See Car Ferry)
Train Indicators, 452†
Train Lighting (See Lighting)
Train Line (See Horse)
Trainman (See Employee)
Train Rules: Standard Code, Weak Points in, 494†
Train Shed (See Station)
Trainways (See Electric Railways)
Transportation and Car Accounting Officers: Annual Meeting, 12
Traveling Engineers' Association: Convention, 350, 394†
Organization, 443†
Trestle (See Bridge)
Trolley (See Electric Railways)
Trucks: Buckwater Electric Baggage Trucks, 892*
Position of Freight Car Trucks on Curves, 1058*
Tub (See Locomotive Boiler; also Tunnel; also Machine Tools)

Tunnel (See also Subway, and Tunnel)
Construction, 220
Proposed Tunnel Cuts, New York Bay, 198
Turkey
Railway Tunnel in Turkey, 97
Tunnels
Motor Tunnel, for Malin Locomotives, 42*
Tuttle, Lucius, 697*

U

Underframe (See Cars)
Union Machine Co.
Throttle Rod Stuffing Box, 441*
Union Pacific (See also Hazman Lines)
Annual Report, 831*†, 900
Educational Bureau, 1118
Enterpriser, at Omaha, 287
Locomotive Shop, Omaha, Neb., 1084*
Merger Suit Hearings, 707, 754
Unit System, Extended to Union Pacific
General Offices, 69
Union Switch & Signal Co.:
Style "U" Signal, 538*
U. S. Indestructible Gasket Co.:
New Plant, 361
United Steam Engineers:
University Extension for Engineers, 931
Universities (See names)
University of Illinois:
Railway Education in Illinois, 962

V

Vacuum Cleaners:
Keller Portable, 486*
Valuation of Railways:
Opposition to, 566†
Railway Attitude Toward, 1137†
Valve (See also Machine Tools):
Baker-Pilliod Gear, 1210*
Throttle Valve, 210*
Walschaerts Valve Gear, 417*

American Railway Association Proceedings:
Vol. 5, 348
American Society for Testing Materials; Year
Book for 1910, 915
American Steel Railway Investments, 492
Coal Mines, 450
Comparative Analysis of Railroad Reports, 5
Congressional History of Railways, A, 150
Everyday Freight Rules and Tariff Manual, 572
Good Roads at Low Cost, 958
Heat Engines, 732

Africa, 555, 974, 975, 1024, 1185
Algiers, 190
Amaga Railway of Colombia, 437
Argentina, 836, 1084, 1187, 1253, 1271
Australia, 100, 1253
Asia, 1274
Brazil, 190, 338, 419, 526, 988, 1156
Belgium, 470
British Honduras, 356
Bolivia, 526, 1109, 1253, 1254
Caucasus, 601
Chile, 161, 331, 446, 660, 785, 928
China, 12, 470, 600, 838, 944, 1025, 1048, 1283
Colombia, 1192
Costa Rica, 1025
Cuba, 1172

Vancouver Coal Iron and Steel
Vachado
Pacific Type Locomotive, 549*
Viaduct (See Bridge)
Virginian Railway:
Telephone Train Despatching, 431

W

Wabash Railroad:
Frame Welding at Fort Wayne Shop, 860*
Wabash-Pittsburgh Terminal:
Overlapping Protective Committees, 148†
Wabash:
Pearson-Farquhar Syndicate, 211†
Wages (See Employee)
Walschaerts Gear (See Valve)
Washington Water Power Co.:
Automatic Block Signals, 1142*
Water Power (See Hydraulic)
Water Terminals (See Hoisting and Convey-
ing)
Waterways:
German Praise for McPherson's "Trans-
portation in Europe," 1121
Railways as Obstructions, 1105†, 1106†,
1174†, 1178†
Report at International Railway Congress,
279
Transportation and Traffic in Austria-
Hungary, 797
Transportation and Traffic in England, 996,
1045, 1267
Transportation and Traffic in Holland, 190
Transportation and Traffic in Italy, 452
Transportation and Traffic in Russia, 214
Water Transportation in the United
States, 666
Watson-Stillman Co.:
Locomotive Throttle Valve, 210*
Welding (See also Shop Kinks):
Buckeye Autogenous Welding, 897*
Oxy-Acetylene Welding and Cutting, 242*,
394†

NEW BOOKS.

Kent's Mechanical Engineers' Hand-Book, 915
Mann-Elkins Act, The, 492
Polytechnic Engineer, The, 996
Power Signaling in Great Britain, British Col-
onies, Belgium, France and Italy, 778
Practice and Theory of the Injector, 572
Proceedings of the International Railway Fuel
Association, 535
Proposed Advances in Rates by Carriers in Offi-
cial Classification Territory, 958
Railroad Administration, 711
Railway Library, The, 348
Railway Management at Stations, 1225

FOREIGN RAILWAY NOTES.

[See also General Index, under subjects and names.]

Ecuador, 935, 1048
Egypt, 564
France, 747, 928
Great Britain, 814
Hayti, 1024, 1080
Honduras, 670, 1024
Hungary, 193
India, 805
Italy, 624, 944
Japan, 92, 710, 1080
Manchuria, 1048
Mexico, 163
Milan, 601

Welding of Cast Iron
Wells, John, 1000
Wagon, 367*
Western Electric Co.:
Private Car Telephone, 178*
Submarine Cables, 676
Western Pacific:
Annual Report of Denver & Rio Grande,
490*†
Through Passenger Service, 292
Ties, Iron, Russia, Negotiations With,
277, 289, 375
Western Wheeled Scraper Co.:
Air Dump Cars, 604*
Wheel:
Canadian Pacific Car Wheel Foundry,
643†, 843†
Car Wheel Foundry Methods, 626†
Charcoal Iron Car Wheel, 273†
Drop Flange Test, 536†
Flange Lubricator, 675*
McConway Steel Tired Wheel, 891*
Sharp Flanges on Steel Freight Car
Wheels, 1050†
Wheeling & Lake Erie:
Annual Report, 533†
Double Track Truss Bridge with Suspend-
ed Tracks, 77*
Shops at Brewster, Ohio, 34*
Winslow, Horace L., Co.:
Heating System, 444*
Wood (See Ties and Timber; also Lumber)
Wrenches (See Shops)
Cochran Pipe Wrench, 716*
Proper Length, 842†, 1052†
Y
Yards and Terminals (See also Signaling)
Decentralization of Terminals, 45
New York City Freight Terminals, 166,
542*
Terminal Conditions in Chicago, 698
Water Terminals, 706

Railway Special Agent and Police, The, 180
Railway Special Work, 273
Rule Four of the Standard Code of Train Rules,
687
Settlement of Labor Disputes, The, 450
Strikes.—When to Strike, How to Strike, 572
Supplement to the Iron and Steel Works Direc-
tory, 958
Transportation in Europe, 619
Twentieth Century Sheet Metal Worker, 619
Valve Setter's Guide, The, 112
Why Railroads Need Higher Rates, 619

INTERSTATE COMMERCE COMMISSION RULINGS.

[See also General Index.]

Acme Cement Plaster Co. v. Wabash Railroad
et al., 51
Alabama Lumber & Export Co. v. Philadelphia,
Baltimore & Washington et al., 328
Alpha Portland Cement Co. v. Delaware, Lacka-
wanna & Western et al., 292
American Cresote Works, Ltd., v. Illinois Cen-
tral et al., 328
Anaconda Copper Mining Company v. Chicago
& Erie Railroad Company et al., 1276
Arlington Heights Fruit Exchange et al. v.
Southern Pacific et al., 201
Baer Brothers Mercantile Co. v. Missouri Pacific
et al., 201
Ballin, Solomon, v. Southern Pacific, 1127

Banner Milling Company v. New York Central
& Hudson River et al., 292
Bash Fertilizer Co. v. Wabash et al., 169
Beekman Lumber Co. v. Louisiana Railway &
Navigation et al., 328
Billings Chamber of Commerce v. Chicago, Bur-
lington & Quincy, 260
Block-Pollak Iron Co. v. Houston, East & West
Texas, 1090
Borgfeldt, George, & Co. v. Southern Pacific
Company et al., 169
Bott Brothers Manufacturing Co. v. Chicago,
Burlington & Quincy et al., 260
Brese-Trenton Mining Co. et al. v. Wabash et
al., 1276

Cameron, William, & Company, Inc., v. Houston,
East & West Texas et al., 260
Cameron, William, & Co., Inc., v. Texas & Pa-
cific et al., 171
Cady, H. F., Lumber Co. v. Missouri Pacific
et al., 201
Chappelle, Pat., v. Louisville & Nashville et al.,
49
Chapelle, Pat., v. Louisville & Nashville, 884
City of Spokane, Wash., et al., v. Northern Pa-
cific et al., 95
Colorado Coal Traffic Association v. Colorado &
Southern et al., 49
Colorado Coal Traffic Association v. Colorado &
Southern et al., 1018

[See also General Index.]

- Columbia Grocery Co. v. Louisville & Nashville, 49
Commercial Club of Omaha v. Anderson & Salline River Railway et al., 49
Commercial Club of Omaha v. Anderson & Salline River Railway et al., 936
Commercial Club of Omaha v. Baltimore & Ohio et al., 937
Commercial Club of Omaha v. Chicago & North Western et al., 260
Commercial Club, Traffic Bureau, of Salt Lake City, Utah, v. Atchison, Topeka & Santa Fe et al., 98
Corporation Commission of the State of North Carolina et al. v. Norfolk & Western, 138
Craig, W. F., Lumber Co. v. Virginian Railway et al., 260

Davies, Edward G., v. Illinois Central, 201
De Bary, Fred'k., & Co. v. Louisiana Western et al., 49
Deeves, Griffin H., Lumber Co. v. Chicago & North Western et al., 1018

Felton Grain Co. v. Union Pacific et al., 201
Fish, S. T., & Co. v. New York, Chicago & St. Louis et al., 981
Fisk, Homer P., & Sons v. Boston & Maine, 138
Florida Cotton Oil Co. v. Central of Georgia et al., 328
Ford, J. B., Co. v. Michigan Central et al., 1091
Freeman Lumber Co. v. St. Louis, Iron Mountain & Southern et al., 328

Gamble-Robinson Commission Co. v. St. Louis & San Francisco et al., 260
Green, Fred W., receiver for Ionis Wagon Co., v. Alabama Great Southern et al., 981
Gulf Coast Navigation v. Kansas City Southern et al., 1276

Hanley Milling Co. v. Pennsylvania Company et al., 1018
Harbor City Wholesale Co. of San Pedro, Cal., v. Southern Pacific et al., 201
Henderson & Barksdell v. St. Louis, Iron Mountain & Southern, 169
Henderson Elevator Co. v. Louisville & Nashville, 171
Highland Iron & Steel Co. v. Vandalia Railroad et al., 169
Hillsdale Coal & Coke Co. v. Pennsylvania Railroad, 369
Humboldt Steamship Co. v. White Pass & Yukon Route et al., 292
Hydraulic Press Brick Co. v. Mobile & Ohio et al., 1090

Idaho Lime Co. v. Atchison, Topeka & Santa Fe et al., 90
Irishmen Lumber Co. v. St. Louis, Western & Gulf et al., 301
In re extra fare paid by reason of non-validation of limited excursion tickets, 884
In re Reduced Rates on Returned Shipments, 82
In the matter of jurisdiction over rail and water transportation, 51
In the matter of the investigation and imposition of certain demurrage schedules, 1019
Isbell, M. & Co. v. Shreveport & Michigan Southern et al., 981

Jacob, W. F., and Isaac C. Weber, trading as W. F. Jacob & Co., v. Pennsylvania Railroad, Clark Brothers Mining Co. v. same, 554
Johnson, J. W., Co. v. Clyde Steamship Co. et al., 1090

Klyce, Henry A., Co. v. Illinois Central et al., 1168

League of Southern Idaho Commercial Clubs v. Oregon Short Line et al., 169
Lebanon Paper Co. v. Elgin, Joliet & Eastern et al., 171
Loftus, George S., v. Pullman Company et al., 51
Louisiana Central Lumber Co. et al. v. Chicago, Burlington & Quincy et al., 171
Lull Carriage Co. v. Chicago, Kalamazoo & Saginaw Railway et al., 140

Maricopa County Commercial Club v. Santa Fe, Prescott & Phoenix et al., 100
Menefee Brothers v. Vicksburg, Shreveport & Pacific et al., 260
Millar, A. H., & Co. v. New York Central & Hudson River et al., 260
Morgan, A. P., Grain Co. et al. v. Atlantic Coast Line et al. Railroad Commission of Alabama v. Louisville & Nashville et al. Railroad Commission of Georgia v. Atlantic Coast Line et al., 937
Mosson, M., Co. v. Pennsylvania Railroad, 209

National Hay Association v. Michigan Central et al., 49
National Petroleum Association et al. v. Missouri Pacific et al. National Refining Co. v. Missouri Pacific, 169
Newding, Stanley, v. Missouri, Kansas & Texas et al., 201
Northern Lumber Manufacturing Co. v. Texas & Pacific et al., 201

Oak Grove Farm Creamery v. Adams Express Co. et al., 982
Ohio Foundry Co. v. Pittsburgh, Cincinnati, Chicago & St. Louis et al., 328
Omaha Grain Exchange v. Chicago & North Western et al., 884
Orange Grocery Co. v. Morgan's Louisiana & Texas Railroad & Steamship Co. et al., 1091
Ouerbacher Coffee Company v. Southern Railway et al., 201

Pankey & Holmes v. Central New England et al., 169
Paragon Plaster Co. v. New York Central & Hudson River Co. et al., 1018
Pennsylvania Smelting Co. v. Northern Pacific et al., 201
Ponchatoula Farmer's Association, Limited, v. Illinois Central, 1091
Preston, Albert, v. Chesapeake & Ohio et al., 982
Proctor & Gamble Co. v. Greenham, Hamilton & Dayton et al., 1276

Quamman & Astor Lumber Co. v. Chicago Great Western et al., 169
Quamman & Astor Lumber Co. v. Chicago, Milwaukee & St. Paul et al., 260

Railroad Commission of Nevada v. Southern Pacific et al., 100
Record Oil Refining Co. et al. v. Midland Valley Railroad et al., 262
Reiter, Curtis & Hill, v. New York, Susquehanna & Western, 260
Rickel, T. A., v. Atchison, Topeka & Santa Fe, 1018
Rutland, W. W., and E. L. Rutland, partners, doing business as The Canadian Valley Grain Co., v. Chicago, Rock Island & Pacific et al., 260

St. Louis Hay & Grain et al. v. Mobile & Ohio et al., 1090
St. Paul Board of Trade et al. v. Minneapolis, St. Paul & Sault Ste. Marie, 169
Saginaw & Manistowish Lumber Co. et al. v. Atchison, Topeka & Santa Fe et al., 138
Sawyer & Austin Lumber Co. v. St. Louis, Iron Mountain & Southern et al., 260
Schmidt, Traugott, & Sons v. Michigan Central et al., 1126
Sherry, John J., v. Southern Pacific et al., 171
Shoecraft, S., & Son v. Illinois Central et al., 1018
Sikeston Mercantile Co. v. Boston & Maine et al., 981
Sligo Iron Store Co. v. Union Pacific et al., 1126
Southern California Sugar Co. v. San Pedro, Los Angeles & Lake, 201
Southern Cotton Oil Co. v. Southern Railway et al., 49
Spiegel, George M., & Co. et al. v. Southern Railway Company, 1000
Stacy Mercantile Co. v. Minneapolis, St. Paul & Sault Ste. Marie et al., 171
State of Oklahoma v. State of Iowa et al. v. Pullman Co. et al., 1276
Stilwell, Nelson D., v. Lehigh & Hudson River Railway et al., 981
Stott, David, v. Michigan Central et al., 171
Strauss, August H., v. American Express Co. et al., 292
Sunderland Brothers Co. v. St. Louis & San Francisco, 171
Sunnyside Coal Mining Co. et al. v. Denver & Rio Grande et al., 171

Texas Grain & Elevator Co. v. Chicago, Rock Island & Pacific et al., 171
Traffic Bureau of the Merchants' Exchange v. Southern Pacific, 98

Ullman, Joseph, v. American Express Co. et al., 328

Waco Freight Bureau et al. v. Houston & Texas Central et al., 201
Webster Grocer Company v. Chicago & North Western et al., 1018
Wells-Higman Company v. Grand Rapids & Indiana Railway Company et al., 1018
Wilburine Oil Works, Limited, v. Pennsylvania Railroad et al., 169
Wilson Brothers Lumber Co. v. Norfolk Southern et al., 201
Wilson Produce Co. v. Pennsylvania Railroad, 171
Winters Metallic Paint Co. v. Chicago, Milwaukee & St. Paul et al., 171
Wyman, Preston & Company v. Boston & Maine Railroad et al., 1162

[Portraits are indicated thus.*]

- Adams, Herbert H. 154
Aronson, Frederick H. 807*
Aronson, Robert W. 1189*
Cunningham, William J. 701
Daniel, E. H., 1202
Dodge, Charles J. 748*
Doddridge, W. B., 561
Dougherty, Curtis, 1203*
Eaton, Edmund L., 13
Eaton, Marshall, 909
Ewing, C. H., 808
F. H. Rogers, H. 140
Foster, Albert M., 331
Foster, Charles W., 171
Foster, Thomas A., 1601
Foster, Timothy J., 896*
Fritz Benjamin J., 431
Foster, Carroll M., 101*
Gale, Everett E., 139
Galloway, Alfred E., 1166
Gould, E. T., 802*
Gould, William D., 802*
Gould, John Freeman, 1397
Graham, F. S., 796*
Clark, Frank H., 800*
Graham, Daniel D., 1
Graham, Walter W., 112
Graham, William J., 701
Harrison, James T., 1186*
Harrison, Fairfax, 370
Harrison, C. J., 3
Higgins, Richard T., 667
Higgins, Henry C., 518*
Huggett, Marvin, 783*
Hungerford, Homer L., 101
Hunt, William H., 1397
James, Luther M., 703*
James, W. L., 1303
Kearney, James R., 806
Keele, William, 1161*
Kerr, R. G., 1012*
Kerr, Robert, 557
Kemp, Martin A., 1136, 1198*
Kerr, Charles W., 481*
Kinn, Jane, M., 701
Latham, Charles W., 706*
Lee, Roy, 706
Lester, H. H., 140
Lester, J. W., 709
Lester, Paul J., 708
Lester, Albert H., 1094
McCall, John A., 1021*
McGraw, C. L., 758
McLaine, C. L., 758
McPherson, Charles F., 710*
McPherson, Logan G., 167
Mack, John William, 1199*
Malone, Thomas Henry, 1166
Malone, George F., 555
Malone, Charles H., 1313
Mason, S. A., 987*
Mason, C. F., 1021
Meyer, Balthasar Henry, 1137, 1300*
Miller, Henry W., 1161*
Mitchell, Rella R., 981
Moore, W. F., 808*
Muthfield, E. F., 983
Murray, E. H., 758
Nelson, Lewis, 417*
Peterson, Robert Stevens, 3
Pomeroy, L. R., 86
Raymond, Edward, 1094*
Rising, Alfred Hunt, 331
Risch, M. C., 757

Robertson, David D., 139
Rockwell, Fayette R., 537
Rowlands, Thomas F., 110

Shea, Cornelius J., 708
Shelton, Albert D., 261
Snell, Edward L., 1166

Spencer, Lewis J., 1163
Steele, Sydney V., 1163
Strickland, Samuel G., 808

Taylor, Hugh McCheser, 669
Thompson, Fred L., 131
Tuttle, Lucius, 693

Under, Charles L., 92

Van Alstede, David G.

Wheat, Garrett, 130

Woshburgh, L. F., 438

Wynn, William W., 1093

Walter, John G., 160
Walt, George R., 191
Wells, George G., 936
White, Stephen W., 261
Whitcomb, David, 100
Williams, W. S., 1279
Wright, Carl L., 130

ELECTIONS AND APPOINTMENTS.

Albee, H. P., 182
Abbott, T. A., 141
Abbott, W. W., 668
Abrams, J. P., 99
Ackert, C. H., 885
Ackley, N. B., 708
Adams, I. L., 819
Adams, Frank M., 172
Adams, Guy, 261
Adams, H. M., 33
Adams, J. E., 885
Adams, J. E., 482
Adams, W. A., 140
Aiken, A. D., 481
Akers, T. G., 293
Aldinger, W. R., 437
Alexander, F. W., 304
Alexander, Stephen J., 303, 294
Altred, F. H., 350, 371, 438
Allen, E. C., 1128
Allen, W. C. B., 983
Almquist, W. H., 294
Amos, J. L., 669
Anderson, C. L., 303
Anderson, E., 102
Anderson, J. W., 1127
Anderson, W. M., 140
Andrews, Ball & Stratman, 668
Andrews, C. W., 597, 709, 1164
Angwin, B. M., 886
Anthony, C. L., 48
Apperson, A. B., 757
Applegate, O. P., 141
Archuleta, F. M., 709
Archer, P. J., 847
Ardery, A. M., 1202
Armstrong, J. C., 53
Arnold, F. C., 1128
Arundel, J. T., 371
Askew, W. H., 330, 597, 916
Asselin, P. L., 1021
Atkins, J. P., 1164, 1202
August, D. B., 293
Axeley, O. O., 293
Ayer, Geo. E., 983

Badgley, L. C., 1128
Baker, E. U., 102
Baldwin, W. A., 1128
Baldwin, W. G., 1164
Ball, R. E., 557
Bancroft, W. H., 1279
Barker, F. M., 1164
Barnes, J. L., 983
Barnet, W. R., 1165
Barwell, Wm. F., 1094
Barnock, J. C., 1021
Batchelder, D. J., 1278
Batman, J. C., 808
Baths, J. M., 1128
Baum, W. W., 265
Baumgarten, M. G., 371
Baxter, Robert W., 101
Beach, W. G., 668
Beards, C. W., 1128
Beardslee, S. J., 983
Beatty, Dr. H. A., 53
Beaumont, J., 758
Bechely, F. J., 293
Beck, L. L., 141
Beck, P. A., 886
Becker, Ernest, 1165
Beckingham, George, 557
Beckley, S. G., 438
Beebower, W. A., 330, 331
Beigen, R. N., 202
Bell, E. H., 172
Bellairs, W. F., 709, 808
Belt, H. B., 674
Bement, F. G., 293
Bemis, E. L., 204
Benjamin, A. T., 807, 939
Bennett, O. P., 203
Benson, E. S., 674, 885
Bent, C. C. F., 53
Berlinget, J., 1164, 1202
Berry, Geo. W., 1127, 1164
Berry, J. S., 204, 482
Bets, A. V., 508
Betzner, M. N., 293
Bierd, W. G., 885
Biever, C. H., 708
Black, R. P., 141
Blackett, John, 481
Bladon, J. L., 203
Blaess, A. F., 1203
Blair, G. A., 203
Blair, W. S., 808
Blake, W. H., 1164
Blamond, H. B., 293, 966
Blasing, W. A., 293
Blessig, Louis W., 203
Blount, C. W., 172
Bodenheimer, J., 482

Boget, Wm. L., 192
Bomgard, J. L., 38
Bonfield, C. C., 103
Bonner, H. P., 139
Bonney, G. L., 330
Boone, Charles H., 757
Booth, C. M., 482
Booth, Geo. W., 481, 597
Boswell, R. E., 885
Boswell, R. E., 1128
Boughner, A. E., 556
Bowe, John L., 102
Bowman, F. M., 101, 261
Boyce, W. S., 808
Boyd, J. A., 523
Boyd, R. M., 1279
Bradley, G. A., 983
Bradley, H. S., 1128, 1165
Brainard, A. E., 1094
Branch, C. S., 141
Brant, C. A., 519
Brav, C. A., 1202
Bremer, Wm., 294
Brimson, Chas. T., 101
Brimson, W. C., 668
Brimson, W. H., 53, 556
Broderick, H. J., 375
Bronner, E. D., 709
Bronner, W. S., 438
Brooks, H. M., 808
Broughton, W. H., 140, 807
Brown, C. L., 939
Brown, E. N., 370, 371, 518
Brown, E. T., 557
Brown, F. E., 764
Brown, H. A., 371
Brown, H. E., 983
Brown, S. W., 330
Brown, W. E., 556
Brown, W. J., 482
Brown, R. B., 939
Broxup, C. T., 204
Brumell, J. L., 262
Buckingham, J. L., 140
Buckingham, J. L., 17
Buckley, M. J., 481, 597
Buckner, J. T., 556
Budd, Ralph, 709
Buffington, M. G., 597
Burdick, E. L., 709
Burdon, James, 557
Burke, A. A., 557
Burke, A. B., 438
Burkheimer, H. W., 1022
Burmeister, Frank, 708
Burnett, H. C., 262
Burnett, H. C., 674
Burr, W. D., 265
Burrows, W. G., 1095
Bury, R. A., 940
Bush, A. G., 939
Bushnell, F. A., 557
Bussing, G. H., 262, 294, 758, 1022
Busteed, F. F., 371
Butler, F. A., 294
Butler, J. L., 886
Butler, T. F., 1128
Byram, L. R., 262
Byrne, W. B., 519
Byrnes, Walter, 939

Cabell, F. L., 104
Cabill, W. R., 1128
Calcutt, H. S., 438
Calder, A. B., 885
Caldwell, C. A., 596
Calhoun, A. M., 293
Campbell, B. A., 983, 1093
Campbell, Geo. H., 53
Campbell, H. K., 482
Campbell, L. L., 939
Campbell, N. A., 674
Candy, S. L., 1127
Canfield, J. B., 294
Cannon, C. J., 1095
Cannell, H. C., 939, 1065
Carden, R. G., 140
Cardona, C., 557
Carland, Emma J., 1094
Carr, R. E., 555
Carrigan, M. J., 53, 1567
Carruthers, W. A., 1164
Carson, Jr., C. A., 371
Carson, C. L., 1128
Carter, J. W., 808
Carter, S. L., 669
Cassidy, Frank, 983
Castro, Eduardo, 438
Caswell, C. H., 1128
Cauthen, A. B., 101
Chamberlain, W. B., 172
Chapin, F. G., 438
Chapman, H. V. V., 984
Charlton, Geo. J., 1128
Cheney, D. C., 885

Cheney, D. C., 1128
Cheney, H. A., 119, 438
Chisam, C. J., 757
Chittenden, A. D., 555
Clapp, B. A., 1202
Clapp, E. W., 204, 262, 885, 983
Clapp, T. N., 94
Clark, Arthur E., 807
Clark, H. P., 1164
Clark, J. H. C., 375
Clark, J. E., 23, 1112
Clark, R. E., 708
Clark, Truman H., 1094
Clark, T. L., 939
Clarke, J. J., 1202
Clarke, M., 668
Clarke, R. M., 1094
Clemenson, L. E., 102
Coapman, E. H., 668
Code, J. G., 140
Coe, C. W., 140
Cole, H. R., 708
Collett, R., 1279
Collier, Jr., Samuel P., 597
Collins, H. L., 141
Collins, J. E., 1021, 1128, 1165
Collins, J. N., 886
Colvin, D. D., 758
Coman, W. E., 53, 262, 709
Conaughty, W. W., 172
Conger, Kenyon B., 939
Conn, J. C., 102
Connell, Henry, 519
Convey, T. P., 939
Cook, J. A., 939
Cook, R. G., 939, 983
Cook, T. J., 1203
Cook, W. D., 597
Coolidge, C. A., 518
Coon, J. W., 1202
Cooper, E. S., 668
Cooper, J. H., 141, 984
Copperthwaite, E. E., 983
Corcoran, L. F., 172
Corley, Eugene, 203, 1386
Cornelsen, O., 555
Cornell, X. H., 1128
Cotter, J. J., 939
Coughlin, J., 669, 709
Coughlin, Wm., 757
Cousins, E. J., 102
Cox, F. L., 1278
Coyne, M. C., 668
Craddock, A. R., 1278
Crain, A. M., 519
Crane, C. E., 262, 297
Crane, George, 808
Crews, W. W., 668
Croswell, T. H., 709
Crow, A. L., 438
Cruse, S. E., 557
Crum, D. L., 1094
Cunningham, R. W., 519
Cunningham, J. H., 557
Cunningham, J. L., 438, 597
Curlie, Robert, 596
Curren, W. G., 983
Curry, F. M., 370, 1063
Cutler, T. J., 1128
Cutts, A. B., 1128
Cutts, Geo. T., 293
Cutts, J. W., 1279
Da Costa, B. H., 813
Daggy, J. J., 757
Daley, Eugene, 1164
Daily, Pat., 808
Dalton, R. P., 371
Daniel, C. L., 757
Daniels, Geo. F., 758
Dassell, Charles R., 808
Davenport, J. H., 1165
Davenport, W. H., 172
Daves, Wm., 177
Davidson, C. R., 1168
Davis, C. B., 519
Davis, D. C., 669
Davis, D. M., 557
Davis, F. V., 330
Davis, J. H., 102
Davis, Lewis L., 203
Davis, W. K., 764
Dean, J. W., 555, 668
Dearing, H. P., 705
De Cou, L. A., 140
De Forest, Henry W., 293
De Garmo, F. B., 555
De Groodt, B. J., 1021
Delaney, Daniel, 1165
De Lanoy, Geo. W., 1165
Dempsey, T. A., 555, 596, 668
Dengel, J. H., 481, 482, 557, 1234
Denham, W. R., 1264, 1282
Denmark, D. A., 102

Dennis, John, 109
Dennison, J. E., 370
Derrah, S. V., 204, 261
Des Brosses, R. K., 438
De Treville, Richard, 939
Deuel, E. W., 1093
Deuel, W. A., 293, 330
Dewey, J. J., 597, 669
Dewey, W. L., 141
Dewey, W. S., 939
Dibble, W. C., 330
Dickinson, W. J., 1278
Dickson, John B., 1128
Diel, W. J., 1095
Dickson, G. L., 556
Dietrich, F. J. W., 885
Dike, Chester T., 807
Dillie, J. H., 807
Diman, A., 1022, 1095
Divine, W. L., 438
Dobbin, G. A., 1128
Dobson, C. R., 940
Donahue, Geo., 1129
Donahue, J. G., 1063, 1233
Donat, G. H., 808
Donnelly, E. A., 294
Donny, W. H., 669
Donohue, James, 293
Dooley, W. H., 886
Dousman, B. A., 101
Dowley, H., 1278
Dowling, J. D., 141
Downing, G. F., 668
Downs, Lawrence A., 1127, 1203
Doyle, Richard, 1202
Dozier, R. H., 939
Drake, H. J., 757
Driscoll, John J., 1127
Drury, M. J., 1022
Duckworth, J. R., 669
Dudderar, G. W., 939
Dudley, F. M., 140
Dudley, F. W., 204
Dudley, F. W., 101
Duguid, J., 1203
Duncan, A. R., 293, 668
Dunne, W. T., 102, 481, 808
Dunning, W. D., 596
Du Puy, Raymond, 939
Durlam, Owen, 1165
Dutcher, A. J., 669
Dutton, H. D., 293, 330
Duvall, Ewing, 757
Dyer, W. M., 984
Earp, Alfred S., 669
Easley, K. A., 556
Eaton, George H., 764
Eck, Geo. H., 1095
Eckerd, W. H., 1127
Edgar, R. B., 519
Edson, Thomas, 375
Egan, F. W., 939
Eggebrecht, R. E., 1094
Ehrke, J., 597
Eldredge, D. B., 1128
Eldredge, P. C., 885
Ellett, Andrew L., 438
Ellman, A. W., 764
Ellington, J. W., 371
Elliott, D., 1093
Elliott, F. S., 53
Elliott, W. I., 669
Ellis, G. E., 204
Elzey, Rudolph, 940
Elsworth, R. S., 983
England, Norton, 141
English, Wm. J., 708
Ensign, C. P., 172
Eppes, E. B., 1164, 1282
Erb, Newman, 293, 966
Essender, C. H., 1093
Eschen, L. C., 1093
Evans, C. R., 668
Evans, G. I., 294
Evans, J. S., 172
Evans, Walter, 519
Evans, W. L., 984, 1094
Everdell, Wm., J., 939
Ewing, Albert, 807
Ewing, Charles L., 101
Fairbairn, J. M. R., 669
Fairmon, H., 1021
Faick, F. M., 757
Farrell, E. G., 481, 1062, 1063
Farrell, H. F., 482
Farrell, J. B., 330
Farrell, J. D., 1279
Farrell, J. F., 710, 940
Farrell, J. W., 668
Farrar, J. L., 141
Fay, F. L., 438
Feakins, F. L., 102
Fell, H. E., 808

Langford, R. D., 482
Lanning, R. D., 668
Lappin, E. D., 294
Larkin, J. G., 141
Lashley, J. H., 939
Lassiter, N. H., 668
Lathrop, J. P., 437
Laud, H. E., 385
Lawler, F. J., 557
Lawrence, G. A., 1021
Lawrence, W. J., 203
Lawton, G. A., 883
Ledford, R. F., 597
Ledlie, H. F., 300, 482
Lee, F., 1664
Leggett, Geo. H., 1165
Lehy, Geo. W., 371
Leisenring, John, 1095
Leonard, J. W., 668
Leonard, B. G., 597
Leonard, W. F., 596
Letts, F. C., 885
Lewis, C. E., 204
Lewis, Thornton, 438
Lillie, G. W., 807
Lincoln, C. B. F., 557
Lindsay, B. D., 101, 1128
Lindsay, G. B., 101
Linsay, W. P., 808
Livesey, J. T., 709
Lloyd, Wm., 519
Lomax, E. L., 53, 102
Longman, J. A., 885
Longman, B. F., 709, 757
Lorraine, C., 262
Lounsbery, H. E., 808, 1203
Lovell, J. D., 262
Low, P. F., 710
Lowderbaugh, E. H., 557
Lowry, J. W., 261, 1388
Luke, J. H., 708, 14
Lundquist, C. L., 482
Lutz, S. G., 1128
Lutz, W. B., 1021
Lutzow, E. H., 939
Lyons, A. L., 140
Lyon, A. N., 140
Lyons, C. L., 757

McCabe, H. W., 596, 668
McCabe, T. B., 141
McCamam, H. B., 262
McCann, C., 51
McCarty, Allen, 518
McCarty, O. H., 1164
McCauley, A. G., 757
McClean, Geo. B., 371
McConahy, E. B., 558
McConn, J. D., 557
McCormick, Andrew, 885
McCormick, J. J., 438
McCrea, J. A., 437
McCuen, J. P., 886
McDonald, J. C., 141, 203
McDonald, J. M., 1021
McDonough, James, 1072
Macedo, Pablo, 70
McElree, A. W., 172
McElroy, H. E., 482
McElroy, H. K., 1168
McFarland, L. F., 330
McFee, J. W., 1282
McGe, W. J., 1282
McGee, John, 983
McGowan, George, 262
McGrath, J. T., 1128, 1203
McGrath, T. L., 609
McGrover, E. E., 1022
McGrover, J. W., 1022
McKellar, J. C., 1021
McKenney, J. T., 438
McKenno, J. H., 939
McKernan, M., 983
Mackie, F. J., 668, 807
Mackin, J. W., 101, 854
McKinnon, J. A., 53
McKinstry, T. A., 983
McLardy, A. A., 101
McLean, J. E., 482
McLeod, H. E., 1093
McMahon, W. J., 73
McManus, C. L., 102
McManus, P. L., 1128, 1278
McMurray, Wm., 1203
McNeil, Thomas, 557
McNicholl, Geo. A., 53
McNiff, J. W., 172
McWhirter, W. L., 172
Maguire, Robert W., 293
Maher, Peter, 118
Mahoney, Edward, 172, 203
Mallen, Richard, 370, 371
Malone, M. F., 1208
Malone, M. F., 1202
Manchester, F. S., 1138
Manchester, H. C., 885
Manchester, W. G., 984
Mann, C. H., 1128
Mann, C. H., 983
Mann, F. D., 1021
Marsden, E. M., 556
Markley, F. A., 764
Marks, W., 710

- Marshall, F. E., 886, 943
 Marshall, William H., 1279
 Martin, G. W., 345, 1322
 Martin, H. C., 108
 Martin, J. H., 1279
 Martin, T. H., 331
 Martin, T., 173, 204
 Massa, A. L., 557
 Massey, A. P., 709
 Matson, J. S., 148
 Matthews, Frank L., 330
 Matthews, Frank W., 518
 Matthews, H. W., 293
 Matthews, John, 437
 Mattimore, J. A., 1128
 Mattoon, W. L., 1164
 Maxwell, J. W., 481
 May, H. C., 940
 May, John, 940
 May, John S., 438
 Meadows, O., 203, 1112
 Meglenny, L. H., 141, 983
 Melin, P. M., 807
 Melton, Charles, 518, 523
 Nelson, E. P., 481
 Messmer, J. F., 1202
 Mewshaw, C. A., 1128
 Meyers, Fred, 1127
 Michel, Wm., 984
 Milan, Thomas, 518
 Midgell, E. P., 668
 Miller, B. P., 1129
 Miller, C. R., 330
 Miller, F. E., 437, 555
 Miller, F. M., 885
 Miller, G. W., 597
 Miller, H. C., 481, 1180
 Miller, R. E., 203
 Miller, W. E., 481, 708
 Miller, W. R., 172
 Minch, C. W., 1165
 Minor, H. D., 330
 Mitchell, A., 1032
 Mitchell, E. B., 140
 Mitchell, L. W., 203, 481
 Modisett, H. M., 1278
 Moe, Frank L., 523, 555
 Moffatt, J. C., 102
 Mohler, A. L., 1128
 Montgomery, F. H., 1279
 Moon, N. L., 668
 Moore, B. W., 203
 Moore, H. L., 102
 Moore, J. L., 557
 Moorehead, C. D., 757
 Moran, H. C., 1094
 Morgan, W. D., 939, 983
 Morley, H. C., 371
 Morris, D. H., 674
 Morris, J. C., 1164
 Morris, R. L., 439
 Morris, S., 172
 Morris, Walter R., 519
 Morrison, C., 885
 Morris, A. W., 278
 Morse, F. W., 885
 Morton, J. D., 203, 481
 Moseley, L. L., 1128
 Mozier, W. R., 674
 Muir, J. C., 203, 1322
 Mulchay, J. H., 808
 Munson, J. B., 668
 Murphy, C., 668
 Murphy, J. E., 597
 Murphy, M. G., 939
 Murray, A. D., 557
 Murray, Thomas J., 1279
 Myers, F. L., 555
 Myles, R. W., 482
 Naylor, C. H., 555
 Neish, J. B., 1129
 Nevins, B. E., 172
 Newell, M. E., 141
 Newman, F. R., 984
 Newman, W. A., 1202
 Nichol, R. C., 102, 294
 Nicholson, John, 808
 Nicholson, Wm., 1128
 Nickerson, O., 1127
 Niland, Wm., 885
 Nolan, J. R., 368
 Nolan, Michael, 708
 Nolan, W. J., 140, 172
 Noonan, Wm. T., 1093
 North, J. G., 556, 668
 Nyquist, Carl, 1164
 Oakley, C. B., 141
 Ober, R. P., 294
 Obergfell, Alfred W., 102
 O'Brien, J. P., 1127
 Ochiltree, C. E., 939
 O'Connor, Charles A., 1279
 O'Connor, Frank, 709
 O'Day, John M., 370
 O'Donnell, Frank L., 204
 O'Donnell, Thomas, 708
 O'Donnell, T. F., 141
 O'Gara, James, 983
 Ogden, Fred D., 1094
 O'Loughlin, M., 1094
 Oldham, E., 1164
 O'Leary, Thomas, 262
 Olhausen, J. T., 1128
 Olson, Einar, 481, 1062
 O'Neill, E. T., 371
 O'Neill, W. V., 173
 Olson, I. L., 261
 O'Reilly, A. J., 107
 Ormsby, R. P., 481
 Orr, T. M., 101
 Orrison, C. L., 8
 Orth, Thomas, R. T., 939
 Otis, A. H., 481
 Otterman, W. P., 403
 Overbay, W. P., 438
 Overholt, S. H., 331
 Oviatt, H. C., 1129
 Page, C. N., 1164
 Palmiter, Peter, 6
 Parish, R. G., 107
 Park, J. P., 481
 Park, W. C., 1127
 Parker, C. A., 293
 Parker, G. F., 1128
 Parker, R. J., 555
 Parker, W. A., 1202
 Parks, F. T., 708
 Paterson, R. P., 481
 Paton, W. F., 757
 Patterson, S. B., 141
 Patton, S. W., 983, 1021
 Paul, L. G., 262
 Peabody, E. W., 1093
 Peacock, E. L., 172, 597
 Pearman, J. L., 371
 Pease, H. L., 669
 Peck, E. A., 481
 Peck, George R., 1278
 Penn, E. E., 885
 Penn, Wm., 983
 Pennington, R., 668
 Peppall, George, 204
 Perkins, G. O., 1164
 Perry, A. D., 294
 Peters, S. B., 669
 Peterson, C. J., 519
 Peterson, C. P., 102
 Peterson, F. E., 1165
 Peterson, W. C., 262
 Petri, Phillip, 557
 Pett, A. H., 668
 Pettit, G. R., 371
 Phillips, H. S., 668
 Phillips, W. H., 1165
 Phlips, Dexter, L., 939
 Pickley, John, 1127
 Piculell, H. C., 102
 Pierce, Daniel T., 481
 Pierce, J. W., 1099
 Pierson, J. H., 668
 Pinckney, W. E., 481, 1435
 Plunhof, H. J., 1093
 Plumley, Chas. A., 203
 Polhamus, A. A., 204
 Pollard, H. D., 1127, 1164
 Pond, M. A., 1127
 Ponder, A. R., 172
 Porter, A. W., 1164
 Porter, E. L., 141
 Porter, F. R., 203
 Porter, F. R., 204
 Potter, Geo. L., 1164, 1202
 Potts, John D., 262
 Powell, A. L., 204
 Powell, T. H., 102
 Power, C. W., 102
 Powers, M. A., 555
 P'Pool, L. D., 172
 Pratt, C. L., 330
 Prendergast, A. P., 988
 Prescott, Abel E., 864
 Price, G. W., 984
 Price, A., 371
 Price, A., 939
 Price, J. H., 371
 Price, L. W., 984
 Priest, C. E., 519
 Prindle, H. E., 438
 Ritchard, J. T., 939
 Push, Charles E., 1202
 Puhl, A. J., 519
 Purcell, James, 757
 Purdon, C. D., 482, 1389
 Purkett, W. A., 519
 Pusey, R. D., 523
 Putsche, G. L., 371
 Quigg, W. H., 1202
 Quigley, Joseph, 886
 Quinn, Wm., 204
 Racey, S. L., 519
 Ramsdell, T. M., 438
 Ranney, E. G., 557
 Rehmeier, O. H., 262
 Reid, J. M., 758
 Reigart, H. P., 939
 Reister, J. C., 939
 Renick, H. E., 172
 Rennie, F. T., 1128
 Reynolds, L. G., 102
 Rhodes, L. B., 1165
 Rhodes, S. C., 172
 Richards, S. R., 1129
 Ridgely, J. A., 940
 Riley, C. C., 438
 Riley, W., 294
 Rine, E. M., 1099
 Rinearson, W. C., 102, 1811
 Rinehart, R. E., 481
 Ripley, C. T., 886
 Ripley, Payson, 983
 Robinson, C. T., 1127
 Robinson, I. W., 101, 1127
 Robinson, A. G., 940
 Robinson, A. L., 940
 Robinson, I. W., 940
 Robinson, William W., 290
 Rodman, J. M., 1202
 Roemer, J. H., 1180
 Rouerman, John P., 172, 262
 Rogers, S. A., 371
 Ross, C. L., 1127
 Ross, Geo. H., 885
 Ross, J. J., 708
 Rossiter, L. P., 557
 Roth, H. J., 885
 Rothenbush, A. D., 885
 Rouse, C. A., 102
 Rowland, J. R., 1128, 1202
 Rowley, W. C., 709
 Row, H. E., 508
 Ruby, R. L., 140
 Ruggles, O. W., 1279
 Rupp, P. J., 983
 Russell, G. W., 438
 Russell, Henry, 708
 Rutt, C. L., 519
 Ryan, C. J., 1128
 Ryan, John F., 330
 Sample, Frank L., 1279
 Sanford, S. P., 261
 Sartelle, J. C., 140, 1566
 Saunders, L. H., 983, 1094
 Schenck, Jr., Edwin, 886, 940
 Scherer, L. L., 437
 Schumacher, T. M., 1021, 1094
 Schwarz, F. W., 101
 Scott, J. M., 437, 1203
 Scott, Osborne, 939
 Scoville, L. O., 293
 Scruby, T. F., 808
 Seely, J. L., 371
 Seabrook, S. G., 481
 Seawright, S. A., 709
 Sebastian, Don B., 102
 Sebastian, E. B., 294
 Seely, O. N., 438
 Seman, H. W., 1278
 Senger, J. W., 102, 1280, 1389
 Setzkorn, C., 940
 Sevin, John V., 265
 Seymour, F. B., 1279
 Seymour, L. S., 262
 Shannon, F. P., 518
 Sharp, H. W., 983
 Shattuck, C. L., 886
 Shaw, A. C., 885
 Shaw, Harry C., 265
 Sheldon, F. R., 807
 Shepard, H. H., 1099
 Shepherd, W. F., 939
 Sheridan, H., 668
 Shipp, W. E., 807
 Shirah, L. C., 709
 Shotwell, W. J., 172
 Shropshire, W. A., 983
 Sibley, W. R., 375, 1435
 Sim, J. J., 708
 Simmons, G. R., 293, 330
 Simonson, Charles D., 438
 Simpson, D. R., 668
 Sims, H. B., 173
 Sinclair, Percie L., 1279
 Sipp, G. S., 438
 Skillen, J. H., 204, 294, 1188
 Skinner, W. D., 1203
 Slack, F. T., 983
 Slayton, F. T., 1165
 Sleight, H. G., 293, 437
 Sloan, Howard M. C., 1202
 Smith, C. E., 714
 Smith, C. F., 983, 1099
 Smith, E. H., 764
 Smith, F. B., 674
 Smith, G. A., 482, 1435
 Smith, G. R., 885
 Smith, Geo. W., 203
 Smith, Milton, 323
 Smith, Peter, 262
 Smith, R. F., 1165
 Smith, T. M., 758
 Smith, W. P., 1278, 1279
 Smith, W. T., 371, 1182
 Smuck, R. G., 886
 Smythe, E. E., 885
 Snell, W. H., 204, 557
 Snyder, Clayton, 939
 Snyder, M. E., 481
 Sobotta, Frederick, 939
 Sorg, Jr., Charles, 204
 Souder, W. J., 807, 886
 Southworth, H. A., 1128
 Spain, O. N., 438
 Speakman, D. H., 438
 Spicer, Meade T., 101
 Spivey, J. P., 983
 Stack, L. D., 481, 597
 Stafford, J. A., 808
 Staggs, E. D., 557, 808
 Stamm, C. C., 555, 668
 Stanley, R. D., 1128
 Stansbury, C. M., 482
 Stanvan, F. W., 886
 Starkweather, G. C., 1093
 Starr, Henry C., 101
 Staten, J. M., 439
 Stebbins, A. A., 668
 Steele, Hugh, 939
 Steele, J. N., 668
 Stehle, Fred G., 294
 Steinhil, C. P., 1165
 Stephens, E. H., 141, 1127
 Stephens, G. H., 331
 Stephens, J. P., 940
 Stevens, J. P., 294
 Stevens, John F., 370, 518, 1322, 1810
 Stevens, J. P., 371, 1181, 1233
 Stevens, J. S., 438
 Stewart, C. L., 107, 1127
 Stewart, G. S., 53
 Stewart, R. D., 1117
 Stewart, R. S., 262
 Stewart, W. T., 668
 Stedman, W. H., 1165
 Stone, C. M., 710
 Stone, John C., 983
 Stone, June, 939
 Stonebraker, W. L., 1127
 Stoner, G., 53
 Stuart, W. B., 1164
 Stuart, J. W., 707
 Stout, C. B., 1202
 Stradford, Robert L., 1127
 Strayer, F., 102
 Strickler, C. R., 1165
 Strubel, J. A., 1127
 Stubbs, R. B., 939
 Stubbs, Ralph S., 1165
 Stumpf, J. E., 1127
 Sullivan, D., 330
 Sullivan, D. E., 886
 Sullivan, John F., 757, 984
 Sullivan, L. F., 983
 Summers, F. E., 555, 807
 Sumner, H. A., 294, 330
 Sutherland, C. C., 481, 597
 Swan, C. A., 294
 Swartzbach, J. J., 1128
 Swearingin, H. H., 481, 597
 Sweat, F. L., 668
 Sweeney, J. E., 438
 Swingly, C. D., 557
 Swygart, J. P., 1202
 Symmonds, J. M., 519
 Taggart, C. W., 757
 Taglione, W. S., 102
 Tarr, J. B., 708
 Taylor, B. E., 885
 Taylor, D. R., 481
 Taylor, Geo. C., 101
 Taylor, J. W., 101
 Taylor, R. C., 519
 Taylor, R. G., 808
 Taylor, W. D., 984
 Tebbetts, G. E., 102
 Tegtmeyer, E. F., 438
 Tennis, W. H., 102
 Terhune, W. B., 140, 294
 Thayer, Otis, 885
 Thomas, A. C., 708
 Thomas, Geo. F., 808, 885
 Thomason, E., 101
 Thompson, A. W., 1164, 1202
 Thompson, C. S., 482
 Thompson, F. C., 330
 Thompson, J. S., Barbour, 1127
 Thompson, R. G., 261
 Thorn, John K., 1094
 Throop, W. B., 555, 668
 Tilev, W. G., 757
 Timberlake, W. H., 102
 Tinsman, Frank N., 983
 Tinsman, W. S., 1279
 Tittmore, J. N., 1164
 Tobin, H. J., 1202
 Todd, Alexander B., 331
 Toole, O. A., 556
 Tonbrun, E. H., 482, 519
 Tordello, J., 557
 Torrey, F. A., 1279
 Towne, M. E., 102
 Townsend, Oscar, 885
 Townsend, Walter B., 371
 Treford, R. G., 939
 Tremam, George E., 669
 Trufant, W. G., 1165
 Tucker, W. D., 674, 885
 Tupper, H. E., 294
 Tuttle, Lucius, 518, 523
 Upshur, W. D., 438
 Van Allen, I. L., 557
 Van Arsdol, C. C., 758
 Vanderbil, Jr., W. K., 140
 Van Fossen, Fred, 371
 Van Rensselaer, J. F., 669
 Van Sickle, Walter R., 1094
 Van Zandt, G. C., 1202
 Vaughan, R. C., 203
 Venamor, B. W., 519
 Vliet, Garrett, 710
 Wackher, W., 556
 Wade, C. L., 1127
 Wadleigh, Frank A., 669
 Waggoner, H. St. John, 481, 1165
 Waegoner, J. F., 482
 Waldo, F. E., 708
 Waldo, G. H., 293
 Waldron, N. A., 482
 Walker, C. C., 438, 1181
 Walker, J. T., 261
 Walker, Walter M., 294
 Walsh, J. L., 556
 Walton, Ernest, 172

- Oregon, The Home & A. 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

RAILWAY CONSTRUCTION—Continued.

St. Louis & Southeastern, 333
St. Louis, Brownsville & Mexico, 263, 373, 559, 942, 1205
St. Louis, Fort Smith & Dallas, 174, 294
St. Louis, Iron Mountain & Southern, 333
St. Louis, St. Charles & Northern Traction, 986
St. Louis Southwestern, 54, 559, 712, 1097
St. Marys & Kingsland, 942
St. Paul Railway Promotion Co., 712
Salinas, McAlister & Southern, 1097
Salmon River Railway, 887
San Antonio & Aransas Pass, 54, 143
San Antonio, Rio Grande & Tampico, 333
San Diego & Arizona, 143
Sandy River & Rangeley Lakes, 760
San Joaquin Valley Electric, 986
San Pedro, El Paso & St. Louis, 1023
San Pedro, Los Angeles & Salt Lake, 263, 483, 605
Savannah & Southwestern, 206
Savannah, Augusta & Northern, 263
Seaboard Air Line, 54, 521, 942, 1023
Seattle-Everett Traction, 104
Short Line, 1130
Shreveport & Memphis, 1167
Silver Lake Railway, 600
South Dakota Interurban, 206
South Dakota Roads, 672
South Georgia-West Coast, 483
Southern Cambria (Electric), 206
Southern Indiana, 265
Southern Pacific, 104, 174, 263, 333, 373, 559, 600, 672, 712, 760, 811, 945, 1023, 1205
Southern Pacific of Mexico, 104, 521, 986, 1130
Southern Railway, 760
Southwestern, 54
Sparks Western, 1023
Spokane & British Columbia, 1097
Spokane, Portland & Northern, 811
Springfield & Central Illinois Traction, 521, 1023
Springfield & Western, 1023
Springfield & Western Inter-Urban, 333, 521
Stamford & Eastern, 54, 1024
Stateline & Southern, 988

Statesville Air Line, 1024
Stearns Co. & Lumber Co. Lines, 942
Stephenville North & South Texas, 54, 674
Sterling-Moline Traction Co., 209, 483
Stockton Terminal & Eastern, 521, 1097
Stuttgart & Rice Belt, 811
Sumter & Choctaw, 942
Superior & Southeastern, 1130
Sydney & Louisburg, 1024
Tacoma Eastern, 483
Tampa & Jacksonville, 521, 1281
Temiskaming & Northern Ontario, 672, 1130
Temple Northwestern, 440, 559, 1130
Tennessee, Alabama & Georgia, 1205
Texas Central, 54, 206, 559, 813
Texas, Oklahoma & Eastern, 813
Texas Roads, 104, 333, 559, 600, 986, 1167
Texas Roads (Electric), 521, 887
Texas Southeastern, 1205
Texas Southern, 521
Tidewater & Southern (Electric), 887, 986
Topeka & Northwestern, 600
Tremont & Gulf, 1097
Trinity Valley & Northern, 1130
Tuscaloosa Mineral, 672, 1097
Tuscarora Valley, 1024
Twin City & Lake Superior (Electric), 333
Uintah Railway, 1097
Union Pacific, 54, 174, 263, 600, 887, 942, 1130
Union Radial Railway, 1130
Union Terminal Railway, 811
United Railways Co. (Electric), Portland, Ore., 174, 373
Utah & Grand Canyon, 1167
Utah & Salt Lake Electric, 145
Utah Roads, 174
Utah Roads (Electric), 483
Valley Park, St. Louis & Eastern, 209
Vandalia Railroad, 811, 888
Vera Cruz, Tobasco & Campeche, 333
Vermont Valley, 1024

Vidalia & Southeastern, 143
Virginia & Carolina Southern, 672
Virginian Railway, 260, 942
Visalia (Electric), 888
Wichita Falls & Northwestern, 942
Wabash-Pittsburgh Terminal, 54
Wamego River & Rock Creek Valley, 672
Warren, Johnsville & Saline River, 1097
Washington Railways (Electric), 333
Washington-Virginia, 143
Wasito & Black Mountain, 1205, 1281
Waterloo, Cedar Falls & Northern (Electric), 811, 1024
Westchester Northern, 54
Western Allegheny, 1167
Western of Georgia, 1205
Western Maryland, 54
Western Pacific, 373, 1130
West Virginia Roads, 712
Wheeling & Lake Erie, 559
White Sulphur Springs & Yellowstone Park, 1205
Wichita Falls & Northwestern, 294, 603
Wichita Falls Route, 1024
Wichita, Kinsley, Scott City & Denver Air Line, 104
Wichita, McPherson & Gulf, 294
Wildwood & Delaware Bay Short Line, 104
Willapa Harbor & Coast Line, 811, 888
Williamsburg, Greenville & St. Louis, 483
Winston-Salem Southbound, 104, 600, 1130, 1167
Wisconsin & Northern, 760, 942
Wisconsin & Southwestern, 600
Wisconsin Roads, 265
Woodville Railroad, 1130
Wrightsville, Adrian & Lyons, 143
Youngstown & Northern, 373
Youngstown & Ohio River, 672
Yreka Railroad, 585
Zinc Belt Railway, 600

RAILWAY FINANCIAL NEWS.

Alabama Great Southern, 1206
Albia & Centerville, 1282
Albuquerque & Eastern, 55
Algoma Central & Hudson Bay, 143, 1206
Ann Arbor, 761, 1282
Antoine Valley, 143
Archison, Topeka & Santa Fe, 373, 483, 521, 888
Atlantic Coast Line, 1024
Atlantic, Quebec & Western, 942
Atlantic South Shore, 1131
Aurora, Elgin & Chicago, 811
Baltimore & Ohio, 483, 601, 811, 986.
Baltimore & Ohio Chicago Terminal, 263
Bartlett-Florence, 263, 334
Beaumont & Great Northern, 441
Beaumont, Sour River & Western, 483
Belt Railroad & Stock Yards Co., 1131
Berkshire Railroad Co., 813
Boston & Albany, 175, 295, 761
Boston & Maine, 601, 672, 761, 811, 890, 986, 1168
Boston Railroad Holding Co., 175, 761, 1097, 1131
Brinson, 55, 295
Brooklyn Rapid Transit, 1131
Buffalo & Susquehanna, 105, 175, 267, 295, 441
Buffalo, Rochester & Pittsburgh, 441, 601, 761
Caldwell & Northern, 672
Canadian Northern, 175, 263, 334, 601
Canadian Northern Ontario, 263, 334
Canadian Pacific, 97, 104
Canadian & Northern Pines, 672
Central Arkansas & Houston, 144
Central of Georgia, 295, 560
Central of New Jersey, 601, 1206
Central of New England, 175, 263, 483, 521, 672, 988
Chattanooga Southern, 175, 295, 506
Chicago & Ohio, 175, 263, 295, 334, 601, 672, 1097
Chicago & Ohio of Indiana, 175, 521
Chicago & Alton, 143, 260, 761, 811
Chicago & Milwaukee Electric, 441
Chicago & North Western, 1004, 1168
Chicago & Southwestern, 942
Chicago, Burlington & Quincy, 761
Chicago, Cincinnati & Louisville, 104, 109, 171, 486
Chicago Great Western, 206, 321, 392
Chicago, Indianapolis & Louisville, 441, 601, 811
Chicago, Indianapolis & Mackinac, 521
Chicago, Milwaukee & St. Paul, 104, 601, 1282
Chicago, Peoria & St. Louis, 104
Chicago, Rock Island & Pacific, 263, 521, 560, 811
Chicago Southern, 206, 295, 392, 942, 1097
Chicago, Toledo & Rock Island, 143
Chicago, Toledo & Southwestern, 1097
Cincinnati, Dayton & Chicago, 1004, 1206
Cincinnati, Hamilton & Dayton, 521, 1131
Cincinnati, New Orleans & Texas Pacific, 306

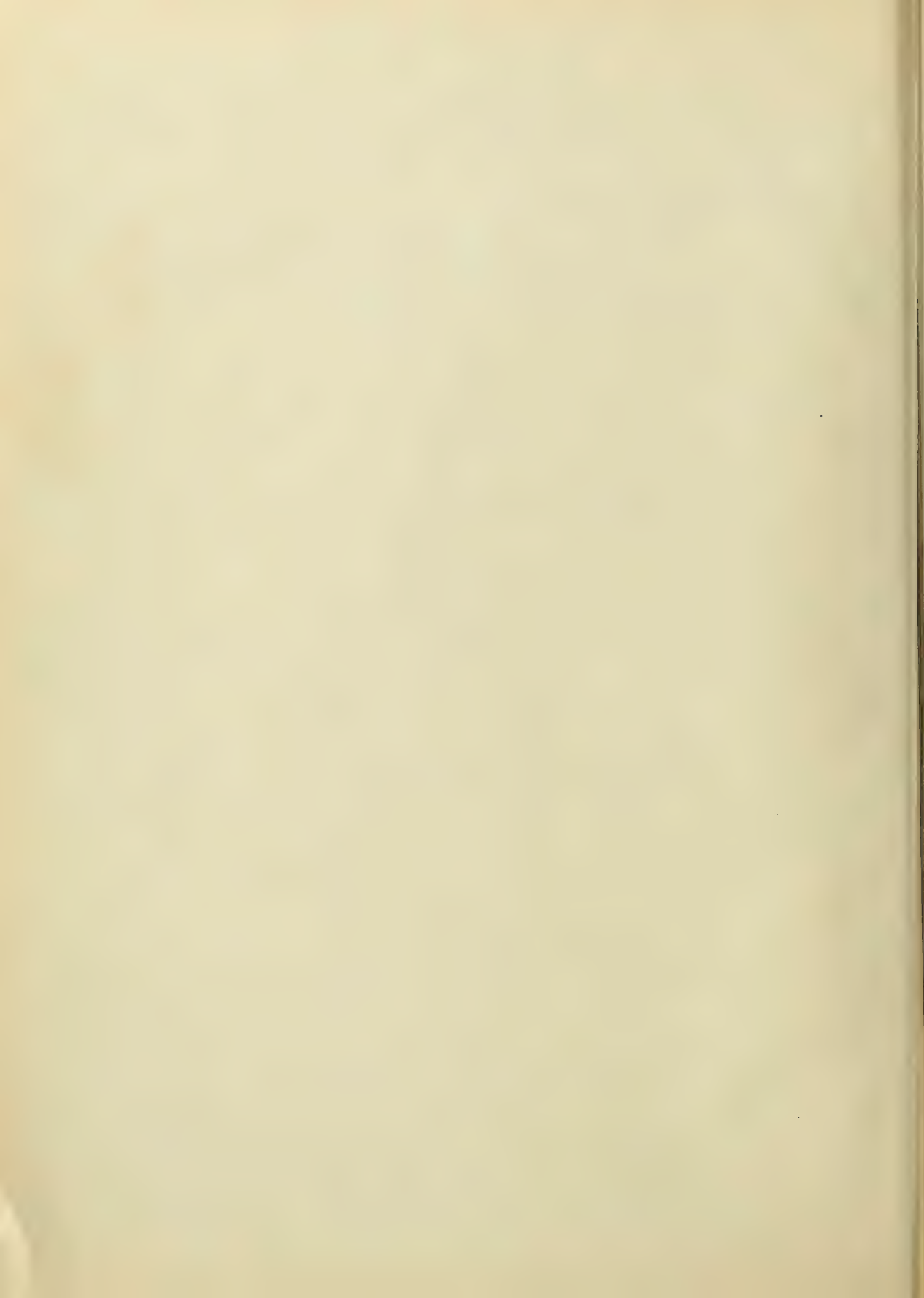
Cleveland, Cincinnati, Chicago & St. Louis, 672, 1282
Colorado & Southern, 206, 373
Cuba Railroad, 55, 105, 483, 942
Cumberland Railway & Coal, 1206
Delaware & Eastern, 334, 373
Delaware & Hudson, 601
Delaware, Lackawanna & Western, 560, 712, 1131, 1206
Denver & Rio Grande, 263
Denver, Northwestern & Pacific, 712
Des Moines & Fort Dodge, 105
Detroit & Mackinac, 1131
Detroit, Toledo & Ironton, 334, 441, 601, 761, 1024, 1097, 1131
Duluth & North Minnesota, 712
Duluth, South Shore & Atlantic, 560
Duluth, Winnipeg & Pacific, 1168
Dunkirk, Allegheny Valley & Pittsburgh, 295, 712
Edmonton & Slave Lake, 601
El Paso & Southwestern, 521
Erie, 672, 1131
Eureka & Palisade, 986
Evansville & Terre Haute, 521
Fitchburg Railroad, 521, 672
Florida East Coast, 483, 1131
Fonda, Johnstown & Gettysville, 521
Fort Smith & Western, 1131
Galveston, Harrisburg & San Antonio, 105
Gettysburg & Harrisburg, 888
Grand Rapids & Indiana, 811
Grand Trunk, 263, 334, 761, 811
Grand Trunk Pacific, 263
Great Northern, 441, 761
Hocking Valley, 55, 175, 295
Hunter's Run & Slate Belt, 888
Illinois Central, 1131
Illinois Tunnel Co., 672
Indianapolis Union, 1131
Interborough Rapid Transit, 1024, 1206
International, 295
International & Great Northern, 105, 114, 441, 521, 601
Interoceanic of Mexico, 986, 1168
Interstate Railroad, 106
Iowa Central, 441, 672
Kansas & Michigan, 143, 761
Kansas Bridge & Terminal, 1206
Kansas City, Fort Scott & Memphis, 105, 175
Kansas City, Meriden & Chicago, 104, 114, 761
Kansas City & Oklahoma, 600
Kansas City Terminal, 1074
Kentucky & Indiana Bridge Railroad Co. (Louisville, Ky.), 105, 206

Lancaster, Oxford & Southern, 712
Leavenworth Terminal Railway & Bridge Co., 206, 334
Lehigh Valley Railroad, 143, 263, 1208
Lexington & Eastern, 1097
Long Island, 441
Lorain, Ashland & Southern, 942
Louisville & Nashville, 58, 1097, 1131
Lynch & Birmingham, 761
Maine Central, 560
Manila Railroad, 206
Manistiquette Railway, 441, 712
Memphis, Dallas & Gulf, 143, 175
Mexican Northern, 761
Mexican Railway, 761
Mexican Union, 105
Michigan Central, 888
Midland Valley Railroad, 55
Minneapolis & St. Louis, 55, 105, 712, 1206
Minneapolis, St. Paul & Sault Ste. Marie, 560, 761
Missouri, Kansas & Texas, 105, 295, 942, 1168
Missouri, Kansas & Texas Terminal of St. Louis, 373
Missouri, Oklahoma & Gulf, 986
Missouri Pacific, 175, 263
Mobile, Jackson & Kansas City, 601
Mobile Terminal & Railway Co., 560
Monterey, Fresno & Eastern, 334
Mount Airy & Eastern, 1097
Muscatine North & South, 105
Nashville, Chattanooga & St. Louis, 1131
National Railways of Mexico, 105, 263, 483, 521, 712, 1168
Nevada County Narrow Gage, 942
Newark & Bloomfield, 560, 1206
New Brunswick, 334
New Haven & New-Haven, 813
New London Northern, 143
New Mexico Central, 560
New Orleans & New-Haven, 560
Newport & Richmond, 560
New York & Hudson, 560
New York Central & Hudson River, 55, 761, 942
New York Central Line, 1097
New York, Chicago & St. Louis, 175
New York, N. J. & Hartford, 334, 761, 811, 942
New York, Ontario & Western, 55
New York, Saratoga & Western, 560
New York, Westchester & Hudson, 560, 811, 942
Norfolk & Western, 143
Norfolk Southern, 761, 888, 1131
Northern Central, 104, 109, 295, 260, 334, 441, 1131
Northern Pacific, 560
Ottawa & Ontario, 560
Ottawa & New Western, 811
Oregan Railroad & Navigation Co. (Astoria, Ore.), 105, 206

Oregon Short Line, 560, 1099, 1282
Oregon-Washington Railroad & Navigation Co., 1131
Pacific & Eastern, 712
Pan American Railroad, 483
Parral & Durango, 1024
Pennsylvania Company, 712
Pennsylvania Railroad, 175, 334, 761, 890
Philadelphia & Reading, 1206
Philadelphia & Western, 297
Pittsburgh, Binghamton & Eastern, 1282
Pittsburgh, Cincinnati, Chicago & St. Louis, 295
Pittsburgh, Shawmut & Northern, 105, 143, 811
Pittsburgh, Wheeling & Kentucky, 601, 712
Quebec & Lake St. John, 295, 441, 601
Rhode Island & Massachusetts, 813
Rio Grande & El Paso, 373
Rio Grande Railroad, 263, 764
Rome & Clinton, 761
Rome, Watertown & Ogdensburg, 143
Rutland, 811, 942

St. Mary's & Western Ontario, 430
St. Louis & San Francisco, 11, 30, 303, 393, 411, 888, 986, 1131
St. Louis, Brownsville & Mexico, 906
St. Louis, Iron Mountain & Southern, 775
St. Louis, Southeastern, 34, 314, 1163
San Antonio & Rio Grande, 560
Seaboard Air Line, 55, 672, 1024, 1168
Seaboard Company, 295
Seaboard & Maryland, 560
Southern Railway, 406, 408, 409, 601, 602, 942, 1079
Southern Pacific, 55, 263
Southern Railway, 1282
Sparks Western, 986
Spokane, Portland & Seattle, 371
Tennessee, Alabama & Georgia, 1796
Tennessee Central, 560, 71
Terre Haute, Indianapolis & Eastern Traction, 601
Texas Central, 105, 143
Texas Mexican, 373
Third Avenue (New York), 262, 295, 1131

Tonopah & Tidewater, 1206, 1282
Tonopah & Tidewater, 1206, 1282
Union Pacific, 560, 601, 888, 1282
Underground Electric of London, 113
Vermont Valley Railroad, 560, 601
Wabash, 101, 263
Wabash-Pittsburgh Terminal, 25, 304, 305, 393, 601, 672, 611, 1097, 1106
Washington, Baltimore & Annapolis, 10
Western Ohio Railway, 105
Western Pacific, 371, 423, 492
Wheeling & Lake Erie, 105, 175, 560
Wichita Falls & Northwestern, 1024
Wichita Falls & Wellington, 601
Wilmington, Newcastle & Southern, 888
Youngstown & Ohio River, 712



Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY EIGHT TIMES IN JUNE, BY
THE RAILROAD GAZETTE (INC.), 83 FULTON ST., NEW YORK.

CHICAGO: Plymouth Bldg. CLEVELAND: Williamson Bldg.
LONDON: Queen Anne's Chambers, Westminster.

W. H. BOARDMAN, President and Editor

F. A. SIMMONS, Vice Pres. & Treas.

HENRY LEE, Secretary

The address of the company is the address of the offices.

EDITORS

W. H. BOARDMAN, Editor.

SAMUEL O. DUNN,

Western Edit. Mgr.

BRADFORD BOARDMAN,

Eastern Edit. Mgr.

ROY V. WRIGHT

ERNEST McCULLOUGH

G. L. FOWLER

WILLIAM FORSYTH

S. W. DUNNING

CLARENCE DEMING

B. B. ADAMS

W. E. HOOPER

F. E. LISTER

F. W. KRAEGER

H. H. SIMMONS

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico\$5.00 a year.

Canada\$6.00 a year.

Foreign Edition (London).....£1 12s. (\$8.00) a year.

Single Copies15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49.

FRIDAY, JULY 1, 1910.

NUMBER 1.

CONTENTS

EDITORIAL:

Editorial Notes	1
Can Politeness Be Taught?	2
A Paradox of Railway History	3
The New Epoch in Railway Affairs	3
New Books	5

LETTERS TO THE EDITOR..... 5

MISCELLANEOUS:

Profits of American Railways, as Illustrated by the Illinois Central..	6
Railway Business Mail	11
Transportation and Car Accounting Officers.....	12
Foreign Railway Notes.....	10, 12

SHOP SECTION.

EDITORIAL:

Editorial Notes	13
The Durability of Tool Steel.....	14

LETTERS TO THE EDITOR 15

ILLUSTRATED:

Economical Features of Electric Motor Applications.....	16
Shop Kinks; Chicago & Northwestern	21
Heat Treatment of High-Speed Steel	31
The Brewster Shops of the Wheeling & Lake Erie.....	34
Turntable for Mallet Locomotives.....	42

MISCELLANEOUS:

How the Foreman Can Promote Shop Efficiency.....	15
Engine Failures	44
Foreign Railway Notes	44

GENERAL NEWS SECTION

SUPPLY TRADE SECTION 56

ALL of the laws relating to interstate commerce, revised to this date, are this week published by *The Railway Age Gazette* in a pamphlet of about 150 pages. It is for sale at 50 cents each, or \$4 a dozen. The form of this compilation is intended to be convenient for reference by operating, executive and legal department officers. It contains the full text of the acts,

including revisions to this date. The different kinds of types used indicate at a glance the new requirements, the old requirements still in force and those expunged. The acts here given are: The Interstate Commerce Act (1887-1910), The Commerce Court (1910), The Elkins Act (1903-1906), The Act Relating to Testimony (1893-1906), The Expedition Act (1903), The Sherman Anti-Trust Act (1890), The Safety Appliance Acts (1893-1910), The Employers' Liability Act (1908), The Hours of Service Law (1907), Investigation of Block Signals, Etc. (1906-1910), The Accident Law (1910), The Ash Pan Law (1908), The Arbitration Act (1898), Transportation of Explosives (1909).

WITH the announcement that the New York, New Haven & Hartford has filed notice of what may be called its "local" increase of passenger rates, one of the most interesting ventures into the rate problem enters its initial stage. We have heretofore pointed out that the New Haven in the year 1906 reduced voluntarily passenger fares to two cents a mile on that large remainder of its system where the two-cent-a-mile rate had not before prevailed; and that, during the three years following, the gain in gross passenger receipts was \$2,328,912, or nearly 11 per cent. Success in lowering rates is now to be tried out on the theory of another success by raising them. It is to be tried out, also, in the face of uncertainty raised by the continued retention of the two-cent rate on mileage books and the transfer of considerable business to the parallel trolleys of the steam lines—there being several hundred miles of such trolleys in Massachusetts, Rhode Island and Connecticut. That the increase of local fares, roughly estimated at about 18 per cent., will be a force making for decreased passenger traffic is obvious, and the only question is whether or not it will be more than made good by the higher fares. Prophecy on the subject wastes itself until the returns following July 23, the date the first instalment of the new fares comes, and there may be interferences affecting the fair out-working of the problem, with the spectre of federal action in the background. But barring such obstructive influences, there have been in our railway history few more instructive attempts than this of the New Haven to answer the old query, "What will the traffic bear?" without going beyond the bounds of a "reasonable" passenger rate and incurring the serious risk of some form of outside intervention. That the experiment is made on a system of great passenger density adds to its ultimate value.

SOME of the newspapers in their financial columns are calling attention, as indices of railway prosperity and credit in spite of the federal attitude, to the "marketing" of railway loans to the amount of several hundred millions since the opening of the present year. The statement calls for brief analysis. Accepting the figures for loans offered, the query follows how large a proportion of the loans are really "marketed"—that is to say, how large is the amount in the hands of actual investors and how large a part of them is still in the strong boxes of the underwriters. More pertinent still is the comparative rate of return to the railway corporations and to the investors as compared even with a year ago. What is the average discount which the railways must pay the underwriters? What is the higher rate paid the investor? Any solvent railway corporation entrenched behind a long dividend paying record can, of course, get its money if it is willing to pay enough. How long would the New York Central or the Pennsylvania Railroad have to wait for its money if it were willing to offer at par a loan bearing interest at a rate equal to its dividend? The real test is one of comparison; and when the railway bond houses complain of the sluggishness of the bond market; when the St. Paul goes abroad to borrow money at a rate considerably higher than 5 per cent, and when the high-rate short-term note of the high class railways again reappears, the loan market for the railways, as well as for other corporations, can hardly be described as receptive. The causes of this situation that bears

hard on railways seeking funds needed for improvements postponed by the panic-period are several, but the foremost of them are two: One is at home; namely, the higher cost of living that has compelled the host of small investors to seek the railway security that gives higher returns even with a slight edge of risk. The other cause is abroad, expressed tersely in this extract from a cable despatch from its London financial correspondent to the New York *Evening Post*:

"The feeling is that these recurring disputes between your government, your legislatures, and your financiers are very injurious to you. Europe considers, in fact, that much harm may be done your financial position by this constant nagging, which is far worse than actual speedy reforms."

It may be added, that the state of feeling expressed by the *Evening Post's* correspondent is not strictly limited to the other side of the Atlantic.

CAN POLITENESS BE TAUGHT?

THE politeness of American railway employees is nothing to brag of—although the passenger agent now and then does venture, in his advertisements, to "point with pride" in a cautious way. The behavior of ticket sellers and the men on passenger trains has undoubtedly improved during the past ten or fifteen years, but this improvement is not sufficiently marked or sufficiently general to warrant any definite conclusions. Officers whose duty it is to enforce courteous behavior still treat it too much as a secondary matter. The Delaware, Lackawanna & Western issued an admirable appeal to its employees a year or two ago, and other roads copied it; but an appeal does not fill the bill. Unless the Lackawanna is different from all other roads, there must be a large percentage of its men who need something much more definite than a circular. The Southern Pacific reprinted and circulated among its employees an article printed in this paper last November, in which numerous actual instances of incivility, boorishness and bad judgment were set forth in detail; but we cannot imagine that the article touched the consciences of more than one in a hundred of such of the company's men as were ill-bred, though it was, no doubt, very useful to those whose consciences were already active and who only needed a stimulus to their judgment. Another road on which the importance of politeness is well understood is the Chicago & Northwestern. An article on the subject from its employees' magazine was copied in the *Railway Age Gazette* (Feb. 25, page 419); and the editor of the magazine proposes to agitate the subject further.

All these things are useful, but after all they are only a scratching of the surface. The great difficulty is that this superficiality of treatment is almost a necessity. Many railway employees must be selected primarily for their efficiency in other things, so that one who sets out to perfect them in politeness finds himself handicapped at the outset. In a dry goods store or a hotel, ability to treat customers in a pleasing manner is a main qualification; but a station agent or a conductor, however helpful he may desire to be, finds only an extremely small percentage of the passengers needing him. In a store, every person that comes in must be attended to. In a railway station the agent or other representative of the road may do his full duty toward 99 per cent. of the passengers without saying a word. The employee thus cultivates a habit of mind that is not favorable to courtesy. He is engrossed in his work. At times, as in the case of long delays due to a washout or a wreck, nearly all of the passengers at a given place need help at once, suddenly imposing on the agent a strenuous task; and the chances are that he will not be equal to it.

In view of the difficulty of teaching politeness to men who either lack the desired instinct or in whom such instincts are smothered by the hard work that they have to do; and in view of the indifferent success that has attended the efforts which have been made in the past to improve this branch of the art of railroading, it is fair to ask the question, Shall we really

make a determined effort to establish a high standard? Hitherto, and judging solely by results, it is not far out of the way to say that the answer is "No; do as well as is reasonably practicable, with the grade of men you have to deal with, and let it go at that." But no one formulates this view in words; and the only basis that can be found on which to put forth concerted effort is the view that is expressed by railway officers: Yes; we desire to attain as high a standard as possible. The question is, What is possible?

Why not supplement appeals and hints with measures to find out how far beneath the skin these have penetrated? A correspondence school, which succeeds in teaching something at arm's length, and which goes into details in a way that most railway superintendents seem never to have heard of, could give us innumerable points. It is a delicate subject, it is true. The trainmaster, himself, is likely to be far from Chesterfieldian in his manners. But why not consult a professor of deportment? This is not meant as a joke, but in sober earnest. We shall not attempt to develop the idea, but feel perfectly certain that it could be developed profitably in the brain of an ambitious superintendent or train master. Why is this any less practicable than to have surgeons educate men in first aid to the injured, or Col. Dunn teach them how to save lives by not dropping boxes of dynamite?

So many young employees are fairly polite without any training, having learned courtesy at home, that one may easily make the mistake of being content with circulars—or be still lazier, and be content with a couple of lines in the rule book—and rest in the assumption that "politeness costs nothing." This is true only in the most narrow meaning of the word "cost." Politeness does not necessitate the expenditure of any material thing. To the railway superintendent, however, who has several hundreds or thousands of men under him, all of whom should be polite to the passengers and other customers of the road, politeness is never inexpensive. He must try to get the maximum of politeness for the minimum of wages, and must go further, and seek executive ability and politeness combined, a combination which is never cheap. At best, many men must acquire a good-deal of their knowledge about courtesy after they enter the railway service, and the question is whether to trust to their doing this satisfactorily on their own initiative or to try to systematize their efforts. One cannot draw his men up in line like soldiers and have them take exercises in making bows or putting on smiles, but the principle of the drill or of catechizing is essential nevertheless. In train despatching and the handling of train orders the use of hypothetical questions has often done much good. Why should not the same principle apply in the matter of courtesy? It may be said that being polite to passengers is a very different matter from safe-guarding their lives by enforcing obedience to the train despatching rules, but we need only a short conference with the advertising department to be assured that it is as important to keep passengers good-natured as it is to preserve their lives!

As an essential element in politeness is intelligent and alert interest in others' welfare, our topic includes something more than smiles and pleasant cadences; it may be said to cover the matter as well as the manner of the communication of a railway employee to a customer. Not long ago the manager of one of our principal railways was mortified to find that on the occasion of a 10-hours' blockade hundreds of passengers had been unnecessarily delayed very seriously by the omission of the agents and conductors to tell them how to reach their destinations by taking another railway or by private conveyance. These employees may not have lacked courtesy, but by reason of the neglect of themselves or of someone at headquarters, they lacked reasonable knowledge; and the disregard of passengers' rights was flagrant.

In cases where all trains are very badly delayed agents and conductors must offer advice even where the passenger is so much in the dark as not to know that he needs advice. He must be told the best way to reach his destination, even if thereby his money is turned into the treasury of a rival line.

The experienced agent, if he be of the proper temper, does this without instruction. All agents should be trained to do it. It is a serious damage to the reputation of a company if they do not do it. If such an emergency occurs only once in two years, or perhaps longer, the necessary training is not easy; but it is a duty just the same. The superintendent who neglects to train his agents and conductors to do their best in this matter may have in his own mind reasons for it; but all these reasons are unworthy. It is true that in the case of a big wreck or washout the traveler's troubles are largely inevitable, and must be put up with on the most philosophical basis possible. But the fact that the passenger has a ton of trouble that is incurable is no reason why all reasonable efforts should not be taken to relieve him of the additional half ton which can be cured. The fact that the railway company is not responsible for certain things is no reason for refusal to ameliorate the conditions as far as possible, without regard to the location of the responsibility. The superintendent cannot neglect to give information to the public on the ground that agents will make blunders and give passengers improper advice; this is simply one of the annoyances that must be put up with. Even where a blunder is made which causes someone a little expense and leads to the presentation of a claim for damages, the fact still remains that a railway company, in its own interest and for the promotion of its own popularity, should do the best that it can by its passengers with the best men that it has. If the mistakes made by the conductors and agents are too numerous, the fact indicates, not that the railway should shirk its obligation to the public, but that it should have a better class of men to deal with the public.

A PARADOX OF RAILWAY HISTORY.

THE now famous Sherman Act bearing the title of "An Act to protect trade and commerce against unlawful restraints and monopolies" is twenty years old, having been approved July 2, 1890. Notwithstanding the findings of the courts, not a few legal authorities hold that it was never intended to apply to railways, but to industrial and trade combinations. Its title tends to confirm that view and its other title in common parlance, "The Anti-Trust Act," has expressed the laical idea that it was intended to apply, fundamentally at least, to the trust combinations seeking to control commodities and especially the commodities that represent necessities of living—not the railways that supply transportation. But in its actual working the railways have borne the brunt of the act. The courts have not merely applied it thus far to the railways, but to them more forcibly and severely than to the trusts. It would be too much to say that an anti-trust federal statute has been transmuted by the courts into an anti-railway statute. But it is true that the railways have been its leading objects in court procedures from the trans-Missouri and Northern Securities cases down to the latest invocation of the law to enjoin the increase of freight rates by the western railways. There have been other legal procedures, like the sugar refining case and the two important suits postponed in the United States Supreme Court until next autumn. But, up to this time, the suits against the trusts, as compared with those against railway combination "in restraint of trade" have been incomplete and secondary.

Yet, of the two, the railways and the trusts, assuming that both were within the reach of the law, the lightnings of the statute should logically have struck the trusts first and hardest. The trusts, taking them collectively, have been by almost general consent one of the causes of the increased cost of living. How far they share that credit with such other elementary causes as personal extravagance, larger production of gold, the tariff, limited farming and other influences, there is no way of accurately finding out. But the Sherman act was aimed at them primarily; and certainly the great expansion of the trusts at a period some ten years ago, followed by the public outcry against them, was not a fact of a nature to divert federal action and turn it against the railways. The trusts, as stated, have many

of them not only affected the necessities of life, but have aimed at control of prices throughout the whole country and in some cases have succeeded in doing so. The railways, to be sure, have formed their combinations. But those combinations have in no case been on a national scale. They have been grouped and outlined within certain distinct territorial bounds. Again, unlike the trusts, the railways have not raised their prices, but have diminished them. And, finally, while the railways have been under the checks and restraints of public supervision, compelled by law to make returns and face a certain civic and fiscal responsibility, the trusts have been under no such restrictions. Surely, reasoning from such premises, it was the trusts and not the railways that should have first drawn statutory fire. The trusts should normally have been a lightning rod for the railways, instead of the reverse that has come to pass.

This historical paradox—for it is already historical, though its history is not yet ended—is hard to understand fully, though it has its clues. If one seeks the leading cause it is probably the publicity which the railways have been forced—and not unwisely—to face. Their publicity is not complete, nor can it ever be. There are railway affairs and doings, many of them minor, but some of them major that cannot be blazoned abroad. The idealized condition where two railway presidents meet to make a "deal" and instantly proclaim the fact will never be attained until human nature and political economy are reconstructed. Still it remains true that, as compared with the average and strong trust ranging all the way from a New Jersey corporation with wide and flexible powers down to a "gentlemen's agreement," the railway represents ultra publicity; and that very publicity with its display of facts—such, to use the most recent case, as the filing of rates a month ahead—opens it to the attacks of law. A quality which, in its most generalized sense, is a virtue, becomes a legal infirmity. The small or uncertain offense, the offense which must pass through the courts before it is determined to be an offense at all, the offense which in the case of the trust goes undiscovered hales the railway into court. The same paradox comes to pass in the court of public opinion. In that fierce light which beats upon the railway, the eye of the citizen sees habitually and repeatedly under the publicities exacted by law, things, good or bad, that the non-public service corporation screens. The citizen's vision of the railway is direct. As bearing on the trust, though naturally the first target of the Sherman act, the citizen's vision is almost necessarily oblique.

Hence the strange historical paradox in the operation of the Sherman act by which the minor has superseded the major, publicity has been chastised harder than subtlety, the agent that has reduced prices to the consumer more sharply disciplined than the agent that has raised them, and the railway made not only the prime objective of a federal "anti-trust" statute enacted twenty years ago, but just now of a fresh statute still further restrictive and without repeal of the act of 1890. The anomaly would be more diverting were it invested with fewer elements of possible economic tragedy.

THE NEW EPOCH IN RAILWAY AFFAIRS.

THE results of any law are apt to depend more on how it is administered and obeyed than on its provisions. The statutes against murder in the western states and territories in pioneer days were very good laws; but as there were many who chose to disregard them and public sentiment was rather lax as to their enforcement, they did not contribute much to the peace and order of society. The original act to regulate commerce was a good law. If it had been enforced and obeyed according to its spirit it might have solved the "railway problem." But the railways elected habitually to disobey it, and the Interstate Commission and successive federal administrations enforced it but feebly. The public, failing to see that the real trouble was not lack of laws, but weak administration of them, called for more legislation; and so within the last seven years we have had the Elkins act, the Hepburn act, and the

various measures passed this year, the most important of which is that amending the Interstate Commerce act.

While this new "rate law" is in its infancy it is a good time for all directly affected to consider earnestly, and perhaps even prayerfully, what they are going to do about it. The country has taken giant strides along the path of government regulation during the last few years. The enactment of this law is one of the longest of them. It gives the Interstate Commission a control over the initiation of railway rates such as ten years ago no one but a Populist would have proposed. It does not necessarily follow that it will either hurt or help anyone. Like the previous laws to regulate interstate commerce, its effects will depend mainly on how it is administered and obeyed.

The present personnel and temper of the Interstate Commerce Commission encourage optimism. When the Hepburn act went into effect four years ago the commission was reorganized by the appointment of four new members. None of them had expert qualifications. Some said and did things for awhile that drew criticism from and caused alarm to both shippers and railway men. It was whispered that certain of them had not doffed their interest in politics when they put on the duties of commissioners. But they are all men of ability. Study and experience have increased and ripened the knowledge and wisdom that they bring to their intricate and important duties. The present temper of the commission probably is about as fair as that of any body of men can be who hold offices such as theirs in a country where public sentiment towards railways is what it is here. They appreciate the magnitude of their increased duties and responsibilities—duties and responsibilities in some instances much greater than they sought. No body of men could wield such powers as they now have in a way that would avoid frequent error and criticism. But if the shippers and railways give the commission a fair chance it is probable that with its ripened wisdom and increased sense of responsibility it will arbitrate with approximate justice between them.

Until very recently it looked as if shippers as a class would insist that the earnings of railways be restricted within the very narrowest limits that the law will permit. Their attorneys contend that rates constitutionally may be reduced and held down to a point that barely avoids confiscation; and it seemed that most of them were going to insist on having their pound of flesh. The success of the mediatory efforts of J. P. Morgan & Co. in getting the meat packers to agree to raises in their rates is a ray of sunlight. The large packing industry having been convinced that the prosperity of the country as a whole is not to be increased by arbitrarily limiting the returns of one of the largest industries of all gives occasion to hope that other shipping interests may be led to see the matter in the same light. It ought to be plain to every thinking business man that the profits of any one industry cannot be arbitrarily restricted while the profits of other concerns are not limited without inviting disaster. The public can perhaps determine what return shall be earned on the present investment in railways; but it cannot compel future investments in them. Each investor will insist on having the profit to which he thinks he is entitled, regardless of public opinion on the subject; and the effect of providing that only a small return shall be derived from the railway or any other business will simply be to divert investment from that business to other businesses whose profits are not limited.

For the passage of this new legislation the railways themselves are in a negative sense largely responsible. They have never obeyed the laws so well as in the past four years. But their course before that was in many ways adapted to incur public hostility, and their managers have since shown a singular incapacity to deal with public sentiment. We have many great railway executives; but the experience of the last few years, in which the roads have been whipped in almost every battle that they have fought with the shippers and the politicians, shows that we have few railway statesmen. It might have been much harder to have passed the additional restrictive laws if the rail-

ways had not been divided among themselves. But at the very inception of the administration's campaign for more legislation the executives of some lines which were especially anxious to get legislation to legalize existing combinations of competing roads are said to have indicated to President Taft that if he would favor legislation of this kind they would not vigorously oppose his other projects. The President did recommend the legislation they desired, but could not get it passed. Meantime when the amendments to the Interstate Commerce act were being considered the railways failed to make adequate appearances before the senate and house committees by witnesses representing them either as a whole or in any considerable number; and consequently the bill was reported by committees and weighed by a public which never had heard the railway case fully presented from different points of view. The ablest opposition to the important provision giving the commission power to restrain advances in rates came not from the railways, but from the Railway Business Association. In view of these facts it is not surprising that the law passed contains none of the provisions of the administration's original bill which the railways wanted, and all of the provisions which they did not want, except that giving the commission power to regulate the issuance of securities, with the addition of several radical clauses which were forced into it by the "insurgents."

Now that the Mann-Elkins bill has been passed it is to be hoped that the railways' course in reference to it will be more statesmanlike than was their opposition to it. Recent decisions of the courts concede to the commission very large powers. Government regulation is rapidly ceasing to be a matter of legal technicalities and becoming almost wholly a question of public expediency. No one will blame the roads for contesting any provisions of the act or orders of the commission that they believe unconstitutional. But their wisest course in future will be to try to work more with the shippers and the commission and less against them. It is high time for the commission, the shippers and the railways to strive very hard to "get together." They have some conflicting interests. But they have one paramount interest in common. This is in the development of good and adequate facilities of transportation. And the development of these facilities is not going to be promoted by the continuance of the incessant bickerings and conflicts of recent years. More important still is it that the railways shall try to get closer to the public. How the Interstate Commerce Commission will administer existing laws, and whether there will be more regulatory laws, will depend on public opinion; and what public opinion will be will depend very much on what the railways do to conciliate and educate it. Public sentiment will be best educated by consistently telling the public the plain truth about the railway business; and, of course, if the facts are to be told the roads must so conduct themselves that there will be the fewest practicable number of facts to tell of which they will be ashamed.

With the wages of labor and other expenses of railway operation rising; with the roads struggling to increase their rates; and with new laws imposing added restrictions and duties on railways and giving the commission greatly enlarged powers, the present marks an epoch not only in the history of transportation, but perhaps also in the history of industry and government in this country. In previous attempts to solve the railway problem most of those directly interested have shown more disposition to follow a familiar parody of the Golden Rule—"Do others as they would do you, and do them first"—rather than to follow the rule itself. The Golden Rule, however, is the summation not merely of piety, but also of common sense; and if the commission, the shippers and the railways could be persuaded to try earnestly to apply it to present conditions, the satisfactory solution of the problem might be brought nearer. On the other hand, if they continue to apply the parody of the rule there is apt to be created a situation relief from which the country may seek by throwing itself into the socialistic arms of government ownership.

NEW BOOKS.

Comparative Analysis of Railroad Reports. H. H. Copeland & Son, New York. Seven charts, bound separately in folders, 10 in. x 8 in. 25 cts. Published annually.

This set of charts shows the income account, profit and loss account, balance sheet and important physical and traffic statistics for 110 railways, 80 for the fiscal year ended June 30, 1909, and 30 for the calendar year ended Dec. 31, 1909. The figures given show not only the total amount of the various accounts as given in the annual reports of the railways, but they are also worked out on unit bases to afford comparisons between the different roads. Each chart contains figures for a group of roads operating in the same section of the country and presumably under more or less similar conditions. The object of the analysis is to reduce the figures to units which are logically comparable for different roads. Earnings, for instance, are given on a per mile operated basis, on a per revenue train-mile basis, and on per ton-mile and per passenger-mile bases; and the same kind of painstaking comparison is made between different classes of expenses. The balance sheet shows capitalization on a per mile-owned basis. Before the classification of revenues and expenses prescribed by the Interstate Commerce Commission was put into effect it would have been impossible accurately to compare in detail a number of roads in the way that the Copeland analysis does. Now, even since the adoption of the classification by all important roads, it would take a skilled statistician many hours, if not days, to make as careful an analysis of a single road's annual report as is made for each of these 110 roads. One entirely unfamiliar with the form and meaning of railway accounts could not learn anything in particular from these comparative analyses. They should be, however, of very great value to those who understand the meaning of railway accounts, and their value increases in proportion to the greater knowledge that is possessed by the one who uses them.

Probably there are no unit figures of comparison between different roads that are entirely satisfactory, but having at one's command unit figures for a great number of roads adds immensely to the accuracy with which one can judge of the earning power, adequacy of maintenance expenditures, financial condition, etc., of any one given road. For instance, it may mean comparatively little to know that a given road spent \$600 for repairs and renewals of passenger cars in a given year, but if this unit figure can be readily compared with the sums spent by a number of other roads operating in the same territory, and under like conditions, the figure for the given road takes on some meaning. The entirely unique feature of the analysis is the care and thoroughness with which figures are reduced to units that have a real meaning, as, for instance, in the case of repairs and renewals of equipment, which figures are shown not on a basis of mileage operated, which is entirely illogical but is nevertheless often used in making comparisons, but on a basis of cost per unit of equipment and cost per mile run per unit of equipment. Besides this unique feature the analysis gives figures that are uniform, both for what they represent and in their method of derivation, a result that would have been impossible before the railways were compelled to make returns to the Interstate Commerce Commission.

The charts should prove of great value to the statistical department of any bank or bond house dealing in railway securities, and should also be of much use to the higher officers of railways, more especially to higher financial officers, but also to the higher engineering and operating officers. The work is in a class entirely by itself as far as we know. Manuals containing railway and industrial statistics are avowedly for reference only, and it is necessary to go to the annual reports or to the returns to the Interstate Commerce Commission to get more detailed figures. In the Copeland analysis all the essential figures that most railway reports contain are given and in addition there is a wealth of information in the form of derived figures that lays before one facts from which it is possible to form an intelligent judgment about a property.

Letters to the Editor.

LOCOMOTIVE HEADLIGHTS.

London, N. Y., June 27, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In the article on Locomotive Headlights, in your issue of June 20, you say that the original purpose of carrying a light at the head end of a locomotive was probably to enable the engineman to see obstructions on the track ahead.

Is this historically correct? It has always been my opinion, and I believe that the history of the locomotive headlight on English railways will corroborate it, that the original purpose of the locomotive headlight was simply to indicate the front end of the train, or, if you prefer, the direction in which the train was moving.

From my own railway experience, I am also of the opinion that to-day the primary use of the headlight is to indicate the direction in which the train is headed, and that any assistance that the headlight may be to the engineman in enabling him to see obstructions on the track ahead is incidental rather than essential.

ALEX. P. GEST,
Superintendent.

DISTANT SIGNALS THAT ARE TOO DISTANT.

Chicago, June 17, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In your criticism June 10 of my remarks on distant signals, I think you were acting under a misapprehension. What I had in mind in saying that the distant indication might be valueless if placed too far away from the home signal, was the situation where such distant indication is from two and one-half to five miles away, as quite frequently happens, especially on single track. I believe that you will agree with me that in such cases very little dependence can be placed on the distant indication. I do not consider 4,000 or 5,000 ft. an excessive distance.

As to the matter of handling trains of different speeds and classes, you will see what my ideas on the subject are by referring to a letter of mine which you published some time ago. This was illustrated with several diagrams showing signal aspects.

I think a careful reading of my article will show that what I recommended as best practice was the use, where blocks must necessarily be very long, of intermediate distant signals; and that I merely suggested that possibly in some cases it might be as well to omit the distant indication altogether. I could refer to several roads where such practice is consistently followed.

W. H. ARKENBURGH,
Special Engineer, Rock Island Lines.

Chicago, June 20, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have read the article in your issue of June 10, by Mr. W. H. Arkenburgh, on "The principles governing the arrangement of automatic block signals." There are some good points in this article, but I would particularly criticize that part of it relating to distant signal indications. I am inclined to the opinion that his statements are his own personal deductions rather than something supported by any operating officer with whom he may have come in contact, as your editorial suggests. Several western roads have installed three-position signals, and others are beginning to do it; and certainly Mr. Arkenburgh's statement, that the distant signal ceases to be of practical value and is an absurdity, is not a fact borne out by the results obtained on the Rock Island road, where three-position signals have been in use for some years on lines of both heavy and thin traffic and where a large number of this particular type of signal is being installed every year.

A. G. SHAVER,
Signal Engineer, Rock Island Lines.

PROFITS OF AMERICAN RAILWAYS, AS ILLUSTRATED BY THE ILLINOIS CENTRAL.

BY HOWARD G. BROWNSON, PH.D.,
University of Pennsylvania

At the present time there is a widespread feeling throughout the United States that incorporated industries are receiving excessive profits at the expense of the general public. The railways, on account of their public nature and their monopolistic character, have been singled out for especial criticism. In a specific way this attitude has found expression in heavily increased taxation and a persistent demand for material reductions in both freight and passenger rates.

The strength of the movement lies in its vagueness. The press and public speakers have flooded the country with general statements accusing the roads of receiving larger profits than they should, and these accusations are believed by large portions of the population. The saying goes, "Where there is smoke there is fire," and despite the vague and general character of many of the charges and the sensationalism of popular writers there is ample evidence to show that the owners of not a few roads, for example, the Union Pacific, have received handsome returns on their cash investment.

Nevertheless, the careful student of railway capitalization must ask the question, Are all the elements of the problem taken into account even in the flagrant cases of stock watering? A half truth is often more dangerous than an absolute falsehood and the calm judgment of the American people should insist on examination of railway capitalization that takes into consideration all the factors. Then, and then only, has the public a right to make a decision.

Unfortunately, the history of American railway finance has been so checkered that it is almost impossible to-day to extract from the maze of stock and bond issues a correct statement of the present cash investment in our transportation system as a whole. Stock watering, necessary and unnecessary discount on securities, capital expenditures made from income, tremendous obsolescence of property due to progress and improvements, accompanied by equally great appreciation of real estate, poor accounting, and unwise, sometimes fraudulent, financial management, all have combined to make any estimate of present cash investment a Chinese puzzle.

While reasonable knowledge of investment in railway transportation is impossible for the roads as a whole it is not for a few conservatively managed and operated systems such as the Pennsylvania, the Chicago & North Western, the Burlington and the Illinois Central. In systems of that type a careful and detailed study of the mass of data contained in published reports should establish with a reasonable margin of error the approximate cash investment in the property and the net return to the different classes of investors. After all, it is unlikely that a marked difference should exist in the return on cash investment made on different large systems in the same territory for a period of, say, fifty or sixty years. Stock watering and errors in accounting can affect only the nominal returns.

Of the various large roads just mentioned the writer has chosen the Illinois Central Railroad for two reasons. In the first place, during the past four years he has made a careful study of its history and of its traffic, operating and financial statistics for a history of the system now in preparation. In the second place, the Illinois Central is typical of what is best in American railway management. It has had a continuous history of slightly over sixty years. Its management, especially in financial matters, has been conservative; it has been operated solely in the interest of its shareholders and of the public; its sound credit has enabled it to acquire dependent lines at reasonable prices and on a cash basis; and, above all, the accounting systems of the parent and most of the acquired lines have been reliable, reasonably accurate, fairly detailed and kept in accordance with the best practices of the times.

Moreover, such a study is of more than ordinary interest on account of the typical character of its territory. The Illinois Central, extending as it does from Omaha and Chicago on the

north to New Orleans and Savannah on the south, includes a territory where differences in climate, population, physical conditions, business methods, industrial pursuits, nature of traffic and standards of operation make the returns of the road fairly typical of the country as a whole.

The primary object of this study is to ascertain just what has been the cash investment in the undertaking and what profits the owners have made on their cash investment. The legal organization of the system is rather complicated and in its public reports there has been a considerable amount of error, omission and duplication. For the sake of simplicity the statistics are confined to those lines operated directly by the Illinois Central Railroad Company (excluding the Yazoo & Mississippi Valley, the Indianapolis Southern and the Central of Georgia) a total of 4,550.54 miles, and the balance sheet and income accounts have been rearranged so that assets, capitalization and income cover the same mileage. As indicated later, the assets have been placed on what is practically a cash basis while discounts, stock dividends, etc., have been eliminated. In brief, the aim has been to rearrange the accounts as if the Interstate Commerce Commission classification of accounts had been in effect since 1851.

At first sight it seemed utterly hopeless to adjust to that standard accounts of some fifty odd corporations extending over a period of sixty years, especially when poor accounting methods or destruction of reliable statistics made most of the reports almost worthless. However, as the figures have been patiently examined it has been possible to secure results with the probability of only reasonable error.

The annual reports of the companies to their shareholders, to Poor's Manual of Railroads and to the state and federal railway commissions have been the basis of estimates. Those reports are of three kinds: (a) those of the I. C. R. R. Co. proper; (b) those of subsidiary lines built by the I. C. R. R. Co.; (c) those of subsidiary lines purchased or leased by the I. C. R. R. Co.

The annual reports of the I. C. R. R. Co. give detailed information as to all construction work and improvements handled by that company and as to cash received from practically all securities sold directly to the public. From them it has been possible to secure an itemized statement of the cost of the I. C. R. R. proper (705.5 mi.) and capital expenditures on acquired lines (except D. & S. C.) after acquisition, cash paid in by shareholders, net receipts from sales of land grant, net increase applied to capital account, and cash received from I. C. R. R. mortgage bonds. These statistics agree with the sworn statements submitted to the Illinois Railroad and Warehouse Commission and to the Interstate Commerce Commission, and all accounts prior to 1876 were carefully examined by a special committee of English and Dutch stockholders.

In addition to the itemized expenditures of the I. C. R. R. Co. there exist complete statements of the cost of the subsidiary lines built directly by the I. C. R. R. Co. These statements can be found in the offices of the Iowa, Wisconsin and Illinois railway commissions or in reports of the Illinois Central.

These two sources cover \$229,163,229.52 out of the estimated assets of \$316,543,690.56; and, unless there is actual fraud in the accounts of the corporation, may be taken as substantially correct.

The accounts of subsidiary roads built independently of the Central and subsequently acquired are a serious source of error. In practically all instances, however, an itemized statement of original cost of construction was secured. With those statements as a basis all subsequent changes in the balance sheet were carefully checked with amounts received from sale of securities, increases in equipment, improvements in right of way and construction account, growth of both gross and net earnings, market value of property, etc., etc. Rough approximations of probable cost of construction were made and any variations from this standard were examined. Maintenance charges per unit of equipment or track were checked

up. Where evidence showed a depreciation of property the assets were written down in a liberal manner. In the case of the southern roads very heavy amounts were written off for depreciation during and after the civil war. Since the cost of a given amount of equipment is easily ascertainable and since right of way and terminal construction in a level country will have a cost somewhere between known maxima and minima, any padding of construction or capital accounts of material extent becomes evident. Thus, by checking the expenditures of one road against those of other roads in similar territory a further check was obtained. Moreover, when the companies were purchased by the Illinois Central the estimated valuation of assets had an additional check in the cash or cash equivalent price paid by the purchaser. The writer, so far as he has willingly erred, has erred on the side of conservatism, and it is his opinion that many of the statements are too low.

The total estimated cost of these acquired lines at time of purchase amounted to \$87,380,461.04, or approximately \$11,000,000 in excess of the cash investment of the I. C. R. R. Co. Against this should be set approximately seven to eight millions of net earnings applied to construction account during the period of reorganization and not taken into account in the company's reports. Since all the lines, with the exception of the Dubuque & Sioux City and the St. L., A. & T. H., were purchased at foreclosure sale, mostly at a time of panic, it is reasonable to infer that the original investors lost very heavily, particularly in the case of the southern lines.*

On the whole, the greatest source of danger lies in depreciation of property. The writer has no hesitation whatever in saying that the total investment in the system charged to capital account is considerably in excess of even his figures. The lines, particularly since 1890, have been kept up to the best standard of American maintenance, but no one can say whether that is sufficient. Personally, the writer believes the actual cost of duplication on the Illinois Central would run from 20 to 25 per cent. or more below original investment, but if that is true it would apply with greater force to the roads of the country as a whole. The great appreciation of real estate, however, would more than balance any depreciation. For the system the writer hazards an estimate of \$50,000,000 as the present value of the real estate of the corporation in excess of original cost.

As an independent check on the capital expenditures the writer made an estimate of the receipts from securities, income, land, etc., as reduced to a cash basis. Perhaps the best proof of the accuracy of the work is the fact that the estimates of capital expenditures and capital receipts, each made entirely independent of the other, balance within two and a half million dollars, or under 1 per cent. Since practically all securities of the I. C. R. R. Co. were placed at the best current market rates without stock bonuses or other devices of poor credit, the discount is a negligible factor. Three per cent. and 3½ per cent. bonds were sold at discounts of from \$50 to \$300 per bond, but this is only a nominal discount, since the saving in interest is supposed to eliminate the discount by the time the bonds mature. Practically, the capitalization is without water except for less than \$6,000,000 of stock dividends distributed prior to 1869.

With these explanations let us now take up the statements showing the capitalization and return on cash invested in the system. Table 1 is a statement of the cash value of assets for the operated mileage and the par value of securities outstanding in the hands of the public.†

TABLE 1.—Assets and Liabilities, June 30, 1909.

Capital Assets—Railway and equipment.....	\$269,766,000.00
Bonds.....	18,422,000.00
Stocks.....	3,772,334.06
	\$291,960,334.06

*This covers a mileage at time of purchase of something over 2,500 miles of main and branch lines.

†Securities in various trust funds are regarded as in the hands of the public.

‡This and subsequent tables cover merely the mileage operated directly by the Illinois Central R.R. Co.

Current Assets.....	\$15,777,692.58
Deferred Assets.....	2,449,644.92
Contingent Assets.....	8,435,261.10
Total Assets.....	\$316,543,699.56
(In the hands of public.)	
Capital Liabilities—Capital Stock.....	\$199,272,900.00
Issued free stocks.....	9,959,800.00
D. & S. C. stock.....	34,300.00
Stock.....	\$119,297,000.00
Funded debt, Illinois Central R.R.....	\$119,899,000.00
Funded debt, C. St. L. & N. O.....	16,154,000.00
Funded debt, D. & S. C.....	2,766,000.00
Funded debt, C., A. & N.....	60,000.00
Funded debt.....	\$138,166,143.80
Current Liabilities.....	\$25,166,143.80
Deferred Liabilities.....	9,324,883.90
Contingent Liabilities.....	3,047,413.46
Miscellaneous—Miscellaneous funds.....	1,283,001.89
Surplus.....	\$36,454,289.53
	\$39,268,457.98
	\$44,724,747.51
Total Net Liabilities.....	\$316,543,699.56

*Excludes \$25,000,000 4 per cent. collateral trust bonds of 1903, representing investment in Yazoo & Mississippi Valley R.R.

For the operated mileage, therefore, the net liabilities in the hands of the public are less by nearly \$45,000,000 than the cash value of the assets exclusive of real estate appreciation. Since the present liability of 3 per cent. and 3½ per cent. long time bonds is under their nominal par the real surplus is very much larger.

Table 2 shows the net cash receipts of the system applicable to capital amounts and the sources of expenditure. Allowance has been made for refunding operations, and securities used to purchase subsidiary lines are rated at equivalent cash price.

TABLE 2.—Cash Receipts and Expenditures on Capital Account—March 20, 1851, to June 30, 1909.

Receipts	
Capital stock—Illinois Central R.R.....	\$103,858,740.00
Capital stock—C., S. L. & N. O.....	2,000,000.00
Funded debt*.....	\$105,858,740.00
Net income.....	140,901,720.00
Miscellaneous Liabilities.....	50,450,719.00
Profit on subsidiary lines.....	16,983,099.00
	11,824,754.00
Total Receipts.....	\$326,048,832.00
Expenditures.	
Construction account.....	\$269,766,000.00
Stocks and bonds.....	22,194,380.00
Miscellaneous assets.....	31,310,619.00
Miscellaneous.....	2,757,421.00
Total Expenditures.....	\$326,048,832.00

*The difference between this item and the nominal net funded debt is due to the retirement of \$17,000,000 construction bonds by receipts from the land grant.

It is interesting to note that the shareholders either directly or indirectly have provided over half the entire receipts, although the nominal net debt exceeds the capital account (including leased line stock) by over thirty millions.

In the year 1909 the income account stood as follows, excluding duplication due to inter-system accounting:

TABLE 3.—Income Account.*—Year ending June 30, 1909.

Net operating income.....	\$13,454,229.76
Income from investments.....	697,850.86
Fixed charges.....	\$14,162,080.62
Surplus for the year.....	5,713,078.00
Dividends.....	\$8,449,002.54
	7,752,995.50
Surplus above dividends†.....	\$696,007.04
	Per cent.
Earned on total investment.‡.....	4.48
Net earnings from operation applied to capital acct.§.....	4.79
Paid on total investment.....	4.26
Paid on capital account.....	4.79
Average rate interest—par outstanding¶.....	3.92
Average rate interest—cash dividend||.....	4.39
Dividend rate.....	7.00
Dividend on cash invested by shareholders.....	7.89
Dividend on cash plus accumulations of net income.....	5.04
Applicable to dividends on cash invested by shareholders.....	8.14

*Excludes income received from subsidiary companies.

†This surplus exceeds that given in the annual report by \$162,890.27, most of which is represented by net earnings expended in D. & S. C.

‡Total income applied to balance sheet statement of assets.

§Net earnings from operation applied to construction account plus cash, supplies and other strictly cash assets.

¶Fixed charges less sinking fund charges, rentals of line and interest paid on money borrowed.

||Excludes from funded debt \$14,000,000 retired by receipts from land grant.

Considering that the average rate of interest on good investments such as P. R. R., U. P. R. R. or I. C. R. R. 4 per cent. bonds for 1909 was over 4 per cent., the above shows that the net return on the investment in the Illinois Central was not particularly remunerative. A single year, however, is a very poor criterion of a company's earning capacity, and to show the profits of the railway there is attached Table 4, which gives the net results for 52 years from 1858 to 1909.

In this table, capital account includes construction account (i. e., railway and equipment) plus supplies, cash and miscellaneous assets of tangible character, but not securities, paper or other forms of non-tangible assets.

Col. A—Net earnings from operation applied to capital account.

Col. B—Dividend rate.

Col. C—Net income applicable to dividends applied to cash invested by shareholders.

Col. D—Dividends paid applied to cash invested by shareholders.

Col. E—Dividends paid applied to bid, plus accumulations of surplus, i. e., equity of shareholders.

TABLE 4.—Return on Investment. (See Notes below.)

Year.	A.	B.	C.	D.	E.
1858.....	1.55	..	*6.65	.....	.....
1859.....	1.78	..	4.32	.....	.....
1860.....	3.02	4	0.67	0.71	0.71
1861.....	4.04	4	1.96	1.88	1.88
1862.....	5.39	4	4.81	2.08	2.08
1863.....	6.75	6	9.95	5.17	5.17
1864.....	7.33	8	12.32	8.00	8.00
1865.....	6.47	10	10.23	10.77	10.77
1866.....	6.37	10	9.95	11.85	11.85
1867.....	7.22	10	13.43	11.85	11.85
1868.....	7.15	10	13.24	11.85	11.85
1869.....	8.45	10	15.21	12.80	12.80
1870.....	7.52	10	14.45	12.80	12.80
1871.....	6.96	10	12.43	12.80	12.80
1872.....	5.73	10	8.46	12.80	12.80
1873.....	7.35	10	13.10	12.80	12.80
1874.....	6.97	8	10.93	9.95	9.95
1875.....	6.91	8	9.60	9.95	9.95
1876.....	5.72	8	7.21	9.95	9.95
1877.....	6.40	4	8.91	4.97	4.97
1878.....	7.04	6	10.50	7.48	7.30
1879.....	7.38	6	11.83	7.48	7.11
1880.....	7.95	6	13.06	7.48	6.82
1881.....	7.32	7	11.94	8.73	7.60
1882.....	7.72	8	14.90	8.73	7.35
1883.....	6.90	8	15.91	9.95	7.81
1884.....	6.21	12	13.06	9.95	9.55
1885.....	6.11	8	12.07	8.95	7.86
1886.....	5.92	7	11.40	8.73	6.83
1887.....	5.89	7	12.91	8.73	6.55
1888.....	4.23	6	6.80	6.95	5.37
1889.....	4.69	3	3.87	3.47	2.69
1890.....	4.48	6	7.59	6.95	5.36
1891.....	4.17	5	5.68	5.69	4.51
1892.....	4.07	6	5.73	5.69	4.50
1893.....	4.45	5	5.89	5.69	4.56
1894.....	4.83	5	6.65	5.62	4.54
1895.....	4.86	5	5.96	5.62	4.49
1896.....	4.80	5	6.57	5.58	4.41
1897.....	4.24	5	5.92	5.58	4.48
1898.....	4.93	5	9.33	5.58	4.46
1899.....	4.75	5	9.21	5.58	4.34
1900.....	5.08	5.05	10.59	6.04	4.74
1901.....	5.41	6	11.62	6.58	4.85
1902.....	6.83	6	13.08	6.46	5.03
1903.....	5.68	6	11.99	6.88	4.96
1904.....	5.91	6	9.90	6.38	4.75
1905.....	5.57	7	11.31	7.42	5.39
1906.....	5.88	7	12.12	7.49	5.15
1907.....	6.37	7	13.01	7.42	5.07
1908.....	4.74	7	8.92	7.42	4.39
1909.....	1.39	7	7.88	7.39	5.04
Average.....	5.69	6.62	9.48	7.60	6.61

* Deficit.

Column B, D and E, interest dividend on full paid stock 1860-1865, 1880-

1899, half from sinking fund 1866-1889.

Column C, interest dividend on cash invested at 4 per cent. should be

added to the table. (This is taken account of in the average.)

Column 1877 marks the beginning of the real accumulation of surplus

capital. Prior to that year earnings and losses had

anced each other.

The next query is: How much is the property worth at the present time? There can be no better standard than that of the stock market. At date of writing, March 31, 1910, Illinois Central stock is selling for 140, or \$153,014,400 for the 1,092,960 shares outstanding, just \$19,175,660 more than the cash actually paid in. This price is considerably under the average of the past ten years. In other words the shareholders, i. e., the owners, of the Illinois Central have received, during the past 52 years, an average dividend of 7.6 per cent. on the cash actually invested and in addition have a property

worth at least \$50,000,000 more than that which they put into it.

It should be noted, however, that a large share of this surplus is due to the original federal land grant. The federal government, through the state of Illinois, gave the railway 2,500,000 acres of land to have a direct rail line from Chicago to Mobile. Had it not been for this aid the road would not have been built for at least a decade, perhaps never, and the profits from this grant must be regarded as a bonus given by the government for military and political reasons. From 1851 to 1906 the company received from the land grant a net total of \$27,725,689.29. In return the state of Illinois has received from \$250,000 to \$700,000 a year in taxes (7 per cent. charter tax) over and above the average paid by other Illinois roads. Allowing for enhanced credit, interest on receipts from grant in excess of payments to the state, etc., etc., the land grant might be regarded as responsible for \$20,000,000 to \$25,000,000 of the surplus.

Omitting this special feature, which is not applicable to most of the roads east of the Mississippi river, the profits of the shareholders may be stated as an average dividend of 7.6 per cent. and a surplus derived from railway rates of from \$25,000,000 to \$30,000,000.

Whether this seems large or small depends on the viewpoint of the reader. To a banker accustomed to 10 per cent. or 15 per cent. dividends and a surplus of 100 per cent. to 1,000 per cent. this is very small; to the investor in 3 per cent. government bonds it spells extortion and exploitation of the public. Every profit, however, is largely relative and it is so with the profits of the railway. To do justice to the corporation and the public it may be well to judge the returns by a threefold standard: (1) the service of the railway to the public; (2) the methods by which the road has secured its profits; (3) the profits of other industries in the territory.

The easiest statement of the service of the railway is to compare the Mississippi Valley in 1851 and 1909. In the earlier year Illinois had a population of 850,000 scattered along the navigable streams. The remainder of the Mississippi Valley was settled to about the same extent. Agriculture carried on in isolated farms or plantations was the well nigh universal rule. The yoke of oxen and the flatboat were the means of transportation, and they typified the economic conditions of the period: industry backward, social life crude, political conditions those of the frontier.

What a contrast to-day as one travels southward from Chicago on the New Orleans Limited! Fertile fields of corn and cotton cultivated by scientific methods; great industrial centers producing goods for a world market; a thickly settled territory peopled with as progressive and intelligent a population as can be found anywhere in the world!

To attribute these changes to the facilities introduced by the Illinois Central and other railways of the territory is to do no more than state an historical fact. The Mississippi Valley of the Twentieth Century is possible only by means of modern railway transportation.

The influence of the railway may be stated in a more specific way by a comparison of traffic statistics of the Illinois Central:

	1859.	1909.
No. tons of freight.....	142,433	24,876,666
No. tons moved 1 mile.....	31,650,364	6,042,796,832
No. of passengers.....	600,875	32,668,388
No. passengers moved 1 mile.....	88,404,814	691,733,048
Ton-miles per mile of road.....	73,263	1,587,371
Passenger-miles per mile of road.....	34,660	130,125

Where, in 1860, there was a single line southward from Chicago and East Dubuque to the comparatively unimportant city of Cairo there are now lines connecting practically every important city in the Mississippi Valley.

The vast increase in traffic has been accompanied (perhaps caused) by a marked decline in the average rates:

	1859	1909
Average receipts per ton-mile.....	2 11 cts.	0.506 cts.
Average receipts per passenger-mile.....	9.11 cts.	1.836 cts.

In 1851 Vice-President Neal, in an official report, suggested that the road might haul corn profitably for 1 cents per ton-

mile, in 1909 it hauled corn from Chicago to New Orleans for 4 cents per ton-mile. Coal from southern Illinois and Kentucky competes in the Chicago market with lake-carried eastern coal; the grain of Illinois and Iowa competes in Liverpool with grain from England and Russia. The reductions in charges are even more significant when taken in connection with the important improvement of both freight and passenger service that makes difficult any real comparison. Perhaps the saving to the public can be emphasized in no more striking way than by the fact that had the average rates for 1859 been in effect in 1909 the railway charges would have been \$94,932,145 more than they were. That the railway has performed for the public an exceedingly important service not even its most rabid opponent can deny.

The next question is: What methods has the railway pursued to secure its profits? The answer is simple: By important technical improvements in its plant and a better utilization of its capital and employees. Consider the following figures:

	1862.	1909
Ton-miles per dollar of capital.....	3.4	21.4
Ton-miles per employee.....	288,000	1,510,000
Freight train expenses, per train-mile, ct.....	.216	.118*
Freight repairs, per train-mile, ct.....	.218	.118*
Total operating and maintenance.....	.466	.3198*
Maintenance of way per ton-mile, ct.....	.455	.125
Interest and dividends per ton-mile.....	1.39	.339
Transportation expenses per ton-mile.....	.61	.26
Tons per freight train.....	81.1	355.10
Average load per freight car, tons.....	3.2	23.04
Ton-miles per freight car.....	53,819	112,111
Ton-miles per mile of road.....	73,263	1,587,371

*1906.

Despite the reduced cost of certain items, such as rails and machinery, it is questionable whether one dollar of capital in 1909 would go much, if any, further than fifty years earlier. On the other hand, the wages of labor—the big item in expense of operation—have increased from 50 per cent. to 200 per cent., according to the class of work. Thus, the marked decreases in expense of operating the road have been obtained only by constant exertion on the part of the management. The company has followed the good business policy of doing a greatly increased business at a smaller profit per unit—witness the reduction of profits per ton-mile from 1.39 cents to .339 cents. In addition, it has been able—by improved methods of operation—to cut in half the actual cost of moving the traffic. With constant demands for improved service, with a steady increase in the rate of wages, with greater demands on the part of the public, the marked reductions in cost of operation, and with them reduced charges to the public, are a tribute to the efficiency of management.

That the railway has committed many sins in the form of secret rebates, unjust discrimination and control of public servants is unfortunate. No one condones such offences. Nevertheless, they are incidents, unfortunate, it is true, but incidents in the development of transportation. They are the outcome of an almost universal system of business practice for which the people, and the people alone, are responsible. Is a railway buying a legislature to secure a necessary franchise which the political machine will not give honestly a greater offender than the farmers who force through legislation giving to a partizan and political railway commission power to arbitrarily reduce rates in their own interest? The railways bribe the legislatures, but who elect men that will be bribed? The railways give illegal rebates, but who elect the judges and executives who should enforce the law? Before the general public judge too harshly the past sins of the railways it might be well for each individual to scrutinize most carefully the honesty of his own gains. "Let him that is without fault cast the first stone."

The third basis of comparison is the profit made by comparable industries. Like must be compared with like. The shareholders of the Illinois Central for practically sixty years have assumed the risk of management of one of the largest railway enterprises in the world. They have borrowed vast sums of money, the obligations of which must be met irrespective of business conditions. They have been responsi-

ble to the public for an economical and efficient system of transportation for the millions of people dependent upon the railway. There are not imaginary risks and responsibilities. In 1873-78 the shareholders invested over \$5,000,000 in various southern lines, and for a while this threatened to be a total loss. From 1867 to 1887 the company operated the Iowa lines at a total loss of over a million dollars. A number of bankrupt roads have been purchased and the danger of heavy loss incurred. Since 1867 the company has leased thousands of miles of road and has guaranteed annually millions of dollars of fixed charges. That these undertakings have proven successful is due to the splendid financial credit of the corporation and to its sagacious management. It is an axiom of business, as well as of economic theory, that he who assumes the risks of an enterprise should also receive the profits. The shareholders of the Illinois Central have assumed great responsibility and many risks; it is a clear injustice to measure their profits by the return on perfectly secured first mortgage bonds or on first-class farm liens.

Moreover, the ability of the management must be taken into account. The talents of men are not all alike. Should the profits of a Marshall Field or a John Wanamaker be compared with those of a small merchant unable to rise above his petty surroundings? The Illinois Central has been managed by men of exceptional ability, and the results of their labor should be compared with those of their business equals, not their business inferiors. While the road has not been managed by such brilliant geniuses as Vanderbilt, Gould, Huntington and Harriman, it has had executives of first-class rank. Among the men prominent in the affairs of the road have been lawyers, such as Lincoln, Fentress, Ayes, Dickinson; engineers, such as Robert Mason, Geo. B. McClellan, J. F. Wallace; financiers, such as Robert Schuyler, Geo. Bliss, J. Pierpont Morgan, E. H. Harriman, Levi P. Morton; executives, such as W. R. Arthur, W. K. Ackerman, W. H. Osborn, J. C. Clarke, E. T. Jefferey, Stuyvesant Fish and J. T. Harahan. Unlike many other great undertakings, the road has been operated solely in the interests of its owners and of the public, and if these men of exceptional ability have not all made for themselves distinguished fortunes they have carefully developed the interests entrusted to their trusteeship. In ability of management the Illinois Central compares favorably with other great western enterprises carried on by men such as Gustavus Swift, Philip Armour, Marshall Field, McCormick, Pullman, etc. But where these men started with hardly a cent to their names, the Illinois Central started with an initial investment of nearly thirty millions at a time when capital in the West was very scarce. It is no more than fair to compare the Swift, Armour, Field, McCormick Pullman fortunes with the profits of the owners of the railway.

It is by these standards, therefore, that the profits of the Illinois Central must be judged. It has rendered the public service of tremendous importance; by a management of a high standard of ability it has greatly cheapened the cost of transportation and extended widely the means of communication; as a reward its owners have received good returns on the cash they have invested.

It would be interesting to compare the profits of the railway with other concrete investments, but that is perhaps impossible. In the period under consideration tax free farm mortgages have paid from 5 per cent. to 15 per cent. interest. The Illinois Central has borrowed money at approximately the following rates: 7 per cent. to 1868; 6 per cent., 1868-1880; 5 per cent., 1880-1890; 4 per cent., 1890-1909, or an average of somewhere around 5 per cent. As compared with these returns the railway, viewed as a whole, has earned from its railway business from 1.55 per cent. to 8.45 per cent., an average of 5.69 per cent. The amount actually paid in dividends and interest would run something under this percentage. In 1909, a year under the average, the net amount

paid on the entire investment was just .49 per cent. higher than the interest paid on the cash value of the funded debt, viz., 4.79 per cent. and 4.30 per cent., respectively.

The returns to the shareholders have been much more liberal. The 52-year average has been 9.48 per cent. earned and 7.6 per cent. paid on the cash actually invested; 8.38 per cent. earned and 6.61 per cent. paid on cash investment plus accumulated surplus. In addition, there is an appreciation of value amounting to \$20 to \$30 per share (excluding influence of land grant). During the same period parts of the land grant originally sold at from \$8 to \$15 per acre have increased in value to \$100 to \$225 per acre. But such comparisons are erroneous because they cannot take into account long periods of small gains and even of losses.

It is not the purpose of the writer to draw any conclusions either for or against the corporation. Each reader must be his own judge of the rewards obtained by the Illinois Central management. In drawing those conclusions, however, he should be fair to the corporation as well as to the public. Likewise, it should be remembered that the company has received many favors from the public; it is a public-service corporation; the risks of management are less than in industrial concerns, and the owners are largely trustees to the public.

In conclusion it may be asked how far the returns of the Illinois Central are applicable to the railways of the country as a whole. In the first place, the writer believes that a similar inquiry regarding railways such as the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the Chicago, Rock Island & Pacific, the Chicago, Burlington & Quincy, the Great Northern, the old Chicago & Alton, the Pennsylvania, the New York, New Haven & Hartford, the Louisville & Nashville, and other roads of that type, would tell pretty nearly the same story. The rewards of capital and business ability have been high during the past half century and the railways have shared in the distribution.

In the second place, a careful distinction should be made between the profits of the railway as a whole, and that of either the shareholders or of a few manipulators on the inside. The majority of readers will admit, I believe, that the return on the total investment, 5.69 per cent., is not excessive considering the risks and dangers. The shareholders of the railway have secured considerably larger returns because, first, they assumed all the risk and borrowed money at less than 5.6 per cent. from conservative investors; second, they reinvested a large part of the surplus, thereby guaranteeing the permanence of a fair dividend rate. Had a more speculative management been in control the total earnings of the road would not have been any greater (assuming corresponding ability of management) but the division between stock and bond holders might have been radically different. For instance, had the stockholders invested, say, a half or a third the capital they did they would have earned, at times, perhaps 20 per cent. to 30 per cent. on the cash investment; at other periods they could not have met interest charges and might have lost their original investment. Speculative reorganizations might have followed by which a few financiers on the inside would have made large profits at the expense of the unfortunate stockholders.

While the Central has a considerable monopoly of its territory it is also subject to fierce competition; its important business, viz., from Chicago to St. Paul and Omaha, to St. Louis, to Memphis, to Birmingham, to Louisville and to New Orleans is strongly competitive. As a result its rates are made very largely, if not entirely, independent of the amount or character of its capitalization. On the Chicago-St. Louis business the undercapitalized Illinois Central line shares the same rate with the overcapitalized Alton and Wabash. Had the Illinois Central line from Otto to East St. Louis cost the Central \$10,000,000 or \$15,000,000 instead of \$5,589,439.98 the gross and net receipts could be no larger. If the total cash invested in either the Alton or the Wabash could be obtained it is doubtful

whether the average return would be radically different from that on the Central; except, perhaps, for better management on the part of the Central or the Alton.

In 1876 the Illinois Central had some \$5,000,000 tied up in the southern lines which threatened to be a total loss. This caused a bad slump in the stock, so that full paid shares dropped to 40. W. H. Osborn, practically in charge of the road, could have so manipulated affairs that a large number of the shareholders would have sold at this low price. There was an opportunity to make millions of dollars. Instead, the management advised the shareholders not to sell, and eventually turned the threatened disaster into the most profitable and brilliant extension of the railway. They made millions for their shareholders, but they lost an opportunity to make fortunes for themselves.

As James J. Hill has repeatedly emphasized, the present is a time when the transportation facilities of the nation need billions of additional capital. It is time that the public awake to the facts of railway history. The popular writer, the politician and the man with an axe to grind have exposed the skeleton in the railway closet, and in exposing the methods by which some great fortunes have been made have intentionally or unintentionally led the public to believe that the skeleton inhabited the whole house. It is well that the story of fraud, of rebates, of mismanagement of property and betrayal of trust be told; it is equally important that the public realize the value of the services rendered by the railways of the country.

If secret rebates exist, enforce the law against shipper and carrier. Legislatures and the judiciary are unduly influenced? Remove the conditions which make such things possible. Stockholders and investors are robbed by those to whom they entrusted their property? Turn the searchlight of publicity on every corner of the closet and let the accumulation of filth and dirt be impossible. But also let the splendid record of many American railways be known for what it is worth. Let men like Stuyvesant Fish, W. C. Brown, A. J. Cassatt and the thousands of others who have placed the interests of their shareholders above their personal profits have credit for what they have done.

The writer leaves to the reader judgment as to the justness of the profits received by the shareholders of a railway such as the Illinois Central. Seven and eight per cent. dividends may be too small; they may be too large. Be that as it may, let the comparison be made with what the railways have done and with what the profits made in other lines of industry. Excessive profits to those who invest their money in safe undertakings is one thing; reasonable returns to those who have borne the heat and toil of past economic developments is quite another matter. A poorly paid laborer gives poor results; a well paid laborer usually gives good results. In all the problems of railway rates, regulation of public service corporations, etc., the public must still answer the old question: Is not the laborer worthy of his hire?

ELECTRIC LINES IN TURKEY.

Reouf Bey, acting consul general of Turkey at New York, has announced that the ministry of public works in Constantinople has opened bids for building a system of electric trolley lines in and around Constantinople. The successful bidders are offered the franchises of five lines decided on by the government, and such additional lines as the bidders may propose and the government finds desirable. The time for the submission of the projects is six months. Specifications can be had from the Turkish consulate at New York. The five lines proposed by the government are: From Chichli to Kilios on the Black Sea, along the European shore of the Bosphorus to Buyukdere and traversing the Foret de Belgrade; from Scutari to Kadikuey and Moda; from Yedikoule to Chichli and the Sweet-Waters-of-Europe; from Scutari to Alemdagh; from Scutari to Beicos and the Mountain of Geant.

RAILWAY BUSINESS MAIL.*

OFFICE OF THE

NEW YORK,

MEMORANDA FOR THE GUIDANCE AND INFORMATION OF
EMPLOYEES OF THE NORTH & SOUTH RAILROAD CO.
IN THE HANDLING OF RAILROAD BUSINESS MAIL.

MATTER WHICH WILL BE CARRIED AS RAILROAD
BUSINESS MAIL.

LETTER MAIL ON NORTH & SOUTH R. R. CO.
MAY BE EITHER SEALED OR UNSEALED.

Relates to
Letters and communica-
tions entirely written.
Letters and communica-
tions partially written
and partially printed.

1. Letters and other communications, relat-
ing to the business of the North and South Rail-
road Company, exchanged between officers, agents and employees of the Company.

LETTER MAIL TO IMMEDIATELY CONNECTING ROADS.

Relates to
Letters and communica-
tions entirely written.
Letters and communica-
tions partially written
and partially printed.

2. Letters and other communications relat-
ing to the business of this Company and immedi-
ately connecting railroad and transportation
companies, exchanged between such companies,
may be carried to and from authorized junction
points.

PRINTED AND OTHER MATTER, ON NORTH & SOUTH
R. R. CO., AND TO OR FROM IMMEDIATELY
CONNECTING ROADS.

MAY BE EITHER SEALED OR UNSEALED

Relates to
Printed matter.
Advertising matter.
Returned baggage checks.
Freight tariffs.
Passenger rate sheets.
Time tables.
Claim papers.
Car tags.
Blue prints.
Waybills, copies, abstracts
and corrections of same.
Tracers.
Car reports.
And any other matter re-
lating to business in
which the North & South
Railroad Company par-
ticipates.

3. All classes of printed and other matter,
in which this Company is interested, destined to
points on North & South Railroad; also to or from
immediately connecting roads, may be carried on
the North & South Railroad to and from author-
ized junction points.

Packages destined to connecting roads or
beyond are limited in weight to ten (10) pounds.

Waybills should be enclosed in special envel-
opes bearing imprint "Waybills," and plainly
marked via route of the shipment.

If contents cannot be inspected without dam-
aging wrapper, package must bear label reading
"Printed Matter."

PRINTED AND OTHER MATTER TO OR FROM ROADS
BEYOND IMMEDIATE CONNECTIONS.

UNSEALED ONLY.

Relates to
Printed matter.
Advertising matter.
Returned baggage checks.
Freight tariffs.
Passenger rate sheets.
Time tables.
Claim papers.
Car tags.
Blue prints.
And any other matter of
like character relating
to through business in
which the North & South
Railroad Company par-
ticipates, not letters, and
not classed by Post-Office
Department as letter
mail.

4. All classes of printed matter and any other
matter of like character unsealed, in which this Com-
pany is interested, which are not letters and not
classed by the Post Office Department as letter mail,
exchanged to or from roads beyond immediate
connections, may be carried on the North & South
Railroad to or from authorized junction points.

When it is desired that a letter of transmittal
should accompany such packages addressed to or
from roads beyond immediate connections, such
letter must be enclosed in sealed government
stamped envelope, the stamp being embossed on
the envelope. The date of the letter must be
written or stamped on the face of the envelope.
The opening of the envelope cancels the stamp.
The ordinary postage stamp applied by mutilage
cannot legally be used. The government stamped
envelope of a sufficient denomination to cover its
contents must be attached to the outside of the
package.

Packages from or destined beyond immediate
connections are limited in weight to ten (10) pounds.

Packages must be so wrapped that they are sub-
ject to inspection and should be marked "Printed
Matter," or "Claim Papers," etc.

Relates to
Letters and communica-
tions entirely written.
Letters and communica-
tions partially written
and partially printed.
Printed matter, etc., cov-
ered by Rule 2.

MAIL TO OR FROM INDIVIDUALS OR COMPANIES
OTHER THAN RAILROADS.

MAY BE EITHER SEALED OR UNSEALED.

5. Letters and other communications, relat-
ing to business of this Company, exchanged be-
tween this Company and

Express companies,
Telegraph companies,
Sleeping and parlor car companies,
Passenger or baggage transfer com-
panies,
News companies,
Co-operative freight lines,
Operating associations,
Traffic associations,
Demurrage bureaus,
And such concerns and individuals
that do business with (or over the
lines of) this Company,

*provided such letters and communications are
handled only by agents and employees of the
sender and those addressed.*

Relates to
All mail matter.

6. All matter specified in these rules that
may be carried as railroad business mail should be
clearly addressed, and if destined to points beyond
this road must bear route and junction points, and
in addition to other marks be plainly marked with
initials "R. R. B." and the name of the forward-
ing company.

MATTER WHICH WILL NOT BE CARRIED AS RAIL-
ROAD BUSINESS MAIL.

Relates to
Letters and communica-
tions entirely written.
Letters and communica-
tions partially written
and partially printed.
Printed matter, etc., cov-
ered by Rule 3.

7. Letters and other communications of any
character not relating to business of the North &
South Railroad Company.

Relates to
Letters and communica-
tions entirely written.
Letters and communica-
tions partially written
and partially printed.

8. Letters and other communications to and
from foreign roads which have no immediate con-
nection with the North & South Railroad Com-
pany.

Relates to
Letters and communica-
tions entirely written.
Letters and communica-
tions partially written
and partially printed.

9. Letters and other communications be-
tween connecting roads and their local agents
situated along the lines of this Company.

Relates to
Letters and communica-
tions entirely written.
Letters and communica-
tions partially written
and partially printed.
Printed matter, etc.,
covered by Rule 3.

10. Letters and other communications, relat-
ing to business of this Company, exchanged
between this Company and

Express companies,
Telegraph companies,
Sleeping and parlor car companies,
Passenger or baggage transfer com-
panies,
News companies,
Co-operative freight lines,
Operating associations,
Traffic associations,
Demurrage bureaus,
And such concerns and individuals
that do business with (or over the
lines of) this Company,

*unless such letters and communications are han-
dled only by agents and employees of the sender
and those addressed.*

Relates to
Letters.

11. In general no company or carrier nor any
officer or employee thereof may carry letters in the
railroad business mail which are neither written by
an officer or employee of the Company nor ad-
dressed to it.

Relates to
All mail matter.

12. No packages will be handled to or from
connecting roads exceeding ten pounds in weight.

Relates to
All mail matter.

13. No matter will be accepted unless it
bears the name of the forwarding company and
marks indicating that its content is railroad busi-
ness mail.

*Code of Rules reported by a Committee at the Association of Transporta-
tion and Car Accounting Officers, suitable for any railway, but worded as
though prepared for the "North & South Railroad"

GENERAL.

Relates to
All mail matter.

14. In case of doubt always use United States Mail and immediately submit question for decision to *

* Designate officer.

TRANSPORTATION AND CAR ACCOUNTING OFFICERS.

The thirteenth meeting of the Association of Transportation and Car Accounting Officers was held at the Antlers' Hotel, Colorado Springs, Colo., June 21 and 22, representatives of over one hundred railways being present.

The delegates and their families were welcomed by the mayor of Colorado Springs, following which A. D. Parker, vice-president of the Colorado & Southern, gave an interesting talk.

The report of the executive committee indicates a membership of the association of 218 railways, operating 232,556 miles and having in service 2,323,107 cars. An amendment to the constitution was adopted authorizing the appointment by the executive committee of an assistant secretary. An amendment to the by-laws was also adopted changing the name of the committee on car service and per diem to that of committee on car service. It was decided to hold the next meeting of the association at Chicago December 13 and 14, 1910, and the summer meeting next year at Cape May City, N. J., June 20 and 21.

The opinion of the committee on car service that a uniform embargo notice is impracticable was concurred in. The opinion of the committee that no change is necessary in Rule 7 of the per diem rules was concurred in, as was the opinion that no change is necessary in the definition of the term "Switching Service" in the per diem rules. The committee was instructed to prepare for submission at a later meeting amendments to the per diem rules to cover the payment of per diem on all railway cars every day that the same are on foreign lines, including new cars en route from builder to owner, with provision for reclaim if mutually agreed upon.

The report of the Committee on Office Methods and Accounting, recommending the practice of not including the deliveries of more than one date on a junction on report, was adopted. The association adopted the committee's recommendation with regard to showing reporting marks at the head of each column of the per diem report and the entering thereon of each car number in full for every car shown; it being the consensus of opinion that abbreviations in the number or initial will result in errors. The recommendation of the committee with reference to the receiving road retaining the best carbon copies of interchange reports, the printing of interchange reports on a bond paper weighing 16 pounds to the ream of 500 sheets 17 in. x 28 in., and the necessity for checking of information in interchange reports by proper representative of the receiving road before certification was adopted as the recommended practice of the association.

The association recommends the practice of calling attention to apparent over-allowances in per diem reports received and adopted form O.M. 24 (k) for that purpose. Under Subject No. O.M. 30 the association concurred in the expression of the committee in Resolution No. O.M. 30, which provides a method for handling per diem claims, designates the road which shall furnish proof in case of dispute as to date of interchange, but does not determine the character of the proof, inasmuch as the character of the proof must, under the per diem rules, be determined by the roads at interest, in accordance with local conditions.

The circular prepared by the Committee on Handling Railroad Business Mail, covering matter which may and may not be carried as railway business mail, was adopted for submission to the American Railway Association. This appears in another column of the *Railway Age Gazette*.

Under Subject No. C.T. 4 of report of the Committee on Conducting Freight Transportation, the association was favored with a paper containing the remarks of E. D. Levy, superin-

tendent of transportation, St. Louis & San Francisco, before the General Managers' Association of the Southeast, at Atlanta, Ga., March 10, 1910, in connection with the handling of over, short and damage reports by the transportation department. The committee was instructed to investigate and report upon the possibility of placing hasps on freight car doors near a more convenient reaching distance of the men who are required to inspect and record seals from the ground. That portion of the report of the committee under Subject No. C.F.T. 5, which provided for the annual re-weighing and re-stenciling of cars of railway ownership was returned to the committee for further consideration. In this connection, however, the association recommended that the American Railway Association be requested to consider the advisability of recommending to the Master Car Builders' Association a change in the rate charged for re-weighing and re-stenciling foreign cars, to an amount not less than one dollar a car. Under Subject No. C.F.T. 7 the committee advised that the rules of the Railroad Refrigerator Service Association in connection with the handling of perishable freight are now in the hands of a sub-committee for the purpose of providing adequate transportation rules, the same to be embodied in the rules of the Railroad Refrigerator Association.

The report of the Committee on Conducting Passenger Transportation under Subject No. C.P.T. 3, which recommended the modification of Rule 7 of the per diem rules to provide for joint service and per diem rates on passenger equipment according to capacity, was returned to the committee for further consideration. At the request of the committee Item d of Subject C.P.T. 3, relating to uniform mileage rates on passenger equipment cars hauled empty for delivery to borrowing road, was returned to it.

The Committee on Joint Interchange and Inspection Bureaus reported that at its instance the General Superintendents' Association of Chicago is now prepared to experiment with joint interchange and inspection at the Union Stock Yards district of Chicago for a period of three months. The results of this experiment will be reported to the association at its next meeting. During the consideration of this report the association was favored with an interesting description of the joint inspection and interchange bureau at Pueblo by the manager, Mr. Roberts, also with a detailed account, by J. A. Wagner, of the workings of the Iowa Transfer at Des Moines.

The election of officers and members of committees resulted as follows: Officers for the year 1910-1911: president, M. B. Casey (D., L. & W.); first vice-president, G. W. Taylor (Southern); second vice-president, W. T. Wolff; secretary, G. P. Conard; treasurer, F. M. Luce. Members of the executive committee for the term expiring 1913, E. D. Levy (St. L. & S. F.); T. S. Bell (Pennsylvania). Members of the Committee on Car Service and Per Diem for the term expiring 1913, Hocking Valley Railway and Wabash Railroad. Members of the Committee on Office Methods and Accounting for the term expiring 1913, Chicago, Milwaukee & St. Paul Ry. and Western Maryland R. R. Members of the Committee on Nominations, term expiring 1911, C. C. Riley (K. C. S.), M. J. C. Wrenne (N., C. & St. L.) and Fred Clark (C., B. & Q.).

RAILWAY TIES FOR CHINA.

The call for bids for railway ties was advertised in the Shanghai papers in November and December last and called for 150,000 wooden sleepers, 1,600 crossing timbers and 5,000 bridge ties. Two American firms submitted bids for Oregon pine, but, although their quotations were lower than jarrah wood, they failed to secure the award. It is thought that the reason therefor was the inferior quality of wood supplied under a previous contract, the creosoting process proving quite unsatisfactory. The Oregon timbers supplied at the time were evidently merely coated with creosote, the preservative not being injected under pressure as it should have been.

Shop Section.

BECAUSE of the large number of shop knicks submitted in the competition which closed on June 15, the judges have been unable to come to a decision as to the prize winners in time for publication in this issue. The list this time contains ten competitors, ranging from master mechanic to apprentice. Three of the present competitors have each entered in two previous competitions, showing that their interest did not cease with one trial. Geographically this last contest represents the states of New Hampshire, New York, Maryland, Virginia, Tennessee, Georgia, Indiana, Iowa, New Mexico and California. Nine railways are included, both of the far western competitors being employed on the Santa Fe. The result of the competition will be announced August 5.

THE individual motor drive, as applied to machine tools, and the high speed tool steels have revolutionized machine shop practice and machine tool design within the past ten years. Shop managers and engineers were surprised to find how little they knew of the individual capacity of the tools in their shops when they were confronted with the problem of applying individual motor drives and were forced to analyze the work being done by each tool and to study its possibilities. In spite of the wonderful strides which have been made in machine tool operation there is still much to be gained, as a study of Mr. Robbins' article on another page will show. "The fact that few tools are in operation more than 50 to 60 per cent. of the time and that the load factor may be as low as from 10 to 40 per cent." indicates that there is room for considerable improvement in getting the work in and out of the machine, in adjusting it, in changing and adjusting the cutting tools, in getting the work to the machine and in getting as much work as possible out of the machine while it is in operation. The fact that the surcharge or burden on the tool per hour is usually considerably higher than the wage per hour of the operator does not seem to be generally understood, although progressive shop managers and betterment engineers have been directing attention to the fact for several years.

THE story is told, and is vouched for as being true, of a requisition that was received from a small shop on a western railway for an additional air compressor. The necessity for this could not be understood at headquarters, and the superintendent of motive power sent a member of his staff to investigate. The shop was in a district subject to extremely high temperatures, and it was found that the master mechanic, in order to rest comfortably, had installed three or four nozzles in the bedroom of his bungalow connected to the compressed air system. The turning of a valve when he retired to his room would insure a cool and comfortable night's rest. It is needless to say the air compressor was not furnished. The installation of a small electric fan gave him an equal amount of comfort at very much less expense.

This is hardly more extravagant than the practice at a number of terminals or important points of furnishing compressed air from one power plant for the repair shops, car repair yards, roundhouses and classification yards. This not only requires a large amount of extra piping, but the air pressure at the outlying points varies greatly and is not at all satisfactory. It is far better to install two or three electrically driven compressors at the more important centers of distribution. Electrical energy may be transmitted to these points from the central power plant far more efficiently than compressed air. The reduction in the length of piping reduces the cost of maintenance, especially in cold weather when the moisture gathers and freezes in the pipe and has to be thawed out. The loss through leakage is also reduced in direct proportion to the reduction in the length of the piping.

The electrically operated compressor requires little attention and is said to give very satisfactory results.

THE fact that a high-speed tool steel was practically destroyed at a temperature within 50 degrees of the best temperature for tempering it, was brought out in a paper presented before the Western Society of Engineers by C. P. Berg, of the Link Belt Company. An abstract of this paper appears on another page of this number. This is a most important point, for in tempering tools it is common to employ a man who judges the temperature by sight, according to well-known scales to be found in the standard mechanical engineers' pocket books and textbooks on iron and steel. According to the temperature table of M. Pouillet, deep orange heat indicates a temperature of 2021 deg. F.; a clear orange heat indicates a temperature of 2192 deg. F.; a white heat indicates a temperature of 2372 deg. F., and a bright white heat indicates a temperature of 2552 deg. F. There is a difference of 172 degrees between a deep orange and a clear orange heat. There is a difference of 180 degrees between a white heat and a bright white heat, yet the ability of men to distinguish between these slight shades in color depends wholly upon the eye of the individual. When a tool steel is found to be most efficient and to have the longest life when quenched at a temperature of 2350 degs. and is burned and practically destroyed at a temperature of 2400 degs, it must be realized that some more efficient method of determining heat in tempering tools must be adopted, and a good pyrometer should be used. With the remarkably efficient apparatus now on the market for obtaining the right degree of heat and for ascertaining when this degree has been reached, it is unlikely that the use of the human pyrometer will be continued long in shops where many tools have to be tempered.

WHILE the convention of the International Railway General Foremen's Association, held in Cincinnati early in May, was a successful one, it would have been much more so had a better selection been made of the subjects for discussion. That the executive committee realized this is indicated by the subjects which have been chosen for the 1911 convention. In the first place the number of topics to be reported on has been reduced to four. These are thoroughly practical and are such that the foremen can discuss them to advantage and should receive much benefit from the discussion. A most noticeable feature of the recent convention was that the moment the discussion touched on the problems of shop organization or efficiency the members almost immediately began to show a greater interest in it. Men who were not accustomed to speaking in public found little difficulty in expressing themselves and in making themselves understood at such times. Why? Because each one had tried in his own way to increase the efficiency or output of his shop and, realizing the complexity and immensity of the problem, was watching keenly for any suggestions which might add to his success in getting still better results. It is from such discussions as this that the men gain inspiration and go back to their work with renewed zeal and accomplish surprising results. A few years ago a general foreman attended one of these conventions for the first time. He felt pretty well satisfied with the results he was obtaining, but after listening to and taking part in the discussion and talking things over on the side with some of his newly found friends, he came to the conclusion that he was a novice at the game. Probably he underestimated his ability, for he had gathered a good and loyal organization about him. He began to put some of his new ideas into effect and made one or two trips to other shops whose good practice in certain respects had been brought to his attention at the convention. To-day he is regarded as more

or less of an authority on shop efficiency. The man from whom he claims to have received his first and much of his inspiration is also enthusiastic about the help he has received from attendance at the conventions. With this feeling on the part of most of those who have been attending the conventions and three such subjects on next year's program as "How Can Shop Foremen Best Promote Shop Efficiency?" "Methods of Shop Organization" and "Shop Kinks" the success of the General Foremen's Association is assured and its field of usefulness will be greatly extended, especially if the intention is carried out of having the next convention held at a central point which may easily be reached by a large proportion of the railway shop foremen.

THE DURABILITY OF TOOL STEEL.

THERE are probably very few men that have not experienced a feeling of surprise when they saw, for the first time, a piece of high speed steel cutting a heavy chip at a rapid rate, while the tool itself was held continuously at a red heat. We have associated this temperature with softness for so long that it is impossible to disabuse ourselves of the idea at once. The case is analogous to that of the penetration of the X-rays. A brick is no more solid than a piece of glass, but because we can see through the glass, we have difficulty in picturing to ourselves the penetration of a visually opaque brick by a ray of light.

It is evident, however, in the light of recent research that we will be obliged to revise our preconceived ideas as to the effect of heat on the cutting qualities of tool steel. The matter was treated quite exhaustively in a recent paper read before the Iron and Steel Institute by Edward G. Herbert.

The experiments upon which the conclusions of the paper were based were made with a machine constructed for the especial purpose of determining the durability of various tool steels. In this work one element was fixed that has not, heretofore, been treated with scientific accuracy. This is the condition of bluntness to which the tool is worn. The other features, such as the shape of the cutting tool, the thickness and width of the chip, and the speed of the tool were all determined, and then the amount that could allowably be worn away from the point of the tool was taken as a measure of its bluntness; the apparatus was so designed that this could be accurately measured while the tool was at work. With these conditions fixed its durability could be determined. That is to say, its durability could be denoted by the number of minutes that it would continue cutting under the standard conditions before reaching this predetermined condition of bluntness. And here comes in one interesting point as to whether the relative durability of various steels is independent of the conditions of cutting. As, for example, whether a steel that shows a greater durability than another in cutting steel will show the same superiority when cutting brass. There is some reason to believe that it may not.

The results of the investigations detailed in the paper go far to substantiate the soundness of the heat theory of tool steel durability. That is to say, the durability of a steel is dependent upon the temperature at which it is operated, and though many of the phenomena have escaped notice in the shop, they are found to check with practical experience.

It has been noticed that, at low speeds, carbon steel is more durable than the high speed steels, but that at higher speeds the carbon steel is less durable. So the fact that a high-speed steel will not keep its edge so well as a carbon steel under a light, finishing cut has long been familiar to engineers; but the fact that the durability of a high speed steel, working under a light cut, can be greatly increased by running at a high speed, and that under these conditions it will keep its sharp edge better than a carbon steel tool is not generally known. The most curious thing in the whole matter is that the durability of all steels, without exception, is very low at low speeds under light cuts, and that the durability of the cutting

edge increases as the speed is raised. In this connection the durability is measured, not by the time that it will continue cutting without becoming blunt, but by the amount of metal that it will cut away.

The points to be settled were the cause of the durability of the cutting edge of a given steel at different speeds and the physical changes that are produced. "If it had been found that an increased cutting speed involved a simple decrease in the durability of the cutting edge, it would have been natural to answer the first point raised by saying that we were dealing merely with the rubbing of metal against metal; that this rubbing was more severe at the higher speeds and, therefore, caused the more rapid wear. But it has been found that an increase in the cutting speed is actually accompanied by an increase in the durability of the tool, that this durability attains a maximum at a certain speed, which is different for steels of different chemical composition, and that the durability then declines as the speed is further increased, so that it becomes evident that this explanation is insufficient. The durability of the cutting edge cannot depend simply on the rubbing of metal against metal, but it may depend on that which results from the rubbing, namely, the evolution of heat and the consequent rise in temperature of the cutting edge, a rise which naturally becomes greater as the speed increases.

"Assuming this to be the case, we find that the durability or wear-resisting properties of all tool-steels is relatively low at normal atmospheric temperatures, that it increases as the temperature rises, attains a maximum at a certain temperature, dependent upon the composition of the steel, and declines as the temperature is further raised."

If this theory is correct it should be possible to vary the durability of a tool running at a constant speed by simply varying the temperature and this can best be done by varying the depth of the cut. Experiments were made along these lines and the results were found to check. That is to say, at constant speeds and varying depth of cut, the durability increased to a maximum and it did exactly the same thing with varying speeds and constant depth of cut.

The work was then continued by determining the durability under conditions of varying speeds and constant cut and the maximum ascertained when the work was flooded with cold water. Then the work was flooded with water at a temperature of 149 deg. F., when it was found that the maximum durability was attained at a lower cutting speed. That is to say, at a point where less heat was needed from the rubbing action to raise the tool to the critical temperature.

The question was then attacked from a purely theoretical standpoint wherein it was assumed that the action of a tool in cutting steel was exactly analogous to that of a jet of water impinging on a fixed object. That is to say, the tool was in the act of cutting through a stream of metal, and that the same laws would govern in the two cases. This law is that the rate at which energy is dissipated in the form of heat is proportional to the cube of the velocity of the jet. According to this law, then, the heat at any point on the cutting surface of the tool is proportional to the thickness of the chip, multiplied by its area with the result multiplied by the cube of the cutting speed. In order to check the accuracy of this assumption the data obtained by F. W. Taylor and described by him in a paper before the American Society of Mechanical Engineers in 1906 was taken and plotted. Curves were then plotted based on the assumption and the two were found to coincide so closely as to show very clearly that the hypothesis is a correct one in its essential features.

A further experiment tended to corroborate the heat theory. In the early work the material and tool had been flooded with water, which must have had some cooling effect on the tool though the point was embedded in the metal and was inaccessible to the water itself. It was found that, on running the tool dry, that the maximum durability was attained at a lower speed and that when the speed increased beyond that critical point the

durability dropped away more rapidly than it did with the water cooling. This is what was to be expected since the rate of heating would be more rapid when running dry than when flooded.

Now, turning to the workshop side, we find that there is a mass of corroborative evidence, pointing to the probable truth of the heat theory. For instance, it is well known that a tool usually stands up to its work better if it starts warm, that is to say, if it is put in the fire for a moment before being used, and that frequently the durability of the tool is increased by increasing the cutting speed.

Another curious thing brought out by these investigations is that there are frequently two points of maximum durability. For example, the durability of a steel may increase up to a speed of 40 ft. per minute and then fall off until at 60 ft. it is very low, beyond which it will rise again and be more durable at 80 ft. than it was at 40 ft. This phenomenon is exceedingly common and is not confined to any one class of steel. It is, of course, natural that this should not have been observed in the shop, because a workman, on finding that his tool was wearing away too rapidly, would not be apt to increase the cutting speed and would thus fail to develop this secondary point of durability. The other difficulty in getting at this is the fact that before the temperature can reach the high degree corresponding to the second point of maximum durability it must pass through the one corresponding to the lesser degree of durability lying between the two maxima. Still we have some evidence that this is what does take place. A tool after being set to work 'apparently fails, that is it becomes blunted to some extent, but if it is allowed to continue cutting it 'builds up' according to a workshop expression and recovers its durability and may continue cutting for some time without a further loss of sharpness."

The matter has not yet been sifted to a finality. There are too many elements entering into the durability of a tool to permit of that for some time. The chemical composition, the rate of cooling, the degree of temper, the method of cooling, all have an influence that is subtle but appreciable. Enough has been done to show that the contradictory results obtained with various tempering compounds are quite reasonable when viewed in the light of this new theory. Why there should be two points of maximum durability is difficult to understand and much work will have to be done before the phenomenon will be explained. But this much does seem to have been shown with a fair degree of positiveness, that all tool steels increase in durability as their temperature is raised above that of the atmosphere, and that there is some critical temperature, varying with each and every class and composition of steel, at which its maximum durability will be found and at which it will do its best work.

Letters to the Editor.

AIR BRAKE HOSE INSPECTION.

Solmes, N. Y., June 16, 1910

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Covering economical practice, may I suggest that in fitting air hose the angle of the coupling be arranged so that the label is always on top when the hose is coupled. This allows inspectors to readily examine the label and determine the age of the hose, and saves time in inspection.

May I also suggest that a shape or form of label could be adopted as standard by the M. C. B. Association, such as a broad arrow or a crescent, to be placed in service after an agreed date. This could be copyrighted, hence all inspectors could at a glance determine the age of the hose. This would avoid delay in inspection, and as railways sell transportation, anything which will speed that should be of benefit.

HOW THE FOREMAN CAN PROMOTE SHOP EFFICIENCY.*

BY C. L. ALDEN.

Foreman Heavy Freight Car Repair, New York Central & Hudson River, West Albany, N. Y.

The promotion of efficiency should be the constant aim and ambition of the foreman, first, last and all the time. It is generally admitted that now, as at no time in the past, the foreman is privileged to use his ideas, initiative and plans and, as is right, is held strictly accountable for results. His aim should be to encourage thrift, industry, incentive and invention, to create harmony and to prevent as far as possible discord, strife and agitation. He should be a man of known temperate, steady habits, possessing a clear brain, cool, calm judgment and an education of sufficient caliber to which added experience will make a good, all-around practical employee. He should exercise his authority with justice, acting promptly (but not hastily) without equivocation, honorably and unselfishly, with the idea in mind that he is dealing with his fellow men, treating them as men, equals, who, for the time being, are so situated that he is perhaps the more fortunate in a monetary sense, and that to-morrow, figuratively speaking, the relationship may be reversed. Do not think I advocate supineness, taking the course of least resistance (although it really is) or that I lack a proper appreciation of my employer's end of affairs, for that is the end sought above all else, and that is the surest and safest course to attain my own advancement. I have proven this course to be to our mutual interest, and do not say it will meet every case or location, but believe it will.

The foreman should be in a position at every pay day period to know just what each employee is earning. Especially is this true where labor is done on a piecework basis. I am now writing more especially of repairs to freight cars, both foreign and local, and of all classes and degrees of defects. He should learn the standards for each car and class of car, together with changes, omissions, additions, etc.; also be able to learn early if the car is in need of painting; if it is able to run for another year or more without it, it is so much gained.

He should be able to determine promptly whether repairs are made properly; that through material men a proper supply of necessary material is in stock at all times, thus avoiding unnecessary delays; and that delivery is made to cars or supply stations promptly in order that the delays be reduced to a minimum. Also that metal parts for straightening, welding or alteration are sent to the blacksmith shop, repaired and returned promptly. He should so plan his work, and work his plans, that when he causes a job to be marked "rush" when sent to the blacksmith or machine shop, there will be no doubt in the mind of anyone handling it that he means just that. Too many men fall into the error of marking jobs rush when there is absolutely no need of it. The job lies a long time before being taken away and the machinist or blacksmith quite justly is of the opinion that he really wasn't in a rush for it and the word loses its effectiveness, and in a short time the foreman must accompany the job or be disappointed.

Your bright, active foreman desires above all things to release cars promptly, especially foreign ones, or those on which a date of release has been given. He must see that a proper and sufficient supply of company-furnished tools are in stock to meet all emergencies, as well as to see that each employee supplies himself with his share of tools to do his work in a suitable manner. The tools he is furnished with should be recorded on a card showing just what was issued, the name of the workman, date, etc., and an accounting should

*This is one of the articles that was submitted in the competition which closed April 15. Other papers on the same subject were published in the issues of May 6 and June 3, 1910.

be made whenever the employee leaves, is transferred or discharged. This is an effective way of reducing "lost" tools to a minimum.

The foreman should not hesitate to teach his inspectors any details in connection with his own work or to inform them thoroughly. I have no patience with a man who is afraid of losing his position in case he teaches and develops another. There's no danger, I am sure, if you take care of your end of it. These learners will help you out immensely if you let them, and they render you and the company better service, and before long you may wish to use just such a man for an unexpected vacancy, one you had not foreseen. Teach them. I expect to point with pride to every such man taught by me and can, every one.

It should be the desire of every foreman to give his local men preference in promotions; he also should aim to have a man under him competent to relieve him when the management says "come up higher." It is proven that through selection and uniformly courteous treatment to employees, without any favoritism, a certain man has increased the efficiency of his men, as shown in their average hourly piecework rate, from 24.46c. in November, 1909, to 27.98c. in March, 1910, a 12 per cent. increase in winter months. This means fewer and better workmen, consequently, better results all around.

Let the foreman do away with domineering, bullying tactics all along the line, insisting that all in authority under him deal justly and kindly, yet firmly, with employees; not showing preference for a favored few, but consulting the table of earnings, which should be complete every two weeks, or at least once a month. Make the selections for promotion from the best men where executive ability is in evidence.

In piecework shops there is a tendency among workmen to pull out more than the inspection card calls for, as it will add to their income; when taken to task they show you broken pieces, declaring they were broken. This must be guarded against and can be eliminated by notifying the men that in no case will payment be made for work not authorized. It becomes necessary to do this, especially where the removed parts might enter into a combination of defects on foreign cars, denoting unfair usage.

This subject of the promotion of efficiency is so far-reaching I can but mention many items and will no doubt overlook many which the reader will consider vital. The foreman must have a rather comprehensive knowledge of repairs to foreign equipment, as well as to his own. Such matters as M. C. B. standards to be used in substitutions, safety appliance regulations, lading rules, custom rules on bonded freight, charges and credits, wrong repairs and defect carding for them, handling fire damages, retracking wrecked cars, oiling, packing, etc., and above all, the M. C. B. rules of interchange and arbitration decisions, are items to be thoroughly familiar with. The question of wrong repairs especially should be very near his heart as such repairs are practically a loss to his company. He should aim to be the very best car inspector on the job as well as the best bill clerk and not hesitate to teach any interested employee who shows a desire to study these subjects. In this way he will pick up many a jewel in the rough. There is also the question of conserving supplies, avoiding unnecessary waste, reclaiming second-hand materials from wrecked and condemned cars, cleanliness in shops and lockers; prompt disposition of scrap, wheel and other guarantees, and prompt compliance in making required reports. Don't "cuss" men, be tidy but not fastidious, respect yourself and command it, and above all give the very best service you can to the man higher up.

From Valparaiso the fare by the Trans-Andean Railway to Buenos Ayres is £14 (\$68.13) first class and £9 (\$43.80) second class. In (\$12) is charged for each 11 lbs. of baggage transported, the passenger being allowed hand baggage. This is the same as the old rate for baggage, but a new and lower rate will be fixed as soon as the different interests of the road can come to some agreement.

ECONOMICAL FEATURES OF ELECTRIC MOTOR APPLICATIONS.*

BY CHARLES ROBBINS.

It is only recently that data have been available to show beyond doubt the intermittent operation of the average machine tool. When a machine shop is driven by a belt from engine to line-shaft, and from lineshaft to machine tool, it is difficult to determine with any degree of exactness the length of time any particular tool is in operation, or the average time of operation during the working day. With the installation of motors on lineshafts, it became evident that the total horse-power capacity of motors was much in excess of the power generated in the power station. This ratio is sometimes three to one, other times possibly four to one.

As individually driven tools are adopted it is noticed that the total horse-power capacity of all the motors connected to the service grows very rapidly, and that the ratio of the connected capacity to the power supplied is often as high as five or six to one, indicating that the time-load factor of the average machine tool is relatively low. This apparent difference between the connected capacity of motors and the demand on the power station has led to a careful analysis on the part of the motor builders to determine exactly the length of time tools can be expected to be in operation.

An analysis which took into account the time of loading, cutting, unloading, and other delays occasioned by miscellaneous causes, showed conclusively that it was not necessary to use a continuously rated motor; in fact, an intermittent rating on the motor for a period not exceeding two hours' continuous service answers for almost all kinds of machine tool applications. This knowledge enabled the motor manufacturer to build a more economical motor, one of smaller size, and consequently reduce the expense of applying motors to machine tools. The present-day tool equipment ought not, therefore, to be much more expensive, if any, than that of the belt-driven tool, when the cost of belting, shafting and power house equipment is considered.

When machine tools are equipped with individual motors, a graphic recording meter may be connected in the motor circuit, making it possible to have a complete log of the operation of the particular tool during its time of service. The chart furnished by the graphic meter will show the time of loading and unloading the tool, the time of cutting, all delays due to stoppages for one cause or another and the amount of power to operate the tool, which is a direct function of the work done.

A time study can be made for each tool from these charts, and knowing the theoretical time for the job an analysis can be made of the curve, furnishing information that will enable the foreman to increase the productive capacity by the elimination of delays. He will also know whether or not the tool has been working at its maximum capacity, whether the tools have been kept up to standard conditions, and in general can apply the necessary remedies.

ECONOMICS OF MOTOR DRIVE AS DETERMINED BY ACTUAL PERFORMANCE OF THE TOOLS.

The economy of the individual motor drive, due to the fact that practically the exact cutting speed can be obtained for any operation, has been pointed out. This economy is not so important, however, as that of keeping a tool in continuous operation through longer periods of time, by reducing the time required for handling and other avoidable delays.

The accepted method of capitalizing motor drives seems in general to be on the basis of the incidental savings in the workman's time. In our opinion this is not the whole story by any means. When determining the monetary advantage of motor drive, the value of time saving should be considered on the basis of its effect on the total cost, which includes the workman's labor and the investment cost per hour of the tool.

*From a paper presented at the April meeting of the American Society of Mechanical Engineers at New York. Mr. Robbins is connected with the Westinghouse Electric & Manufacturing Company.

In addition to workmen's wages, every shop has the following expenses:

- a Interest and depreciation on cost of buildings and accessories.
- b Repairs and renewals to existing equipment
- c General operating expenses, including losses due to defective workmanship, design and material.
- d Salaries of supervisors, engineering staff and clerks

These overhead charges must be included in the cost of any manufactured article. A method frequently employed is to determine from time to time the percentage which the total overhead charge bears to the cost of total actual or productive

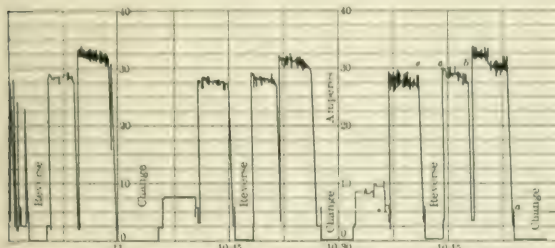


Fig. 1—Record When Turning Shafts Shown in Fig. 2.

labor. This percentage in large shops reaches from 100 to 200 per cent, or even more. The total labor charge is then obtained by multiplying the actual labor cost by one, plus the per cent. to be added for the overhead charge. This is an easy way to take care of the overhead charge; but the method is inaccurate and does not show the relative importance of different types and sizes of machines. This statement is especially true where a great variety of materials is manufactured, in shops using a large number of different types and sizes of tools. Under such conditions, the percentage obviously varies within wide limits for different kinds of work.

A satisfactory method of distribution is to set off against each tool its proportion of the total overhead charges. The portion chargeable to each tool depends entirely on local conditions; and thorough familiarity with these conditions is needed in order to apportion these charges equitably. In this way, the relative importance of each machine is taken care of.

In a shop where only one type of article is manufactured and the castings are passed from one machine directly to the next, a simple and logical way is to divide the total overhead charge among the tools, in proportion to the floor space charged to each tool. In the majority of shops, however, the above simple condition does not exist; several sizes and kinds of articles are usually turned out, and various sizes and types of tools, differing greatly in their operating characteristics, are employed. In such cases, not only must the floor space be considered, but also the time each tool is actually in operation, the nature of the work and the amount of supervision and engineering attention needed.

Large shops handling different classes of materials are in most cases divided into various departments or sections, and each section may be considered as a separate smaller factory. The overhead charges against each department may thus be apportioned among its tools in proportion to the floor space occupied, making proper allowance for special local conditions, or special supervision or engineering attention. Here again is required thorough familiarity with both the engineering and the shop features of the materials manufactured. In our experience we have found the overhead charges to be approximately as follows:

Variable charges	From 50 to 55 per cent.
Salaries	2 1/2 to 3 1/2 "
Interest on cost of machine tools	5 " 10 "
Depreciation on cost of machine tools	3 " 10 "
Fixed charges	1 " 2 "
Power	1 " 2 "

DEFINITIONS OF TERMS.

In discussing the economics of motor drive there will be a

number of terms used which are here given with our interpretation of their meaning.

Applied to the operation
Time factor = ratio of actual cutting time to total time required to complete a machining operation

Actual cutting time

Total time to complete operation

Applied to a Machine Tool

Total daily actual cutting time in hours

Time factor in per cent. = $\frac{\text{Total daily actual cutting time in hours}}{\text{Total number of working hours}} \times 100$

Average running load = average input to motor while operating, usually expressed in kilowatts, but may be expressed in per cent. of full load input.

For rough calculation in this paper the input of a motor in kilowatts is assumed to be the same as the output in horsepower, that is, the motor efficiency in all cases is assumed to be about 75 per cent. This low percentage will take care of the fact that motors operate at light loads a considerable part of the time.

Maximum load = maximum input to motor, expressed in same terms as the average running load.

Average load = Average daily load = average input to motor during the total working hours; usually expressed in kilowatts. This load multiplied by the total number of working hours gives the total kilowatt-hours consumed per day, and is the basis of payment for energy.

The average load multiplied by the number of hours per day and by the price per kilowatt-hour gives the cost of energy per day. The average load also equals the average running load multiplied by the time factor.

Load factor = the ratio in per cent. of the average daily load to full-load rating of the motor, or

$$\text{Load factor} = \frac{\text{Full load rating of motor}}{\text{Average daily load}}$$

CONDITIONS ENTERING INTO OPERATION OF MACHINE TOOLS.

In order to obtain a maximum output from a machine tool, a careful analysis must be made of all the conditions entering into the operation of the tool. One method of doing this in the case of a motor-driven tool is to take power readings at frequent intervals and lay these out on a chart basis. Another, and a much more convenient method, is the employment of a suitable meter, as already described, designed to make a graphic curve, showing the exact condition occurring in the service when such a meter is applied to any motor-driven tool.

Fig. 1 shows a record obtained while shafts of the dimensions shown in Fig. 2 were turned from machinery steel. Both Fig. 1 and Fig. 2 are lettered for reference. The records read from right to left, as indicated by the time at the bottom of the curve in Fig. 1. The vertical co-ordinate is in amperes, the full scale being 50 amperes. This current at 220 volts corresponds to 11-kw. input to the motor. At the extreme right the record indicates zero power; that is, the motor was standing idle. During the interval marked "change" the stock to be turned was placed in the chuck of the lathe. At a the current increases for a very short interval to about 3 amperes, while the lathe was running idle. The current then suddenly increases to about 30 amperes, due to the fact that the cutting tool was fed against the stock and the cut started. The current remains at this value for a period of about five minutes while the cut AB is taken, changing the diameter of the stock as indicated in Fig. 2. At b the current drops to three amperes, the motor running idle while adjustments of cutting

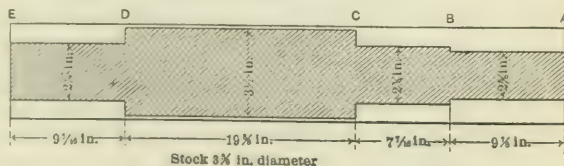


Fig. 2—Shaft of Machinery Steel.

tools are made. The current then increases to 28 amperes while the cut BC is taken. At c the machine is stopped to reverse the half-completed shaft for machining the opposite end. At e the machine is again started and the current increases to 27.5 amperes while the cut ED is taken. Another adjustment of the diameter is then made, the machine running idle for a short interval. From 8 to 10 amperes are required when the final cut DC is taken, after which the machine is stopped to remove the completed shaft. A similar cycle is repeated when the next shaft is turned.

The record shows three completed cycles, covering the time

required to complete three shafts. At 11:15 a. m., before taking the cut *ED*, there are sudden fluctuations of current; the form of the curve compared with other cycles shows clearly that some trouble was encountered with the cutting tool or work, and the adjustments made. The record also shows the delay in time.

Table 1 is a summary of the data obtained from the graphic record, part of which is shown in Fig. 1. Observations of

cent. and its minimum value is 30 per cent. The load factor is 25 per cent. under normal conditions. It must be obvious that, with a given rate of cutting, the fewer the delays the higher will be the time factor. The magnitude of the records is an indication of the rate of removing metal, as will be further explained.

By means of this meter record it is possible to discover all delays, and to check the rate of cutting metal. Those are the

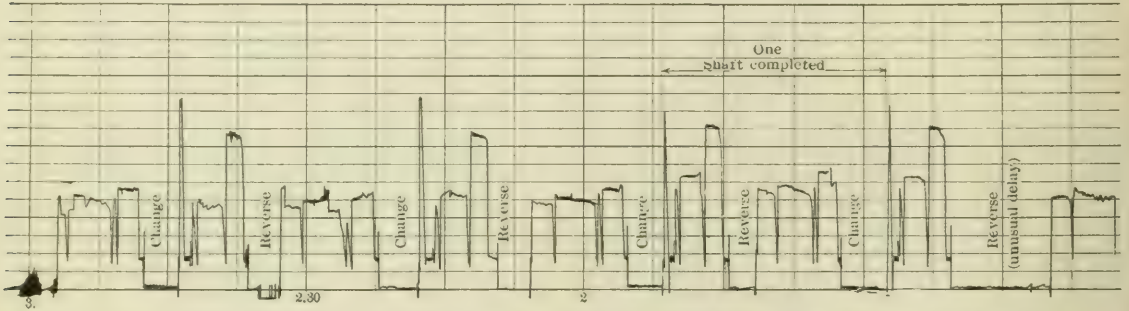


Fig. 3—Record Made When Turning a Light Shaft Which Could be Placed and Removed by Hand.

cutting speed and feed were taken at the lathe. The cutting speed used while turning these shafts was 55 to 60 ft. per min. The feed while taking the cuts *AB*, *BC* and *ED* was 0.04 in. per revolution, and while taking cut *DC* was 0.077 in. per revolution. The normal time to complete a shaft was from 27 to 32 min. In case of shaft No. 1 the time was 62 min.; this was the first shaft, turned after starting work, and preliminary

two fundamental factors which determine the rate of output on machine tools. Any deviation from the standard cycle of operation is at once detected from the form of the record. Observations of cutting speed and feed need be taken in only one case. The record will not only show the deviation therefrom, but will also indicate whether the modification is an improvement or a drawback to the rate of output. Fig. 3 and Fig. 4 show two records taken on the same roughing lathe, operated by the same man, but turning two different shafts. The shaft turned while making the record shown in Fig. 3 was light, and could be removed and replaced in the lathe by hand. That turned when the curve in Fig. 4 was obtained was heavy, and required crane service. The greater intervals between cutting operations, so apparent in the case of Fig. 4, were due to delays in obtaining crane service to handle the heavy shaft.

Table 1—Analysis of Time and Power of a Lathe Operation.

Shaft	Time	Mins. Ampe.	Cutting				Mins. %	Total Cutting	Change	Reverse	Adj. Tool	Misc.	Comp.	Time Factor	Load	Per.
			AB	BC	ED	DC										
1	7.30	Mins. 5.1	3.7	4.9	4.9	Mins. 18.6	5	5	12.0	21.2	61.8					
		Amps. 23	22	22	5	% 30	8.1	8.1	19.5							
2	8.05	Mins. 5.3	3.9	4.4	4.4	Mins. 18.0	4.7	2.4	4.4		29.5					
		Amps. 25	23	24	5	% 61	15.9	8.1	14.0							
3	8.30	Mins. 5.0	3.7	4.8	4.6	Mins. 18.1	7.5	2.4	1.9		29.9					
		Amps. 29	25	24	7	% 60.5	75	8	6.4							
4	9.05	Mins. 4.5	3.4	4.8	4.7	Mins. 17.4	3.2	8.9	2.3	27.1	31.8					
		Amps. 31	29.5	24	8	% 54.8	10	27	7.2							
5	10.05	Mins. 5.1	3.8	4.5	4.7	Mins. 18.1	8	2.5	1.3		54.0					
		Amps. 29	28	25	6	% 33.5	9.3	4.7	2.4							
6	10.30	Mins. 4.9	3.6	4.6	4.9	Mins. 18.0	4.3	2.4	2.0		28.7					
		Amps. 28	25	25	5	% 67.6	16.1	11	7.5							
7	11.00	Mins. 5.0	3.7	5.4	5.1	Mins. 19.2	5.5	2.6	2.7		30.0					
		Amps. 29	26	24	4.5	% 64	18.4	8.7	9							

adjustments, oiling lathe, etc., consumed 21 min.; 12 min. were required to adjust the cutting tool. In the case of shaft No. 5, 54 min. were required on account of a 27-min. delay. The amperes referred to in Table 1 are those above the 3 amperes required to run the machine idle; they are, therefore, a measure of the power required to remove the metal. The time factor averages 33 per cent.; its maximum value is 67 per

cent. After the improvement, 12 shafts per day were completed with the same overhead charge, thus reducing the labor and over-

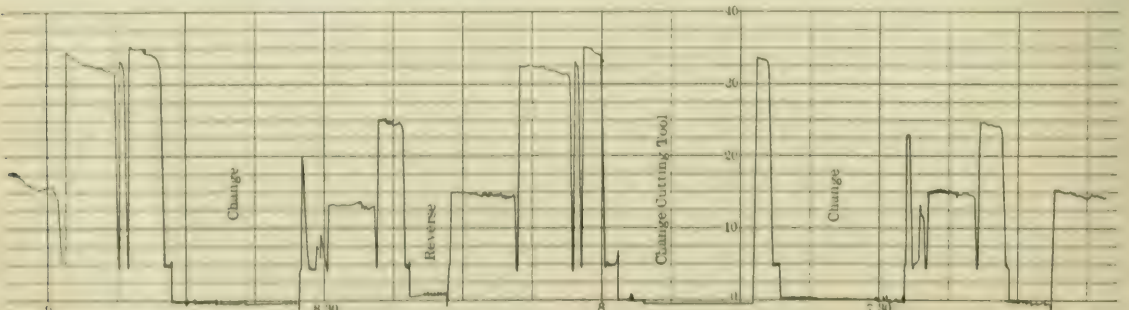


Fig. 4—Record Made When Turning a Heavy Shaft Which Required a Crane for Handling.

head tool charge to 79 cents per shaft. Such a delay seems self-evident, after it has been discovered, but in a large shop where everybody is busy small delays are easily overlooked. An automatic recording meter reveals delays caused by grinding and replacing tools, etc., besides those just indicated.

The elimination of delay, however, is not the only advantage to be obtained from the use of a recording meter. Fig. 5 and Fig. 6 are meter records which show rates of cutting on a shaft with the dimensions given in Fig. 3. In Fig. 5 the cutting speed was 50 ft. per min. The feed for cuts *AB*, *BC* and *ED*, was 0.05 in. per revolution, and for *DC* was 0.072 in. per revolution. The same feed was employed for corresponding cuts in Fig. 6, but the cutting speed was 100 ft. per min. It will be noted that the current above friction load in Fig. 6 is double that required for similar operations in Fig. 5. The saving in time is clearly shown. An analysis of records of this kind, taken over a period of several days, gives a means of determining the most economical feeds and cutting speeds to employ on a given operation.

Table 2 shows the time relation between the various operations in roughing the shaft, outlined in Fig. 5. Approximately the same conditions were found with shafts of other characteristics. The time factor of lathe operation for this class of work is thereby shown to vary from 28 to 65 per cent., the average being about 50 per cent.

An investigation by personal observations over a short period of time often leads to erroneous results, as is shown by the following experiments: In turning shafts on a roughing lathe, the first trial was with a cutting speed of 80 to 100 ft. per

min. The rate for maximum economy can be determined for different classes of work; and the records, considered as standard, can be compared with other operations of the same character to see whether the proper rates of cutting were used. In a finishing operation the rate depends upon the accuracy required. A record can be made while an expert machinist

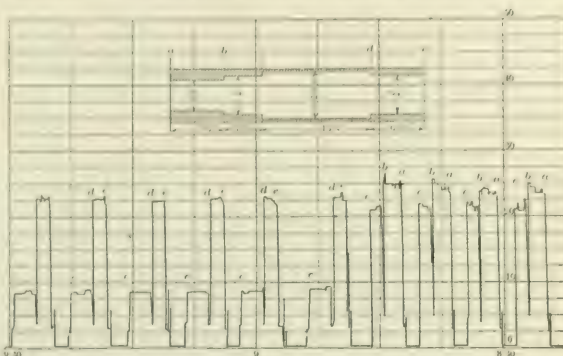


Fig. 5—Record Taken When Turning Shaft Shown on Diagram.

does the job, and this record should be referred to when other jobs of similar character are machined.

By the use of curve-drawing meters, and a careful study of the data obtained, the superintendent of a shop in which the individual motor-drive system is employed can set a limit fair both to employer and employees, for roughing, finishing, adjusting and setting-up. Different methods of doing the same job can be compared to determine which is the most efficient.

The graphic meter need not be located near the machine to which it is connected, but may be placed in the foreman's office. Small leads connected to a shunt, or to a series transformer, according to whether direct current or alternating current is employed, are all the wiring required. The wiring can be so arranged that the connections of the meter can be readily transferred to any one of several tools; thus a single meter can be made to serve a group, or any number of tools,

Table 2—Time for Roughing Shaft, Extreme Conditions.

	AVERAGE CONDITION		BEST CONDITIONS		POOREST CONDITIONS	
	Minutes	Per Cent of Total Time	Minutes	Per Cent of Total Time	Minutes	Per Cent of Total Time
Removing and replacing shafts	6.0	38	2.8	23	14.9	50
Adjusting tool	1.7	11.0	1.4	12	6.7	22
Cutting	8.0	51.0	8.0	65	8.4	28
Total	15.7		12.2		30.0	

min., and a feed of 0.026 to 0.044 in. per revolution. In the second case, a cutting speed of 40 to 50 ft. per min. at a feed of 0.05 to 0.07 in. per revolution was employed. A single job could be completed in either case in 16 min., 12 min. being required for cutting. However, the average time per shaft, during several days' operation, was 22.6 min., with the higher speed, and 21.6 min. with the slower speed. The same number of cubic inches of metal per minute was removed in each case; but with the higher speed, more frequent regrinding of tools was necessary, resulting in more delays and giving the lower speed five per cent. advantage in time saving.

USES OF THE GRAPHIC RECORDING METER

By means of the graphic recording meter, the following improvements in shop management can be effected:

a If individual motors are used to drive machine tools, the exact percentage of total working hours consumed in actual cutting can be determined; it is found to average from 40 per cent. to 50 per cent., the maximum being as high as from 60 per cent. to 65 per cent. where the cut is of long duration; the minimum from 20 per cent. to 30 per cent. where jobs are short and the delay long in waiting for material, drawings, etc.

b The meter reveals all delays and suggests measures for eliminating those not necessary and reducing all others to the minimum, thus materially increasing the time factor. All delays shown should be accounted for, and an attempt made to avoid them. Common delays are in assignment of the next job, in obtaining drawings, tools and other necessary materials, and in waiting for crane service.

c The rate for cutting indicated by the power consumption of motor-driven tools can be checked with a recording meter. The maximum rate is limited only by the nature of the work, the strength of the machine tool and of the cutting tool.

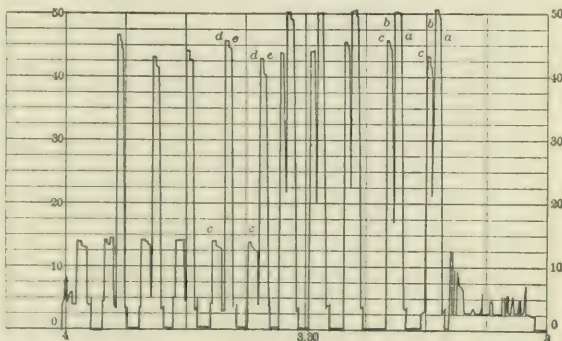


Fig. 6—Record When Turning Same Shaft as in Fig. 5 at Double the Cutting Speed.

depending somewhat upon the frequency with which the records are required.

So far we have dealt chiefly with the time required to do machining operations, time being a most important consideration with shop managers and those who use machine tools. The power consumption, however, is also of some importance, especially to those requiring motors for machine tool operation.

RELATIVE ECONOMY OF LINESHAFT AND INDIVIDUAL MOTOR DRIVE.

An increase in economy of operation of manufacturing machinery can be effected in two ways: First, by reducing the power required to operate the machinery, by saving of friction load, etc.; second, by reducing the time required for a

given operation, or, in other words, increasing the output in a given time. When confronted with the problem of deciding between the continued use of an existing lineshaft drive, or an individual motor drive, or when deciding between the two methods for a new installation, the problem should be considered in all its phases, as outlined in Table 3. This table includes every important item to be considered, except one; and in every case the advantage is with the motor.

Comparing the first cost is possibly the first consideration to enter the mind of most men, and this is the one consideration omitted from Table 3. That this consideration is relatively of minor importance will be evident, when the saving in power consumption and in time, made possible by individual motors, has been considered.

SELECTION OF MOTOR AND TOOL EQUIPMENT.

In the selection of a motor-driven tool, there are certain features which should be taken into account and properly

Table 3—Comparison of Lineshaft Drive and Individual Motor Drive for Machine Tools.

Item	Lineshaft Drive	Individual Motor Drive	Advantage of Individual Motor
1 Power consumption...	Constant friction loss in shafts, belts and motor, power for cutting	Friction loss (motor and tool only); useful power only while working	Less power required
2 Speed control...	No. speeds = no. cone pulleys X no. gear ratios	No. speeds = no. controller points X no. gear ratios	More speeds possible; time saved in speed adjustments
3 Reversing...	Clutch and crossed belt	Reversible controller	Time saved in reversing
4 Adjusting tool and work	Stopping at any definite point, very difficult	Can be started in either direction and stopped promptly at any point	Time saved in setting up and lining up
5 Speed adjustment...	Large speed-increments between pulley steps	Small speed-increments between controller steps	Time saved by obtaining proper cutting speed
6 Size of cut...	Limited by slipping belt; large belts hard to shift	Limited by strength of tool and size of motor	Time saved by taking heavier cuts
7 Time to complete a job			Much less time required as indicated for previous items
8 Liability to accidents	Slipping or breaking belts; injury to machine tool, cutting tool or prime mover	Injury to machine tool, cutting tool or motor	Much less liability to accidents
9 Checking economy of operations	Close supervision required; very difficult to locate causes of delay	Accurate tests possible by means of graphic meter which records automatically all delays and rate of cutting	Causes of delay and remedies easily located without personal supervision
10 Flexibility of location	Location determined by shafting, and changes difficult	Location determined by sequence of operations; changes readily made	Greater convenience in handling and increased economy of operation; more compact arrangement possible

analyzed, and specifications drawn to cover them. If a tool is for specialized manufacturing, there should be specified:

a The exact class of work which the tool is to accomplish.

b If the power required to remove the metal is not known, then a statement should be made as to the approximate feed and cutting speeds to be taken.

c Careful analysis should be made of the time required to load and unload the machine, to determine the feasibility of employing auxiliary means other than manual labor for loading the tools.

d From this information, an approximate determination can be made as to the intermittency of operation of the tool, in order to decide whether an intermittently rated motor or a continuously rated motor will be required.

e By a knowledge of the physical shape of the work, determination can be made as to whether an adjustable speed motor will result in economy of time, if used on this particular class of tool.

f Will enable the tool builder to determine upon the proper type of controller, and its most desirable location from an operating point of view for the workman.

If a special type of tool is not desired and it is preferable to purchase one with such characteristics that it can be used for general manufacturing, one should determine as nearly as possible the range of material or work for which it will be used in straight manufacturing operations. A knowledge of this will undoubtedly permit of a better motor and tool selection, than the simple purchase of a standard stock tool.

It should be realized that under present schemes of operation few tools are in operation more than 50 to 60 per cent. of the time, whereas, the load factor of those tools may be as low as from 10 to 40 per cent. Thus we have it brought home to us clearly that much of the time the tool is in idleness and is often operated at much less than its maximum capacity.

The direct-current motors are built for speed adjustment over a range of 1 to 2, 1 to 3, and in some instances 1 to 4. With the proper selection of controller the speed adjustments may be made in small increments of from 10 to 15 per cent., and since these small increments of speed adjustment are available, it is essential that a controller be selected of such type that it can be mounted conveniently to the operator, so that he may take full advantage of them.

Where it is necessary to employ the alternating-current motor, it may be absolutely essential to employ a gear box to obtain the various speed adjustments. When such a machine is employed, the fine gradation of speed obtainable with a direct-current adjustable speed motor is absent, and the gear box will practically take the place of the ordinary cone pulley arrangement. It has, however, one advantage when motor-driven, and that is, that the tool is supplied with positive power at all times, and will take care of the maximum conditions without slipping or loss of power, which frequently occurs when the belt drive is used. In some instances it has been found possible to make good use of the so-called multi-speed alternating current motor. This form of motor consists in certain different types of windings, permitting of a multiple method of pole grouping, such as for instance, a speed of 1,800, 1,200, 900 and 720 r.p.m., according to the method of winding the motor. In some cases, this type of multi-speed motor, when used in conjunction with a gear box, will permit of somewhat finer gradations of speed than are possible with a constant-speed alternating-current motor and a standard gear box.

GENERAL CONCLUSIONS.

The economical operation of a machine shop requires a thorough analysis of all the operating costs; that is, overhead and operating charges of all kinds, and an accurate knowledge of the operating conditions of all machine tools. Investigations of these conditions must be conducted by someone familiar with both the engineering and the shop features of the apparatus manufactured. The investigator should also be familiar with the characteristics of the various types of motors and methods of control, in order that the most advantageous electrical equipment as well as the best machine tool equipment may be installed, with suitable tools for different sets of conditions.

Such investigations lead to the following improvements which result in increased productive capacity:

a More flexible arrangement of tools.

b Greater facilities for handling materials at the tools.

c Greater facilities for handling materials between tools.

d Better facilities for obtaining auxiliary material, drawings, tools, etc.

e Better facilities for making adjustment of the tools during machinery operation.

f Removal of causes of unsuspected or avoidable delays due to small accidents and improper characteristics of the drive.

g All lost time, due to whatever cause, and which can be avoided, is immediately brought to the attention of the superintendent, and an analysis of these losses will result in their elimination.

Shop Kinks.

CHICAGO & NORTH WESTERN.

The Chicago shops of the Chicago & North Western have been regarded for years as among the best managed railway shops in the country. Although the plant is a very old one and the men are paid on a day-work basis, few, if any, shops of the same size have been able to equal it, either as to output or efficiency. It is not surprising, therefore, to find an exceptionally large number of labor-saving devices or kinks in it. The ones described in this article have been selected and are

center may be forced against it while the cylinder is being turned on the outside. The outside, after it is turned, is filed smooth. The gear tool B, having 16 cutting tools, spaced $\frac{1}{8}$ in. apart, is then used to space off 24 rings in two operations, cutting in to a depth of $\frac{1}{8}$ in. The twenty-fourth ring is cut off by a special tool. The tool C is then placed in the lathe. It has two adjustable boring tools which are adjusted to the finished inside diameter of the packing ring. As this boring tool advances the rings drop off one at a time; they are of the correct inside and outside diameter, but are not of the required thickness.

The rings are finished to the proper thickness on a magnetic chuck F, shown in Fig. 2. The magnetic chuck consists

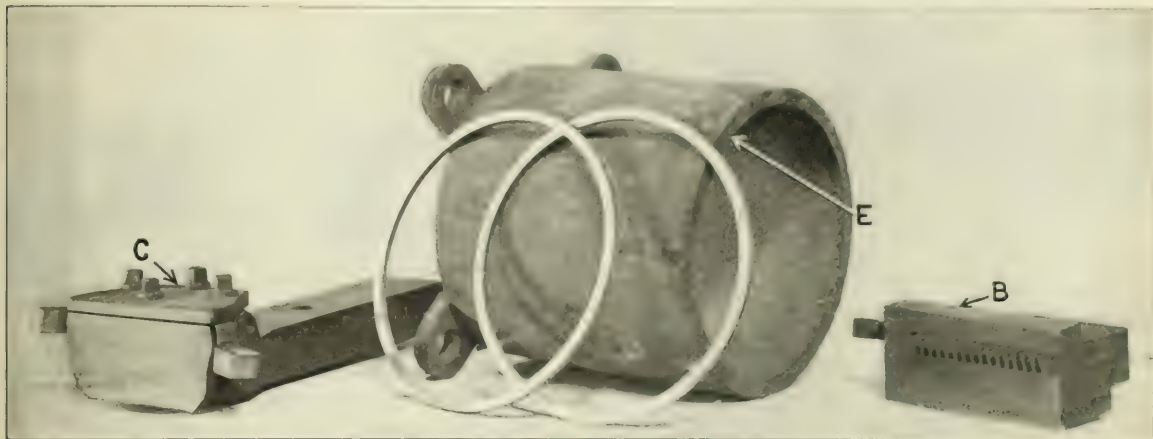


Fig. 1—Tools for Boring and Cutting Off Packing Rings for Air Pump.

ranged by the foreman of the erecting shop, H. D. Kelley. Credit for developing the devices is due to the various foremen at both the Chicago shops and those at other points on the system; everyone has lent a hand in their development, from the shop superintendent down.

PACKING RINGS FOR $9\frac{1}{2}$ -IN. AIR PUMP.

Packing rings for $9\frac{1}{2}$ -in. air pumps are made in the fol-

lowing manner: A cast iron cylinder or barrel, large enough to make 25 rings, is bolted on the face plate of a lathe, and the inner edge E, Fig. 1, is turned off in order that a plug

of a series of electro-magnets, arranged in a circle, with rectangular heads, finished flush with the face of the chuck, as shown in the photograph. The electric current is conducted to brass discs or rings at the back of the chuck through the carbon brushes A. The brass rings are connected to the

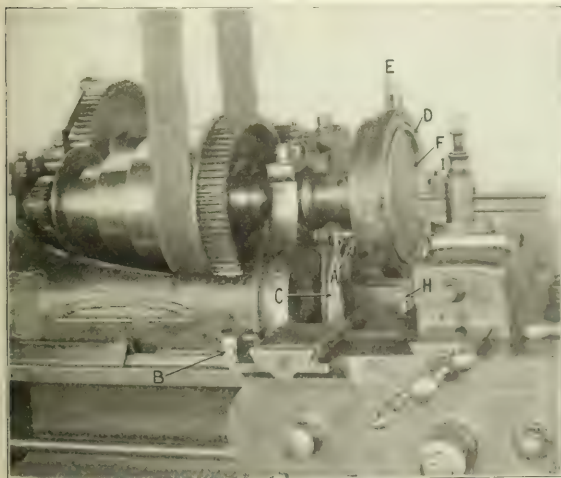


Fig. 2—Magnetic Chuck for Finishing Packing Rings for Air Pump.

lowing manner: A cast iron cylinder or barrel, large enough to make 25 rings, is bolted on the face plate of a lathe, and the inner edge E, Fig. 1, is turned off in order that a plug

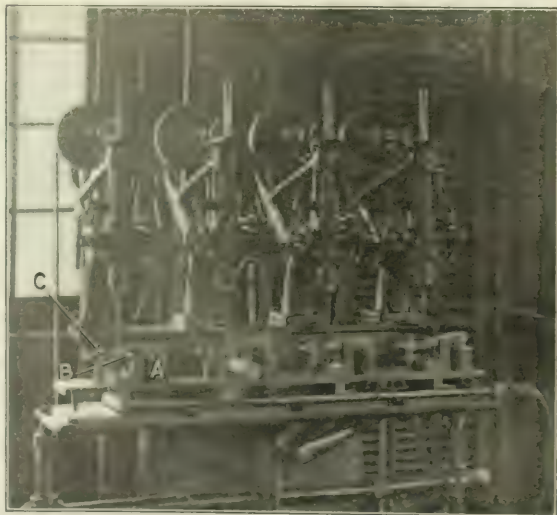


Fig. 3—Pneumatic Clamps and Jigs for Boring Holes in Pins.

magnets. The brush holder C is bolted to the lathe, and both brushes are held firmly against the brass rings by means of springs. The inside diameter of the chuck face is equal to that of the largest size packing ring. For smaller rings the

adjustable dogs E, G, H and I are used to keep the ring from sliding. In the photograph a 9 $\frac{1}{8}$ -in. ring is shown in a 10-in. chuck. The stop B is set so that the facing-off tool will come

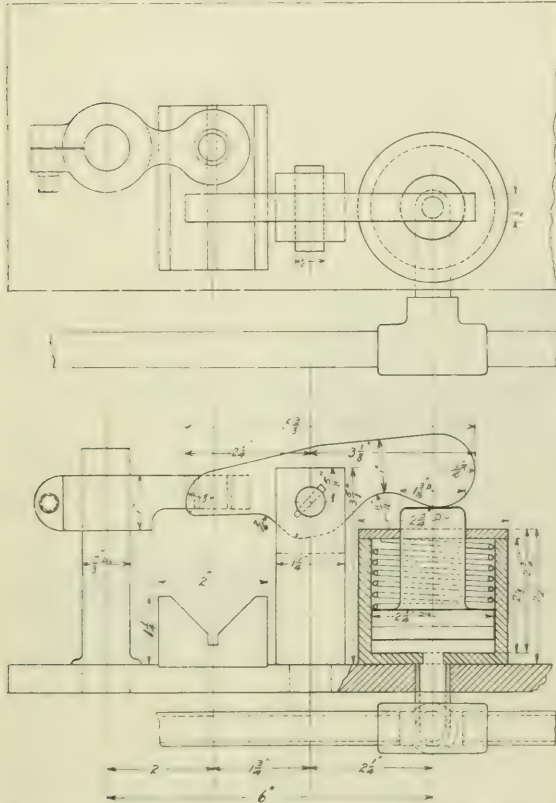


Fig. 3A—Pneumatic Clamp and Jig for Drilling Pins, Etc.

within $\frac{1}{4}$ in. of the face of the chuck. The unfinished packing ring, $\frac{3}{8}$ in. in thickness, is placed in the chuck and

finished on both sides to a thickness of $\frac{1}{4}$ in. By this method one man turns out 100 finished rings per day.

PNEUMATIC CLAMP AND JIG FOR DRILL PRESS.

A four-spindle drill, equipped with a gang of pneumatic clamps and jigs for drilling holes in pins, bolts, etc., is shown in Fig. 3. To operate the clamp, air at a pressure of 85 lbs. is admitted to the cylinder A, and the lever B is forced down on the pin. The jig C is fitted with a set of bushings whose inside diameters correspond to the sizes of the drills used. The clamp is shown in detail in Fig. 3 A.

ADJUSTABLE REAMER.

An adjustable reamer, used in connection with the manufacture of 2-in. pneumatic blow-off cocks, is shown in Fig. 4.

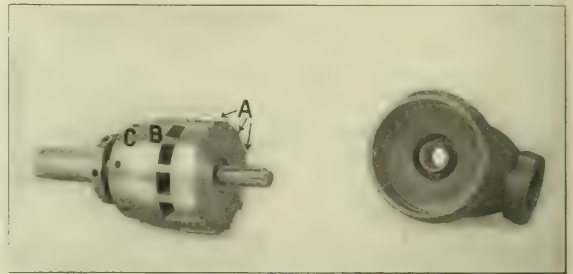


Fig. 4—Adjustable Reamer for 2-inch Pneumatic Blow-Off Cocks.

There are 12 removable cutters A, which are adjusted to the correct diameter after grinding and are held tight by the taper collar B and the nut C. One of the cutting blades is shown in Fig. 4 A. These are made to fit tightly in equally spaced slots in the 4 $\frac{1}{8}$ -in. head. The taper collar forces them up tight against the taper head, holding them securely. The blades may easily be removed for regrinding.

MANUFACTURE OF AIR PUMP VALVE AND SEAT.

The valve seat for an air pump, shown in Fig. 5, is manufactured in the following manner: The forging A is made by the dies and formers shown in Fig. 6, which are used in an Ajax forging machine. A piece of round iron is held in the female die at E, and is partly upset and the hole punched in it by the

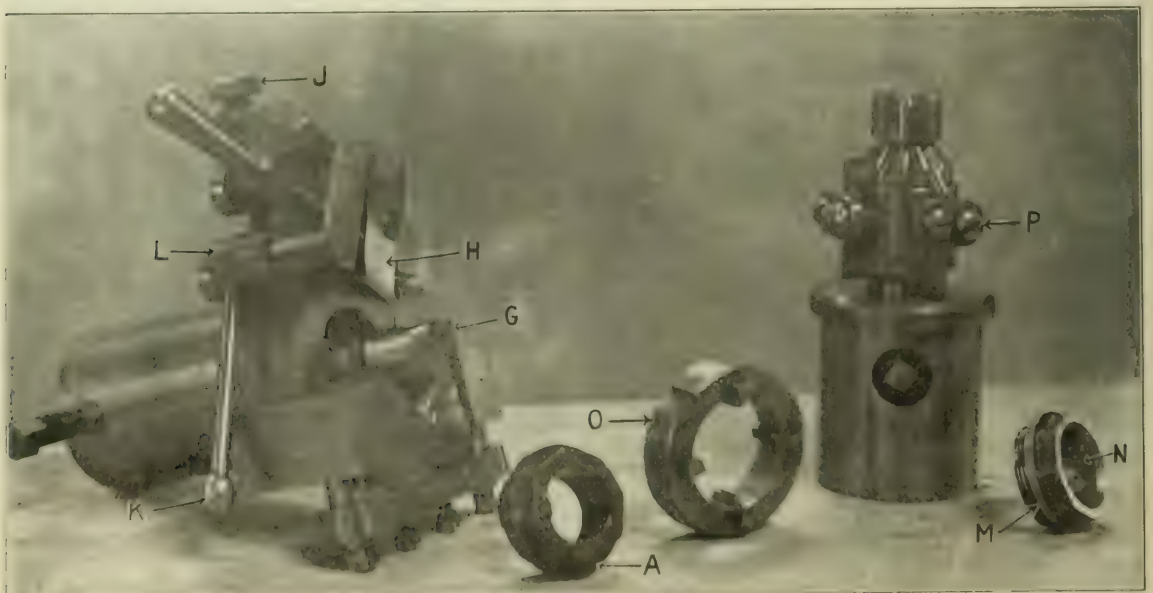


Fig. 5—Tools for Machining Valve Seat for Air Pump.

plunger B. The forging is completed in a second operation by the plunger D and the die C. It is then cut off and finished in a turret lathe by the tool shown in Fig. 5. At the first operation the reamer G faces off the threaded end and roughs out the inside; the turning tool H finishes the outside to the diameter

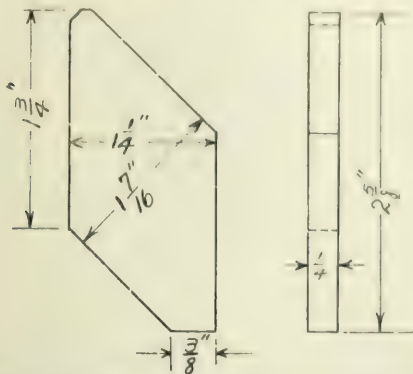


Fig. 4A—Cutting Blade for Adjustable Reamer.

of the thread. To cut the recess between the threads and the bottom of the seat at M, a lever K is thrown up and the tool takes a deeper cut, this being done by means of an eccentric L. The throw of the eccentric is regulated by an adjusting screw J. The forging is then threaded by the die O, after which it is screwed into a chuck, and the seat end is machined to the

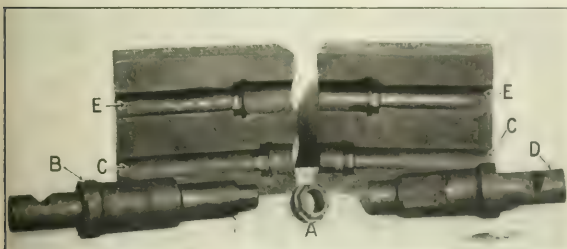


Fig. 6—Dies and Formers for Forging Valve Seat for Air Pump.

correct angle and the inside diameter is finished by a special reamer P. The valve for this seat is forged by the die shown in Fig. 7. The flanges of the valve F are flattened from the round iron at a white heat in the dies at A, B and C. The last operation is performed in D by the plunger E. These valves

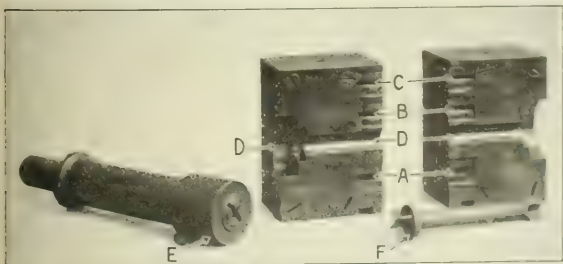


Fig. 7—Dies and Formers for Forging Air Pump Valve.

are formed on both ends of a round bar which is cut in the middle. They are then finished in a turret lathe by the cross feeding or side adjusting tool, shown in Fig. 8. The cutting tool is set for the correct angle of the valve seat and is fed across the lathe at right angles to the work. The valve A,

Fig. 8, is held by a two-jaw chuck in the spindle of the machine. The cross-feeding device is bolted to the tail stock.

MILLING GROOVES IN INJECTOR WATER NUT

A brass injector water nut, with 50 grooves milled in the top, is shown in Fig. 9. These grooves are cut on an ordinary milling machine with the aid of the special chuck shown in Figs. 10 and 11. The chuck consists of a shell H, a 50-tooth gear C,



Fig. 8—Tool for Finishing Air Pump Valves on Turret Lathe.

which is feather-keyed to the shaft D that carries the head B; also a handle E, on the end of which is fastened the cam F. This cam works against the follower G, the working faces of the cam and the follower being helices. Attached to the handle is a ratchet R.

The chuck is set on the bed of the milling machine and its operation is as follows: The nut to be milled is screwed into the head B; the handle E is turned in a counter clockwise direction until the ratchet R drops through the slot S in the shell H and engages the gear C, thus turning the shaft D to the proper position for the cutting of the first groove. The slot S is so designed that a movement of one-fiftieth of a turn of D is allowed. The spring I furnishes friction for holding the chuck in position, while the handle E is turned back until the slot in H stops it at A, the slot being just wide enough from A to A' to allow the handle to pass through H. The backward movement of the handle brings the cam F into engagement with the follower G,

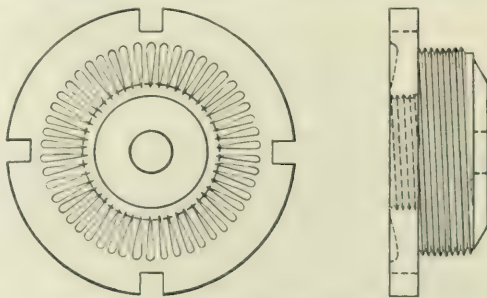


Fig. 9—Injector Water Nut.

thus raising the nut to such a height that the groove will be milled to the proper depth. The follower G is feather-keyed to the shell H so that it will not revolve with F. As the handle is turned back to its initial position the spring I pulls the chuck down, the ratchet R turns the gear C one-fiftieth of a revolution and the operation is ready to be repeated. It is possible to mill the grooves as fast as the handle can be turned back and forth.

DIES FOR STAMPING PRESS.

A set of dies for stamping gaskets for the top, bottom and center heads of a 9½-in. air pump is shown in Fig. 12. The dogs, A, B and C in the male die are removable, thus allowing the stamping of three different types of gasket with these dies. Another set of dies for stamping the copper water strainer for

feed water pipes is shown in Fig. 13. These dies are made of tool steel and are used in a No. 2½ double stripper machine manufactured by the E. W. Bliss Company, Brooklyn, N. Y.

FLUE CUTTER.

A most efficient flue cutter has been designed by B. Hendrikson, foreman of the tool room at Chicago. This tool, which is shown in Fig. 14, is so constructed that an air whistle is blown the instant the cutter wheel has made its way through the flue, thus notifying the operator that the cut is finished. Another important feature of the tool is the air feed. The tool is driven by a pneumatic motor and air is pumped into the cylinder B through the driving shaft A, thus affording a means of expanding the cutter disks out against the flue. The flue cutter in operation is shown in Fig. 15. The following test, which was made at the Chicago shops, will give some

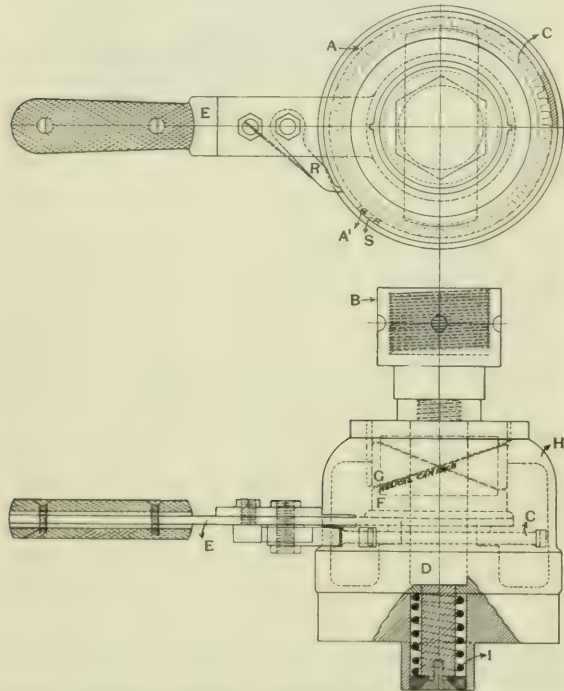


Fig. 10—Chuck for Milling Grooves on Injector Water Nuts.

idea of the rapidity with which the flues can be cut. The device is patented:

Engine No.	No. of flues cut.	Time (minutes).	Air pressure.	Av. per flue (seconds).
294	125	4	85	3.8
872	271	21	85	4.6
626	191	13	90	4.1
678	224	18	85	4.8
318	291	18	85	3.7
325	291	20	80	4.1
86	241	17	90	3.1
190	338	38	85	6.8
291	146	11	85	4.5
437	122	11	80	5.4
300	190	14	80	4.4

BENDING CLINKER BAR HANDLES.

A set of dies for bending clinker bar handles on a forging machine is shown in Fig. 16. The part A is bolted to the crosshead, and the base B to the bed of the machine. When A travels backward the spring H pulls the die C open as it moves backward away from the roller G. At the same time the plunger D starts backward, and as it clears the end of the die E, the spring L pulls E to the left. The clinker bar heated to a red heat is thrust in to the left of the center piece M until it strikes the stop E, which allows just enough material for bending. The crosshead then comes forward and the plunger D strikes the curved side of the die E and forces it toward the center, bending the iron about the left side of M



Fig. 11—Chuck for Milling Grooves on Injector Water Nuts.

The die C then comes in contact with the iron and bends it downward until the die strikes the roller G, when it is swept

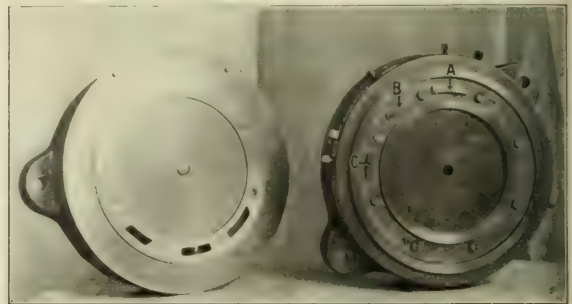


Fig. 12—Dies for Stamping Gaskets for Air Pump Heads.

inward and around the center piece M. One of the handles is shown in the foreground in the photograph.

CUTTERS FOR SLAB MILLING MACHINES.

Side rods are roughed out and finished in one operation at

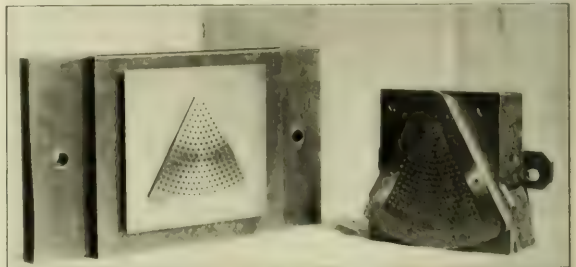


Fig. 13—Dies for Stamping Copper Water Strainers for Feed Water Pipes.

the Chicago shops. The special tools for doing this work are shown in Fig. 17. One of the cutters (there are 216 in the

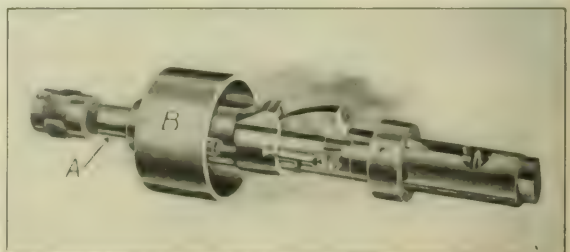


Fig. 14—Flue Cutter.

tool) is shown in Fig. 17a. These cutters are driven in straight and are kept from turning by pack punching the arbor forcing the soft metal of the arbor into the stem recess of the cutter. The results from these tools have been excellent. They seldom

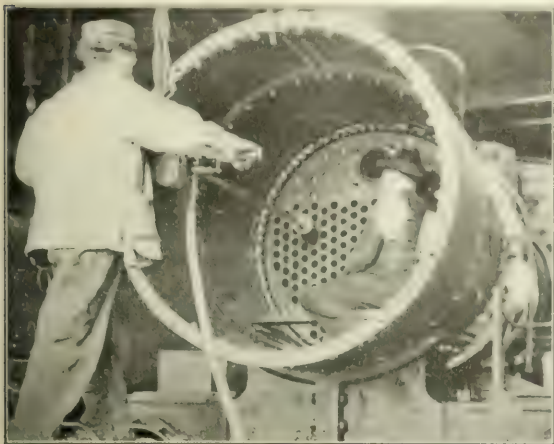


Fig. 15—Flue Cutter in Operation.

require grinding and are run at a cutting speed of 6 to 8 in. per min., taking a $\frac{1}{2}$ -in. cut.

TESTING BOYER SPEED RECORDERS.

A simple device for testing Boyer speed recorders is shown in Fig. 18. It consists of a small air engine, direct connected to the flywheel of the speed recorder. An auxiliary tank and a reducing valve provide a constant air pressure, making it possible to maintain any constant speed of from one to 100

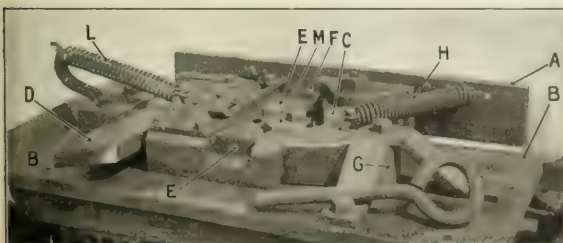


Fig. 16—Dies for Forming Clinker Bar Handles.

miles per hour. The pulley of the recorder turns ten times as many revolutions per minute as the number of miles per hour registered; that is, r.p.m. equals ten times m.p.h. For example, to check the recorder at 50 miles per hour it is only necessary to speed up the machine until the pulley turns 500 r.p.m. If the recorder is correct it will register the correct speed.

TOOL FOR TURNING TUMBLING SHAFTS.

A special tool for turning tumbling shafts is shown in Fig.

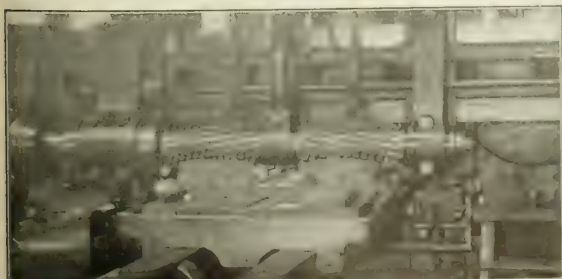


Fig. 17—Milling Side Rods.

19. It consists of a leaf, leave A to which the tool B is bolted. This revolves about the shaft C, which is screwed

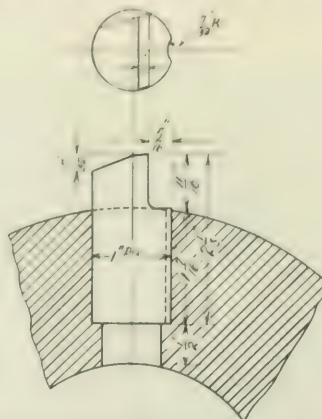


Fig. 17A—One of the Cutters in Milling Tool for Side Rods.

on the spindle of the lathe. The tool is fed by means of the carriage and the plate D, which is fitted to the groove E at the left on the sleeve, and is held in the tool post.



Fig. 18—Device for Testing Boyer Speed Recorders.

CHECKING LOCATION OF DRIVING WHEEL ON AXLE.

A shop kink which is used to great advantage in testing the proper location of crank pins in relation to the keyway when

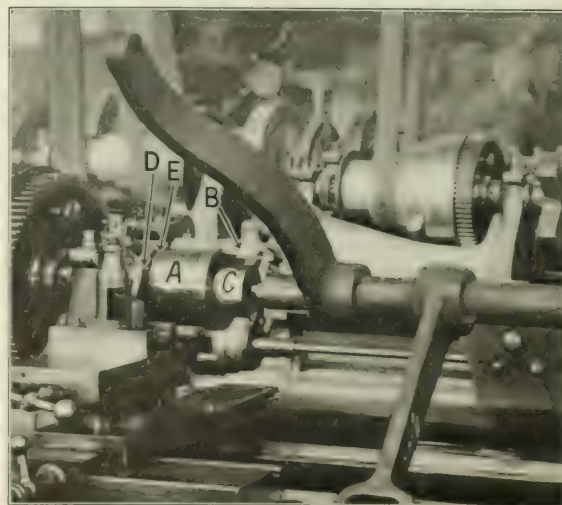


Fig. 19—Tool for Turning Tumbling Shafts.

pressing a wheel on an axle is shown in Fig. 20. The lower inside center A is placed on the center line of the keyway. The upper point B is in the same vertical plane and furnishes a guiding point in pressing the wheel to its correct position on the axle. The point B should be in the center of the crank pin when the point A is on the center line of the keyway.

DRILL PRESS CLAMP FOR ASH PAN CASTING.

A clamp for holding ash pan castings on a drill press table

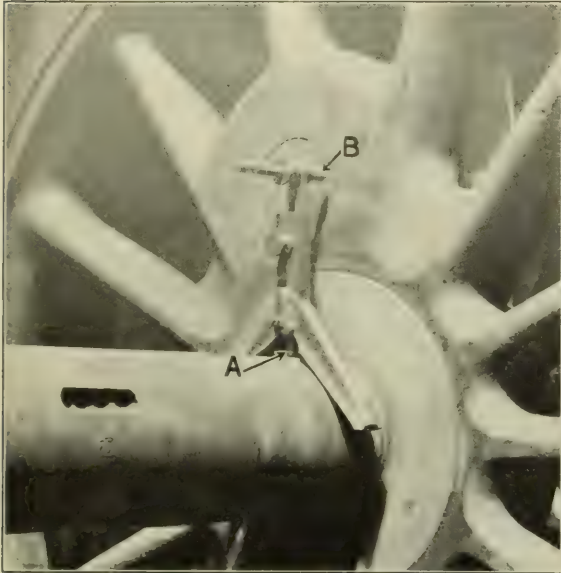


Fig. 20—Tool for Checking Proper Location of Driving Wheel on Axle.

is shown in Fig. 21. The clamp A revolves upon the shaft B, which is bolted to the drill press table. The casting C, which is held by the clamp, may be placed in any position for drilling by driving out the key D and turning upon the pin B.

REMOVING BULL RING FROM PISTON SPIDER.

A tool of great advantage in removing the bull ring from



Fig. 21—Clamp for Holding Ash Pan Casting on Drill Press.

the piston spider is shown in Fig. 22. The dogs A and B attached to the cross piece C are inserted in the bull ring D, and the screw E is forced against the piston F; the dogs A and B pull the spider off.

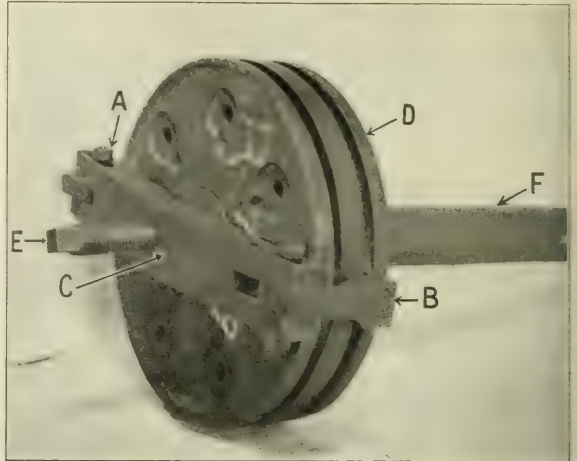


Fig. 22—Tool for Removing Bull Ring from Piston Spider.

and the screw E is forced against the piston F; the dogs A and B pull the spider off.

PISTON RING TOOLS.

Two handy tools for applying snap rings to a piston head are shown in Fig. 23. The tool A spreads the ring and B is

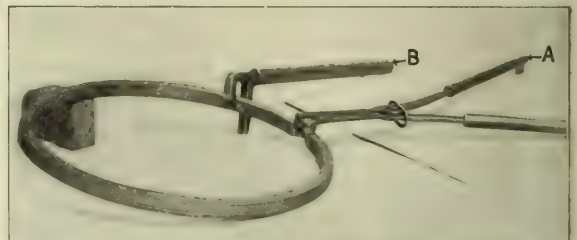


Fig. 23—Tools for Applying Snap Rings to Piston Head.

used as a lever for pulling the piston ring down into place.

PNEUMATIC LATHE FOR CHASING FOLLOWER BOLTS.

A considerable saving of time is made by the use of the small pneumatic bench lathe shown in Fig. 24, which is used

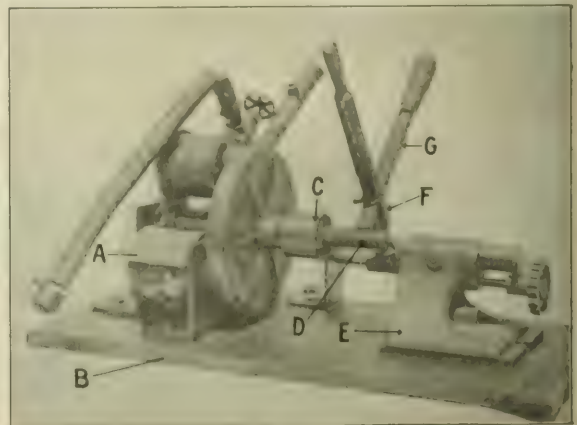


Fig. 24—Pneumatic Lathe for Chasing Follower Bolts.

for chasing follower bolts. It consists of an air motor A mounted on the base plate B, also of a special chuck C for holding the follower bolt, a tailstock E and a tool carriage F, which carries the chaser tool G. This provides a simple and easy means of chasing follower bolts at the bench and is especially useful in connection with roundhouse work.

PISTON VALVE KINKS.

The parallel strip, shown in Fig. 25, is used to considerable

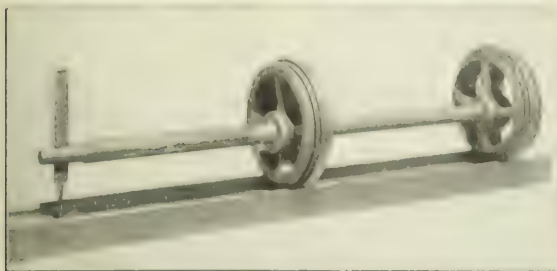


Fig. 25—Parallel Strip for Lining Up Dowel Pins on Piston Valve Spiders.

which carries the chaser tool G. This provides a simple and easy means of chasing follower bolts at the bench and is especially useful in connection with roundhouse work.

PISTON VALVE KINKS.

The parallel strip, shown in Fig. 25, is used to considerable

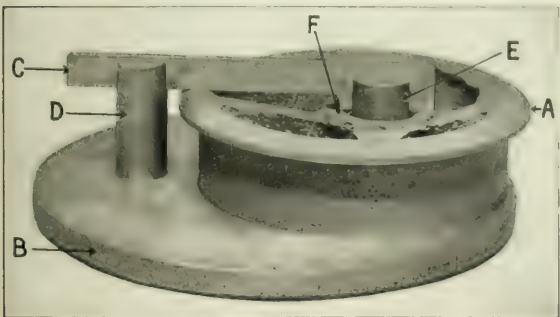


Fig. 26—Device for Laying Off Keyways on Piston Valve Spiders.

advantage in lining up dowel pins on piston valve spiders. For the proper laying off of keyways on piston valve spiders the

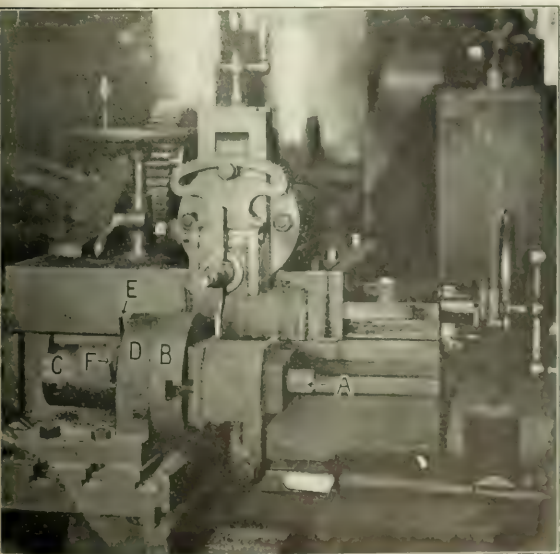


Fig. 27—Chuck for Planing Rod Brasses.

device shown in Fig. 26 is used. The spider A is placed in the counterbore hole on the plate B, and the parallel strip C is inserted in the slots of the tool posts D and E, as shown. The keyway is then scribed at F. It is thus located in the correct

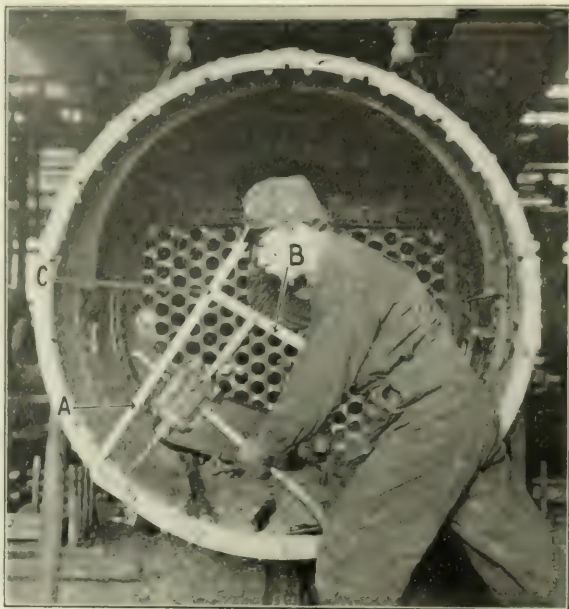


Fig. 28—A Handy Device for Drilling Small Holes in the Front End.

position and there is no danger of the valve binding in the steam chamber when it is connected to the valve motion.

ROD BRASS CHUCK.

A special chuck for planing rod brasses is shown in Fig. 27. It is so constructed that the brass is planed perfectly square

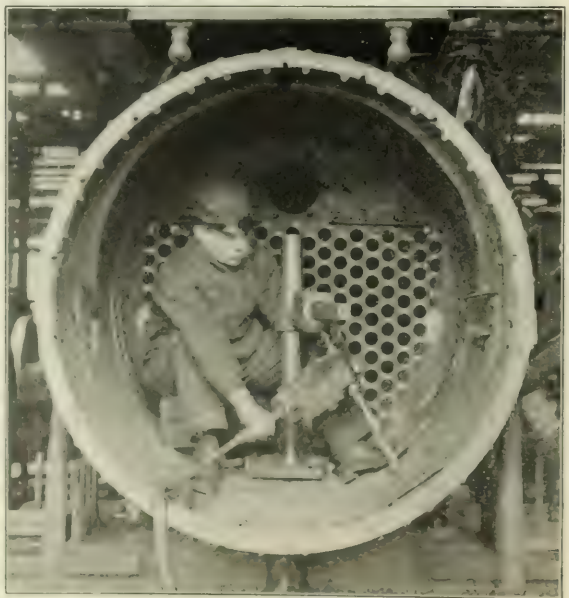


Fig. 29—“Old Man” with Ball-Shaped Head for Drilling Saddle Bolt Holes.

on all four sides without being unclamped. Means are also provided to take care of wedge braces. The nut A clamps the brass to the chuck B; the nut C holds the chuck to the frame D. To turn the brass 90 deg. the finger E is drawn

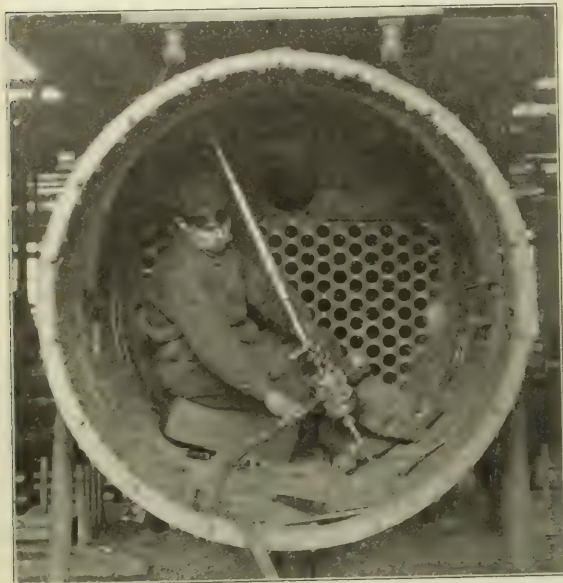


Fig. 30—Extension Bar for Supporting Air Motor.

down, disengaging a slot on the inside. The nut C is then loosened and the brass is turned until the finger E engages in the next slot on the inside face of B. This slot is cut at right angles to the first stop. The brass is turned in this way four



Fig. 32—Drilling Holes in Steam Pipe Flanges.

use an "old man." The long piece A is hooked over a stud or bolt at its lower end and is held at the upper end by the workman's right hand. The cross piece B is pivoted to A at C and is pressed down upon the slotted top of the motor by the weight of the workman's body.

The "old man" with the ball-shaped head shown in Fig. 29

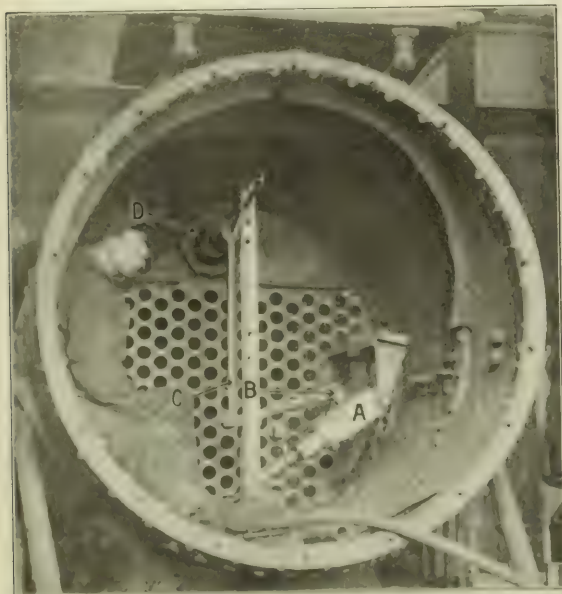


Fig. 31—Grinding Dry Pipe Joint in Front End.

times and is placed on the four sides. The finger F is used when it is desired to plane braces at angles other than 90 deg.

DRILLING HOLES IN THE FRONT END.

The apparatus shown in Fig. 28 is especially useful for drilling holes of small diameter when it is not convenient to



Fig. 33—Reaming Guide Bolt Holes.

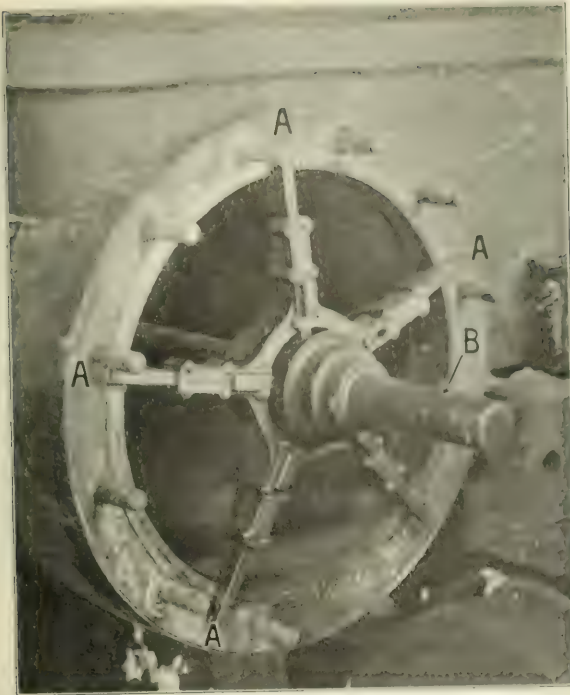


Fig. 34—Adjustable Device for Lining Up Guides.

is used for drilling the saddle bolt holes in the front ends. An extension bar for supporting an air motor in drilling holes in the boiler at any angle is shown in Fig. 30. This

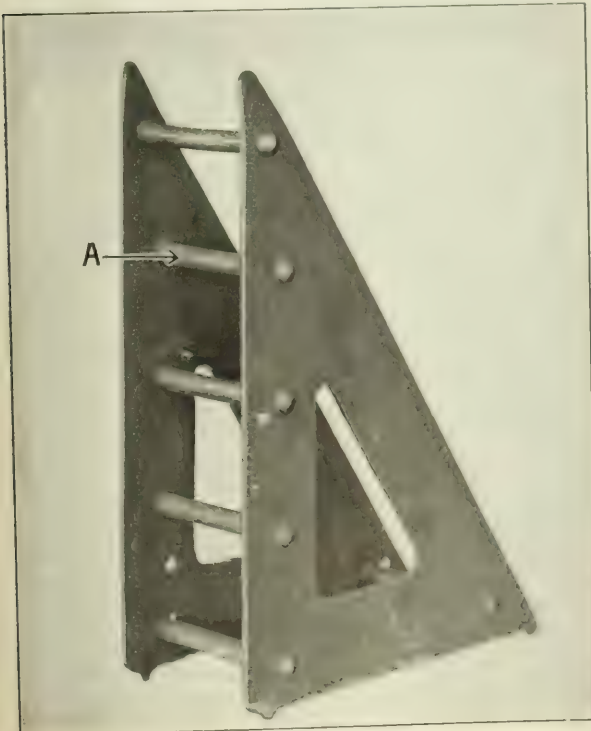


Fig. 35—Step Bracket for Putting Up Binders.

tension is adjustable and may be used in any size boiler without the need of any special tool. A special rigging for guiding the dry pipe into the front end of the boiler is shown in Fig. 31. The device consists of an air motor A connected to a crank B, which oscillates the handle C attached to the dry pipe D, as shown in the photograph. A convenient apparatus for drilling holes in steam pipes is

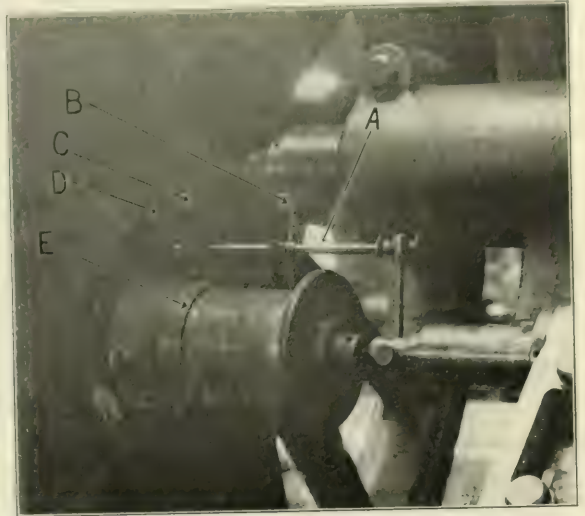


Fig. 36—Device for Locating Wear on Crank Pins.

shown in Fig. 32. The steam pipe is held rigidly with the face to be drilled in a horizontal position, by means of the two pairs of legs B and C, the upper parts of which are inserted through the two holes in the steam pipe and are keyed down to the frame D. At the top of D is a flat piece of iron E, which supports the top of the motor F. This support extends out sufficiently to allow the proper adjustment to the motor in locating the center of the hole to be drilled.

REAMING GUIDE BOLT HOLES.

A convenient apparatus for reaming guide bolt holes is

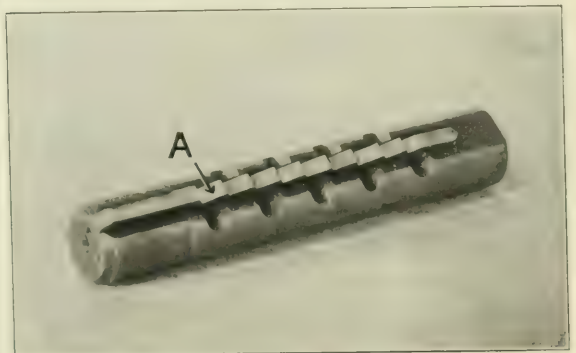


Fig. 37—Tool for Slotting Keyways.

shown in Fig. 33. The rigging may be quickly set up and is operated as follows: The reamer A is inserted in the guide bolt hole and the lever C, with a fulcrum at D in the adjustable jack E, is placed under the motor. Pressure is applied by the workman at the left, thus feeding the reamer into the hole as the workman on the right operates the motor.

ADJUSTABLE DEVICE FOR LINING UP GUIDES.

A kink used in lining up guides is shown in Fig. 34. It is constructed with the arms A notched at the ends to fit cylin-

ders whose diameters range from 16 in. to 21 in. It is placed at the front of the cylinder, as shown, with a similar but smaller device in the back cylinder head supporting the bar B. The bar is thus held in the center of the cylinder and is free to slide backward and forward, affording a means for lining up the guides.

STEP BRACKET FOR PUTTING UP BINDERS.

The step bracket in Fig. 35 is especially handy as a fulcrum for putting up shoes, wedges and binders. It is used

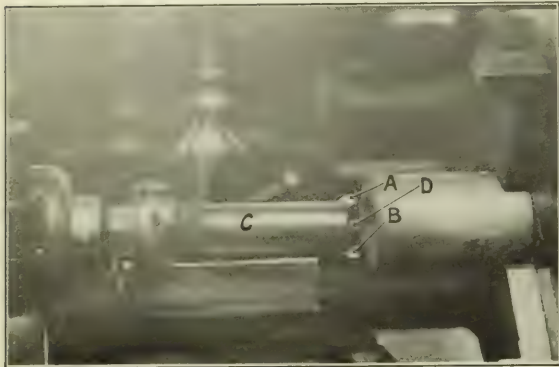


Fig. 38—Adjustable Boring Tool.

with the vertical side placed against the outside of the wheel. A bar is fulcrumed on one of the steps, as A, and with one end extending through the wheel and under the part to be raised. A sufficiently wide range is afforded by the five steps or points of support for putting up a binder.

INDICATOR OF WEAR ON CRANK PINS.

A special tool that readily indicates whether or not a crank pin is out of round is shown in Fig. 36. The device is fastened in the crank pin center of a quartering machine, with the three fingers B, C and D in contact with the pin, as shown. As it is revolved about the pin E the high and low spots are noted. The fingers are adjustable and may be used on crank pins of any size.

KEYWAY SLOTTING TOOL.

A tool for slotting keyways, used in a hydraulic press, is shown in Fig. 37. The cutting part consists of a number of

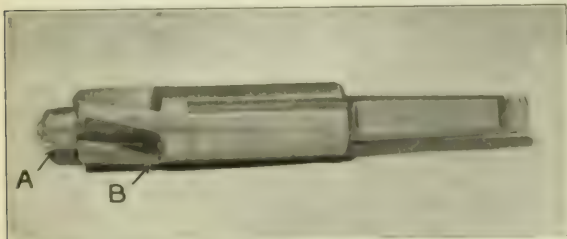


Fig. 39—Tool for Drilling Flue Sheets.

teeth of different heights, the lowest being at the right and the highest at the left. As the tool advances each tooth removes a little more metal than the preceding one. If necessary it may be used by driving it with a sledge.

ADJUSTABLE BORING TOOL.

An adjustable boring tool for use in the tail-stock of a lathe is shown in Fig. 38. It consists of two cutting tools, A and B, held in the chuck C by the nut D. The tools may readily be adjusted. The device is used principally in boring valve motion bushings.

DRILLING FLUE SHEETS.

A special tool for drilling flue sheets is shown in Fig. 39. The rose bit A is inserted in the small hole in the sheet and

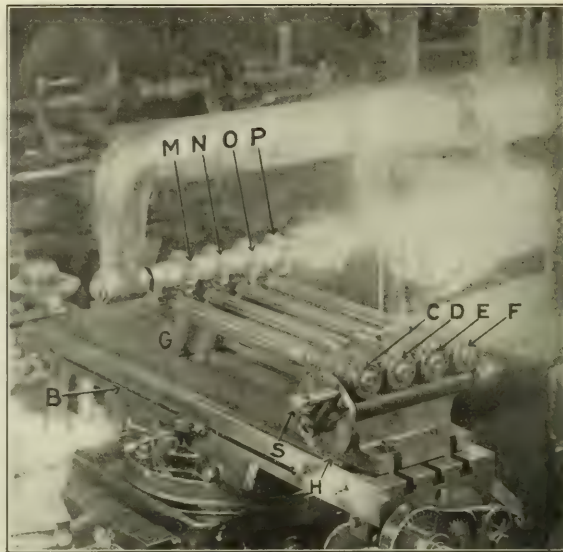


Fig. 40—Gang Chuck for Milling Four Reamers at One Time.

the drill B cuts the flue hole to the proper size. A hole can be drilled in from 32 to 35 seconds with this tool.

CHUCK FOR MILLING REAMERS.

A special gang chuck used for milling four reamers at the same time is shown in Fig. 40. It is bolted to the table B, and the reamers are inserted in the individual chucks C, D, E and F. The gang tail-stock is brought up, as shown, and the



Fig. 41—Templet for Laying Out Cylinder Castings.

reamers are fed into the four cutters M, N, O and P. The chuck is equipped with a spacing head H, and all four reamers are spaced at the same time by the movement of the handle S.

TEMPLET FOR LAYING OUT CYLINDER CASTINGS.

A templet for laying out cylinder castings for slotting is shown in Fig. 41. The false center A is placed in the end of the cylinder, with the templet T pivoted to it at the center B. The templet is then adjusted so that there is stock outside of it at all points where the casting is to be machined. This being done,

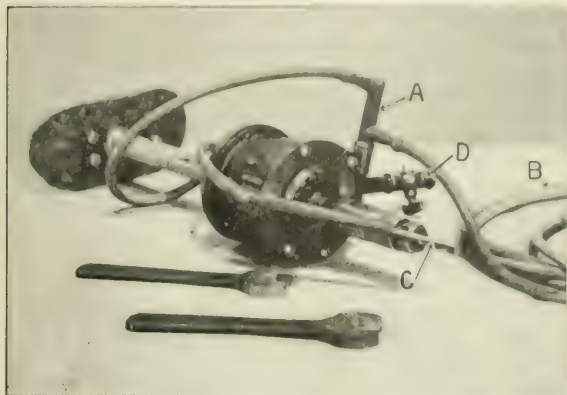


Fig. 42—Water Attachment for Breast Drill.

the cylinder casting is laid off according to the outline C, D, E, F, G, H and I.

WATER ATTACHMENT FOR BREAST DRILL.

A breast drill with an attachment for spraying water on the drill in drilling detector holes in staybolts is shown in Fig. 42. The rubber tubing B is placed in a water tank. The water is siphoned from the tank through this tube, the part A and out through the nozzle C. The air for operating the drill enters the motor through D. Some of it goes through the pipe A,

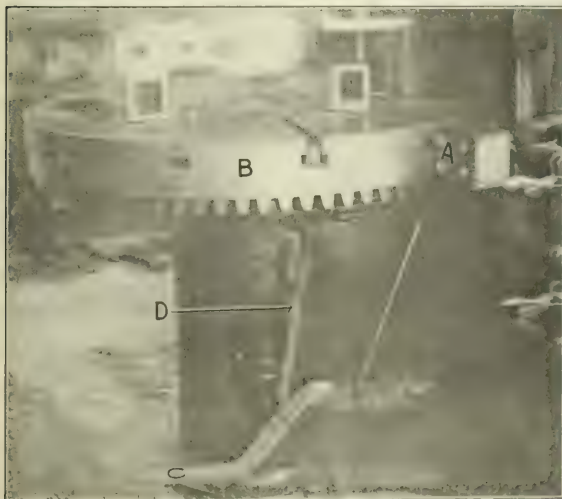


Fig. 43—Brake on Boring Mill.

rushing across the end of the tube B, thus causing a partial vacuum in B and siphoning the water through it.

WATER ATTACHMENT FOR BREAST DRILL.

A considerable saving of time in stopping a boring mill may be accomplished by the use of a foot brake, as shown in Figs.

43 and 44. The brake A, consisting of a block of wood, is connected to the foot brake C. When pressure is placed on C the brake is forced against the table with sufficient force to

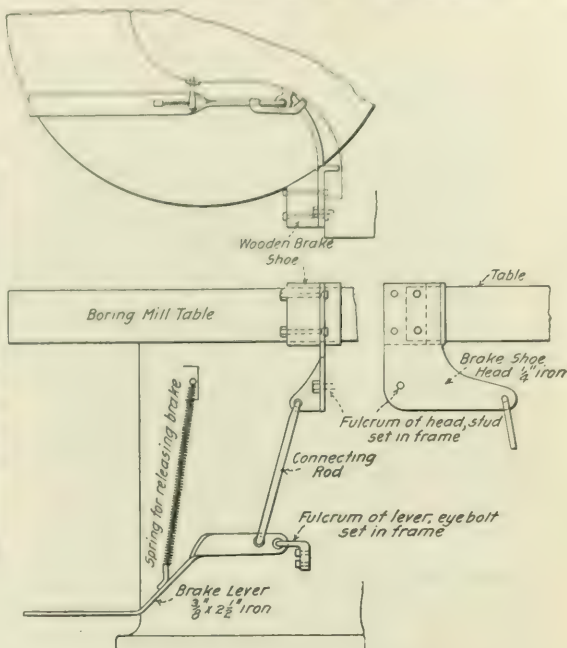


Fig. 44—Foot Brake on Boring Mill.

stop the machine immediately. When pressure is removed from C the spring D releases the pressure on the block.

HEAT TREATMENT OF HIGH-SPEED TOOLS.*

BY C. P. BERG.

The experiments described in this paper were undertaken in order to obtain the relation between temperature in tempering and the life of tools to a greater degree of exactness than heretofore known to the writer. The perfection of the electric furnace for high temperatures and its development into dimensions for such practical purposes as heat treatment of metal-cutting tools, in connection with the electric pyrometer for measuring these high temperatures, has made possible such investigations. The writer will confine himself exclusively to the attempt of solving the problem as it concerns the effect of various temperatures upon the life of high-speed tools.

The work may be said to consist of:

A. To establish a guide as to how rapidly the steel should be heated under the high heat treatment by a heat absorption test.

B. To determine at which degree of temperature in the heat treatment the maximum cutting efficiency occurs for a steel of a certain chemical composition.

C. To give the reasons for the relations found by these tests by metallurgical examinations and to illustrate them by photomicrographs.

Steels Used in Test.—Four prominent high-speed steels were selected to be experimented upon. These steels were marked A, B, C and D, and these marks will be retained in referring to the four series of specimens undergoing the various tests.

Tools Used in the Tests.—In order to eliminate the effect of forging upon the steels to be tested, straight tools for boring or inside turning, ground to shape and to standard angles in a grinder, were decided upon. Steel bars of $\frac{3}{8}$ in. by $1\frac{1}{2}$ in.

* Abstract of a paper presented at the June meeting of the Western Society of Engineers.

size were cut from the four steels, to be made into tools for roughing cuts in boring cylinders to $4\frac{1}{2}$ in. diameter. The tools were treated and ground with a cutting edge on both ends and to cutting angles as shown in the accompanying sketch, Fig. 1.

Specimens Used for Physical Tests.—Cylinders made from cast iron, of a chemical composition producing exceptionally hard castings, were provided for the tests. In order to insure equality, the greatest care was taken in preparing the molds for the castings, and all were poured from the same heat. In view of the fact that the life of a tool decreases with the increase of combined carbon in the castings on which it is used, and again, that the amount of combined carbon is dependent upon the rapidity with which the cast iron is cooled after pouring it into the mold, it became necessary to find some method by which these castings could be cooled in the same length of time. The molds were therefore specially arranged for this purpose and eight minutes after the iron was poured the cores were removed and the castings cooled in water. This gave the castings as nearly as possible the same amount of combined carbon. The dimensions of the cylinders were as follows: Outside

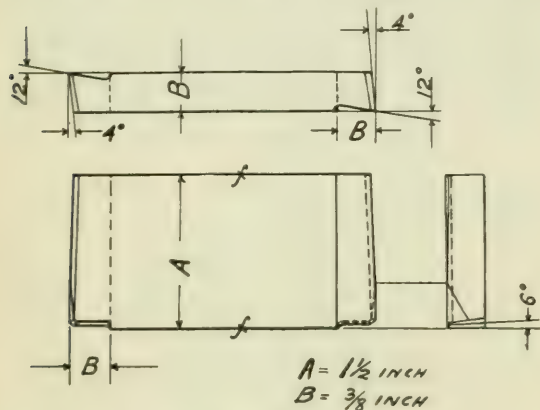


Fig. 1—Boring Tool Used in Tests.

diameter, 8 in.; length, 8 in.; and diameter of core, 4 in., leaving $\frac{1}{2}$ in. of metal to be removed by the double end tools to be tested, or, in other words, providing for $\frac{1}{4}$ -in. depth of cut for each end of the tool.

Heat Treatment of the Tools.—The temperatures used in the heat treatment of tools have heretofore generally been measured in practice by the terms: cherry red, bright yellow, white, etc. These measurements of heat were probably as correct as any other in connection with the old-time method of tempering tools in the blacksmith forge, where no accurate control of the heat could be obtained. Admitting that there are experts in this line, who are able to guess temperatures very closely by the color of the heated steel, the writer has heard differences of opinions, when the limit line was to be drawn between white and bright yellow, etc. With the modern electric furnace, its perfect control, evenly distributed heat preventing burning of the steel, and the thermo-electric pyrometer for measuring temperatures, the science of treating metal-cutting tools has taken a long step forward.

The instruments as used for the experimental tools were: A muffle furnace for preheating the steel slowly up to 1,400 deg. F., prior to transferring it to the tube furnace to be subjected to the high heat treatment. The muffle furnace was of the wire resistance type constructed for temperatures up to 1,800 deg. F. The tube chamber design of furnace, where the experimental tools were subjected to the high-heat treatment, was constructed for temperatures up to 2,600 deg. F.

The current for both of these furnaces was controlled on a switchboard which carried the thermo-electric pyrometer, which was connected with the thermo-couples by the switch in the

center of the board, this rendering possible the reading of temperatures in several furnaces on the one instrument by turning the switch. To insure accuracy the thermo-couples used were calibrated before and after the readings made on the temperatures of the test specimens. The calibrating consisted in taking a reading on water at the boiling point (212 deg. F.), on aluminum at the melting point (1,215 deg. F.), and on copper at the melting point (1,949 deg. F.). In giving high-speed tools the high heat treatment, the temperature should be raised rapidly to the desired degree for quenching, but enough time should be allowed for the heat to penetrate thoroughly to the center of the tool, which otherwise would be in danger of cracking. To do this, it is necessary to know the length of time required by the tool under treatment to absorb the heat to which it is subjected. To ascertain this for a guide in treating the experimental tools, the heat absorption test was made, the results of which are shown in the diagram, Fig. 2.

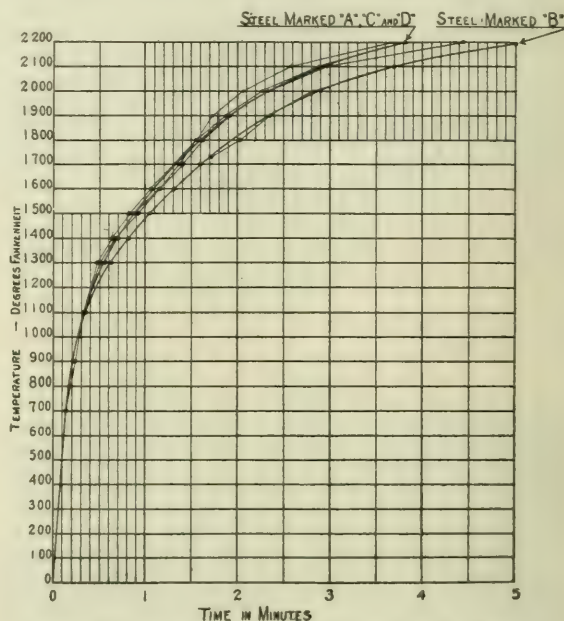


Fig. 2—Heat Absorption of the Four Tool Steels.

Four pieces of steel of equal size, $\frac{3}{8}$ by $1\frac{1}{2}$ by $1\frac{1}{2}$ in., one from each end of A, B, C and D, were prepared with a hole to receive the end of the thermo-couple. The furnace was run up to 2,200 deg. F. and kept at that temperature. The test pieces were placed in the furnace individually and time observations were taken on the increasing temperature of the steel. Noting the uniformity of the curves in the diagram, Fig. 2, it will be seen that the molecular change in the steel up to 2,200 deg. F. did not at any point disturb the evenly increasing temperature of the specimen. As will appear later, it was found that some of these steels are treated with the best results at 2,150 deg. F. The molecular change evidently is not violent enough and quick enough to stop the increase of temperature in the steel, at least it could not be observed by the instruments used.

From other tests made on heat absorption with various sizes of steel, it appears that the time for the absorption of heat increases very nearly in proportion to the thickness of the steel. Thus, a piece of steel $\frac{3}{8}$ in. thick requires twice as long a time as is shown by the diagram in Fig. 2, which would be 6.6 minutes for a temperature of 2,150 deg. F. for any one of the A, C and D steels.

Photographs of fractures were shown of specimens from steel A, which had been heated to 2,150 deg. F., but which were left in the furnace a certain length of time after reaching this temperature before quenching in oil at 100 deg. F. Comparing these

fractures with the ones from the experimental tools and the results from the physical tests of the latter, strongly indicates the necessity of careful observation in the matter of time for the tool to remain in the furnace to become thoroughly and uniformly heated.

A hardness test on these specimens performed with a scleroscope gave the results shown in the following table:

Specimen	Length of time left in furnace.	Hardness by scleroscope
1.....	2 " 00	80
2.....	1 " 00	79
3.....	1 " 00	80
4.....	6 " 00	78
5.....	8 " 00	68
6.....	10 " 00	79
7.....	12 " 00	70

Based upon the above results, the heat treatment of the experimental tools was undertaken. The specimens were marked, preheated to 1,400 deg. F., and from this temperature heated to the various degrees of high heat, as shown in Table III. At the temperatures indicated in the table, the specimens were quenched in oil, which was kept constant at 100 deg. F. For convenient comparison, the results of hardness tests with the scleroscope upon the treated specimens are also shown.

	Tempt., Fahr.	Hardness		Tempt., Fahr.	Hardness
A—1	1,850	78	C—21	1,950	78
2	1,900	81	22	2,050	80
3	1,950	76	23	2,100	80
4	2,000	78	24	2,150	83
5	2,050	81	25	2,200	80
6	2,100	82	26	2,250	75
7	2,150	83	27	2,300	73
8	2,200	81	28	2,350	—
9	2,250	77	29	2,325	71
10	2,250	77	30	2,350	67
0	2,300	74	D—31	1,950	70
B—11	1,850	78	32	2,050	75
12	1,900	74	33	2,100	76
13	1,950	75	34	2,150	81
14	2,000	77	35	2,200	79
15	2,050	83	36	2,250	83
16	2,100	83	37	2,300	86
17	2,150	82	38	2,350	86
18	2,200	79	39	2,300	86
19	2,250	78	40	2,400	84
20	1,750	68			

Specimen 0 of series A softened and caved in on one side. Specimen 28 of series C softened so the free end (not supported by the tongs) tore off in removing it from the furnace. Specimen 30 was taken to replace the broken one, and special precautions were made for its removal from the furnace, and it was quenched without mishaps. The specimens receiving the maximum heat all fused at the ends and some were considerably softened.

Physical Tests.—The life or durability of these tools appears to vary a good deal. Being ground into tools the specimens were put to work under equal conditions on the castings. A 34-in. vertical boring mill was selected for the test, in order that the

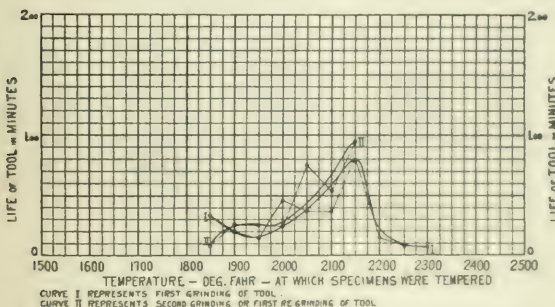


Fig. 3—Relation Between Temperature and Life of Tool Steel "A"

chips should clear away from the tool easily. The ends of the cylinders were faced, to eliminate the scraping of the scale by the experimental tools.

The results from the tests run on the specimens from steel A are plotted in the diagram, Fig. 3. The specimens quenched at a temperature above 2,150 deg. F., failed almost immediately and broke. The second curve (II), which represents the second grinding of the tool, shows a slight increase in durability. This

indicates the effect a second heat treatment (drawing the temper of the tool after the high heat treatment) has on the tool, which effect can be gotten as readily by running the tool at high cutting speeds until it fails, and having it reground, as by drawing the temper in the furnace. However, this method is less accurate, as there is no means of determining the heat thus developed under the cutting action, at the present time. The cutting speed, 80 ft.

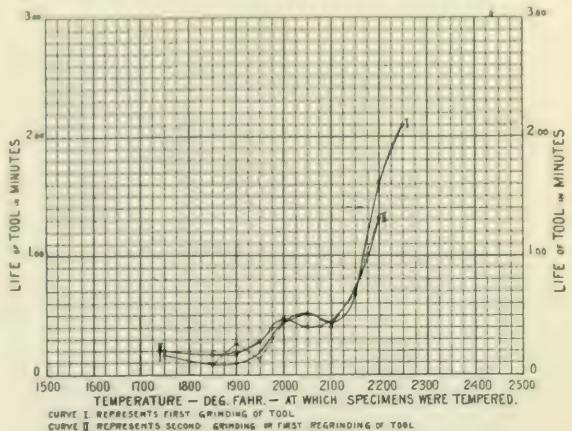


Fig. 4—Relation Between Temperature and Life of Tool, Steel "B."

per minute, the thickness of the shaving or feed per revolution, 0.0339 in., and depth of cut, $\frac{1}{4}$ in., at each end of the tool, were kept constant for all specimens and for both grindings.

Results from the tests run on the specimens of steel B are plotted in the diagram, Fig. 4. The curves do not present a great deal of uniformity at the low temperatures, but improve and become more distinct as the temperature increases. The specimen receiving the highest heat showed the maximum durability, but it failed very suddenly and broke into several pieces. The fractures gave evidence of brittleness. Practically no differ-

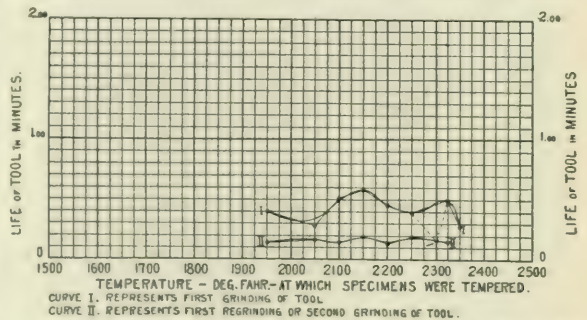


Fig. 5—Relation Between Temperature and Life of Tool Steel "C."

ence in durability appears between the first and second grinding of the tool.

The results from the tests run on the specimens of steel C are plotted in the diagram, Fig. 5. The cutting speeds were evidently too high for this grade of steel. The durability being very low at all points, the variations are not distinct. However, it will be seen that the durability attains its maximum at 2,150 deg. F. in Curve I, representing the first grinding of the tool. The dotted lines show that the specimen which was quenched at 2,300 deg. F., failed and broke almost immediately after starting.

Curve II, representing the second grinding of the tool, does not show any variations whatever, and the difference between this and first grinding is negative. Both these occurrences are directly due to an increase in cutting speed of 20 ft. per minute

for the specimens on second grinding. The cutting speed, 80 ft. per minute, for first grinding, and 100 ft. per minute for second grinding, the thickness of shaving or feed per revolution, 0.0339 in., and depth of cut, $\frac{1}{4}$ in. at each end of the tool, were kept constant for all specimens.

Results from the tests run on the specimens of steel D are shown by the diagram in Fig. 6. In this diagram it may be noted

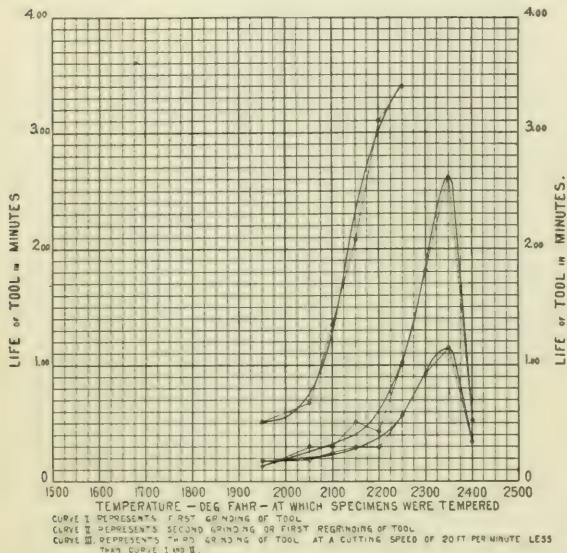


Fig. 6—Relation Between Temperature and Life of Tool Steel "D."

that part of the specimens were subjected to a test after being ground a third time. All three curves (I, II and III) show the variations very distinctly, and of exceptionally high durability, with the attained maximum at the quenching temperature of

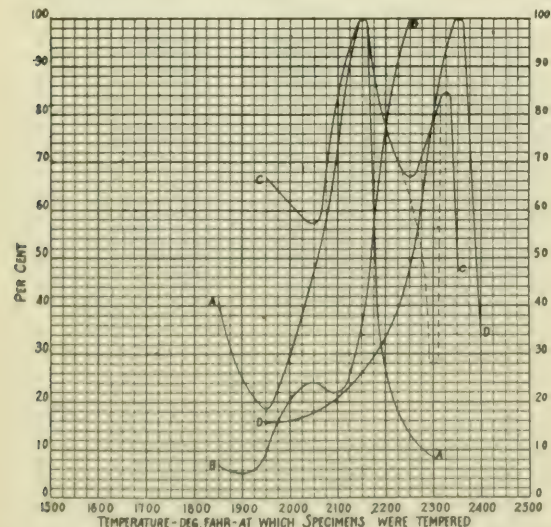


Fig. 7—Relation Between Temperature and Life of Tool in Percentage for the Four Steels.

2,350 deg F. for both the first and the second grinding. The specimen quenched at 2,400 deg F. broke on the second grinding after failing in the length of time (0.52 minute) as shown in the diagram. Only part of the specimens were run on the third grinding, simply for the reason that the time for boring one cylin-

der would not be sufficient for the tool to fail at a cutting speed of 80 ft. per minute. Cutting on more than one cylinder with the same tool would cool the cutting edge of the tool while changing, and the result could not be considered. The cutting speed, 100 ft. per minute for first and second grinding, and 80 ft. per minute for third grinding, the thickness of shaving or feed per revolution, 0.0339 in., and the depth of cut, $\frac{1}{4}$ in. at each end of the tool, were kept constant for all specimens.

In Fig. 7 is shown a diagram giving by percentage the relation between temperature and life of tool, of the four series of specimens. The temperature forms the base of the diagram, and the ordinate is made into a per cent. scale. The maximum life or durability of the tool is taken as the unit output at 100 per cent., and the durability in percentage of the maximum can be read from the curves for any temperature used.

Taking the results of these experiments as a whole, the general shop rule for treating a high speed tool—"Heat it to a white heat and quench it"—does have its shortcomings, because a variation of 50 deg. F. cannot be determined by the eye.

A poorly treated tool decreases the shop production for the manufacturer, who allows it inside his establishment. It increases the bill of the customer, who pays for the tool and the work spent on it. When the works manager comes through the shop and inquires about the tools, the workman naturally testifies the tool steel to be of inferior quality, which, as we have seen, may not be the case, but this tool steel maker has to find a new market for his stock of steel. In short, it is waste of energy and waste of capital.

THE BREWSTER SHOPS OF THE WHEELING & LAKE ERIE.

The main line of the Wheeling & Lake Erie, between Orrville and Harmon, Ohio, formerly passed through Massillon, but the more direct route which was finished last year is some distance south, and new classification yards, a locomotive terminal and large locomotive shops have been located on the new cut-off at Brewster, Ohio, which is about nine miles southeast of Massillon. Practically all of the freight on the Gould lines in western Pennsylvania, West Virginia and eastern Ohio over the Wabash-Pittsburgh Terminal and the Wheeling & Lake Erie will be handled through the Brewster yards, making it an important point. It was decided to abandon the shops at Canton and Norwalk, Ohio, and concentrate the work of locomotive repairs at Brewster. The yards and locomotive terminal were completed and placed in operation about the first of the year, but the shops will not be finished until midsummer.

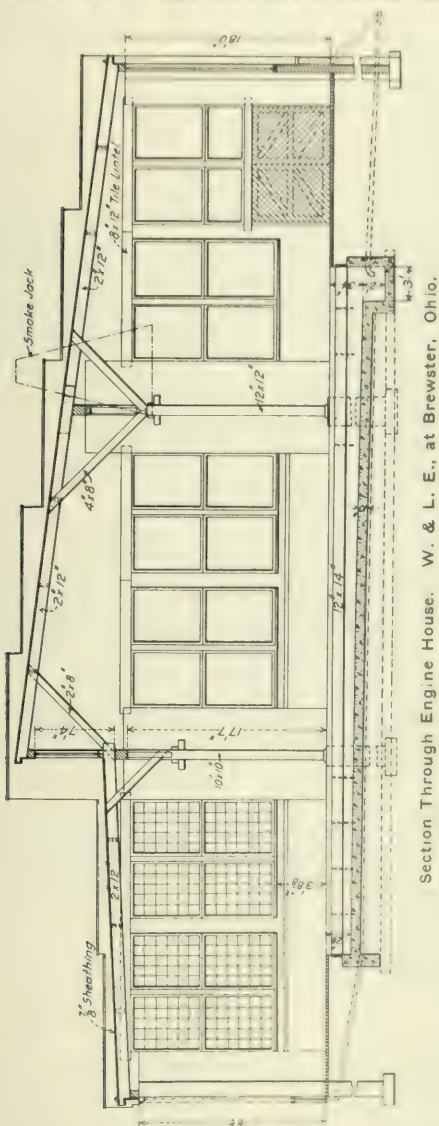
The general arrangement and design of the repair shop facilities, with respect to the distribution and handling of the locomotives and of all labor and material involved in the repair and manufacturing work, was planned under the direction of J. E. Muhlfeld, railway expert. The shop buildings were designed and are being built by Westinghouse, Church, Kerr & Co., and, together with the mechanical details, have been worked out by V. Z. Caracristi, consulting engineer for the Wheeling & Lake Erie.

Engine House.—The engine house and locomotive terminal layout was designed by the chief engineer, H. T. Douglas, Jr. The engine house is constructed principally of vitrified tiles, 8 x 8 x 16 in., and contains 26 stalls. The width of the building is 90 ft., the space between the wall and the turntable pit is 62 ft. 5 in., and the diameter of the turntable is 90 ft. There is one large drop pit for driving wheels under two tracks, and two smaller ones for trucks at the ends of two other tracks. The cross-section shows the flat wooden roof timbers supported at the central portion by two wooden posts placed 30 ft. centers. At the post nearest the inner circle the roof is raised about 7 ft. for light and ventilation and is provided with large hinged glazed sash. The height at this point is about 26 ft., while that at the entrance is only 17 ft. and at the rear wall 18 ft.

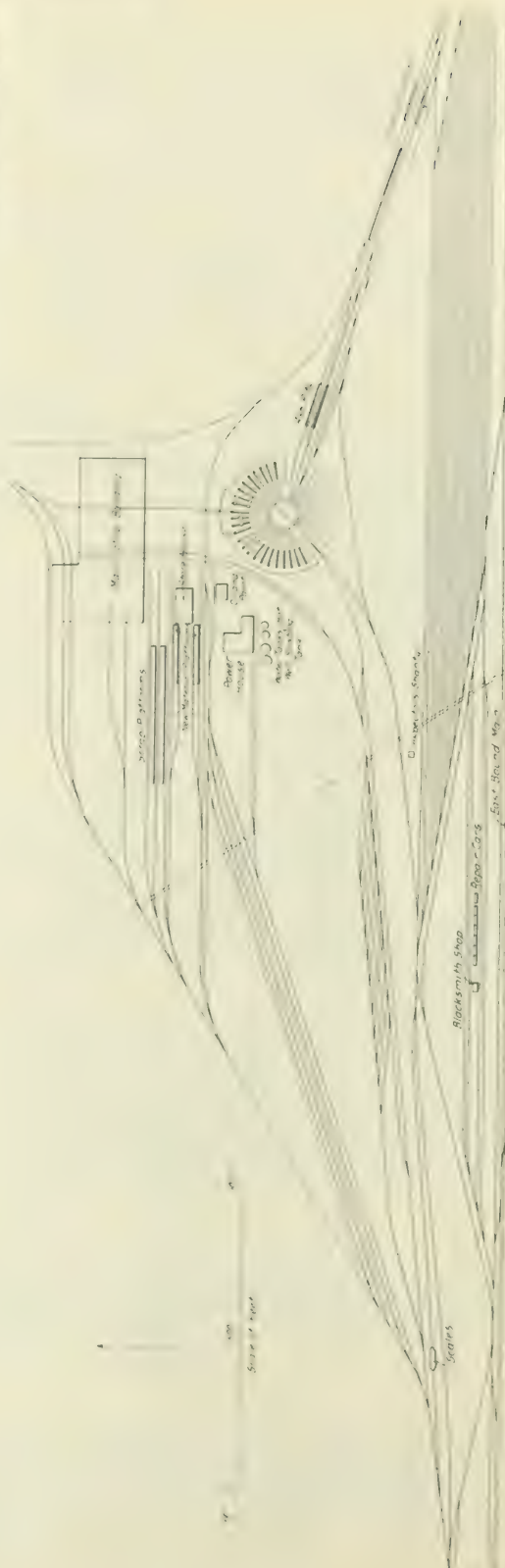
LOCOMOTIVE TERMS AND

Inspection Pits. In the tracks approaching the engine house there are two inspection pits, each 150 in. long, one on each side of the track leading to the coal washing machine. A plan and sections of these tracks and the subway connecting them is shown in one of the illustrations. The walls of the pits are of concrete and the tracks are carried over the subway on T beams.

Coaling Station—The coal wharf is a wooden structure with an incline for elevating hopper cars by an electric hoist. This structure is 38 ft. 3 in. high to the base of the rail. There are

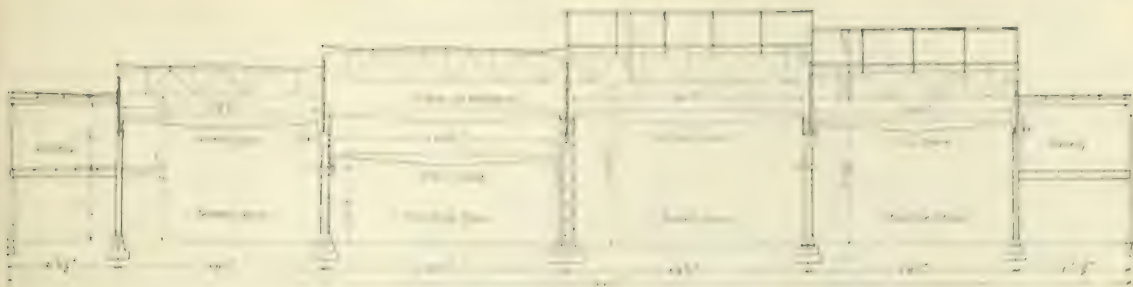


Section Through Engine House. W. & L. E., at Brewster, Ohio.

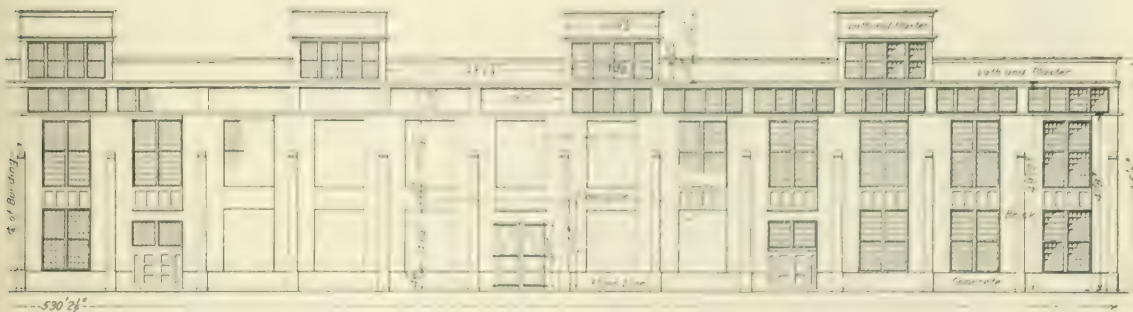


General Plan of the Wheeling & Lake Erie Shops at Brewster, Ohio.

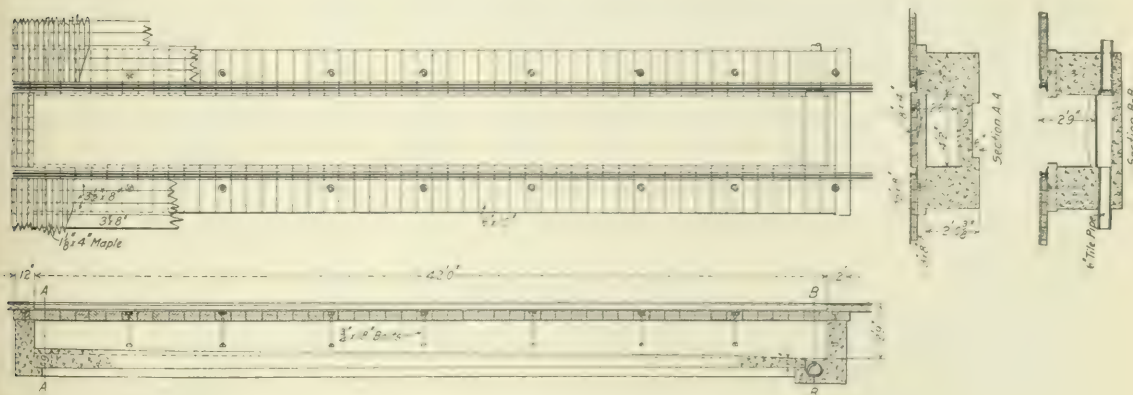
five bins with an incline for gravity discharge to locomotives on each side. The gate and spout for conducting the coal to the tender is the Kattenbach and Gries design. Beyond the coal bins in the same structure there are three bins for the storage of wet sand, having a total capacity of 1,122 tons. One of these bins is shown in section, and it will be seen that they discharge sand directly into large stove driers placed under the center of the hopper bottom of the bin. As the sand is dried it is elevated by compressed air to another bin at the end of the wharf, whence it flows by gravity through hinged spouts to the sand box on the locomotive.



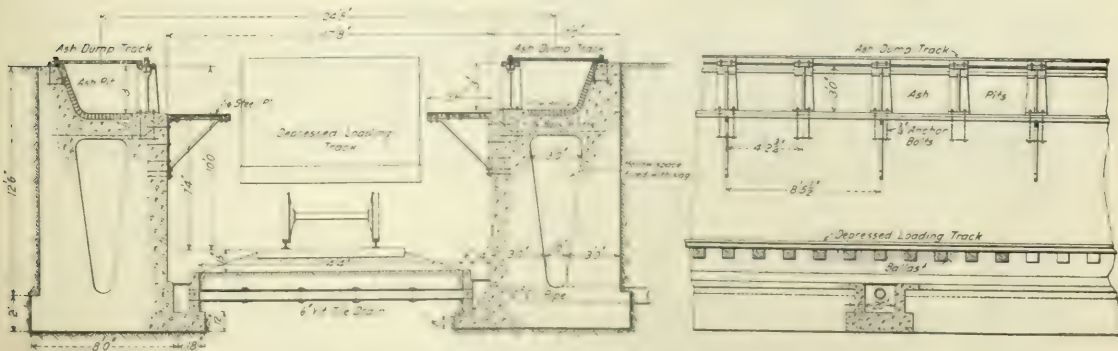
Cross Section Through Locomotive Shop at Brewster, Ohio, W. & L. E.



Partial Side Elevation of Locomotive Shop.



Construction of Pits in the Erecting Shop, Brewster Shops.



Ash Pit Construction, Wheeling & Lake Erie, Brewster, Ohio.

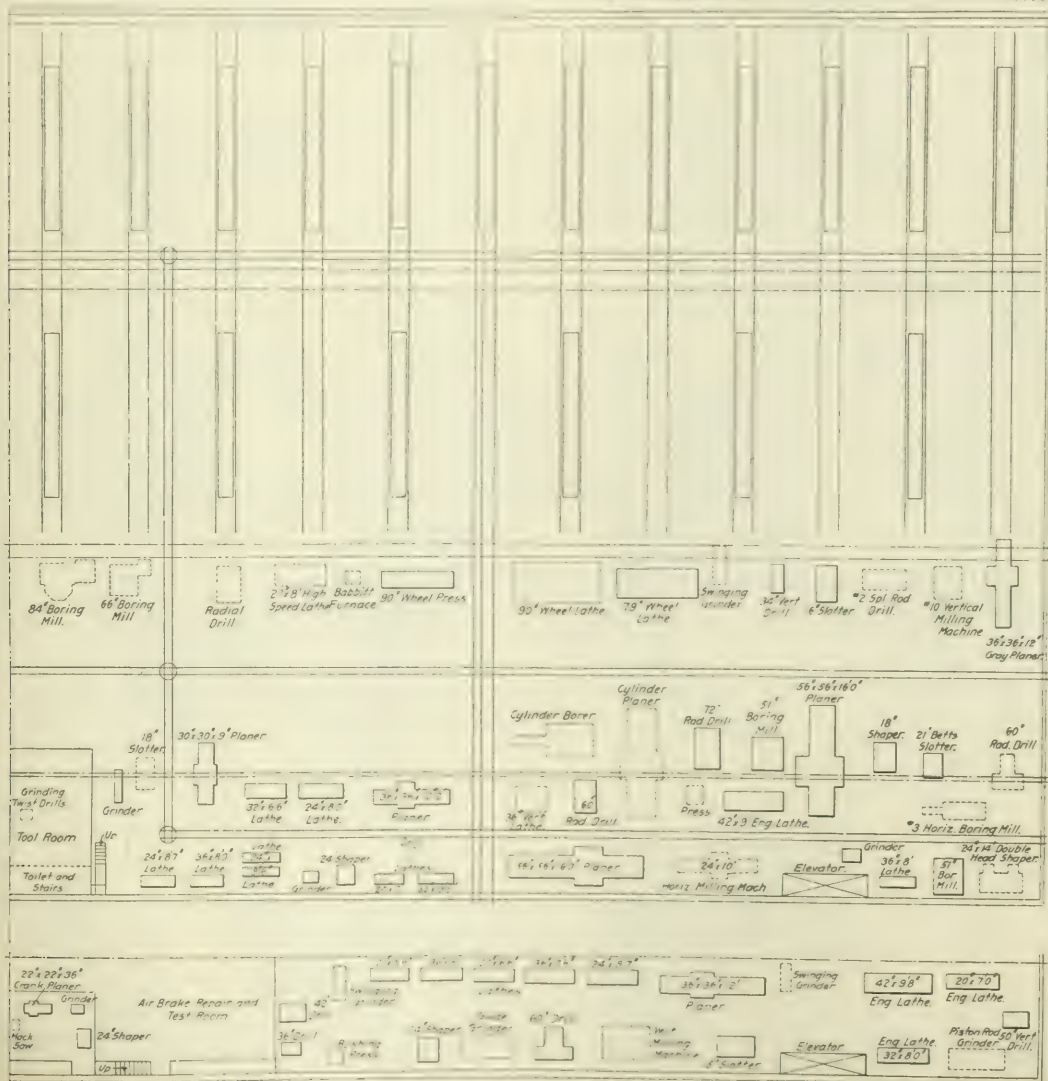
wheels and paved on shop tracks, so that they are raised to the regular erecting pit. In this way the locomotive need only be hoisted high enough to clear the driving wheels for longitudinal transfer and the height of the shop is 4 to 5 ft less than where the locomotive is lifted entirely over others. It will be noticed that the roofs over each bay are very nearly flat and there is only enough depression to provide proper drainage to the down spouts which are inside the walls in all cases. In the view of the south elevation of the locomotive shop it will be noticed that there are transverse upper decks with sash 8 ft. 9 in. high; these are 22 ft. 2½ in. wide and are spaced 11 ft. 10 in. apart. They provide an abundance of light and ventilation and some of them are utilized for the room required for the large hot blast fans used in the heating system. The roof arrangement for light and ventilation is somewhat similar to that which has been employed in the large steel buildings for steel freight car shops.

The floor of the shop consists of a layer of broken stone 6 in. thick covered with tarred sand 1 in. thick. On this is laid 3-in. pine flooring with a final covering of maple 1½ x 1 in. thick laid at right angles with the pine. The floor support at the erecting pits is worthy of notice, as it is intended

to maintain the direction to erect wood floors, which sink under the pressure of the jacks used about the engines. In this design, which is here illustrated, short ties 9 in. thick and 2 ft. 6 in. long are bolted to the top of the concrete pit wall projecting slightly at each side. These ties are laid close together, forming a continuous support for the pit rail as well as a solid support for the floor some distance out from the rail.

The list of tools includes those to be removed from the other shops and the new tools purchased. On the plan the former are shown by full lines, while the new tools are indicated by dotted lines. In the lists of tools which follow the new tools are indicated by asterisks.

Cylinder Section		
No.	Name	Make
1	12 in. radial drill	Sitew
1	60 in. radial drill	Bickford
1	32 in. lathe	Enterprise
1	24 in. lathe	Pond
1	36 in. planer	Fitchburg
1	36 in. vertical lathe	Bullard
1	cylinder borer	
1	cylinder planer	
1	power forcing press	
Frame Section		
1	36 in. planer	Fitchburg
1	30 in. planer	



Plan of Brewster Locomotive Shop, Wheeling & Lake Erie.



No.	Name	Make.
1	2-in. pipe threader	Saunders
1	1½-in. pipe threader	P. & A.
1	pneumatic bender	W. & L. E.

Trunk Shop

1	open forge furnace	
1	energy wheel grinder	Blount
1	36-in. punch and shear	Cleveland
1	8-in. horizontal punch	Cleveland
1	band shear	
1	band punch	
1	16-ft. horizontal bending clamp	
1	24-in. gooseneck drill	
1	circular lever shear	

Boiler Shop

1	plate roller	
1	36-in. double punch and shear	
1	8-in. horizontal punch	L. & A.
1	3-in. x 12-ft. rolls	
1	clamp	W. & L. E.
1	48-in. radial drill	Betts
1	flue furnace (oil)	Ferguson
1	flue boiler to 17 ft.	W. & L. E.
1	flue cutter 2-in. to 4-in.	W. & L. E.
1	flue sweeper	W. & L. E.
1	16-in. x 16-in. bolt lathe	W. & L. E.
1	flue welder, 2-in. to 4-in.	Barth
1	grinder	Diamond
1	3-ton jib crane	W. & L. E.
1	pressure blower No. 2	Sturdevant
1	60-in. shear	Hilles & Jones
1	60-in. punch	Hilles & Jones
1	open-flange fire	W. & L. E.
1	face plate	W. & L. E.
1	cold saw	Newton
1	rotary shear	Lennox
1	17-ft. gap riveter	Chambersburg
1	direct furnace (oil)	Ferguson
1	special radial drill	Pond
1	4-spindle staybolt threading and reducing machine	Lassiter

Blacksmith Shop

2	1,500-lb. steam hammers	Bement
1	200-lb. power hammer	Bradley
14	open forges	
1	spring setter, 30 x 60 in.	W. & L. E.
1	spring bander, 14-in. cylinder	W. & L. E.
1	No. 12 pressure blower	Buffalo
1	4-ton jib crane	
1	pneumatic bender	W. & L. E.
2	oil furnaces	Ferguson
1	face plate	
1	power hammer	Beaudry
2	No. 4 oil furnaces	Ferguson
1	2-in. forging machine	Aljux
2	No. 3 oil furnaces	Ferguson
1	bar shear	Hilles & Jones
1	angle iron forge	W. & L. E.
1	angle shear	L. & A.
1	4,500-lb. hammer	Bement
1	4-in. forging machine	
1	oil furnace	Ferguson
1	oil case-hardening furnace	Ferguson

Power House.—The power house is a substantial building with concrete foundations, brick walls and flat roof, with drainage similar to that of the locomotive shop. It is in the shape of an L, with one long side, 122 ft. 10 in., and the other

in. Russel engine, direct connected to a 250-k.w. Bullock generator, a.c. The two d.c. generators are for power current and the a.c. generator is for lighting. One Ingersoll-Rand air compressor, with simple steam cylinders 14 x 16 in. and compound air cylinders 22¼ x 14¼ x 16 in. One air compressor, same make, with 16 x 16-in. simple steam cylinders, compound air cylinders 25¼ x 16¼ x 16 in. The hydraulic accumulator is placed in the engine room, and the hydraulic pump in the pump room has 18 x 18-in. cylinders and 5-in. plungers working against a pressure of 1,000 lbs. per sq. in. There are also two Blake boiler feed pumps, with 12 x 12-in. cylinders and 7-in. plungers, and one Buffalo fire pump with cylinders 18 x 10 x 12 in. There are four Babcock & Wilcox boilers, each 400 hp., fitted with Roney stokers. The chimney is 9 ft. in diameter and 150 ft. high, made of radial brick and constructed by the M. W. Kellogg Company, New York.

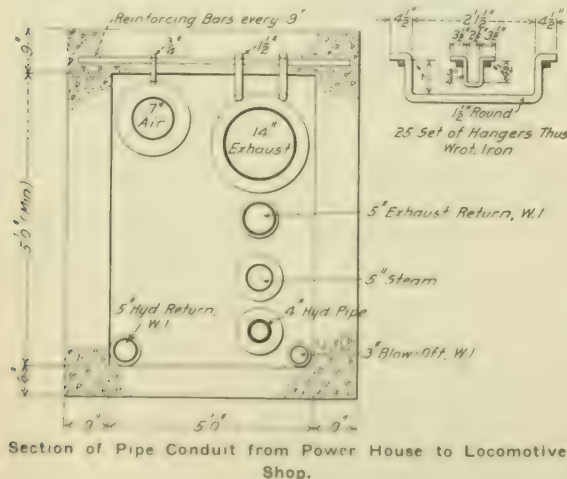
The concrete pipe conduit from the power house to the locomotive shop is shown in section. It is 3 ft. 6 in. x 5 ft. inside and contains one 14-in. exhaust steam pipe, one 7-in. compressed air, one 5-in. live steam, one 4-in. extra heavy hydraulic pipe, one 5-in. hydraulic return and one 3-in. blow-off.

TURNTABLE FOR MALLET LOCOMOTIVES.

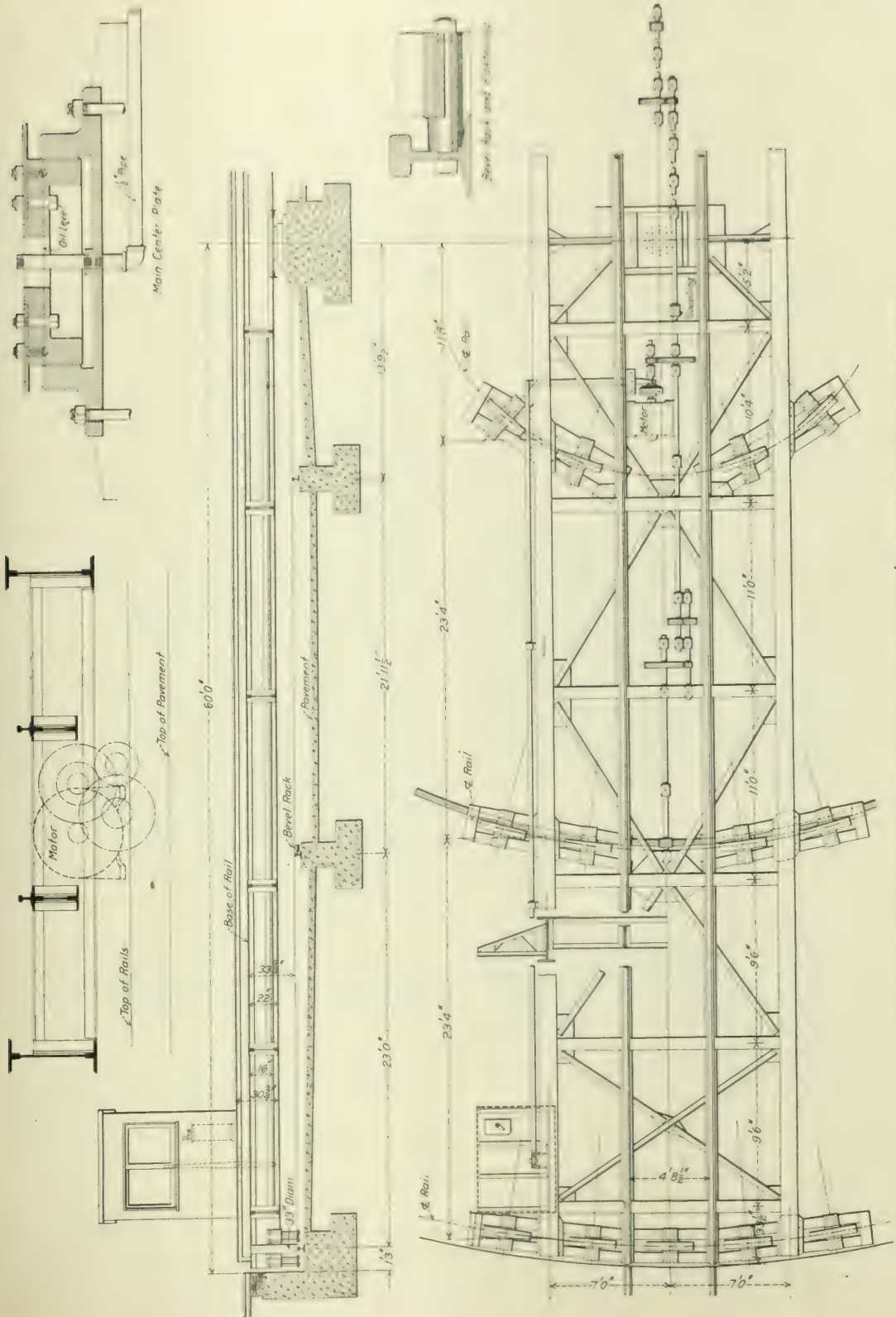
In view of the adoption of the Mallet type of locomotive by several large railway systems of this country and the serious consideration being given the matter by many others, the recent application for a patent by Frank H. Adams, engineer shop extension of the Santa Fe at Topeka, Kan., covering a special design of motor driven transfer type turntable for handling such locomotives is very opportune and interesting as solving one of the heretofore annoying problems at locomotive terminals.

For years locomotives and rolling stock have turned on tables centrally supported and having end supports to temporarily take the load while the locomotive or car is being moved to a balanced position on the table, when the latter is revolved by hand by means of a pneumatic or electric motor mounted on a platform hinged from the main turntable structure and driving a wheel in frictional contact with a circular rail near the outer circumference on the bottom of the pit. The adhesion of this wheel due to the weight of the hinged platform, motor and mechanism is sufficient to revolve the turntable when the load is balanced or if there is a slight excess of weight on the motor end. Some of the larger locomotives, with their tenders, represent a total weight in working order of about 350 tons and an extreme length over all of about 110 ft. It is desirable to turn these long locomotives without disconnecting the tenders, and yet a length of 85 to 90 ft. seems about the limit of length from an economical, practical and operating standpoint for which the present type of centrally supported table can be built and kept within a reasonable expenditure.

It is therefore important that suitable means be provided for turning the longer engines by providing a turntable longer and proportionately at a less cost than the present type tables, and one provided with a simple and positive driving device for revolving it. The table here illustrated is intended to meet these requirements. In addition to the usual center foundation and circular rail at the outer circumference of the pit, there are two intermediate circular tracks on substantial foundations. The diameter of the pit is 120 ft. The diameter of the inner circular track is 27 ft. 7 in., and of the intermediate track 71 ft. 6 in. On the same foundation with the latter is a circular rack 5 in. wide, into which gears an 11-in. pinion driven through spur gearing by an electric motor. The speed of this pinion is intended to be 45 revolutions per minute. The main girders of the table are built up plate girders about 5 ft. deep, and these are spread 14 ft. center to center. The girders under the table track are of the same design and 2½ ft. deep. On each side of the center are five transverse plate girders and the



101 ft. 11 in. It is shown in cross section and also by a floor plan. The equipment consists of: One 16 x 28 in., 248-hp. Ideal engine, direct connected to a 150-k.w. Bullock generator, d.c. One 18 x 26 x 27 in. compound, 325-hp. Bullock engine, direct connected to a 350-k.w. G. E. generator, d.c. One 10 x 20-



Half Plan and Longitudinal Section, etc., of Motor-Driven Turntable for Large Locomotives.

necessary diagonal bracing at each panel. At each end the table is supported by five 33-in. cast iron wheels, and at the intermediate supports there are four similar wheels, making a total of 26 supporting wheels.

The main center plates are shown in cross-section; the bottom plate is provided with a 1½-in. pipe for convenience in bringing in the wires for the electric motor. It should be understood from the design of the center plates that they are not intended to sustain any part of the load, their function being to maintain the table centrally with respect to the pit and the circular tracks.

The electric motor is located in the first panel near the center plates and one pair of reduction gears is immediately adjacent. The other gears for reducing speed are in the next panel, and the shafting is extended on each side of the center to the final pinion at the circular racks. An operator's cab is supported by brackets on the main girders near one end of the table. Power is transmitted through a friction coupling next to the motor, this coupling being operated by a rod which connects the lever in the cab with that at the coupling. To revolve the table the motor is started to allow full speed under no load, then by means of the connecting mechanism the coupling is shifted into frictional contact and power is transmitted to the pinions at the circular track, thus imparting motion to the table. We are indebted to M. H. Haig, mechanical engineer of the Santa Fe, for the drawing and information relating to this new design.

ENGINE FAILURES.

In our issue of April 1 we published data relating to engine failures during the winter months of 1909-10, and suggested that such reports are affected by the interpretation of engine failures, and that it might be possible for the Master Mechanics' Association to adopt a standard for such reports; or, at least, one which might be regarded as recommended practice, so that there would be greater uniformity.

A definition of what constitutes an engine failure, and a list of the delays that should not be considered as engine failures, which are used by the Chicago Great Western, are given below. The explanation of the delays that should not be considered as engine failures is important, as it prevents the reports from becoming so numerous as to be burdensome to the clerks—as they were last winter on many roads—and avoids much useless correspondence.

DEFINITION OF WHAT CONSTITUTES AN ENGINE FAILURE.

"1. All delays waiting for an engine at an initial terminal, except in cases where an engine must be turned and does not arrive in time to be despatched and cared for before leaving time.

"2. All delays on account of engines' breaking down, running hot, not steaming well or having to reduce tonnage on account of defective engine, making a delay at a terminal, a meeting point, a junction connection, with delay to the traffic.

DELAYS THAT SHOULD NOT BE CONSIDERED AS ENGINE FAILURES.

"1. Do not report cases where engines lose time and afterwards regain it without delay to connections or other traffic.

"2. In cases where a passenger or scheduled freight train is delayed from other causes, and an engine (having a defect) makes up more time than it loses on its own account, should not be called an engine failure.

"3. Do not report engine failures on passenger trains when they are less than five minutes late at terminals or junction points.

"4. Do not report engine failures on scheduled freight trains when they are less than 20 minutes late at terminals or junction points.

"5. Do not report as an engine failure delays when an engine is given excess of tonnage and stalls on a hill, providing the engine is working and steaming well.

"6. Do not report delays account engine failures on extra

dead freight trains if the run is made in less hours than the miles divided by ten.

"7. Do not report engine failures on account of engines steaming poorly, or flues leaking, on any run where the engine has been delayed on side tracks other than by defects of engine, or on the road an unreasonable length of time, say 15 hours or more per hundred miles.

"8. Do not report an engine failure for reasonable delays in cleaning fires and ash pans on the road.

"9. Do not report failures against engines that are coming from outside points to the shops for repairs.

"10. Do not report as an engine failure cases where an engine is held in the roundhouse for needed repairs, and called for by the operating department, they being informed that the engine will not be ready until a stated time. Failure to provide that engine before that stated time should not be called an engine failure.

"11. Do not report as an engine failure broken draft rigging on engines and tenders caused by air being set on train, account of bursted hose or breaking in two.

"12. Do not report as an engine failure delays when the weather conditions are such that it is impossible to make the time, providing the engine is working and steaming well.

"13. Do not report as engine failures delays when an engine gets out of coal and water, caused by being held between coal and water stations an unreasonable length of time.

"14. Do not report as engine failures delays where work is done on engines while waiting for other trains to meet or pass, or while the station work is being done.

"15. Do not report as engine failures delays due to engines striking obstructions on or beside the track.

"16. Do not report as engine failures delays due to brakes, tank hose, steam heat hose, injector pipes and ash pans freezing.

"It is understood that the train dispatcher will make five copies of each engine failure report. The superintendent will send one copy to the general superintendent, and one each to the superintendent motive power and machinery, assistant superintendent motive power and machinery and master mechanic, retaining one copy for his file. As this information will be checked against engineers' reports, dispatchers and conductors must therefore give correct cause and particulars.

"If the master mechanic considers an engine failure unjustly charged, he will write to the superintendent giving his reasons and send a copy of his letter to the superintendent motive power and machinery and the assistant superintendent motive power and machinery. If, upon investigation, the superintendent finds an engine failure has been charged without cause, he will cancel it, using regular daily report blanks for this purpose, and will send a copy to the general superintendent, superintendent motive power and machinery and division master mechanic."

FOREIGN RAILWAY NOTES.

Material advances in the pay of employees of the Swedish state lines went into effect in 1908. Theretofore the net earnings had been about 4 per cent. on the capital invested. This sunk to 1.46 per cent. in 1908 and 1.79 in 1909.

The Birsigtal Railway, a narrow-gage line extending for eight miles into the country from Basel, Switzerland, not long ago raised the price of commutation tickets. Thereupon about four-fifths of its patrons "struck," and the road alongside the railway was thronged with hay wagons and bicycles, carrying the people to and from town.

The ministry of public works of Turkey has in view projects for building two lines in Albania, one from Monastir to the Adriatic sea, the other from the Mitrovitza railway to the Adriatic. Still another line will join the Provinces of Roumelia with Baba Eski, Kirk Kalisse, Mouratli, Rodosto Devlet aghach and Harabel. Two plans for this line are being examined.

General News Section.

The Grand Rapids & Indiana has put the main Lake Erie system in use between Fort Wayne, Ind., and Sturgis, Mich., in rail.

The Grand Trunk and the Canadian Pacific have each accepted the award recently granted by an arbitration board concerning the pay of conductors and trainmen. At last accounts the employees had not accepted the award.

The Chicago, Milwaukee & St. Paul is installing telephones for use in train despatching on its line between Marion, Iowa, and Council Bluffs, 260 miles. This road already has telephones in use on train wires on several hundred miles of its lines.

The Indiana State Railroad Commission announces that it will impose the penalties of the law on station agents who do not bulletin the probable arriving times of trains. Inspectors of the Commission are going to report all cases of neglect and irregularity.

On the morning of June 27, about 2 o'clock, a passenger train of the Oregon Short Line was stopped by robbers within the city limits of Ogden, Utah, and all of the passengers, about 100, compelled to give up their valuables. The express messenger was made to deliver the contents of the safe.

At Albany, N. Y., June 27, E. A. Durant and G. Oliver, grain merchants; H. C. Palmer, formerly a freight agent of the Delaware & Hudson, and W. R. Conley, grain inspector for the Albany Board of Trade, were indicted on charges of grand larceny in connection with the issue of fraudulent bills of lading.

On Friday last the Pennsylvania Railroad ran a special train over the new lines of its New York City terminals (soon to be opened) for the accommodation of the superintendent of telegraph and a large party of division operators, foremen and other employees of the telegraph department, from all parts of the company's lines east of Pittsburgh.

Hamilton Carhart, of Detroit, Mich., has given \$100,000 toward the erection of a new building for the National Railway Men's Home at Highland Park, Ill. Mr. Carhart is a manufacturer of overalls and he says the gift is in appreciation of the fact that the railway men have helped to make him wealthy by using extensively the garments he has made.

Count Zeppelin's passenger airship, "Deutschland," with which he had proposed to carry passengers on excursions regularly, has already been wrecked, having been caught last Tuesday in a violent wind and rain storm. Thirty-three persons were aboard the airship, and it landed on the tops of the pine trees in a dense forest, but all of the passengers and crew escaped safely. The extent of the damage to the airship is not clearly indicated in the despatches.

The Boston & Maine has made an increase of from 20 to 25 cents a day in the pay of a large number of stationmen and clerks. The New York, New Haven & Hartford has made an increase of about \$1 a week in the pay of a large number of clerks. The Philadelphia & Reading has increased the pay of engineers and firemen on yard engines. The Great Northern and the Northern Pacific have made an increase of 2 cents an hour in the wages of 1,400 machinists.

The Toll Roads Commission of Pennsylvania, appointed by the last legislature, recommends the abolition of all toll roads in that state. There are still in Pennsylvania 107 companies owning 713 miles of highways on which tolls are charged. It is estimated that to make these roads free will cost the state \$2,000,000. It is proposed to lay one-half of the cost of the maintenance of the roads in the future on the state, one-quarter on the county and one-quarter on the borough.

Hohokus, long obscure, is now a railway center. The New Jersey Rapid Transit Company has established a street-car line to that place from Paterson.

The railway commissioners of Indiana have had much to say during the past few years concerning the dangers connected with highway grade crossings in that state, and have urged that action be taken by the state and municipal authorities; but little or

nothing has been said about the cost of removing these dangers. By way of supplying this lack in the commissioners' proposals, it may be noted that the Mayor of Indianapolis, recently quoted, says that the cost of the necessary elevation of tracks to carry out the separation of grades in that city will cost a trifle over \$2,000,000.

Houston, Tex., reports say that the locomotives on the Victoria division of the Galveston, Harrisburg & San Antonio are to be changed back into oil burners. This order will affect about 25 engines and will necessitate the installation of a number of new oil supply plants, as the old ones have all been demolished. The engines on the Victoria division were changed from oil to coal burners about three years ago, and since then they have been using coal supplied by the coalfields in Oklahoma. It is said that coal has reached a price that is practically prohibitive for use in locomotives.

Governor Hughes, of New York, has approved the bill placing telegraph and telephone companies under the authority of the Public Service Commission of the second district. The Governor thinks that the telephone companies in the first district ought to be under the authority of the commission for that district, but, nevertheless, has signed the bill. He also criticises the law as not sufficiently comprehensive in the authority granted to control the issue of securities by telegraph and telephone corporations. The Governor has also signed the bill amending the labor law in relation to compensation to workmen injured in certain dangerous employments.

At the commencement exercises at Yale University on Wednesday, June 22, James J. Hill, chairman of the board of directors of the Great Northern Railway, received the honorary degree of Doctor of Laws. In presenting Mr. Hill, Professor Perrin said: "Our great Northwest produced Mr. Hill, and he has retaliated by producing a new Northwest. He entered the transportation business as a clerk in 1856. The year 1869 saw him in the business on his own account, and the year 1893 found him president of the Great Northern. His power is practically without bounds—but he cannot raise the freight rates on his own railway. He is the last of a generation of wilderness conquerors. He believes in education of the widest and most thorough sort, and his gifts to this cause have been great and continuous. But the greatest things in all his greatness are his belief in the spiritual significance of man and his longing for the perpetuation of American institutions at their highest and best."

James J. Hill Advocates Decentralization of Terminals.

A paper by James J. Hill was read at the meeting of the National Association of Millers at Minneapolis on June 23, in which Mr. Hill said in part:

"One fact, it seems to me, should give you more concern than almost any other, because you have already felt its effects and because it looms large and dangerous. This is the pressure upon existing terminal facilities. It is a future menace and a present handicap.

"For months past it has been impossible to get freight shipments delivered promptly if these have to be transferred at any of the central markets or principal terminal points. The flood of business that rose to such dangerous height in 1907 is piling up again, with the additions made by natural growths since then.

"The future will add in increasing ratio to these difficulties, as well as to the losses they involve. The only probable relief from the pressure upon our transportation agencies, and especially upon terminals, where the greatest difficulty exists, is the decline of our export trade. The demand of the home consumer is lessening the volume of our export of foodstuffs, and will affect similarly some other items on the list. But this change will bring relief to the carrier only in so far as export terminals are concerned.

"An enormous volume of new traffic is being developed by the industrial advance of the country between the Mississippi

river and the Pacific coast. All of this must seek its market; and much of it will be added to the total that already overburdens our terminals.

"In the great markets of the eastern half of the country, in New York, Cleveland, Buffalo, Chicago, the crisis has already arrived. Traffic growth and terminal congestion are applying the brakes to business progress. This means trouble for the whole country.

"It is no more disastrous to have the banks close their doors than to have the railways choked. The interest which you represent must suffer with the other, and therefore it should be taking thought with others for the future. For the same cause will work out the same effects in the West.

"What is the remedy? Decentralization of traffic terminals offers a partial cure, partial only, however, because it is applicable only to a portion of the business to be done.

"The problem of terminals is the greatest problem of the country, the problem of transportation agencies, of financiers, of the communities directly affected and of all the industries that depend directly or indirectly upon cheap and speedy carriage for the commodities which they buy and sell. It is a problem for everybody, since probably not one business man in the whole country would fail to feel the disastrous effects if it were to be neglected for the next five years as it has for the last ten, and to blight every form of activity by paralyzing the whole trade."

An Exchange of Compliments.

First among railway officers to dare to say that it would (or might) be safe to entrust the Interstate Commerce Commission with rate-making power was a president of the Pennsylvania Railroad (Mr. Cassatt); and now it is the president of that road who first formulates the railway view as to how the commission should proceed under its new power to suspend proposed increases. Mr. McCrea, with other presidents, received from Chairman Knapp of the commission the following telegram:

"Several complaints have been filed against advances in commutation rates between New Jersey points and New York City, and the commission is urged to suspend the same. The new law has not been carefully examined, and some of my associates are absent. Under the circumstances, and to afford opportunity for proper consideration, both as regards our power and the propriety of its exercise, the commission requests your company to postpone until August 1 the effective date of tariff announcing these advances. Your compliance with this request, will be highly gratifying and permission to postpone will be granted application."

Mr. McCrea sent the following reply:

"While our company feels that the proposed increase in these rates is abundantly justified and can readily be so demonstrated, and while it is also advised and believes that the commission is not invested with any power either by the old or the new law to suspend the same, nevertheless I feel that the request so courteously expressed by you as chairman of the commission should not be declined, and therefore the Pennsylvania Railroad Company will comply therewith and ask for permission to postpone, with the understanding and on the condition, of course, that the rates shall not be suspended beyond August 1."

To a farmer, the proviso in the last two lines of Mr. McCrea's letter would suggest, probably, the cow that gave a pail full of milk and then, by the power of her strong hind leg, overturned the same.

Proposed Engineering Building in Boston.

A committee of the engineering societies of Boston, Mass., Ira N. Hollis, chairman, announces a project which is said to be well under way, for the construction of a large building in Boston for club and society headquarters and for offices which shall be similar to the United Engineering building and Engineers' Club in New York City and a circular has been issued asking for the co-operation of all persons interested. About 350 engineers have already given the project their endorsement and it is desired to get ten or twelve hundred more. The committee hopes to form a club of 1,000 resident members from the engineering, architectural, scientific and artistic professions, to pay annual dues of

\$50, and 500 non-resident members at a lower rate. The circular contains tentative plans and an architect's perspective of an eight-story building about 100 ft. x 200 ft., but no definite site is named. The secretary of the committee is L. S. Cowles, 101 Milk street, and the societies interested are the following:

Boston Society of Civil Engineers.
American Institute of Electrical Engineers.
American Society of Mechanical Engineers.
American Institute of Architects (Boston Chapter).
Illuminating Engineering Society (New England Section).
National Electric Light Association (New England Section).
New England Association of Gas Engineers.
New England Street Railway Club.
New England Water-Works Association.
American Chemical Society (Northeastern Section).
Society of Chemical Industry (New England Section).
Telephone Society of New England.
New England Railroad Club.

Disastrous Train Wreck in Mexico.

In the derailment of a runaway train on the National Railways of Mexico, in the state of Colima, June 23, over 60 persons were killed and more than 100 were injured, nearly all the victims being soldiers. The car that was most completely wrecked was filled with officers and their families. The train, consisting of four cars, had broken away from its engine on an ascending grade and, after running back several miles at high speed, jumped the track at a curve. The conductor and engineman were arrested and put in jail.

Spokane Transportation Club.

The Spokane Transportation Club met at the regular monthly dinner on June 17, 1910, at Spokane, Wash. The subject of Through Billing was discussed, it being the desire of the members to secure the billing of freight direct from New York and Chicago to Spokane & Inland Empire points. George M. Hordford, auditor of the North Coast, read a paper on "Railroad Accounting." E. J. Cannon, counsel for the Northern Pacific at Spokane, made a short speech regarding the steady reduction in freight rates and the improvement in traffic conditions.

It was unanimously voted to accept the invitation extended by Waldo G. Paine, for the Spokane & Inland Empire Electric system, and J. C. White, for the Red Collar Steamboat line, to hold the annual picnic of the club on July 20, on the St. Joe river. This is about 40 miles from Spokane, and is reached by the cars of the electric line to Coeur d'Alene, thence by boat on Coeur d'Alene lake to the mouth of the St. Joe river.

American Street and Interurban Railway Manufacturers' Association.

Charles C. Castle, chairman of the Membership Committee of the American Street and Interurban Railway Manufacturers' Association, has issued a circular, on behalf of the executive committee, upon the subject of an increase in membership. Mr. Castle asks of those concerned in the interests of the association that they use personal efforts to extend membership by soliciting those eligible in their immediate territory. The annual convention of the American Street and Interurban Railway Association, with which the manufacturers' association is affiliated, will be held at Atlantic City, N. J., October 10-14, inclusive. A large attendance is assured, and the exhibits will occupy much more space than in any other year in the past. All inquiries for exhibit space should be sent to K. D. Hequembourg, vice-president, at Dunkirk, N. Y. Communications on the subject of new members will reach Mr. Castle if addressed to him as manager of the railroad department of the U. S. Metal & Manufacturing Co., 165 Broadway, New York.

Car Inspectors and Foremen.

The Chief Joint Car Inspectors and Foremen's Association of America will hold a meeting in Washington, D. C., September 6 to 8, 1910, inclusive.

Railway Signal Association.

The annual meeting of this association will be held at the Hotel Jefferson, Richmond, Va., October 11, 1910.

MEETINGS AND CONVENTIONS.

The following list gives names of meetings, conventions and regular meetings, and places of meeting.

AIR BRIDGE ASSOCIATION.—F. M. Nelles, 35 North La Salle St., Chicago, Ill., July 1, Omaha, Neb.
 AMERICAN ASSOCIATION OF DISTANCE ENGINEERS.—J. G. D. Smith, 1111 Broadway, Pa., June 17, Omaha, Neb.
 AMERICAN ASSOCIATION OF GENERAL ENGINEERS AND ELECTRICIANS.—C. M. Burt, Boston, Mass.; next meeting at Paul, Minn.
 AMERICAN ASSOCIATION OF LOCAL FREIGHT AGENTS.—W. J. Thompson, 1000 Federal Bldg., Toledo, Ohio.
 AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fisher, Chicago Bldg., Cincinnati, Ohio.
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York.
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Light, 100 N. W. Chicago, Oct. 18, Fort Worth, Tex.
 AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASS'N.—E. H. Fritch, Monadnock Bldg., Chicago.
 AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, 31 E. S. W. Ky., St. Louis.
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago.
 AMERICAN RAILWAY TOOL FORGE MEN'S ASSOCIATION.—T. J. Harwood, Bloomington, Ill.; July 12, Chicago.
 AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia; June 28-July 2; Atlantic City.
 AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 200 W. 57th St., N. Y.; 1st and 3d Wed., except July and August; New York.
 AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., N. Y.; 2d Tues.; New York.
 AMERICAN STREET AND RAILROAD RAILWAY ASS'N.—H. C. Desobry, 25 W. 89th St., New York; Oct. 10-14; Atlantic City.
 ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; June 20, 1910; Colorado Springs.
 ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A., T. & S. F., Toledo, Ohio.
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Wis. Central Ry., Chicago.
 ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Pl., New York.
 BUFFALO TRANSPORTATION CLUB.—J. N. Sells, Buffalo.
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
 CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; Thursdays; Montreal.
 CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month; Chicago.
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
 ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.
 ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton Building, Pittsburgh; 1st and 3d Tuesdays; Pittsburgh.
 FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R.R., Richmond, Va.
 GENERAL SUPERINTENDENTS' ASS'N OF CHICAGO.—H. D. Judson, 209 Adams St., Chicago; Wednesday preceding 3d Thurs.; Chicago.
 INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
 INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.
 INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.
 INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASS'N.—A. L. Woodworth, Lima, Ohio; Aug. 16-18; Detroit, Mich.
 INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11, Brussels; July 4-16; Berne, Switzerland.
 IOWA RAILWAY CLUB.—V. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
 MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago.
 NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.
 NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
 NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
 NORTHERN RAILWAY CLUB.—C. L. Kennedy, C., M. & St. P., Duluth; 4th Saturday; Duluth, Minn.
 OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Bldg.; 2d Wed.
 RAILWAY CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City; Third Friday in month; Kansas City.
 RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; annual, Oct. 11, Richmond, Va.
 RAILWAY SKEPPERS ASS'N.—J. P. Murphy, Box C, Collinwood, O.
 RICHMOND RAILROAD CLUB.—F. O. Robinson; 2d Monday; Richmond.
 ROADMASTERS' AND MAINTENANCE OF WAY ASS'N.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; annual, Sept. 13-16; Chicago.
 ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
 SOCIETY OF RY. FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.
 SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. R. Ry., Montgomery, Ala.; annual, Oct. 20; Atlanta.
 SOUTHERN & SOUTHWESTERN R.R. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., Mar., July, Sept. and Nov.; Atlanta.
 TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.
 TRAIN DESPATCHERS' ASS'N OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago.
 TRANSPORTATION CLUB OF TOLEDO.—L. G. Macomber, Woolson Spice Co., Toledo.
 TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo; annual meeting, Aug. 16-19, Niagara Falls, Ont.
 WESTERN CANADA RAILWAY CLUB.—W. H. Rosewear, P. O. Box 1707, Winnipeg; 2d Monday, except June, July and August; Winnipeg.
 WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago; Wednesday, except July and August; Chicago.

Traffic News.

The order of the Interstate Commerce Commission reducing freight rates has been suspended until July 12. This is to allow time for further application to the court in Chicago.

Five carloads of silk arrived in New York last week from Yokohama in 16 days, 16 hours and 45 minutes. The silk came by the Great Northern steamship and over the Great Northern railway to the eastern terminus of that line; thence over a line whose advertising agent has not yet reported, and arrived in New York over the New York Central.

The New York, New Haven & Hartford has announced increases in passenger fares throughout a large part of those divisions of the road on which traffic is light. The newspaper statement that the new tariffs made an increase of 20 cents in the fare from Springfield to Hartford, 26 miles, are misleading, this increase applying only on the line through Melrose and not on the main line. The increases vary from 10 per cent. to 20 per cent. They take effect July 23.

The Burlington expects to begin about September 1 to interchange traffic with the Nashville, Chattanooga & St. Louis across the Ohio river at Metropolis City, Ill. Its new line to Metropolis City is nearing completion, and in course of time it will build a bridge across the river to Paducah, Ky., which is the terminus of the Nashville, Chattanooga & St. Louis. For awhile, however, the interchange of traffic will be made across the river by ferries. By this arrangement the Burlington will for the first time be able to transfer traffic directly with a southeastern line.

The revised tariffs on sugar in carloads from New York to the West, which have been issued since the conference on sugar rates between the trunk lines and the lines leading north from New Orleans, show the following rates: New York to St. Louis, all rail, 25 cents per 100 lbs.; lake and rail, 23 cents; New Orleans to St. Louis, 17 cents. To points on the Mississippi river north of Fort Madison the New Orleans rate is 4 cents less than the all-rail rate from New York; to Peoria this difference is 6 cents; to Cairo, 8 cents, and to Louisville, 6 cents. To Detroit from New York the all-rail rate is 20 cents; from New Orleans, 23 cents.

The "Hog Special" is the latest announcement of the passenger department of the Texas & New Orleans. This title does not refer to a passenger train assigned particularly to that class of passengers which is made up of "undesirable citizens." It is a train composed mainly of freight cars fitted with a series of pens for the exhibition of extra fine swine. Why the passenger department should be humiliated by being required to father this suggestive enterprise, we are at a loss to understand. The animals are to be taken around the country for the purpose of instructing the farmers in the art of making themselves wealthy by raising, feeding and marketing hogs. The train will leave Dallas at 4 p.m., July 5, and will keep up its travels until July 27. The schedule indicates that at most of its stops this train will stay all day.

The railways in the Central Traffic Association announce extensive increases in freight rates, to take effect August 1. As an example of the amounts by which the rates are raised, the following figures are given from tariffs issued by the Lake Shore & Michigan Southern and other New York Central lines west of Buffalo. The figures given are the first-class rates; the reductions in the other classes are proportionate: Chicago to Buffalo, old 45 cents, new 54; Detroit to Indianapolis, old 37, new 45; Cleveland to East St. Louis, old 52½, new 64; Cleveland to Indianapolis, old 40, new 48; Chicago to Findlay, Ohio, old 37, new 45. It is given out at the office of the Interstate Commerce Commission that these increases in central territory amount to from 10 to 15 per cent. This statement apparently is based on a hasty reading of the tariffs.

Reports have been given widespread currency in the newspaper press this week that the Granger railways seriously fear a crop failure that will cause a heavy reduction in traffic, and in consequence are severely retrenching their expenditures. The vice-president in charge of traffic of one of the largest of these roads, who recently returned to Chicago from an extensive trip over his lines, said to the *Railway Age Gazette* that these reports

must have been put in circulation by some one who had gone short of the market. His personal observation indicates that the wheat crop is in better condition than it was expected to be a few weeks ago, and that the prospects for corn are excellent. His personal observation was confirmed by reports received this week. The road in question operates in almost every state where, according to the newspaper reports, pessimism prevails regarding crop prospects.

Following the protests presented by the attorney-general of New Jersey, the Interstate Commerce Commission last week requested the railways in that state to suspend until July 20 the advances in commutation rates to and from New York City which had been announced, the principal reason given being that the Commission had not yet had time to carefully examine the law of June 18. Many of the roads replied promptly complying with the request, but the Erie did not comply, and the Commission, acting under the new law, thereupon ordered the Erie to suspend its new tariffs until October 15. Many of the tariffs suspended were to have gone into effect June 26. On Tuesday of this week it was announced that the Erie had agreed to suspend its rates until July 20, and that the order issued by the Commission had been revoked. The Commission intends to hold a hearing concerning these rates on July 12 in Washington. The Central of New Jersey, in announcing these confusing changes in passenger fares, prints on its placards posted in the stations a copy of Chairman Knapp's telegram requesting the roads to postpone the increases, accompanied by an explanation of just what has been done by the officers of the Central.

Increases in Eastern Rates on Live Stock and Packing House Products.

The agreement reached by the packing house interests and the railways for an advance in rates, which was referred to in these columns last week, applies to the rates on both live stock and packing house products. The rate on dressed meat from Chicago to New York under this agreement is to be raised from 45 to 50 cents per 100 lbs.; that on provisions and packing house products, from 30 to 33 cents; that on cattle from 28 to 31 cents, and that on hogs and sheep from 30 to 33 cents. The agreement, as previously indicated, was due to the "missionary work" of George W. Perkins of J. P. Morgan & Co. The following statement was issued by Armour & Co. at Chicago: "The officials of Armour & Co., having fully considered the question of advancing freight rates applicable to their business, have become convinced that the increases suggested, amounting to about 11 per cent. on the average, are justified by present conditions, and therefore will make no opposition. It is believed that there will be no further opposition on the part of anyone interested."

George B. Robbins, president of the Armour Car Lines and a director of Armour & Co., who represented this concern in the negotiations, said in an interview:

"The advance is so small when applied to a single pound of meat that I don't think it will advance the price. Certainly there is no intention of passing the increase on to the consumer. We were governed in making the agreement by the feeling that it is to the interest of business in general that the rates be increased. What we lose in this way—and it is a considerable amount—we hope to gain by increased business which should result from improving the condition of the railways.

"When the railways are not prosperous there is little prosperity anywhere. The railways need money in order to keep up their facilities and make needed improvements and we are bound to admit they are entitled to some consideration."

No similar agreements for advances in other rates have yet been made.

Negotiations Regarding Terminal Rates at St. Louis.

Negotiations between the railways and representatives of the shippers and the municipal assembly of St. Louis regarding the so-called "bridge arbitrators" at that city have been renewed. A general conference was held on June 29, at which the representatives of the railways rejected the proposition of the differential against St. Louis on traffic within a zone of 100 miles.

The railways then announced the appointment of a new committee to carry on negotiations for them. This committee is

composed as follows: Benjamin McKeen, general manager Vandalia, chairman; C. L. Hilleary, general agent New York Central lines, secretary; R. L. McKellar, assistant freight traffic manager Southern; F. B. Bowes, general traffic manager Illinois Central; Edward Hart, Jr., assistant general freight agent Baltimore & Ohio Southwestern; J. M. Johnson, vice-president Missouri Pacific, and W. C. Maxwell, general traffic manager Wabash.

A comparison of the personnel of this committee with the committee previously appointed to conduct these negotiations shows that it has been considerably changed, and no longer contains any representatives of the small independent lines running from points in Illinois to East St. Louis. (See *Railway Age Gazette* June 24, p. 1781-85.) The next conference on the subject will be held at St. Louis on June 30.

The Missouri Commission and the Missouri River Rates.

The Missouri Railway Commission has taken a step indicating that it intends largely to nullify the effect of the order of the Interstate Commerce Commission in the Missouri river rate case, and the decision of the Supreme Court upholding the Interstate Commission's order. The Missouri Commission has set down for hearing by it on July 6 the question whether it shall order the state rates between the Mississippi and the Missouri rivers—which bound the state on the east and west—reduced to the same basis to which the Interstate Commerce Commission ordered the Mississippi river—Missouri river proportions of the through rates from the Atlantic seaboard to the Missouri river reduced. The through rates from the seaboard to the Missouri river were formerly combinations of the local rates from the seaboard to the Mississippi river and the local rates from the Mississippi river to the Missouri river. The Interstate Commerce Commission, carrying out its principle that the through rate ordinarily should be less than the sum of the local rates, ordered the Mississippi river—Missouri river proportion of the through first class rate reduced similarly, but at the same time indicated that it did not believe that the local rates between the rivers should be reduced. One of the effects is to enable a jobber at either the Missouri river or the Atlantic seaboard to ship goods direct from the seaboard to the Missouri river for less than a jobber at St. Louis can ship them from the seaboard to St. Louis and thence re-ship them to the Missouri river. There is no doubt that this puts the shipper at St. Louis at a disadvantage and the Missouri Commission suspects that it works an undue discrimination against him.

It is understood that the Kansas Railway Commission is preparing a petition asking the Interstate Commerce Commission to apply its through rate principle to goods moving from the East to points in Kansas. At present these rates to Kansas points base on the Missouri river.

Traffic Club of Chicago.

The Traffic Club of Chicago had a golf tournament at the Beverly County Club on June 23, in which the "slow freights" defeated the "expresses" 14 to 9. Charles H. Kingsbury won the first prize in the 30-hole event, and John T. Stockton, president of the club, finished second.

Attorney General Wickersham on Railway Regulation.

Attorney-General Wickersham made two addresses before the Illinois Bar Association in Chicago on June 24, in which he discussed railway regulation. He said that the recent legislation by Congress empowering the Interstate Commerce Commission to postpone the taking effect of a change in rates until it has been thoroughly investigated simply gives effect to the common law principle that a carrier must charge only just and reasonable rates. He added:

"The administration's theory seeks to preserve the initiative of the railway company, but to create a tribunal to which appeal may be made in case of threatened abuse of its power of initiative so that investigation can be had before an apparently unwarranted toll be levied upon the public.

"The opposing theory would destroy all initiative and substitute government initiative for that of the carriers. This would be but one step from governmental ownership.

"Fortunately, as I think, the theory first referred to prevailed with Congress, and, under the new law, the railway companies are, as they should be, left to carry on their business on their own initiative, cautioned by the fact that no such proposed action is unduly burdensome to the public, there is a tribunal to which appeal may be had, not simply for restitution, but for the application of the equitable principle of preventing a threatened wrong.

"Such powers as these, exercised with conservative regard to the rights of the carriers and the public alike, in such great powers must undoubtedly be exercised, cannot fail, in my opinion, to remove much of the feeling of antagonism between shippers and carriers which has existed in the past, and be conducive to a greater stability in railway securities than has hitherto obtained."

Mr. Wickersham advocated federal regulation of the issuance of railway securities.

INTERSTATE COMMERCE COMMISSION.

Nashville Properly a Basing Point.

Columbia Grocery Co. v. Louisville & Nashville. Opinion by Commissioner Clark.

Following the ruling of the United States supreme court, the commission holds that because of water competition that is experienced at Nashville, railways may properly charge a higher rate to points intermediate between Nashville and points of origin than to Nashville. (18 I. C. C., 502.)

Must Secure Shipper's Signature.

Southern Cotton Oil Co. v. Southern Railway et al. Opinion by Commissioner Clements.

The initial carrier quoted the lowest rate on cotton linters applicable to shipments moving under a released valuation, but neglected to secure the shipper's signature to such release of valuation. The delivering carrier collected at a higher rate. It is held that it is the duty of the initial carrier not only to advise the shipper of the lower rates applying in case of release of valuation, but when informed of the shipper's desire to avail himself of such lower rates to obtain the shipper's signature in accordance with the tariffs. Reparation awarded. (19 I. C. C., 79.)

Misrouting Not Punishable if Part of Route Is Independent Water Route.

Fred'k De Bary & Company v. Louisiana Western et al. Opinion by Commissioner Clements.

Damages for misrouting are based on the difference in the rate charged and the lower rate applicable via the route directed by the shipper or which the carriers should have used in the absence of any instruction, but to determine the damage all factors in the claimed route must be subject to the commission's jurisdiction and filed in the manner prescribed by law. As part of the route in question in this case, under complainant's instructions, is from port to port, the rate for which is filed with the commission, the complaint must be dismissed. (18 I. C. C., 527.)

Reduction of Rates to Omaha.

Commercial Club of Omaha v. Anderson & Saline River Railway et al. Opinion by Commissioner Clark.

In the Lincoln Commercial Club v. C., R. I. & P., 13 I. C. C., 319, the commission ordered the rate on lumber from southern producing territory to Lincoln, Neb., to be no higher than the rate to Omaha. The railways, therefore, raised the rate to Omaha from 23 cents to 25 cents, and the rate from Lincoln from 24 cents to 25 cents. Within three months the commission ordered that the rate to Des Moines should not be any higher than that to Omaha, and the railways raised the rate to Omaha and to Lincoln to 26½ cents, thus bringing it in line with the Des Moines rate. The commission now finds that the second advance was unreasonable, and that the rate to Omaha

on Des Moines should not exceed 25 cents per 100 lbs. Reparation awarded. (13 I. C. C., 532.)

Tent Poles as Baggage.

Pat. Chappelle v. Louisville & Nashville et al. Opinion by Commissioner Clark.

This complaint is brought by the manager of a traveling minstrel show, and alleges, among other things, that the Central of Georgia refuses to carry the Pullman car and a private baggage car containing tent poles and tent of the troupe on its passenger trains, but ignominiously attaches them to freight trains. Later the baggage car was so repaired as to make it acceptable to the Central of Georgia, so no order on this point is required. The commission holds, however, that tents, poles, seats and other equipment of a theatrical troupe, if they can be loaded into an ordinary baggage car, are properly classified as baggage under the rules governing the movement of private baggage and passenger cars. In the absence of specific limitations a private baggage car which contains a stove must be transported at the rate applicable to private baggage cars, not at the rate on combination cars. (19 I. C. C., 56.)

Equalizing Production Conditions Through Coal Rates.

Colorado Coal Traffic Association v. Colorado & Southern et al. Opinion by Chairman Knapp.

The complaint claims that the rates on coal from mines in the Walsenburg district of southern Colorado to points in Nebraska are unreasonable. The principal point made in the complaint is that it costs more to mine coal in the Walsenburg districts than in the Rock Springs coal fields, and that the Rock Springs coal finds readier sale for domestic uses. The rates taken as a whole yield on an average a little more than seven mills per ton per mile, and the commission does not find them unreasonable. The conditions of higher cost of production at certain points than at others are conditions which the railways ought not to be required to equalize by rate adjustments, and, therefore, except in the case where railways have acknowledged that they have made a mistake in the rates from Walsenburg, the commission does not find that the rates complained of are unreasonable. (18 I. C. C., 572.)

The Pleading of Res Judicata.

National Hay Association v. Michigan Central et al. Opinion by Commissioner Cockrell.

The substance of the complaint is that rates collected by the defendants for the transportation of hay and straw, under official classification, are excessive. In 1900 the classification of hay and straw was changed from the sixth to the fifth, and this higher rate has been maintained ever since. The defendant pleaded that the complaint in this case had already been determined in a proceeding involving the same products and the same subject matter, and that the commission cannot, therefore, again inquire into the matter. It is a fact that in October, 1902, the commission decided a complaint brought by the same association and ordered the defendants to desist from charging fifth class rates on hay and straw and ordering them to charge sixth class rates. This order was not obeyed by the defendants. This was before the passage of the Hepburn amendment, and the courts held that the commission had not at that time power to order a rate for the future. The present complaint was filed about a year after the Hepburn amendment. It is plain that while a plea of *res judicata* is perfectly valid as to all that preceded the effective date of the Hepburn amendment, since that date the commission has power to order a rate for the future, and that therefore the present complaint can be considered.

The second objection of the defendants is to the jurisdiction of the commission over classification matters. The commission finds that to this objection the complete answer is that while the case was brought and tried in form as a matter of classification, as a matter of substance it is clearly and undeniably a rate case. Where the classification primarily affects and controls the rates of a railway, the commission is empowered to pass on such rates. (19 I. C. C., 24.)

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF APRIL, 1910.

[illegible]

The Commission Without Jurisdiction.

Acme Cement Plaster Co. v. Wabash Railroad et al. Opinion by Commissioner Pruett.

Wall plaster is generally transported in bags, and there is a charge of 10 cents to the purchaser for the bag, with the understanding that if the bag is returned with the freight charges prepaid, the 10 cents will be refunded. The shippers have a tariff rule that if the bags are tied in bundles and properly tagged, showing the name of consignor and consignee, one-half of the fourth class rate will be charged, but if these conditions are not fulfilled, the fourth class rate will be charged. In spite of precautions, there are thousands of bags now in possession of the railways, which the complainant refuses to accept, although the bags can be identified by name or brand stamped on them, because the tags have been lost. It is impossible to tell by what customers they have been sent, and credit, therefore, cannot be given. The commission holds that since the measure of damage is based on an understanding existing between the consignor and consignee and not on a rate, that it has no jurisdiction, and, therefore, the complaint is dismissed. (18 I. C. C., 557.)

Rehearing Granted in the Pullman Case.

George S. Loftus v. Pullman Company et al. Supplemental report by the commission.

The Pullman Company and the Great Northern have filed petitions asking the Interstate Commerce Commission to reopen the cases in which the commission found the charges of the Pullman Company generally unreasonable and ordered reductions to permit the introduction of additional evidence, and in addition the companies ask the suspension of the orders (*Railway Age Gazette*, April 15, 1910, p. 982) heretofore made by the commission until the rehearing of the case. The commission declines to postpone further the effective date of the orders. It will, however, assign the cases for rehearing three or four months after the orders have gone into effect.

The principal reason advanced by the carriers in support of their applications is a desire to offer evidence concerning matters which have transpired since the cases were submitted for determination and other evidence which they assume the commission did not have before it when the orders referred to were made.

It is of course true that the commission did not consider evidence which was not in existence at the time the orders were made, but the assumption concerning other evidence is unwarranted and appears to be based upon a mistaken view of the duties to be performed by an administrative tribunal. The conclusion of the carriers concerning the latter seems to be founded upon the fact that the evidence was not specifically offered by any of the parties. It is said the burden of proving that the rates complained of are unreasonable is upon the complaining party, and that until, in the judgment of the carriers whose rates are challenged, a prima facie case of unreasonableness has been made out, it is not necessary for the carriers to make any defense. This, however, leaves no room for the application of information possessed by members of the regulating tribunal, and in this particular case certain portions of the evidence now offered relate to matters which the commission has recently investigated extensively, while other portions cover data included in reports and other documents filed by the carriers in the commission's office. (19 I. C. C., 102.)

No Authority over Alaska.

In the matter of jurisdiction over rail and water carriers operating in Alaska. Opinion by Commissioner Harlan.

The provisions of the act to regulate commerce "shall apply to any carrier engaged in the transportation of passengers or property * * * from one state or territory of the United States or the District of Columbia to any other state or territory of the United States or the District of Columbia, or from one place in a territory to another place in the same territory." The question is now brought up as to whether the commission has the same jurisdiction over rail and water lines in Alaska as

it has over similar transportation within New Mexico or Arizona; in other words, is Alaska a territory in the sense that the word territory is usually used in federal legislation? All the territory over which the United States is sovereign, and which has not been erected into states, is governed by Congress. In *De Lima v. Bidwell*, 182 U. S., 1, the supreme court holds that Congress may deal with territory acquired by treaty; it may administer its government as it does that of the District of Columbia; it may organize a local territorial government, etc. It follows, therefore, that Alaska may be a territory of the United States in a purely geographical sense without being a territory in a political sense. Under the act by which the first civil government was established in Alaska it was provided that the ceded territory shall constitute a civil and judicial district. Repeatedly through the statutes Alaska is referred to as the district of Alaska. It will also be observed that the government provided for Alaska has no legislature, Congress retaining full powers of legislation and other control as fully as in the District of Columbia. In general statutes relating to territories, an example of a description of a territory is as follows: "That part of the territory of the United States bounded as follows, etc., is erected into a temporary government by the name of the territory of New Mexico." Alaska being a district and unorganized territory has required special legislation by the Congress; it has not at any time been erected into an organized territory. In its enactments, Congress has ordinarily maintained the distinction between the unorganized and the organized territories. In the case of *Rasmussen v. U. S.*, 197 U. S., 516, the attorney-general made two points; first, that Alaska was not incorporated in the United States, and second, even if Alaska was incorporated in the United States, it was not an organized territory. The supreme court held that Alaska had been incorporated in the United States. The second point gave the court a direct opportunity to hold that Alaska was an organized territory, but when considering that question, instead of doing so it simply held that the constitution does apply to Alaska, and therefore, etc. The special distinction between an organized and an unorganized territory is the existence or non-existence of a local legislature. The United States Supreme Court in *re Lane*, 135 U. S., 443, on a plea that an act which had been committed in Oklahoma, which was then part of what was known as Indian Territory, was not exempted from being considered a felony, because the federal statute provided that any person committing that offense in the District of Columbia or other places *except the territories* over which the United States has exclusive jurisdiction, shall be guilty of a felony. The supreme court said: "But we think the words 'except the territories' have reference exclusively to that system of organized government long existing within the United States, by which certain regions of the country have been erected into civil governments. These governments have an executive, a legislative and a judicial system." Reference has been made to *Binns v. United States*, 194 U. S., 486, but certainly the ruling in that case, which, as we understand it, deals with the district of Alaska as analogous to the District of Columbia except in details of its government, does not permit this commission when considering a statute that includes the District of Columbia by express reference to include the district of Alaska within its provisions by mere construction. Moreover, the power to regulate rates of railways in Alaska was specifically conferred by the act of 1898 on the secretary of the interior.

Commissioner Clements dissenting:

I am unable to concur in the majority opinion in view of several holdings of the supreme court, which I am convinced are diametrically opposed to the conclusions stated. In *Binns v. United States* the court says: "It has been heretofore held by this court in *steamer Coquitlan v. United States* that 'Alaska is one of the territories of the United States * * *'. Now, can it be doubted that it is an organized territory?"

Much emphasis is laid on the fact that Alaska is not provided with a separate legislative assembly, and this is conceded to be the only other essential element necessary to constitute Alaska an organized territory. I think it is clear from the language used in *Binns v. United States* that this is not essential to the status of a territory.

In an act of 1906 permitting Alaska to send a delegate to the house of representatives the words "district of Alaska" as

appearing in the title of the act were specifically amended to read "territory of Alaska." In a court of claims the court said: "Alaska is as much a domestic territory as Arizona. It is beyond question that prior to the passage of the Hepburn act the commission had no jurisdiction over rates in Alaska, neither had it in New Mexico or Arizona. Absolutely no reason has been suggested to show why this act is not just as essential to the well being of Alaska as to that of any other part of the United States. It is claimed that the law of 1898 conferring the rate-making power in Alaska on the secretary of the interior is a special act and the act to regulate commerce a general law. True the law related only to Alaska, but it dealt mainly with matters other than the regulation of railway rates. It was, therefore, the general law. A narrow or over technical construction of a law should not be resorted to in any case to rid the commission of inconvenience and difficulty incident to the full performance of its duties.

Commissioners Cockrell and Lane write in this dissent.

STATE COMMISSIONS.

F. M. Lee, president of the Mississippi State Railroad Commission, died at New Orleans, La., June 24.

The Oregon Railway Commission has adopted the uniform demurrage code recommended by the National Association of Railway Commissioners, except that it has made the penalty for the detention of a car beyond the free time \$2 a day instead of \$1.

The State Corporation Commission of Virginia has authorized the Washington Southern, extending from Washington to Quantico, to raise its passenger fares from 2 cents a mile to 2½ cents. The order takes effect July 15. It is expected that a similar order will be granted in favor of the Richmond, Fredericksburg & Potomac.

The Missouri Railway Commission on June 25 issued an order that all trains must come to a full stop not less than 10 nor more than 60 rods from any railway junction or crossing at grade unless such stop is rendered unnecessary by an interlocking plant or other device approved by the written order of the commission. The board states that it has been informed that in many instances the gates used at such crossings are ignored, and says that it does not approve of gates as a means of safety.

The New York Public Service Commission, Second district, has ordered the Delaware & Hudson to reduce the charge for passengers on its short leased line from Ticonderoga to Fort Ticonderoga from 25 cents to 15 cents. The defendants claimed that since a statute expressly gives the company the right to charge 25 cents, the commission has no power to reduce this charge. The commission holds that by an amendment to the public service commission law, the commission is expressly authorized to fix a maximum rate, notwithstanding that a higher rate has been heretofore authorized by statute.

The New York Public Service Commission, Second district, has dismissed the complaint of Milford J. Whedon, of Medina, against the New York Central & Hudson River as to the fare between Medina and Rochester as compared with the fare from Medina to Buffalo. The fare from Medina to Buffalo is 65 cents, for a round trip ticket to Buffalo and return \$1.20. The fare charged from Medina to Rochester is 82 cents, and for a round trip \$1.60. Thus the company charges 17 cents more for a single trip from Medina to Rochester than it does from Medina to Buffalo, and 40 cents more for a round trip ticket, the distance being the same in both cases. The travel from Medina to Buffalo is by way of Lockport, and a round trip ticket is sold from Medina to Lockport for 64 cents and from Lockport to Buffalo for 50 cents. A passenger from Medina to Buffalo can, by getting off the train at Lockport and buying a round trip ticket at that point to Buffalo, make the trip from Medina to Buffalo and return for \$1.14. The New York Central is paralleled from Medina to Rochester by the Buffalo, Lockport & Rochester, an electric road, and by the same electric road to Lockport. From Lockport to Buffalo it is paralleled by a line of the International Railway. The fares charged by the Buffalo, Lockport & Rochester Ry. Co. from Medina to Rochester are the same as those charged by the

New York Central; fares charged by it from Medina to Lockport are the same as the New York Central; the fare charged by the International Ry. from Lockport to Buffalo is 50 cents for the round trip. A passenger can make the round trip from Medina to Buffalo by way of these trolley roads, changing at Lockport, for the sum of \$1.14. The commission says that the difference between the fare from Medina to Rochester and Medina to Buffalo is due to the competition of the International Railway from Lockport to Buffalo. For a time after the International was constructed from Lockport to Buffalo the New York Central did not meet the rates and found that its business was leaving. It was, therefore, compelled to reduce the rate from Medina to Buffalo or lose business. At the hearing held in Rochester it was admitted by the complainant that the charge made by the company of \$1.60 for round trip ticket from Medina to Rochester at the rate of nearly 2 cents per mile was not unreasonable in itself. Any intention to claim that it was unreasonable was explicitly disavowed by the complainant, who expressly based his complaint on the ground of discrimination alone. The commission says that preference or advantage is unquestionably given passenger traffic from Medina to Buffalo over passenger traffic from Medina to Rochester; that the conditions, however, attendant on traffic from Medina to Rochester are not like those attendant upon traffic from Medina to Buffalo; that if an undue and unreasonable preference is given Buffalo over Rochester, it might be corrected by requiring the company to make the same rate from Medina to Rochester that it does from Medina to Buffalo, or requiring the company to make the same rate from Medina to Buffalo that it does from Medina to Rochester; that the latter remedy would afford no benefit to anyone and would be of disadvantage to the railway. The commission says that it would be unjust to the railway to compel it to reduce a rate 25 cents in amount which is conceded reasonable. If the rate were unreasonable a different question would be presented. The commission further says it should be clearly pointed out that to constitute a preference or advantage which is undue or unreasonable the controlling circumstances of the two contrasting cases must be the same. In this case they are not the same from the fact that it is an old and well established principle in rates that it is permissible for a railway to meet competition of water routes as best it can without subjecting itself to a charge of undue or unreasonable preference or discrimination. Same can be said of competition by trolley roads.

COURT NEWS.

The Supreme Court of Missouri, by a vote of four to three, has affirmed the validity of the long-and-short-haul law of that state.

At St. Louis, June 27, Judge Dyer dismissed the suit which was begun by the government, May 31, to restrain proposed increases in freight rates. This is the result of the agreement which was made between President Taft and the railways.

In the United States district court in Iowa, Judge Page Morris has sustained the federal hours-of-service law. The decision was in a case against the Illinois Central. The court held that an engineman's period of 16 hours should begin from the time he was called (to perform duties) a half hour before the schedule time for the departure of his train.

At Charleston, W. Va., June 27, the circuit court dissolved the injunction recently granted against the enforcement of the 2-cent fare law of the state on the Chesapeake & Ohio, and ordered the road to refund at Charleston, Huntington and Hinton all excess which has been collected over two cents a mile. A stay of 60 days was granted to give the railway opportunity to appeal.

In the federal court at Little Rock, Ark., June 24, in proceedings in bankruptcy against the estate of the T. H. Bunch Co., the Rock Island railway company presented and had entered a claim amounting to \$205,767. The claim was based on irregularities in connection with bills of lading which, when the Bunch Company failed, were found to have been hypothecated. The railway company paid the drafts connected with the bills of lading. It appears that the freight had been delivered without the surrender of the bills.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Judge Alexander P. Humphrey, general counsel of the Kentucky & Indiana Bridge & Railroad Co., at Louisville, Ky., has been elected president, succeeding C. L. Harris, resigned.

George H. Campbell, general superintendent of the New York division of the Baltimore & Ohio and vice president of the Staten Island Railway and the Staten Island Rapid Transit Railway, with office in New York City, has been appointed an assistant to the president of the Baltimore & Ohio.

Hannan G. Haugan, comptroller of the Chicago, Milwaukee & St. Paul, has resigned, and will devote his time in future to private business and travel. Mr. Haugan was born Nov. 7, 1840, at Christiania, Norway. He began railway work in 1870 on the Southern Minnesota and has been continuously in the service of that company and its successor, the Chicago, Milwaukee & St. Paul. He has been successively cashier and paymaster, auditor and cashier, secretary to general superintendent, land commissioner, and comptroller, having held the latter office since Jan. 1, 1901.

Operating Officers.

J. A. MacKinnon has been appointed superintendent of the Willmar division of the Great Northern with headquarters at Willmar, Minn., succeeding G. S. Stewart, transferred.

George A. McNicholl, Pacific coast purchasing agent of the Grand Trunk Pacific at Vancouver, B. C., has been appointed superintendent, with office at Prince Rupert, and his former position has been abolished.

W. J. Stoneburner, superintendent of the Quincy, Omaha & Kansas City, with headquarters at Kansas City, Mo., has been appointed superintendent of the Denison-Hillsboro Branch of the Missouri, Kansas & Texas with headquarters at Denison, Tex., succeeding G. Stoner.

F. S. Elliott, superintendent of the Superior and Mesabi divisions of the Great Northern at Superior, Wis., has been appointed assistant general superintendent of the Western district, with office at Spokane, Wash. G. S. Stewart, superintendent of the Wilmar division at Wilmar, Minn., succeeds Mr. Elliott.

C. C. F. Bent, general manager of the Baltimore & Ohio Southwestern, at Cincinnati, Ohio, has been appointed superintendent of the New York division of the Baltimore & Ohio and vice-president of the Staten Island Railway and the Staten Island Rapid Transit Railway, with office at New York, succeeding G. H. Campbell, whose appointment to an executive position is mentioned elsewhere in these columns. Mr. Bent's former position has been abolished, and the duties are assumed by general superintendent W. H. Brimson, who reports direct to Vice-President G. L. Potter. John G. Walber, general superintendent of transportation at Baltimore, Md., has been appointed assistant general manager, and his jurisdiction has been extended over the Baltimore & Ohio Southwestern. C. W. Galloway, superintendent of transportation at Baltimore, succeeds Mr. Walber, and his former position has been abolished.

Robert Stevens Parsons, who has been appointed superintendent of the Erie Railroad, with office at Jersey City, N. J., was born May 26, 1873, at Hohokus, N. J. He was educated at Rutgers College, and began railway work with the Erie Railroad in June, 1895, as a civil engineer on the New York division. About a year later he went to the chief engineer's office, and from 1897 to 1899 was assistant engineer on the Buffalo division. He was then for four years division engineer on the New York, Susquehanna & Western. In 1903 he was appointed engineer of maintenance of way of the Erie, remaining in that position until 1907, when he was appointed superintendent of the Susquehanna division, which position he held at the time of his recent appointment. Mr. Parsons has been a member of the American Society of Civil Engineers since 1906.

Traffic Officers.

P. R. Jarvis has been appointed northwestern freight and passenger agent of the Lehigh Valley, with office at Minneapolis, Minn.

H. D. Hughes has been appointed a traveling freight agent of

the Lehigh Valley & Schuylkill, with office at Kansas City, Mo., succeeding J. C. Armstrong, resigned.

E. J. Lenoir, general passenger agent of the Union Pacific at Omaha, Neb., has been appointed passenger traffic manager of the Western Pacific, with office at San Francisco, Cal.

D. H. Hillman, general freight and passenger agent of the Evansville & Terre Haute, at Evansville, Ind., has been appointed general southern agent of the Frisco Lines, with office at Nashville, Tenn.

Charles H. Gomm, commercial agent of the Queen & Crescent at Dallas, Tex., has been appointed commercial agent of the Cincinnati, Hamilton & Dayton, with office in the Merchants Loan & Trust building, Chicago.

H. H. Kilpatrick, commercial agent of the Clyde Charleston Fast Freight Line at Nashville, Tenn., has been transferred to Kansas City, Mo. Harry H. Hill, commercial agent of the Macon & Birmingham Ry. at Nashville, succeeds Mr. Kilpatrick. C. J. Orrison has been appointed traveling freight agent at Birmingham, Ala.

W. E. Coman, general freight agent of the Oregon Railroad & Navigation Co. and assistant general freight agent of the Southern Pacific Lines in Oregon, with office at Portland, Ore., has been appointed general freight and passenger agent of the Spokane, Portland & Seattle and the Astoria & Columbia River, succeeding H. M. Adams, resigned.

Engineering and Rolling Stock Officers.

J. F. Killeen has been appointed general mechanical foreman of the Washington division of the Oregon Railroad & Navigation Co., with office at Starbuck, Wash., succeeding M. J. Carriagan, resigned.

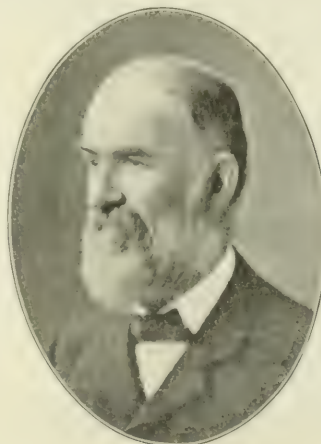
J. D. Harris, general superintendent of motive power of the Baltimore & Ohio, and Earl Stimson, chief engineer maintenance of way, both with offices at Baltimore, Md., have had their authority extended over the Baltimore & Ohio Southwestern.

Special Officers.

Dr. H. A. Beatty has been appointed chief surgeon and medical officer, Eastern lines, of the Canadian Pacific, with office at Toronto, Ont.

OBITUARY.

William H. Brown, formerly chief engineer of the Pennsylvania Railroad, died at Belfast, Ireland, on June 25. Mr. Brown was born February 29, 1836, at Lancaster, Pa. His first



William H. Brown.

railway service was in 1861 as engineer of the United States Military Railway. In 1862 he went to the Pittsburgh, Cincinnati, Chicago & St. Louis as assistant engineer, and in 1863 was promoted to principal assistant engineer. The following year he went to the Pennsylvania Railroad as assistant engineer on the Pittsburgh division, and was appointed engineer of the Philadelphia & Erie division in 1867. Two years later he was put in charge of construction at the Altoona car shops with the title of assistant engineer. He was made resident engineer of the Middle division in 1870, chief engineer and superintendent of the Lewistown division in 1871, superintendent of the Bedford division in 1872, and from 1874 to 1881 he was engineer of maintenance of way. In 1881 he was appointed chief engineer of the Pennsylvania Railroad Company, remaining in that position until his retirement in March, 1906. An appreciation of Mr. Brown's work was published in the *Railroad Gazette* of March 2, 1906, page 198.

Railway Construction.

New Incorporations, Surveys, Etc.

APALACHICOLA NORTHERN.—Passenger service has been extended from Apalachicola, Fla., south to Port St. Jose, 23 miles.

ATCHISON, TOPEKA & SANTA FE.—An officer of the Pecos & Northern Texas writes that work is now under way from the Gulf, Colorado & Santa Fe at Coleman, Tex., northwest to Lubbock, 200 miles, also on a branch from the Coleman-Lubbock line, at a point 16 miles southeast of Lubbock, through Lynn and Dawson counties, to La Mesa, 55 miles. In addition, the line from Plainview south to Lubbock, 45 miles, and the line from Plainview east to Floydada, 27 miles, have been turned over to the operating department. (Oct. 8, p. 662.)

CAROLINA, CLINCHFIELD & OHIO.—The Dumps Creek line has been opened for business from St. Paul, Va., to Hurricane, 12 miles.

CHICAGO & NORTH WESTERN.—Authority has been granted this company by the Railroad Commission of Wisconsin to build 16 miles of railway in Barron county.

CONNELLSVILLE & STATE LINE.—See Western Maryland.

EL PASO & SOUTHWESTERN.—An officer writes regarding the reports that this company will probably build extensions, that at the present time the company is simply making preliminary surveys to Tucson, Ariz., and Phoenix, but that nothing definite has been decided upon.

FRONTIER & WESTERN.—The New York Public Service Commission, Second district, will hold a further hearing on the application of this company for a certificate of public convenience and necessity. The plans call for a line from the terminus of the Frontier Terminal Railway to the International bridge. C. W. Goodyear, president; R. F. Schelling, secretary, Buffalo. (Aug. 13, p. 297.)

GEORGIA & FLORIDA.—This company will start operating through trains over its own tracks from Madison, Fla., north to Augusta, Ga., on July 1.

GRAND TRUNK PACIFIC.—Residents of the section near Weyburn, Sask., have applied to this company to build a line from Regina south to the United States border. An officer writes that the company, at a recent conference with representatives of that section, agreed to make an investigation of the country and build a spur southeasterly, if the amount of business from that territory would justify the expenditure. The projected route is from a point on the branch line which is to be built from Regina southeast to Weyburn.

GULF, COLORADO & SANTA FE.—See Atchison, Topeka & Santa Fe.

HORNELL & BATH INTERURBAN.—The New York Public Service Commission, Second district, has authorized this company to issue an additional \$195,000 of bonds. The proceeds are to be used for building from Hornell, N. Y., east to Bath, 24 miles. C. Adsit, J. M. Finch, Hornell, and J. F. Turk, Hammondsport, are directors. (Jan. 7, p. 68.)

MARIANNA & BLOUNTSTOWN.—This road has been opened for business from Marianna, Fla., to Old Blountstown, 29 miles. (Dec. 11, p. 991.)

MEXICAN ROADS.—The Mexican government has given a concession to V. Mistrretta, Galveston, Tex., to build a line in the state of Tabasco. A company is being organized in the United States to carry out the project.

MICHIGAN CENTRAL.—A new branch, called the Bagley branch, has been opened for business from Salling, Mich., east to Johanna, 11 miles.

NATIONAL RAILWAYS OF MEXICO.—Plans are being made, it is said, to build a branch from Allende, Coahuila, north to Las Vacas, on the Rio Grande, opposite Del Rio, Tex. An international bridge is to be built over the Rio Grande to connect with a branch of the Kansas City, Mexico & Orient.

NEW YORK, NEW HAVEN & HARTFORD.—The New York Public Service Commission, Second district, has authorized the Westchester Northern, a subsidiary of the N. Y. N. H. & H., to

issue \$60,000 capital stock. The proceeds are to be used to secure a right-of-way for the proposed line. The commission recently authorized the construction of a line in the county of Westchester, N. Y. The line will also extend into Connecticut. (June 10, p. 1437.)

ONTARIO & NORTHERN.—Preliminary surveys are being made and work is to be started about October 1, on the line from Ontario, Wis., northeast to Wilton, eight miles. There will be about four steel bridges each 40 ft. long. E. Stackman, president; V. A. Stoddard, secretary, and A. E. Rau, engineer, Ontario. (June 24, p. 1813.)

PECOS & NORTHERN TEXAS.—See Atchison, Topeka & Santa Fe.

PINE BLUFF & NORTHERN.—An officer writes that surveys are not yet finished but that the company expects to let contracts and begin work early in August. The projected route is from Pine Bluff, Ark., north to Searcy, about 80 miles, with a branch west to Little Rock, about 25 miles. There will be one steel bridge. W. J. Miller, president, Lamar, Mo., and F. C. Kyte, engineer, Carlisle, Ark. (June 17, p. 1568.)

PITTSBURGH & FAIRMONT.—According to press reports, this company is planning to operate a double-track line about 120 miles long, between Pittsburgh, Pa., and Fairmont, W. Va. It is understood that the Wabash Pittsburgh Terminal tracks will be used from Bridgeville for an entrance into Pittsburgh. W. M. Laws, president, New York.

ST. LOUIS SOUTHWESTERN.—An officer writes that the 43-mile line of the Stephenville North & South Texas, from Stephenville, Tex., south to Hamilton, is now owned by this company. Work is now under way building an extension from Hamilton, southeast to Gatesville, 32 miles. Thompson & Scott, Wainwright building, St. Louis, Mo., are the contractors. There will be a three-span steel bridge over the Leon river. (April 29, p. 1115.)

SAN ANTONIO & ARANSAS PASS.—An officer is quoted as saying that new track is to be laid on the line between Houston, Tex., and Yoakum; Kenedy and Skidmore, and Yoakum and Moulton. Orders are now being placed for rail to be used on the first 100 miles for early delivery.

SEABOARD AIR LINE.—An officer writes that a contract has been given to E. L. Anderson & Co., Dunnellon, Fla., for building an extension from Fruitville north to Venice, 18 miles. Clearing and grading for an extension from Nichols east to Mulberry is finished and some track has been laid. (April 15, p. 1017.)

SOUTHWESTERN.—This road has been extended from Scotland, Tex., to Archer City, 10 miles. (Jan. 21, p. 165.)

STAMFORD & EASTERN.—This company is said to have completed its organization in Texas, and will at once begin work on a line from Stamford, Tex., east to the coal fields, about 60 miles. An officer is quoted as saying that financial arrangements have been made. W. T. Andrews, president. The directors include R. V. Colbert, F. S. Hastings, C. Brewington and T. M. Richardson, all of Stamford.

STEPHENVILLE NORTH & SOUTH TEXAS.—See St. Louis Southwestern.

TEXAS CENTRAL.—An officer writes that grading is about 75 per cent. finished and track laying is now under way on the branch from De Leon, Tex., westerly through Sipe Springs and Rising Star to Cross Plains, 41 miles. It is expected to have the line finished in time to carry this year's crops. Five thousand tons of 80-lb. open hearth rail is now being delivered, which will be laid on the main line to replace lighter sections. Nothing has been done on the proposed extension from Rotan, Tex., west except to make one or two preliminary surveys. (April 29, p. 1115.)

UNION PACIFIC.—The Greeley branch has been opened for operation from Greeley, Colo., to Briggsdale, 28 miles.

WABASH PITTSBURGH TERMINAL.—See Pittsburgh & Fairmont.

WESTCHESTER NORTHERN.—See New York, New Haven & Hartford.

WESTERN MARYLAND.—Construction work has been started near Connellsville, Pa., on the Connellsville & State Line, which is to build a section of the line to connect the Western Maryland at Cumberland, Md., with the Pittsburgh & Lake Erie at Connellsville. (June 10, p. 1438.)

Railway Financial News.

ALBUQUERQUE & EASTERN.—See NEW MEXICO CENTRAL.

BRINSON.—The Brinson Railroad Co., which recently took over the Savannah Valley, has been authorized by the Georgia Railroad Commission to issue \$1,000,000 of common stock, \$500,000 of preferred stock, and \$420,000 in bonds, the proceeds of which are to be used for retiring the indebtedness of the Savannah Valley road and to make improvements.

CHICAGO, CINCINNATI & LOUISVILLE. The road was sold at foreclosure at Richmond, Ind., on June 23 for the upset price of \$5,200,000, to interests identified with the Chesapeake & Ohio. These interests were the only bidders.

CHICAGO, PEORIA & ST. LOUIS.—The secretary of the organization committee has sent out a circular explaining that the delay in the completion of reorganizing the company under the plan declared effective October 6, 1909, was due to the fact that the committee believes that the best interests of the security holders would be preserved by awaiting the determination of a suit brought by the receivers in the federal court to restrain the enforcement of the Illinois two-cent fare law. The state has been allowed until July 1, 1910, to submit testimony, and it is hoped that a decision will be given shortly thereafter. As soon as this is done the committee expects to carry out the reorganization as provided in the plan and agreement of July 7, 1909.

CUBA RAILROAD.—A dividend of 2 per cent. has been declared on the \$10,000,000 6 per cent. non-cumulative preferred stock, payable August 1. This compares with 1½ per cent. paid in February, 1910, and 1½ per cent. paid in August, 1909.

HOCKING VALLEY.—Judge Lacombe in the United States circuit court at New York has allowed the discontinuance of the suit brought by H. Raymond Munger against this company, J. Pierpont Morgan and other members of the firm of J. P. Morgan & Co. The suit had been brought by Mr. Munger, a holder of preferred stock, to enjoin the company from taking any further steps in regard to reorganization of combination with the Kanawha & Michigan or the Chesapeake & Ohio, and also to prevent a further contemplated issue of common stock. It was charged that when the Hocking Valley transferred \$15,000,000 to J. P. Morgan & Co. it relinquished all claim upon that amount, and that a voting trust was formed, the \$15,000,000 payment effecting a specific appropriation for the redemption of its preferred stock and the railway thereby parting with all ownership of it. Under injunction Morgan & Co. refused to redeem the preferred stock, but upon dissolution of the injunction redemption was resumed and nearly \$12,000,000 out of a total of \$15,000,000 of the preferred stock has been turned over to them.

This company, the Lake Shore & Michigan Southern and the Kanawha & Michigan have filed suits against D. H. Gould and J. S. Stanton, minority stockholders of the Kanawha & Michigan, and against three minority stockholders of the Hocking Valley to recover \$1,000 from Gould and Stanton and \$36,000 from Schoendinger, Westfall and Mannington for dividends which the company was compelled to pay on the \$15,000,000 preferred stock during the time that the company was prevented from retiring this stock by injunctions obtained by the defendants.

MIDLAND VALLEY RAILROAD.—Holders of the \$5,980,000 Midland Valley Railroad 5 per cent. bonds and of the \$1,650,000 Cherokee Construction Co., 5-year 6 per cent. notes are asked to deposit their securities with Drexel & Co., Philadelphia, under a plan to relieve the railway from burdensome car trust payments. Under the plan the railway will issue \$6,000,000 prior lien 5 per cent. bonds secured on the rolling stock, and by collateral on the coal estate of the Construction Company as well as on the railway, and \$1,800,000 6 per cent. 2½-year notes, to be secured by \$2,500,000 general consolidated 6 per cent. bonds. According to the terms of the plan, each \$1,000 bond now out will be exchanged for \$711.11 new bonds and \$168.48 new railway notes, and each \$1,000 Construction Company note now out will be exchanged for \$844.44 new bonds and \$200 in railway notes.

MINNEAPOLIS & ST. LOUIS.—The directors have decided to omit the regular semi-annual dividend of 2½ per cent. on the \$1,000,000 5 per cent. non-cumulative preferred stock due February 15. The annual rate paid since 1909 has been 5 per cent. The official statement of this decision explains that the passing of the dividend is caused by the peculiarly adverse circumstances, including the strike of the switchmen in the Northwest, undergone by the Minneapolis & St. Louis since December 1, 1909.

NEW MEXICO CENTRAL.—A foreclosure suit has been filed under the mortgage on the road partly built from Moriarty, N. Mex., to Albuquerque, 45 miles, and on the Hogan coal fields, made by the former Albuquerque & Eastern.

NEW YORK CENTRAL & HUDSON RIVER.—J. P. Morgan & Co., the First National Bank and the National City Bank, all of New York, are offering \$22,500,000 4½ per cent. New York Central Lines equipment trust certificates of 1910 at a price to yield over 4½ per cent. on the investment. The total authorized issue is \$30,000,000, dated January 1, 1910, and due \$1,500,000 issued bonds and \$500,000 unissued bonds yearly from 1911 to 1925.

NEW YORK, ONTARIO & WESTERN.—T. De Witt Cuyler has been elected a director, succeeding Charles S. Whelen, deceased. Mr. Cuyler was recently elected a director of the New York, New Haven & Hartford, which controls the Ontario & Western, to act as an additional representative of the Pennsylvania Railroad on the New Haven board.

NORTHERN CENTRAL.—The *Philadelphia Ledger* says that the fact that the Moore-Hamilton and the Townsend-Scott committees, both representing minority stockholders, cannot get together, appears to be the chief obstacle in the way of an early conclusion of the negotiations now going on for a lease of the property to the Pennsylvania Railroad.

ST. LOUIS & SAN FRANCISCO.—A syndicate headed by Wm. Salomon & Co., New York, and G. H. Walker & Co., St. Louis, which syndicate recently bought \$6,000,000 new New Orleans, Texas & Mexico division first mortgage bonds and had an option on \$10,000,000 additional, has made negotiations for the sale of this additional \$10,000,000 bonds in Paris, where they are offered, it is understood, by the Banque de l'Union Parisienne and the Credit Mobilier Francais in denominations of 516 francs (about \$100). The \$6,000,000 issue of bonds are 5 per cent. bonds, but the \$10,000,000 bonds sold abroad are 4½ per cent. bonds.

SEABOARD AIR LINE.—The directors have declared the payment in full of the first semi-annual 2½ per cent. interest, due August 1, on the \$24,979,500 adjustment 5 per cent. income bonds.

SOUTHERN PACIFIC.—Kuhn, Loeb & Co., New York, offered for subscription up to June 24 \$25,000,000 San Francisco terminal first mortgage 4 per cent. bonds of 1910-1950. This offering is made simultaneously with offerings of these bonds in Berlin, Hamburg, Frankfurt-o-M., London, Basel, Zurich, Amsterdam and also in Boston, San Francisco, Los Angeles and Portland, Ore. The bonds are secured by a first mortgage on the so-called Bay Shore Line and other railway property, comprising the terminals owned by the Southern Pacific in the city of San Francisco. The total authorized issue under the mortgage is \$50,000,000, of which \$25,000,000 are reserved to be issued for the acquisition of additional real estate for the building of branches or extension of the road covered by the mortgage and for the improvement and betterment of the property. It is understood that about \$5,000,000 of the offering were subscribed for in this country. (June 17, 1910, p. 1570.)

A press despatch from Mexico City says that when the Southern Pacific tracks are completed to Orendain, it will arrange for trackage rights into Guadalajara over the National Railways of Mexico.

WABASH-PITTSBURGH TERMINAL.—A new protective committee of first mortgage bondholders has been organized consisting of James G. Chaplin, chairman; William B. Nicholson, C. L. Harper, Meigs H. Whaples and Richard Sutro.

Supply Trade Section.

William L. Austin has been made president of the Baldwin Locomotive Works, succeeding John H. Converse, deceased. Mr. Austin has been chief draftsman of the company.

The Asbestos Protected Metal Co., Canton, Mass., has recently opened an office at 100 Broadway, New York. P. M. Stewart, formerly building commissioner of New York, is resident manager.

The directors of the T. H. Symington Co., Baltimore, Md., have placed the cumulative preferred stock on a semi-annual dividend basis instead of quarterly as heretofore, so that the quarterly dividend of 1¼ per cent. will not be paid on July 1.

The Northern Engineering Works, Detroit, Mich., crane builders, reports that it has recently installed, in the power stations of the Tunnel & Terminal Ry. Co., New York, two 25-ton, 40-ft. span traveling Northern cranes, and also one of 10 tons capacity.

At the election of officers of the Crocker-Wheeler Company, Ampere, N. J., the following were elected for the ensuing year: President, Schuyler Skaats Wheeler; first vice-president, Gano Dunn; third vice-president, Arthur L. Doremus; chief engineer, Gano Dunn; secretary, Rodman Gilder, and treasurer, W. L. Brownell.

At the M. C. B. and M. M. conventions at Atlantic City, N. J., the Joliet Railway Equipment Company, Joliet, Ill., exhibited two sets of the Perry side bearings. One of these sets made a record of 300,000 miles and the other 400,000 under the cars of the Chicago & North Western Overland Limited trains. The bearings were in splendid condition after this service.

The Universal Portland Cement Co., Chicago, has authorized the construction of the 4,000,000 barrel plant at Buffington, Ind., as planned. In January, 1910, the construction of the first half of the plant, to have an annual capacity of 2,000,000 barrels, was authorized, but now a decision has been reached to increase the capacity of the plant as soon as possible. This construction will cost about \$4,500,000, and when completed will give the company a yearly output of 8,000,000 barrels at the Buffington plant and 12,000,000 total.

The Bucyrus Company, South Milwaukee, Wis., has acquired the exclusive rights to make and sell the Heyworth-Newman drag line excavators, formerly owned by James O. Heyworth, Chicago. The Heyworth bucket is designed with a rigid bail which can be adjusted so that it will actually dig the material rather than scrape off thin layers of it, and its shape is such that it clears itself in dumping even in extremely sticky material. It is claimed that the machine can dig practically any material which a steam shovel can handle, and it is believed that it will successfully meet the demand for canal, irrigation ditch, and certain classes of railway construction work. Three of the machines are now at work on the North Shore drainage canal of the Chicago Sanitary district and others are being used on the New York State barge canal, the Cape Cod canal, and in various other places.

David Van Alstyne has been elected vice-president in charge of manufacture of the Allis-Chalmers Company, with headquarters at Milwaukee, Wis. Mr Van Alstyne is specially well fitted for this work, and is one of the few men who understand thoroughly, and know how to apply successfully, the principles underlying economical and efficient production on a large scale. He was born in Louisville, Ky., June 14, 1865, and was graduated from the Massachusetts Institute of Technology in 1886. He became a machinist's apprentice on the Louisville & Nashville, and remained with that road for eight years in the machine shop and as a locomotive fireman and an engine house foreman. For three and a half years he was engaged in the foundry business in Louisville, after which he was for one year a master mechanic on the Louisville, Henderson & St. Louis. In 1899 he went with the Chicago Great Western as a division master mechanic, but was shortly afterward made superintendent of motive power, remaining in that position until May, 1904, when

he accepted a position as mechanical superintendent on the Northern Pacific. His splendid work on these two roads attracted attention to his qualities as an executive and manager, and in 1907 he was elected vice-president in charge of manufacture of the American Locomotive Company. During the past few months he has been retained in a consulting capacity for a western railway system.

L. R. Pomeroy, assistant to the president of the Safety Car Heating and Lighting Company, New York, has resigned to take a position with J. G. White & Co., Inc., New York, as chief engineer of its railway and industrial division. Mr. Pomeroy has for a long time been considered an authority on railway shop equipment, operation and construction, and is peculiarly adapted both by nature and training for his new work. He was born at Port Byron, New York, in 1857, and attended high school at Milwaukee and the Irving Institute at Tarrytown. From 1874 to 1880 he was engaged in commercial business, bookkeeping, special auditing, drafting and designing of cars and locomotives. From 1880 to 1886 he was secretary and treasurer of the Suburban Rapid Transit Company of New York. For four years following this, he was a special representative of the Carnegie Steel Company, introducing basic boiler steel for locomotives and special forgings for railways. For nine years he was engaged in the same work with the Cambria Steel Company and the Latrobe Steel Company, jointly; this assignment involved metallurgical engineering and experimental research to adapt special steels for railway axles, crank pins and piston rods. From 1899 to 1902 he was assistant general manager of the Schenectady Locomotive Works. For six years following this he was a special representative in the railway field for the General Electric Company, this work covering the electrification of steam roads, railway shops, and the general application of electricity for all railway purposes. For the past two years he has been assistant to the president of the Safety Car Heating and Lighting Company. In connection with this he has devoted a portion of his time in consulting work in the special field of railway shops, machine tool operation and the adaptation of tools to the work, with special reference to sequence of operation and general efficiency.

TRADE PUBLICATIONS.

Concrete Repair Shop Buildings.—The Arnold Co., Chicago, is sending out mailing cards with four photographs of concrete buildings for railway repair shops built by that company.

Chicago, Burlington & Quincy.—The Burlington is sending out mailing cards announcing the new daily tourist sleeper service from St. Louis and Kansas City to Denver. The personally conducted through cars are especially emphasized.

Coal Mining Plants and Washeries.—The Roberts & Schaefer Company, Chicago, has issued Bulletin No. 20 which contains photographs and data regarding 18 coal mining plants and coal washeries which this company has recently completed.

Steel Derricks and Drilling Machines.—The Carnegie Steel Company, Pittsburgh, Pa., has just issued a pamphlet containing a large amount of useful information regarding its steel derricks and drilling machines for oil, gas, salt and other wells.

Idaho & Washington Northern.—"Spokane's Vacation Land" is the title of a booklet describing the mountain, lake and river resorts on the Pend Oreille River Route. The illustrations are reproduced in color and the descriptive matter is interesting reading.

Michigan Central.—"Nearby Resorts" is the title of a 20-page booklet by the passenger department of the Michigan Central, describing outing points near Chicago. Descriptive matter, maps, lists of hotels and other general information is included. A card is also being distributed advertising a new Saturday train to Diamond Lake, Barron Lake, Corey Lake, Fisher Lake and other nearby resorts.

Great Northern.—The passenger department of the Great Northern is distributing a mailing card calling attention to the new Glacier National Park in northwestern Montana, which is reached by the three daily trans-continental trains of that road. Another publication by the same company, in a folder on its international train, the Winnipeg Limited, between St. Paul, Minneapolis and Winnipeg.

Chicago, Rock Island & Pacific.—A large folder, being widely distributed by the passenger department of the Chicago, Rock Island & Pacific to encourage the "see America first" spirit in summer tourists. An editorial from the *Boston American* of February 19, 1910, is reproduced, five views of American scenery are shown, and a few brief arguments in favor of seeing America first are presented.

Great Northern.—The Great Northern issued a booklet descriptive of St. Paul's business interests on the occasion of the annual up-State excursion of the St. Paul Jobbers and Manufacturers' Association, June 12-19. The Great Northern furnished a special train for this trip and the greater part of the itinerary was over the lines of that company. The booklet includes a number of photographs and reproduction of a painting of the city from across the river.

Chicago, Burlington & Quincy.—The "Colorado and Utah Handbook" is the title of a 26-page booklet issued by the passenger department of the Chicago, Burlington & Quincy. In addition to general illustrations and descriptions of that region, a list of rivers in which to fish, a digest of the game and fish laws, and an alphabetical list of hotels and boarding houses are included. The department is sending out with this booklet an advertisement of a 72-page book on "Scenic Colorado" which will be sent for five two-cent stamps.

Northwestern Line.—The passenger department of the Chicago and North Western has issued a folder showing the through route from Chicago to Lake Geneva, with complete service. Another folder gives colonist rates to the West and Northwest. "The Fisherman's Special" is a booklet giving the schedule of the special train on the Chicago & North Western to the fishing resorts of Wisconsin and Michigan. A special schedule of the "Los Angeles Limited" has been issued. The running time of this train has been reduced to 68½ hours.

Electrical Equipment.—The General Electric Co., Schenectady, N. Y., in bulletin No. 4,730 describes its single-truck type of gas-electric motor car; in bulletin 4,732 its Curtiss steam turbine-generators of various capacities; in bulletin No. 4,736 various types of lightning arresters for alternating and direct current, both high and low voltage circuits; in bulletin No. 4,737 an electric hardening surface, designed for hardening or tempering tool steel; in bulletin No. 4,738 three sizes of polyphase, 60-cycle, belt-driven revolving armature type generators for use in small isolated plants; in bulletin No. 4,739 the G E Mazda incandescent lamp with an improved tungsten filament; in bulletin No. 4,740 line drop compensators for alternating-current circuits; in bulletin No. 4,741 luminous arc lamps for direct-current multiple circuits, and in bulletin No. 4,744 meter testing rheostats.

RAILWAY STRUCTURES.

AUGUSTA, GA.—An officer of the Georgia & Florida writes that about July 1 work on a brick warehouse now being remodeled by the company's men at Washington, Twigs and Calhoun streets, in Augusta, will be finished. The building is to be one-story high, 370 ft. x 370 ft.

Du Bois, PA.—See Springville, N. Y.

FORT WAYNE, IND.—Plans, it is said, are being made by Philadelphia architects to put up a union station in Fort Wayne at a cost of \$1,000,000, to be used jointly by the Pennsylvania Railroad, Wabash and Lake Shore & Michigan Southern. (June 24, p. 1815.)

GALVESTON, TEX.—The Galveston-Houston Interurban Railway is said to have bought land in Galveston to be used as a site for shops and car buildings.

HAMMOND, IND.—Improvements to be made by the Baltimore

& Ohio in Lake county, it is said, call for an expenditure of more than \$2,000,000.

HOUSTON, TEX.—The Chicago, Burlington & Quincy is building a new coaling station to cost about \$20,000. As soon as this is completed work on the new station mentioned in the *Railway Age Gazette* of May 20 will be begun.

HOUSTON, TEX.—Plans are being made by the Galveston-Houston Interurban Railway for a new passenger station to be built in Houston. An officer of the Stone & Webster Engineering Corporation writes that no definite conclusion has yet been reached regarding the construction of the building and they are unable to furnish information at the present time.

JEFFERSONVILLE, IND.—The Pennsylvania Railroad is preparing to rebuild the bridge over the Ohio river at this place, it is said, at a cost of \$3,000,000.

LAFAYETTE, LA.—Bids are wanted by the Morgans, Louisiana & Texas for putting up a new brick and slate passenger station at Lafayette.

LINCOLN PARK, N. Y.—See Springville, N. Y.

LOUISVILLE, KY.—The Kentucky & Indiana Bridge & Railroad Co. will give a new mortgage, it is said, to secure funds for building a new double-track bridge over the Ohio river at Thirty-first street, Louisville. The new bridge is to have eight large stone piers and eight spans; two of the spans will be 620 ft. long. It will require about two years to complete the structure.

MEMPHIS, TENN.—An officer of the Louisville & Nashville writes that a contract has been given to the Murch Brothers Construction Co., St. Louis, Mo., and work is to be started by July 1 on a union passenger station at Calhoun street in Memphis. The building is to be 83 ft. x 283 ft., with express room 40 ft. x 200 ft. and a concourse 75 ft. x 283 ft. The station will be constructed of brick, faced with granite and limestone, and is to be used by the Louisville & Nashville, the Nashville, Chattanooga & St. Louis, the Southern Railway, the Missouri Pacific and the St. Louis Southwestern. (Dec. 17, p. 1218.)

MINNEAPOLIS, MINN.—An officer of the Great Northern writes that orders have been given to the Wisconsin Bridge & Iron Co. for fabricating the superstructures to replace old bridges at Fifteenth avenue and Fourth street, and University avenue between Thirteenth and Fourteenth streets, in S. E. Minneapolis. Contracts for the erection and substructure have not yet been let.

PETERSBURG, VA.—According to press reports the Seaboard Air Line is making plans for putting up a new passenger station in Petersburg.

SACRAMENTO, CAL.—The Western Pacific has let the contract for building a machine shop, 138 ft. x 221 ft. According to press reports, work is to begin at once.

SALT LAKE CITY, UTAH.—The Utah Light & Railway has begun work on a machine shop and car plant as an addition to its present shops.

SAN ANTONIO, TEX.—The San Antonio & Aransas Pass, it is said, has under consideration the question of putting up a passenger station at San Antonio.

SPOKANE, WASH.—The Chicago, Milwaukee & Puget Sound is said to have bought 72 acres of land near Spokane, which will be used as a site for car shops, roundhouses and side tracks.

SPRINGVILLE, N. Y.—An officer of the Buffalo, Rochester & Pittsburgh writes that a contract has been given to L. J. Shuttleworth for building a brick and stone passenger station at Springville, also that a contract has been given to the Otto Gas Engine Works, Chicago, for the erection of a bucket type mechanical coaling station of 500 tons storage capacity at Lincoln Park, N. Y., as well as a similar station of 1,200 tons storage capacity at Du Bois, Pa.

SUNBURY, PA.—The Sunbury & Northumberland Electric Railway Company is to pay \$17,000 towards the cost of a new bridge to be built at Sunbury.

YOAKUM, TEX.—The San Antonio & Aransas Pass will put up two new shop buildings, it is said, at Yoakum.

Late News.

The items in this column were received after the classified departments were closed.

G. B. Wall, real estate agent of the Chesapeake & Ohio at Richmond, Va., has been appointed assistant to the president, and will, in addition to his duties as real estate agent, perform such other duties as may be assigned to him.

A press despatch from St. Louis, Mo., which St. Louis Southwestern officials in New York will neither confirm nor deny, says that the Louisville & Nashville has made arrangements to obtain control of the St. Louis Southwestern, and that the arrangements for the transfer of control of this Gould property to the Louisville & Nashville interests will be completed within 30 days. The despatch states that the cash cost to the Louisville & Nashville will be about \$1,500,000.

The Interstate Commerce Commission on June 29 handed down its decisions in the so-called Pacific coast cases, and in almost every instance ordered substantial reductions in nearly all the cases complained of. The cases decided by the commission are the Traffic Bureau of the Merchants Exchange v. Southern Pacific, opinion by Commissioner Lane; City of Spokane v. Northern Pacific, opinion by Commissioner Prouty; Maricopa County Commercial Club v. Santa Fe, Prescott & Phoenix, opinion by Commissioner Lane; Portland Chamber of Commerce v. Oregon Railroad & Navigation Co. and the Transportation Bureau of the Seattle Chamber of Commerce v. the Northern Pacific, opinion by Chairman Knapp; Railroad Commission of Nevada v. the Southern Pacific, opinion by Commissioner Lane; and the Commercial Club of Salt Lake City v. the Atchison, Topeka & Santa Fe, opinion by Commissioner Prouty.

The Spokane case, which has been before the commission before, and in which the railways were asked to submit new schedules of rates, holds that the schedules submitted by the railways are unreasonable, and that the new rates are excessive. The rates established by the commission, effective October 1, are much lower on both class and commodity freight. Railways are required to furnish detailed accounts during July, August and September, showing the revenue which has been earned on business handled under present rates and the revenue which would have been earned on the same amount of business if the rates now prescribed by the commission had been in effect.

In the Salt Lake City case the present class rates in both directions between Chicago, Mississippi river and the Missouri river, on the one hand, and Utah common points on the other, are found unreasonable, and materially lower rates are prescribed; and western commodity rates from eastern points of origin to Utah common points are also found unreasonable, and reduced rates are prescribed. Rates on fruit from California are found unreasonable and lower rates are prescribed. Defendants are ordered to establish to Utah points proportional import rates on certain articles which do not exceed those in force to the Missouri river, and the present rates on sago, tapioca, tea and tea dust found unreasonable to the extent that they exceed those now in effect to Missouri river points. Present passenger fares between Utah common points and Ogden, Utah, and Portland are not found unreasonable, but the rates between Salt Lake City and Los Angeles and San Francisco, and between Ogden and Provo and San Francisco are found unreasonable.

In the Nevada case, class rates in eastern territory to Nevada found unreasonable, and reasonable rates are prescribed.

In the Merchants Exchange case, class rates from Sacramento, Cal., to points on the main line of the Southern Pacific between Reno, Nev., and Cecil Junction, Utah, are found unreasonable, and lower rates are prescribed.

In the Maricopa case class rates from points in eastern territory between the Missouri river and the Pittsburgh-Buffalo line to Phoenix, Ariz., are found unreasonable, and lower rates are prescribed.

In the Portland and Seattle case, class rates from Seattle, Tacoma and Portland to points in Washington, Oregon, Idaho and Montana are found unreasonable, and a reduction of 20 per cent. in these rates is proposed. In no one of the cases was there a dissenting opinion.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Oregon Electric has ordered one electric locomotive from the American Locomotive Co.

The Chesapeake & Ohio is said to be asking prices on 10 locomotives. This item is not confirmed.

The Chicago & Alton is said to be in the market for a number of locomotives. This item is not confirmed.

The New York, New Haven & Hartford has ordered two Pacific passenger locomotives from the American Locomotive Co.

The Chicago, Indianapolis & Louisville has ordered five consolidation freight locomotives from the American Locomotive Company.

CAR BUILDING.

The Chicago & Alton is said to be in the market for 60 passenger cars. This item is not confirmed.

The Metropolitan Street Railway, Kansas City, Mo., reported in the *Railway Age Gazette* of May 13 as being in the market for 25 electric cars, has ordered this equipment from the Cincinnati Car Company.

The Baltimore & Ohio, previously reported as being in the market for freight equipment, has ordered 1,000 coke cars from the Pressed Steel Car Company and 1,000 coke cars from the Cambria Steel Company. This company has also added 1,000 composite gondola cars to its inquiries.

The Georgia Railroad, reported in the *Railway Age Gazette* of June 3 as being in the market for 65 box, 25 coal and 10 stock cars, has placed the orders for the special equipment required for these cars, and they will be built in the shops of the company at Augusta, Ga.

MACHINERY AND TOOLS.

The Baltimore & Ohio has ordered a 300-k.w. synchronous motor-generator set for operating ore unloaders at its new ore dock at Loraine, Ohio. The set will receive alternating current at 440 volts, three-phase, 60 cycles, and deliver direct current at 250 volts.

The Chicago, Burlington & Quincy, reported in the *Railway Age Gazette* of January 7, 1910, as in the market for 30 to 40 machine tools, has revived this inquiry and is now reported as taking prices on 100 tools to cost about \$200,000. This equipment is for the shops at Havelock, Neb.

IRON AND STEEL.

The San Antonio & Aransas Pass.—See this company under Railway Construction.

The Bangor & Aroostook has ordered 5,500 tons of rails from the Pennsylvania Steel Co.

The Boston & Maine has ordered 350 tons of bridge steel from the Phoenix Iron Works.

The Chicago, Peoria & St. Louis has ordered 1,000 tons of rails from the Lackawanna Steel Co.

The New York, New Haven & Hartford is said to have ordered 2,000 tons of heavy section rails from the Pennsylvania Steel Co.

The New Orleans, Mobile & Chicago is said to have ordered 350 tons of rails from the Tennessee Coal, Iron & Railroad Company.

The Great Northern has ordered steel for bridges from the

Wisconsin Bridge & Iron Co. (See Minneapolis Minn., under Railway Structures.)

The Texas City Transportation Co., Texas City, Tex., has ordered 400 tons of structural steel for unloading bridges from the American Bridge Co.

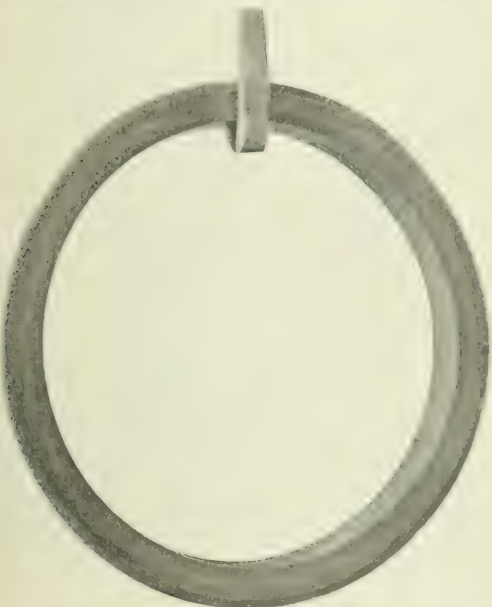
The Western Maryland is said to have ordered specifications for 18,000 tons of the 30,000 tons of bridge work required for the extension to Connellsville, Pa.

General Conditions in Steel. Unfavorable crop conditions, reports from the West and Northwest have had the effect of holding down steel orders. There is a feeling, however, that in event of these reports proving exaggerated, that steel orders in July will show an increase over the month just closed. The steel companies are reported to be receiving orders at about 65 per cent. of capacity and that operations are at present running on an 80 per cent. basis. Sales of pig iron for the first half of this week are estimated at about 50,000 tons.

Inter Ocean Steel Tire.

The Inter Ocean Steel Company broke ground for its plant at Chicago Heights, Ill., April 24, 1909; poured the first steel from its open hearth furnaces on April 20, 1910, and rolled the

first tire on June 14, 1910. The illustration is a reproduction of a photograph of this tire and, as can be seen, it is a perfect arc. In fact, it was shipped with the first lot of tires sent out from the works for use on one of the large railway systems of this country.



First Steel Tire Rolled by the Inter Ocean Steel Company.

first tire on June 14, 1910. The illustration is a reproduction of a photograph of this tire and, as can be seen, it is a perfect arc. In fact, it was shipped with the first lot of tires sent out from the works for use on one of the large railway systems of this country.

Freight Derrick.

The Minneapolis, St. Paul & Sault Ste. Marie is installing large capacity derricks at freight houses in order to handle heavy freight that would otherwise have to be refused. The accompanying cut shows the derrick installed on the unloading platform at the Minneapolis (Minn.) freight depot. This derrick has a capacity of 15 tons; the mast is 40 ft. high and the boom 30 ft. The three motions, raising and lowering load, raising and lowering boom, and swinging, are performed by electric power taken from an a.c. circuit. The motor is a General Electric a.c. motor, ITC-5009, 22-h.p., variable speed, direct connected to the hoist. The hoist has two drums operated by the "American" friction clutch, and a swinging or slewing at-



Freight Derrick, M. & St. P. & S. Ste. M.; Minneapolis, Minn.

stiff legs are arranged to allow the boom to swing under them, any number of complete revolutions of the boom in either direction can be made. A hand power double drum crab is mounted on the back of the mast, to be used in case the electric power is cut off. The foundations are of concrete, and are made large enough to withstand the high overturning forces. This derrick was furnished by the American Hoist & Derrick Company, St. Paul, Minn.

History of the Rock Drill.

W. L. Saunders, president of the Ingersoll-Rand Co., New York, with which company he has been connected for 30 years, writes the following interesting summary of the development of drills of this nature:

The rock drill was conceived and developed in the United States by J. J. Couch, an American, of Philadelphia, Pa., who took out the first practical patents in 1849. In his experiments he was assisted by Joseph W. Fowle. The Couch drill was a crank-and-fly-wheel machine. Couch and Fowle separated in 1848, the latter filing a caveat in 1849 covering a drill of his own invention and describing the successful power rock drill substantially as it is to-day. The most important feature of Fowle's drill was that the cutting tool is attached directly to the piston, so that the steel leading into the hole was an extension of the drill piston rod.

Fowle described his invention in his testimony before the Massachusetts legislative committee in his contest with Burleigh in 1874 as follows: "My first idea of driving a rock drill by direct action came about in this way: I was sitting in my office one day after my business had failed, and happening to take up an old steam cylinder, I unconsciously put it into my mouth and blew the rod in and out, using it to drive some tacks with which a few circulars were fastened to the wall."

The nearest approach to rock drill invention abroad was the work of a German, Schumann, in 1854. Fowle being without means to develop his ideas, they remained in obscurity until Charles Burleigh purchased his patents and produced the Burleigh drill about 1866. This drill was used in driving the Hoosac tunnels in Massachusetts in 1867.

Following Couch, Fowle and Burleigh were Haupt, Wood, Ingersoll, Sergeant, Waring and Githens. Githens was the inventor of the Rand drill. The Ingersoll drill was invented in 1871 by Simon Ingersoll, a modest, ingenious and honest me-

chanic, who went to New York from Connecticut, taking with him models of several inventions. He was riding in a New York horse car one day and describing one of his inventions to a fellow passenger. Another passenger in the car, John D. Miner, overheard Ingersoll's conversation. Miner was a contractor, engaged with a gang of men on some rock excavation in New York. He joined the conversation, saying that he had men striking a steel with a hammer in making holes for blasting, but that they could drill only about 10 ft. of hole per day. Ingersoll said that he could make a machine for doing this work if he had the money. Miner gave him \$50 and his card, saying that he would give him another like amount if he needed it.

Ingersoll's first rock drill was built in a shop at Second avenue and Twenty-second street, New York City, owned by J. F. de Navarro, and managed by Sergeant and Cullingworth. The Ingersoll Rock Drill Co. was organized by Navarro, who, on Sergeant's advice, purchased all the rights and patents held by Ingersoll. The Ingersoll drill was thereafter made with the separate front head as used to-day. Litigation arose with Burleigh, of Massachusetts, who owned the rights of Fowle and others, which resulted in Navarro purchasing all of the patents for the Ingersoll Rock Drill Co.

The business soon returned to Mr. Navarro the \$10,000 which he had paid into it, and in later years he sold his interests to W. R. Chappin for \$525,000. Sergeant sold out, due to friction with the management, and went West to engage in mining, but returned to New York about 1885 and organized the Sergeant Drill Co.

Early in the rock drill development the Rand brothers, Addison C. and Gasper R., had become interested through their connection with the Laffin & Rand Powder Company. Addison C. Rand formed the Rand & Waring Drill & Compressor Company, which was later controlled by Rand and merged with the Rand Drill Co., established in 1871 and incorporated in 1879. J. C. Githens, superintendent of the Rand Drill Co., invented the Little Giant rock drill. He was the originator also of many improvements, notably the double-screw column with column arm, which made practical the application of the rock drill to mining and tunneling.

The Sergeant & Cullingworth Co., manufacturing the Ingersoll drill; the Sergeant Drill Co., and the Ingersoll Rock Drill Co. were merged into the Ingersoll-Sergeant Drill Co. Later the Rand Drill Co. and the Ingersoll-Sergeant Drill Co. were consolidated in the Ingersoll-Rand Co., to-day carrying on the business of all these pioneer concerns. The Rand drill was from the beginning the most formidable competitor of the Ingersoll and Sergeant types. The conjunction of the Ingersoll-Sergeant and Rand companies, therefore, was a combination of valuable patents in rock drills, compressors and general machinery for mining, tunneling and quarrying. Each shop received the benefit of the experience of all the others, and the best features of the Ingersoll, Sergeant and Rand types were taken to make an improved product.

The present Ingersoll-Rand Co., New York, capitalized at \$10,000, sells its products throughout the world. Its machines are recognized standards in their line and its constant endeavor is to maintain high standards.

British Telephone System.

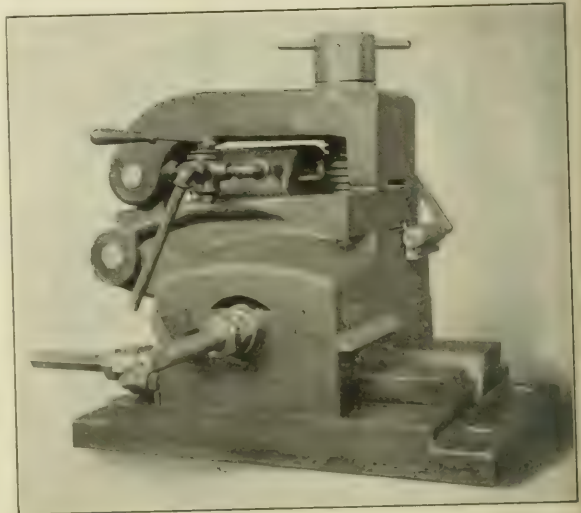
The fact that about two years hence the British post office is to take over and nationalize the entire telephone system of the United Kingdom makes pertinent a review of the results which have been attained in 10 years of a government monopoly of the telegraph system. When the British telegraphs were nationalized, in 1870, it was confidently estimated that the service would be self-supporting and more; but the 40 years of operation show a total deficit of nearly \$87,500,000 for interest, for capital expenditures, and for excess cost of operation over receipts. In other words, more than \$2,000,000 a year has been taken from the pockets of the taxpayers to pay for the luxury of a state owned and operated telegraph system. At present the deficit is more than \$4,200,000 a year. Interest on the investment is paid out of the consolidated fund, but even thus the post office is unable to make the telegraphs pay expenses. The reason for this unsatisfactory showing is chiefly the unprogressive and extravagant method of conducting business under government control. *New York Tribune.*

Shop Equipment.

Pond 42-Inch Car Wheel Lathe.

Several important improvements have recently been made to the Pond car wheel lathe, manufactured by the Niles-Bement-Pond Company. A rough idea of the effect of these changes and others which have been made during the past few years may be gained from the fact that in 1904, the year of the St. Louis Exposition, the machine was capable of turning 6 pairs of wheels in 10 hours and was driven by a 15 h.p. motor. The latest machine is driven by a 40 h.p. motor and has a record of turning 33 pairs of wheels in less than 10 hours. With the latest design the time of handling the work in and out of the machine and of adjusting the work and the tools has been reduced to a minimum, and requires very little physical exertion on the part of the operator. The improvements consist of a power tool clamp, the automatic operation of the gear segment, a new method of traversing the tailstocks, the tailstock clamps and a wheel raising device.

The new power tool rest will clamp the largest tools rigidly and instantaneously by the simple opening of an air valve, thus relieving the operator from all exertion. The air cylinder which furnishes the power for clamping the tool is a part of the lower member of the tool rest. The piston working in the cylinder forces a wedge between a lower fixed roller and an upper roller on the lever end of the clamp itself. The strain on the tool incident to the cut is not carried back to the elastic medium in



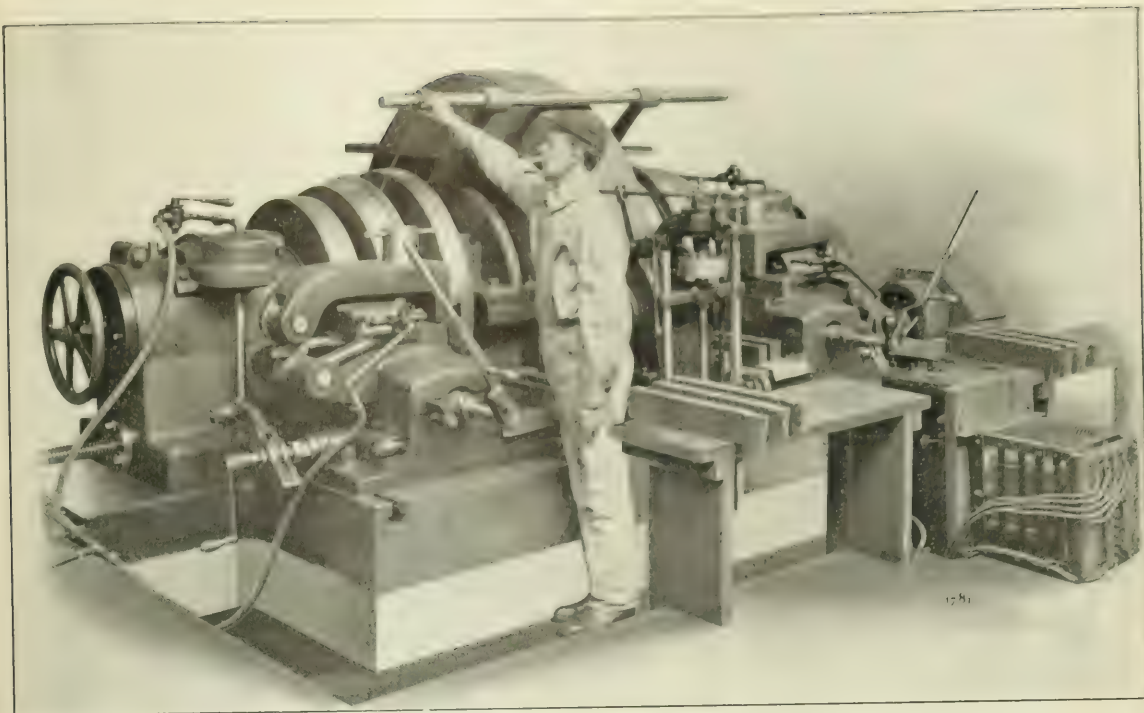
Screw Adjusted, Air Operated Tool Rest.

the cylinder. When the rollers are forced apart by the piston wedge, they remain in that position whether the pressure is maintained in the cylinder or not; thus the clamp is a positive lock. The rest is entirely open at the side and the tools are readily changed without any movement to the slide; in fact, with no extra manipulation of any kind. The power cylinder, being part of the tool rest, offers no obstruction to the view of the work.

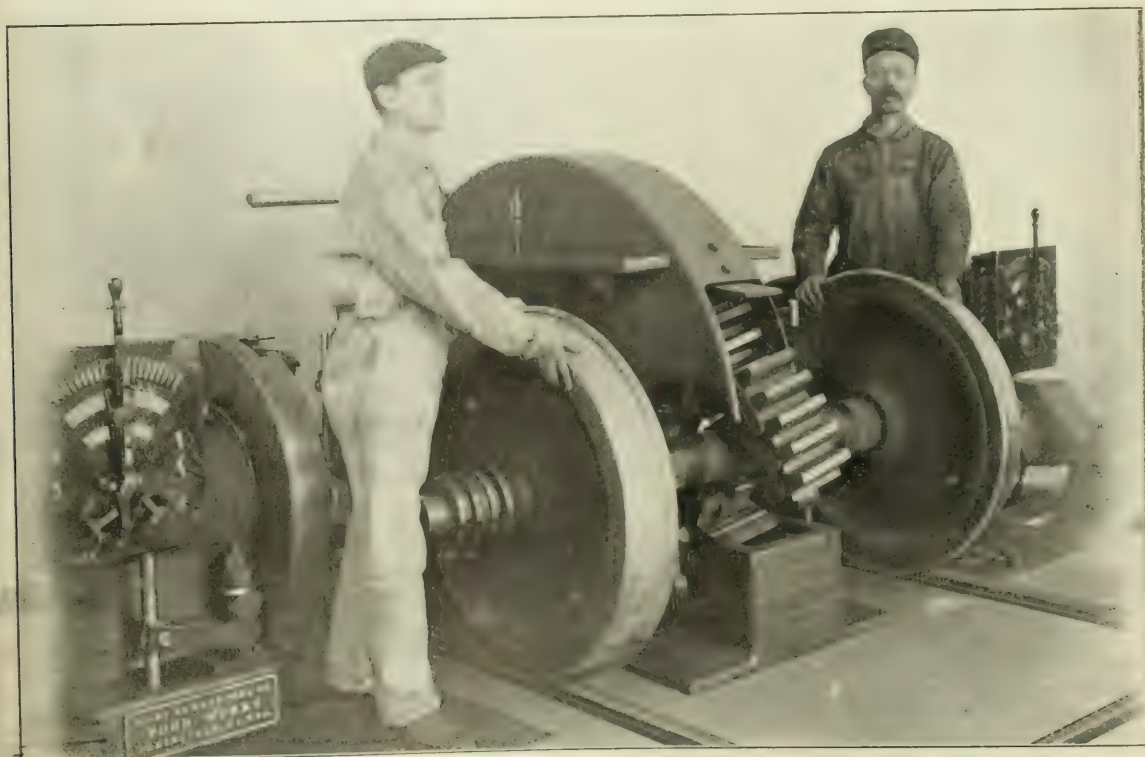
The gear segment is automatically left in an open position when the wheels are rolled out of the lathe. The axle of the next pair of wheels, when it is rolled in, strikes a projection on the underside of the segment, tripping a latch, held in position by a spring, and forces the segment to drop into place. A heavy latch, which may be seen in the illustration, holds the segment in its working position until it is again released by the axle when the wheels are taken out. This not only greatly reduces the time required for putting the gear segment in and out of place, but eliminates all manual labor on the part of the operator.

Much of the time and practically all the labor required for moving the tailstocks back and forth have been eliminated by the use of pneumatic cylinders, which are operated by conveniently located valves.

The lateral pressure on the wheels, as a result of taking heavy roughing cuts, tends to cause the tailstocks to slide on the bed, necessitating the use of four heavy T-bolts to hold each tail-



Pond 42-in. Car Wheel Lathe.



Rolling Wheels Out of Pond Car Wheel Lathe.

Wheels are rolled out of the lathe and are not automatically opened and held open.

stock in position after it has been adjusted. The time and labor incident to tightening and loosening these T bolts has been reduced to a negligible quantity through the use of pneumatic pistons on each tailstock which are controlled from a convenient location. The downward thrust of the piston operates powerful levers on either side of the tailstock, the rocking movement of which draw up the heavy sliding T bolts and hold the tailstock securely in position when taking the heaviest cuts.

Improved skids have heretofore been used to lift the axle to the position where the tailstocks could run to the centers. The wheels are now run into the machine on two light rails which extend to the center of the lathe; two pistons, operated by power and underneath the ends of the rails, raise the wheels with their axle to the centers of the face plates. They can be raised and lowered quickly and accurately by the simple movement of a valve. The rails are specially constructed to be as light as possible and are movable so that they will not interfere when cleaning out the chips.

The following tabulation gives the results of a day's run made at the West Albany shops of the New York Central & Hudson River, using a machine of this design in turning 36-in. Krupp and Paige wheels. The average time for turning was 17 min. 58 sec., and the total for 33 pairs was 9 hrs. 53 min.

Pair No.	Time		Depth	Feed	Speed
	Putting Rough	Finish-Taking Floor to			
	in.	ing.	cut.	ft.	ft.
1	3	11	5	1	20
2	2	8	6	1	17
3	2	9	4	1	16
4	3	9	3	1	16
5	2	9	5	1	17
6	2	9	4	1	16
7	2	9	6	1	18
8	3	9	4	1	17
9	2	11	7	1	21
10	3	10	5	1	19
11	2	10	5	1	18
12	2	9	5	1	17
13	4	11	5	1	21
14	2	12	5	1	23
15	2	8	4	1	14
16	2	9	5	1	17
17	1	8	4	1	17
18	3	10	6	1	20
19	2	8	5	1	18
20	2	9	5	1	17
21	3	9	6	1	18
22	3	11	6	1	21
23	2	5	5	1	17
24	3	11	6	1	21
25	2	9	5	1	17
26	2	10	6	1	19
27	3	7	5	1	16
28	4	10	6	1	18
29	4	9	5	1	18
30	4	10	4	1	18
31	3	10	4	1	17
32	1	7	5	1	14
33	1	10	5	1	17
Average	2.28	9.24	5.07	1.00	17.58

Four-Speed Belt Variator.

The illustration shows a new multi-speed planer made by the American Tool Works Co., Cincinnati, Ohio, which is operated by this company's new four-speed belt variator.

The four speeds are obtained through a pair of opposed four-step cone pulleys, belt operated, the whole being mounted upon a substantial platform on the top of the housing. The variator provides a range of speeds intended to cover the most exacting requirements, which, with the constant high speed return of the platen, insures great working economy.

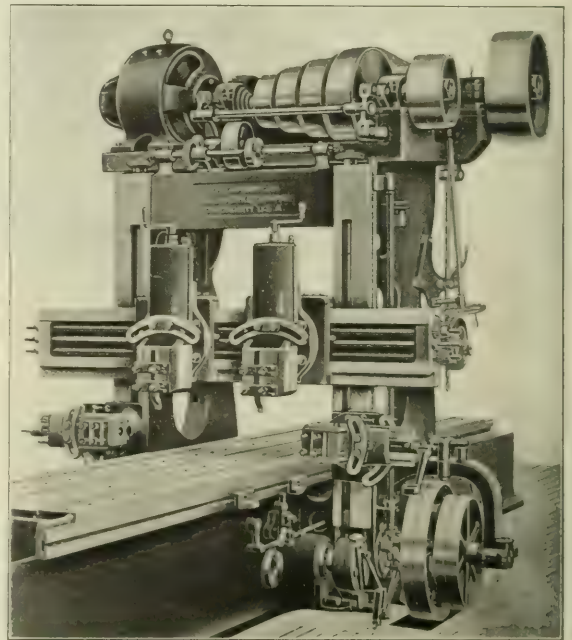
The drive has two distinct and necessary advantages over the gear drive, viz.: simplicity of design and freedom from destructive vibration. There are no change gears to break, stick to or put the shafts, not to mention the frictions to wear and to be adjusted, no jaw clutches to be damaged or broken, and no large reservoir from which the oil often splashes and leaks over the machine. This machine is therefore free from the constant noise and vibration of the gear-driven type.

A pair of belt forks are moved alternately along guide rods by a pair of cylindrical cams, which revolve alternately through the medium of a set of intermittent gears operated by a hand-wheel. One revolution of this wheel shifts the belt from one step to another, a pin indicating the complete revolution. The cam rolls have spiral slots rolled in their peripheries, each belt fork being moved along the guide rods by a roller operating in the spiral slot. The relation between the cams and forks is so arranged that the latter will shift the belt from the high step

of the cone before placing it on the high step of the opposing one.

The tension of the belt is maintained by the vertical lever at the rear, operating in the radial slot. This lever is of convenient height and operates a pair of bell cranks through link connections. The bell cranks serve as levers to guide the driven cone toward the driver, thus slackening the belt. This feature, together with the mechanical belt shifting device, and the fact that the steps of the pulleys are beveled on the edges, permits of easily making rapid changes of speed, even though the belt be very wide. After it is placed for the desired speed, it is tightened by moving the hand lever to the point where tension is sufficient for the work. The driven cone being moved toward the driver, carrying the planer driving belts, is a distinct feature, inasmuch as the tension of the vertical belts is not disturbed when making speed changes, and flying off is overcome.

All shafts in this variator are of large diameter, accurately ground and run in massive phosphor bronze journals, lubricated by the ring or dynamo system of oiling. The journals are supplied with liberal oil wells and return ducts, the idea being to prevent the oil from escaping and coming into contact with



Multi-Speed Planer with Four-Speed Belt Variator.

the belts. All the bearings used are of the ball and socket type.

All speed changes are made without stopping the machine. The driving pulleys have flywheel rims, the momentum of which reduces all shocks to the driving mechanism due to intermittent cutting and reversing, also insuring a steady, even pull at the cutting. They are perfectly balanced, running without vibration even at high speeds. The cutting speeds can be arranged suitable to individual requirements, but are regularly furnished to provide 20-ft., 30-ft., 40-ft. and 50-ft., with a constant return speed of about 80-ft.

Belt drive is regularly furnished with this variator, the tight and loose pulleys being applied to the rear cone shaft. The drive can be obtained direct from a line shaft, provided that it has sufficient speed. If used with similar shafts of about 150 r.p.m., an intermediate or jack shaft is required. The construction of this drive permits converting the belt drive into a motor drive after the machine is installed.

The electric motor drive furnished by this variator requires a constant speed motor for either d.c. or a.c. current. The motor is direct connected to the variator through spur gearing. A starting box provides all necessary controlling mechanism. Should the motor become disabled, the driving gear on the end of the variator shaft may be replaced by a pulley and the planer driven by a belt from a countershaft or another motor.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY JULY 1 TO 15, 1910, IN LONDON.

THE RAILROAD GAZETTE (LONDON), 38 FLEET ST., NEW YORK.

CHICAGO Plymouth Bldg.

CLEVELAND Western Bldg.

LONDON Queen Anne's Chambers, Westminster.

W. H. BOARDMAN, Proprietor.

E. A. SIMMONS, *Printers & Presses.*

HENRY E. JOHNSON.

The address of the company is: Plymouth Bldg., Chicago.

EDITORS

W. H. BOARDMAN, *Editor.*

ROY V. WHEELER

P. E. ANDERSON

SAMUEL O. DENN,

ERNEST MCCLEGGH

W. F. THAYER

Western Edit. Mgr.

G. L. FOWLER

F. E. LISTER

BRADFORD BOARDMAN,

WILLIAM FORNATH

F. W. KRARGER

Eastern Edit. Mgr.

S. W. DUNNING

H. H. SIMMONS

CLARENCE DEMING

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico	\$5.00 a year.
Canada	\$6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49.

FRIDAY, JULY 8, 1910.

NUMBER 2.

CONTENTS

EDITORIALS:

Editorial Notes.....	63
The Western Freight Rate Cases.....	64
Premiums for Good Workmanship on New Locomotives.....	65

LETTERS TO THE EDITOR.....	66
----------------------------	----

ILLUSTRATED:

Low Carbon Steels in Open-Hearth Rails.....	74
Double Track Truss Bridge with Suspended Tracks.....	77
Multiple Track Railways in Del., Md., and Dist. of Columbia.....	79
The Single-Phase Railway; Rotterdam, The Hague and Scheveningen	82
The Northern Appalachian Coal Fields.....	89
Steel in Freight Car Construction.....	84

MISCELLANEOUS:

The Electrification of Railways.....	66
Hine Unit System Extended to Union Pacific General Officers.....	69
Railway Telegraph Superintendents.....	69
Costly Government Railways.....	70
Mechanical Transference of Water-Bourne Freight.....	71
The A B C Rules on the Northern Pacific.....	74
The Train Despatchers' Convention.....	76
Loss and Damage Claims—Causes and Remedies.....	79
The Painting of Cement and Concrete Structures.....	81

GENERAL NEWS SECTION.....	91
---------------------------	----

SUPPLY TRADE SECTION.....	106
---------------------------	-----

MANY rumors have been current within the last few weeks of railway enterprises abandoned and vast retrenchments in expenditures made because of political compilations and fear of crop failures. The pictures painted are dark, and have led many to take a gloomy view of the situation. It has been asserted in some quarters that the policy of the railway heads is one of retaliation for recent federal legislation. A great deal of this outcry is unwarranted. Investigation by this paper shows that on a majority of roads the construction and maintenance forces are about the same as in normal years. Many projected enterprises have been postponed and little new work is being started, but such work as reballasting and relining of track are going on about as usual, and the forces commonly employed to maintain roadbed and structures in good condition have not been reduced any more than has seemed absolutely necessary. The railway managers are trustees for their stockholders, and as new legislation is going into effect they are

acting as the prudent business men would act in similar circumstances. The most ardent opponents indicate that there will be large crops. It is a mistake for regret that so much important work has been deferred, but if the crops are good, and a more conservative policy of railway regulation prevails, no serious doubt will rapidly disappear.

WHEN President Mellen received his honorary degree at Yale, a few years ago, it was stated unofficially that he got the honor primarily not so much as a tribute to his powers as a railway officer, but rather as a gifted rhetorician. This year Harvard honors J. Pierpont Morgan not as a great banker and railway promoter, but as a benefactor and patron of art. Outwardly and officially, President J. J. Hill gets his degree from Yale "straight," so to speak—that is, as an upbuilder of a great railway system. But behind his degree, as an *arrière pensée* and reserved thought, is his recent excursion into economic literature and the national problem of bucolic production. The three honorary degrees, taken together as bestowed by our two great eastern universities, suggest a keynote of scholastic policy. It is not enough that a big railway man should master the physical, and upbuild mighty systems of transportation. He must blend with it also an ingredient of "culture" and reach out into esthetics, into ethics, into economics on a national scale, and into the rest of cultured arcana. All this has the true Augustan and Cæsarian smack. Great bankers, now in bud, clerking it in the Street, and embryo railway sovereigns, toting the surveyor's rod, will take notice and inform themselves early of Phidias and Demosthenes and the ultimate value of the fourth dimension. Chancellor Day, of Syracuse, and other exponents of the higher education accused of hunting overmuch the oleaginous dollar will take the lesson to heart when Yale and Harvard tell us that the thought of the ultimate benefaction perishes save as it is allied with mental culture, and that Minerva, not Vulcan, sits at the head of the table in railway directorates. And, incidentally, the Chicago undergraduates' doxology, beginning "Praise John, from whom all blessings flow," must be amended along less secular and more artistic lines.

PRESIDENT TAFT, after an extended conference at Beverly last Friday with Chairman Knapp of the Interstate Commerce Commission, let it be known that the added authority given to the commission by the new law "is not to be used arbitrarily or for the purpose of hindering the railways in the conduct of their legitimate business. The power to suspend new rates is to be used only in exceptional cases. * * * Chairman Knapp declared that there was nothing on the face of things to show that the new rates [recently proposed by the roads] were unjust or unreasonable. The power of suspension will be applied only to rates where a preliminary hearing gives indication that they are excessive. It is not believed that in any case will it be necessary to avail of the full limit of eleven months allowed under the law. * * * Stock manipulators in Wall street, the administration has been informed, were attempting to trade upon the doubts as to what the commission will do and to make the most of the situation to their own advantage. It was never intended that the new law should be a club or that it should be made the means of profit-taking by 'bears' in the market. The commission will not 'run amuck' and will do nothing to jeopardize the interests of investors." These quotations are from a statement evidently framed by the agent of the Associated Press, and are not to be taken as official; but they may be called pretty nearly official, and they will raise a number of queries. The last part of the statement gives evidence of good sense; but how about the "insurgents," who put into the law that clause requiring the railways to prove the reasonableness of every proposed increase in rates? Chairman Knapp has ample facts to warrant him in his assumption that an increase at the present time is reasonable; but the clause referred to would seem to require him to assume that it is unreasonable—and let the railways demolish the assumption if they can. Again, Chairman Knapp is not the whole commission. President Taft, already criticised for telling Con-

On the whole, the opinions in these cases should, it would seem, inspire optimism rather than pessimism about the future of railway regulation and railway development. They have been interpreted in some quarters to indicate that the commission is pretty sure not to allow reasonable advances in freight rates in other parts of the country. This is not a fair view. While most of the rates to the East on the products of the Pacific coast and the western intermountain country are low, the rates both westbound and eastbound into the intermountain territory have been relatively high—some of them exceedingly so. The commission might, therefore, without inconsistency, order reductions in these rates, and at the same time permit advances in the much lower rates of the carriers farther east. That it clearly recognizes the fact that the general tendency of rates may have to be upward rather than downward in future

The new Mann-Elkins act frees the commission from the trammels put on it by decisions of the Supreme Court. It apparently gives it unlimited discretion to determine when a higher rate may be charged for a short than for a long haul. Does the statement quoted signify that the commission, with

is indicated by statements in the opinion by Commissioner Prouty in the Salt Lake Case.

"It is well understood," said Mr. Prouty, "that in recent years there has been a continuous advance in the prices of most materials and equipment used in constructing and operating a railway, that there has been a constant tendency to advance wages, and that all this has tended to increase the cost of operation. Upon the other hand, there has been a steady improvement in the method of handling freight, trains are longer, all are larger and more heavily loaded, grades are easier, the power derived by a given engine is greater; the density of traffic is much greater. All this tends to reduce the expense of transportation. These two sets of forces work in opposite directions and tend to balance one another. From past records, where the net result has been at any time in the past or is today. It is possible that at the outset the economies of operation more than outweighed the increased cost of labor and supplies, but that of late the heavier has been true. . . . It is evident that the total result to be expected from the operation of these conflicting causes cannot be predicted with accuracy. It is perhaps probable that the effect of increased wages and increased cost of supplies will be more seriously felt in the future than it has been in the past."

This fair, accurate, judicious diagnosis of the transportation situation shows that, whatever may be the attitude of the shippers, the commission refuses to turn its back on the conditions confronting the managements of railways, and encourages hope that it will spare no effort to deal fairly with the roads.

PREMIUMS FOR GOOD WORKMANSHIP ON NEW LOCOMOTIVES.

A MOTIVE power officer who has charge of a large equipment, which is being continually augmented by the purchase of new engines in large numbers, said recently that the thing most prominently in his mind at present is the "poor quality of the locomotives we are getting from the builders and their failure to go into regular service without expensive alterations and repairs." This is not a new condition with respect to American locomotives, and it is one which is becoming more serious as locomotives are ordered in larger numbers, and the expense of taking them down and repairing details of large dimensions becomes heavier. The continuous service of these large machines means so much in tonnage hauled and money earned, and on the other hand, the losses are so great when they are laid up for repairs, that a large price can be profitably paid for them to secure good workmanship in their original construction. Locomotives are usually bought in anticipation of a season of heavy traffic, and when they are placed in service there is commonly a period in the midst of the busy season when their weak points are being continually brought out by failures which require them to be laid off for repairs.

The fact that locomotives are built under the inspection of the representative of the railway and accepted by him relieves the builder in a measure of further responsibility. It is well known, however, that this inspection at the works is inadequate, ineffective, and does not secure for the purchaser immunity for the very defects which it is intended to prevent. The average inspector soon succumbs to the charm of the shop superintendent, who finds for him outside attractions which are pleasanter than the grime and clatter of the busy shop. Even if he is most faithful to his duties, where several inspectors are employed at one shop they cannot compass the numerous operations in the various shops which go to make up the complicated mass of details that are finally assembled in a finished locomotive. While this inspection may be useful in a way, it should not relieve the builder from responsibility for the successful performance of the initial mileage of the locomotive in regular heavy service, as it is in this period that most of the defects of construction and materials are usually revealed.

Almost all other large machines, or engines, are purchased under some form of guarantee which includes continuous performance under heavy duty. A driving wheel lathe is bought with a guarantee that it will turn a given number of worn tires in a given time and continue to do this for a definite period. The same is true of axle lathes and boring machines, and the failure of the machine would soon cause it to be thrown back on the hands of the builder. No such thing is ever done with locomotives which break down from numerous failures in their

first work or month's performance, yet it would seem that such an agreement ought to be feasible and practicable. Large pumping engines for city water works are purchased under a guarantee for successful performance under heavy duty, and their economical performance in rendering a given duty for a very low coal consumption is also guaranteed to the purchaser. Large steamships and men-of-war are given a thorough trial at sea before they are accepted, during which their construction and the quality of the materials used are thoroughly tested. Vessels for the navy are bought under contract which includes a bonus to the builder for each knot they exceed a given speed on measured trial trips, and this stress to which both engines and boilers are subjected in order to attain or exceed the specified speed is such as to determine whether the quality of materials and workmanship are good or poor.

This suggests that it ought to be practicable for locomotive builders to guarantee the initial mileage of engines, under regular service during a given period and be responsible for the principal repairs required during that period. For freight engines this might be 2,500 miles, while hauling the tonnage to which the locomotives are adapted, and for passenger engines it might be 5,000 miles, while hauling the tonnage of cars and maintaining the speeds for which they were designed. The ordinary repairs for which the railway is responsible during this period can easily be obtained from records already at hand; the additional expenses due to poor design, poor workmanship or defective materials should be paid by the builder. As an inducement to the builder to improve the quality of his output a premium might be paid for locomotives which perform their initial guaranteed mileage without exceeding the normal cost of repairs, and it might be advisable to pay an extra price for locomotives purchased under the guarantee of mileage. Figures could easily be obtained to show that even if these premiums and extra prices reached a substantial amount, the policy suggested would be economical for the railway, not only because of the saving in repairs, but also because of the larger earnings derived from the use of a locomotive which is able to perform its regular service without frequent shoppings. The carrying out of this policy would involve the presence of more men from the works on the engines during their initial service. They could have general charge of a group of engines and keep a record of their performances and repairs. These representatives of the manufacturers now see that the new engine is properly set up and started out empty or with a light train, but when the serious work of regular service is begun and the engine breaks down under heavy duty their responsibility has ended and they have gone elsewhere. Under the proposed system they would stand by their guns in the heavy stress of severe service and the information gained by the experience should be valuable to their employers, the locomotive builders. The mileage guarantee system would develop a code of rules which would designate the kinds of repairs for which railways are responsible and those for which the builders are responsible and the conditions which determine when either party should pay the bill. The accounts necessary for adjusting these bills could be kept as accurately and honestly by the railways as by the locomotive builders when they repair worn locomotives; and experience in the repair of foreign freight cars under the M. C. B. interchange rules shows that it would be practicable to adjust claims for locomotive repairs at a foreign shop.

An offer from a locomotive company to make a guarantee of initial repairs would be welcomed by the railways and should secure an abundance of orders at profitable prices which would pay the extra expense involved and save money to the railways. The subject in general involves an investigation of the parts of new locomotives which usually fail or cause engine delays during the first month of their service, the cause of such failures and the best remedy. It will be found that many of these defects are common to all types of

locomotives, and for all lines, and that an earnest effort to correct them would result in large savings. We shall be pleased to receive from mechanical officers and locomotive builders opinions relating to the premium system for new locomotives as here proposed and suggestions as to how it could best be worked out.

Letters to the Editor.

DEPRECIATION RESERVES.

June 4, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have carefully read the article of Henry L. Gray and your editorial comment in your issue of May 27 upon the subject of depreciation. Upon the whole, I incline to Mr. Gray's view. I beg to take issue with you upon the point you make that the amount charged to depreciation should fluctuate according to the perhaps arbitrary views of an executive officer in what you term "fat" and "lean" years.

The instrumentalities of railway operation require renewal from (a) failure by usage and (b) failure by decay. As aptly put by Mr. Gray, the function of depreciation is to keep capital alive. Decay is continuous and is a function of time, and therefore should be charged out monthly the same as interest on bonds. It is not permitted to defer interest charges; why should it be permitted to defer depreciation charges? It seems to me that this "fat" and "lean" juggling of depreciation affords a harmful incentive. For instance, a new general manager with an eye single to "making a record" might reduce depreciation charges for a time (if the law would so permit, of course), and make an excellent apparent showing. In the course of time, however, his engines, cars, etc., would require renewal, with insufficient money set aside for their depreciation. While they were wearing out, the surplus in all probability would be "kept within proper bounds" by numerous rate reductions by the various commissions, based upon the *apparent* low cost of operation on account of low depreciation charges made during that period. Additional capital would then be the only hope, and then charges on watered stock, short time notes, etc.

There can hardly be any doubt that the capitalization on many railways would be lower to-day if capital had not been systematically stifled in years past by the failure to make sufficient depreciation charges or any at all. The regular reservation of amounts from earnings for renewals of wornout equipment, rails, etc., is rational, scientific and conservative, and if followed will redound to the benefit of the stockholder, the public and the railway. When depreciation is not charged, the public early receives the benefit of rates that are too low. This frequently breeds a mushroom development, which is later retarded when the weight of increased capitalization must be borne.

GENERAL SUPERINTENDENT.

Baltimore, Md., May 31, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The article by Henry L. Gray on the "Necessity of Depreciation Reserves" in your issue of May 27 contains the startling statement that all new ties placed in the road should be charged to depreciation. It would seem that such a statement implies imperfect apprehension of the difference between depreciation and renewals. A charge for depreciation is to take care of wear and tear which cannot be provided for in any other way; such, for instance, as the gradual wearing thin of a locomotive boiler, of which, by the way, Mr. Mahil might make a special note, having in mind a recent statement of his that locomotives are turned out of shop after thorough repairs as good as new. There is no depreciation of this nature in respect of ties. When a tie is replaced it is replaced in all its parts and the new tie is as good as the old tie ever was.

If a company likes to reserve something for the renewal of and charge new ties put to use against the reserve that is quite another thing.

M. B. WILD.

THE ELECTRIFICATION OF RAILWAYS.*

BY GEORGE WESTINGHOUSE,
President, A. S. M. E.

Believing unreservedly that the increased capacity of a railway and its station, the economies of operation, and other advantages will bring about gradually the systematic electrification of steam railways, my wish is that the progress of the art may not be hampered and such electrification of our main lines delayed or rendered unprofitable by mistakes which experience, judgment and foresight may enable us to avoid. It is my intention in this paper to direct attention to the necessity for the very early selection of a comprehensive electrical system embracing fundamental standards of construction which must be accepted by all railway companies in order to insure a continuance of that interchange of traffic which, through force of circumstances, has become practically universal, to the great advantage of transportation companies and of the public.

The great difficulty in the electrification of standard railways is no longer the engineering problem of developing a locomotive and an electrical system which will operate trains, but it is a broad question of financial and general policy of far-reaching scope, considering the future electrification of railways in general as distinguished from isolated cases of limited extent, and requiring a combination of the highest engineering and commercial skill.

Requirements for Interchange of Traffic.—To insure interchange of traffic the fundamental requirements, so far as operation by steam is concerned, with full regard for safety, speed and comfort, are very few in number, and are covered by the following:

- a A standard gage of track.
- b A standard or interchangeable type of coupling for vehicles.
- c A uniform interchangeable type of brake apparatus.
- d Interchangeable heating apparatus.
- e A uniform system of train signals.

The additional fundamental requirements for electrically operated railways are:

- f A supply of electricity of uniform quality as to voltage and periodicity.
- g Conductors to convey this electricity so uniformly located with reference to the rails that, without change of any kind, an electrically fitted locomotive or car of any company can collect its supply of current when upon the lines of other companies.
- h Uniform apparatus for control of electric supply whereby two or more electrically fitted locomotives or cars from different lines can be operated together from one locomotive or car.

Electrical Systems for Railways.—Three important electrical systems for the operation of railways have been put into practical operation, all using alternating current in whole, or in part. These systems are:

- a The continuous or direct current system, usually spoken of as the "third-rail" system, which employs alternating current for transmitting power when the distance is considerable.
- b The three-phase alternating-current system with two overhead trolley wires.
- c The single-phase, alternating-current, high-tension system with a single overhead trolley wire.

The equipment of the power houses which generate the current is essentially similar in the three systems, but the systems differ in the kind of motors and the auxiliary apparatus for controlling them, and in the methods and apparatus for trans-

* Abstract of a paper to be presented before the joint meeting of the American Society of Mechanical Engineers and the Institution of Mechanical Engineers, Birmingham and London, England, July 25 to 30, 1910. An appendage, giving statistics as to the electrified steam roads and electric roads to trunk line service, will be published in a later issue.

cutting the current from the power house to the locomotive or car.

RAILWAY MOTOR.

Essential requisites in a railway motor are that it shall carry its load and quickly accelerate it to the required speed, and that it shall operate continuously at any desired speed or speeds. Railway conditions make desirable speeds varying from the slowest to the highest schedule speeds for regular operation, both for the movement of freight and passengers, and for making up time. The steam locomotive, which is limited in power by its boiler capacity, is capable of continuous operation at any speed up to the maximum, but the maximum speed in a given case depends both upon the length of the train and the grade of the track. It automatically slows down when ascending a grade, so that the actual horsepower developed does not vary greatly at different speeds. The limitation of the capacity of the electric locomotive is not the power available, as is the case with the steam locomotive, but in the capacity of the motors, and is usually fixed by the heating of their coils. An electric locomotive may safely develop for a short time an output which far exceeds its normal continuous capacity. The power and speed characteristics of electric locomotives, therefore, differ from those of steam locomotives. The three types of electric motors have certain fundamental differences in speed performance which are important factors in determining the advantages, disadvantages and limitations of the several systems.

Direct-Current Motor.—The direct-current series railway motor automatically adjusts its speed in accordance with the load, running more slowly if the weight of the train be greater, or the grade steeper. The speed with a given load, however, is definite; it is dependent upon the voltage applied to the motor and cannot readily be varied. It is true that the speed can be decreased by inserting a resistance in the motor circuit, but this is wasteful and is inadmissible except as a temporary expedient. It is true also that the motors may be connected in series, thus dividing the pressure between two motors, and thereby reducing the speed one-half; or, if among four motors, to one-quarter speed. As the system of current supply involves a fixed voltage, it is obvious that for emergencies no speeds much above the maximum speed determined in the construction of the motor can be obtained. Furthermore, on account of the high cost involved in maintaining a practically constant voltage throughout the system, the voltage supplied to the motors often decreases considerably at the end of long lines, at the time of heavy load, thereby further reducing the speed attainable. It often happens in railway service that a locomotive should be operated somewhat above the normal speed, and sometimes a locomotive designed for freight service has to be pressed into passenger service. In such cases the speed with the direct-current locomotive would be considerably less than that necessary to maintain the schedule speed. A special form of field control can be used in certain cases for varying the speed, although this has so far been utilized to a very limited extent.

Three-Phase Motor.—On the three-phase system the motor is inherently a constant-speed motor; it runs at approximately the same speed at light load and at full load; it runs at nearly the same speed up a grade as on level track, although the horsepower required on the grade may be several times that on the level. Conversely, it can run no faster on a level than it can climb a grade. In order to give a lower speed, however, the motors may be arranged upon the locomotive in pairs in a manner equivalent to the arrangement of two continuous-current motors in series, just described. Motors may also be arranged for two or more speeds, but this involves some complication in windings and connections. In all cases lower speeds can be secured by the introduction of resistances, which increase the losses and lower the efficiency. In no case can the speed in any of the arrangements of motors be appreciably higher at very light load than it is at full load. The motors are of the induction type, without commutators and their inherent limitations, and are of relative simplicity in construction. The current

is usually supplied at 3,000 volts from two overhead lines through two sets of current collectors. With three-phase motors as now constructed and arranged upon locomotives, it is possible with no additional complication so to utilize the motors when locomotives are making trains upon a descending grade that they become generators and return current to the line, a feature of value in certain mountainous districts, but not of controlling importance in the selection of a universal system.

Single-Phase Motor.—The single-phase railway motor is a series motor with speed characteristics very similar to those of the direct-current motor, as the speed at a given voltage is greater or less, depending upon the load. The speed with a given load is also greater or less, depending upon the pressure applied to the motor; and this is not limited, as with direct-current motors, to that supplied by the circuit, and to one-half and one-fourth of that pressure, but is capable of adjustment to any desired degree of refinement by means of auxiliary connections from the secondary winding of the transformer on the locomotive, which is necessary for reducing the line voltage of 11,000 volts to the lower voltage required by the motors. Not only may numerous voltages less than the normal be arranged for lower speeds, but higher voltages can be provided to make possible speeds considerably above the normal. In this simple manner a wide range of efficient speed adjustment is secured which is impossible with other systems.

Like the throttle lever of the steam locomotive, the control lever of the single-phase locomotive may be placed in any one of its numerous notches to maintain the required speed. This facility of efficient operation over a wide range of speed and power requirements is one of the especially valuable features of the single-phase system. This difference, however, may be noted; the ability of the steam locomotive to maintain its speed continuously with heavy loads depends upon the capacity of the boiler; on the other hand, the electric locomotive has an ample supply of energy available, drawn from a large power house, and the limit of its endurance is determined by the safe temperature of the motor.

The question of determination of the frequency for use on single-phase railways is one of very great importance. Twenty-five cycles is in general use for power transmission purposes and has been adopted by nearly all the single-phase railways now operating. The Midi Railway of France has adopted 15 cycles. The lower frequency permits of a marked reduction in the size of a motor for a given output, or, conversely, of a considerable increase in output from a motor of given dimensions and weight. Three-phase installations in nearly all cases employ approximately 15 cycles. The choice of frequency is one of the most involved, difficult and important problems now presented for solution.

Summary.—Locomotives equipped with each of the three types of motors have been in successful operation and have demonstrated their usefulness, capacity and reliability in practical railway service. The three-phase motor, having a definite constant-speed characteristic, is particularly adapted to certain conditions; but, on the other hand, it has a less general adaptability to the ordinary varying conditions of railway operation. The single-phase motor has a facility of voltage control which gives an efficient means of speed adjustment, and is in this particular superior to other systems. The relative weights and costs of the several types of motors, and of the locomotives designed to accommodate them, depend upon so many conditions that comparisons must necessarily be general. It will be found, however, that these differences in locomotive cost are in many cases more than offset by the cost of the other elements in the electrical system. The control apparatus for all types of locomotives has been developed so that it is reliable and convenient in operation.

TRANSMISSION OF POWER FROM POWER HOUSE TO LOCOMOTIVE.

The controlling factor in the cost of electrification in nearly all cases is the system for transmitting power from the power house to the locomotive, and not the locomotive itself. The choice between the several systems must, therefore, be based

upon a comparison of the complete systems. The differences between the methods of transmitting power are of far greater importance than the differences between power houses or between locomotives. The current for all systems is generated in usual practice as high-tension alternating current, for the reason that electric energy can be most economically transmitted by high-tension alternating current, even though it is in some cases converted into direct current.

Direct-Current System.—For the direct-current locomotive the apparatus which intervenes between the alternating-current generator and the locomotive consists of a number of links or elements through which the electric energy must pass, one after the other. These consist of:

- a Raising transformers in groups of three.
- b A transmission line of three wires, sub-stations, which require attendance, containing
- c Transformers in groups of three, and
- d Rotary converters for receiving the alternating current and delivering direct current.
- e A third-rail contact conductor, which for heavy work must often be supplemented by copper feeders.
- f The track return circuit, which must be provided with heavy bonds, and in certain cases supplemented by feeders and so-called negative boosters.

It is necessary to maintain the alinement of the third rail within close limits both in its distance from the track rails and in its elevation above them, as the contact shoe can have only a small range of automatic adjustment.

Three-Phase System.—For the three-phase locomotives the respective links between the generator and the locomotives are:

- a Raising transformers in groups of three.
- b Transmission line of three wires.
- c Substation transformers in groups of three.
- d Two overhead wires as the contact system.
- e A track return which usually requires nothing but inexpensive bonding.

The two overhead trolley wires require a double system of overhead construction, as the wires must be kept separate and well insulated from one another; the two must be maintained at equal height above the track and at switches and cross-overs the construction is complicated.

Single-Phase System.—For single-phase locomotives there is:

- a A raising transformer.
- b A transmission line of two wires and substations widely spaced, each containing
- c A lowering transformer, which supplies
- d A single trolley wire.
- e A track return, usually requiring nothing but inexpensive bonding.

In certain cases where the distance from the power station is not more than 15 or 20 miles, the single-phase trolley can be supplied directly from the power house, so that only one single element, i.e., the trolley wire, intervenes between the generators and the locomotives. The single trolley wire permits a relatively wide range in height, as the pantagraph trolley automatically adjusts itself to the position of the trolley wire. In some cases the wire has a normal height of 22 ft., but is carried under bridges where the limit is 15½ ft.

The three types of railway motors and the three respective systems for conveying power from the generating station to the locomotives have all successfully demonstrated their ability to operate railway trains.

REQUISITES FOR A UNIVERSAL ELECTRIC SYSTEM.

In selecting a proper electrical system for railway operation it will probably be generally conceded that the following elements are of prime importance:

a The electric locomotives should be capable of performing the same kinds of service which the steam locomotives now perform. This will be most readily secured by electric loco-

motives which can practically duplicate the steam locomotives in speed and power characteristics. This includes a wide range of performance, embracing through passenger service at different schedule speeds; local passenger service; through freight service in heavy trains; the handling of local freight by short trains, and a variety of switching, terminal and transfer movements. This naturally calls for wide variation in tractive effort and in speed, both for the operation of different kinds of trains, and also for the operation of the same train under the varying conditions usually incident to railway service.

b The electric locomotive should be capable of exceeding the steam locomotive in its power capacity. It should be able to handle heavier trains and loads, to operate at higher speeds, and in general to exceed the ordinary limits of the steam locomotive in these regards. The readiness with which several electric locomotives can be operated as a single unit enables any amount of power to be applied to a train.

c The electric system should adapt itself to requirements beyond the ordinary limitations of the steam locomotive in small as well as large things. It should be adapted for use on branch lines, and for light passenger and freight service similar to that so profitably conducted by interurban electric roads, which in many cases run parallel to steam roads, not only taking away the traffic of the steam roads, but building up a new and highly profitable traffic, both in passenger and in express service.

d A universal electric system requires that power should be transmitted economically over long distances and supplied to the contact conductor. The system should utilize the most highly perfected apparatus for the electric transmission of energy and its transformation into suitable pressures for use.

e The contact conductor in an ideal system should be economical to construct, both for the heaviest locomotives where the traffic is dense, and for light service on branch lines. It should impose minimum inconvenience to track maintenance; should give minimum probability of disarrangement in case of derailment, or in case of snow and sleet, and should in general be so placed and constructed as to give a maximum assurance of continuity of service.

The use now made of electricity in steam railway service has been brought about, generally speaking, through compulsion. The steam locomotive has reached its limitations and has been found unsuitable and inadequate in tunnels or in terminal service. Even where other considerations may have been controlling, the problem has usually been a specific one of electrifying a relatively small area. The problem has been solved by considering those factors which were of immediate importance, without giving weight to uniformity with other systems or of extension. Now, the natural course of development will be the extension of these limited zones, until after a time they meet. Then there will arise great inconvenience and expense if the systems are unlike. For the present it may be a matter of little moment whether different systems have their contact conductors in the same position, or whether the character of the current used is the same or different.

THE FUTURE OF ELECTRIFICATION OF RAILWAYS.

The complete electrification of a railway will necessitate a rearrangement of ideas and practices in regard to operations. Coaling and watering places will not be needed; passenger trains will be differently composed, some classes being of less weight; and they will operate more frequently, thus promoting travel; other trains will be heavier than at present, or will operate at higher speeds, and branch lines, by the use of electrically fitted cars, can be given a through service not now enjoyed. The movement of freight will undergo great changes, due to the fact that electric locomotives can be constructed with great excess capacity, enabling them to move longer trains at schedule speed on rising gradients. The large percentage of shunting operations due entirely to the use of steam locomotives will no longer be required. The railway companies can combine upon some co-operative plan for the generation of electricity, thereby effect-

ing large savings in capital expenditures, and can utilize their own rights of way for the transmission of the current, not only for the operation of trains but for many other useful purposes. I foresee from the progress made in the development of a gas and oil engine power a still further reduction in cost, which will accelerate the work of electrifying existing railways. One important aspect of this great question will engage thoughtful consideration of every government, namely, the military necessity for uniform railway equipment in time of war.

Were there now only one system to be considered, there would be a concentration of the energy of thousands on the perfecting and simplifying of the apparatus for that system, to the advantage of railway companies and of manufacturers. In conclusion, I can only repeat, and earnestly recommend to the serious consideration of railway engineers and those in authority, the pressing need of determining the system which admits of the largest extension of railway electrification and of a prompt selection of those standards of electrification which will render possible a complete interchange of traffic in order to save expense in the future and to avoid difficulties and delays certain to arise unless some common understanding is arrived at very shortly.

HINE UNIT SYSTEM EXTENDED TO UNION PACIFIC GENERAL OFFICES.

The Hine unit system of organization has been extended to the general offices of the Union Pacific at Omaha, Neb. A circular issued by A. L. Mohler, vice-president and general manager, and approved by J. Kruttschnitt, director of maintenance and operation, under date of July 1, announced the appointment of the following assistant general managers: 1, Charles Ware, formerly general superintendent; 2, C. E. Fuller, formerly superintendent of motive power and machinery; 3, R. L. Huntley, formerly chief engineer; 4, W. D. Lincoln, formerly superintendent of transportation; 5, T. M. Orr, formerly assistant to the general manager. The circular says:

"Each of the above-named officials continues charged with the responsibilities heretofore devolving upon him, and in addition assumes such other duties as may from time to time be assigned. The titles general superintendent, superintendent of motive power and machinery, chief engineer and superintendent of transportation will be retained by the present holders or their successors to such extent only as may be necessary for a proper compliance with laws and existing contracts."

The system as adopted in the general offices will be similar to that already adopted on all but two divisions of the Union Pacific, the Wyoming and the Utah. The Hine system and its purposes were quite fully outlined in an editorial in the *Railway Age Gazette* of January 22, 1909, p. 150, when its initial installation was made on the Nebraska division of the Union Pacific. Major Charles Hine, its originator, subsequently read a paper on the subject before the Western Railway Club, which was published in the *Railway Age Gazette* of January 21, 1910, p. 134. Those interested in the subject will be able to get a pretty clear idea of both the letter and the spirit of this system by reading these articles.

When it was adopted on the Nebraska division it was regarded by the management as an experiment. It has worked out so satisfactorily that, as already mentioned, it has been extended to all divisions except two, and will be extended to them as soon as details can be arranged. It has also been extended to most of the divisions of the other Harriman lines. Its adoption in the general offices of the Union Pacific indicates that it has become the fixed policy of this road. It should, perhaps, be added that it cannot be carried out in quite all of its details in the Omaha general offices at present, as the office of Mr. Fuller is now at the Omaha shops, and will probably remain there until the new Union Pacific office building which is being erected at Omaha is finished. The general manager and the assistant general managers will then have their offices together, as the superintendent and the various assistant super-

intendents of each division now have their offices together. It will be noted that the general officers who have been made assistant general managers, like the divisional officers who have been made assistant superintendents, continue charged with the duties of the offices they previously held—those of the engineering and motive power and transportation departments—and at the same time have authority over all departments.

With this extension of the unit system on a road such as the Union Pacific, which is not divided into districts, there will be but four grades of operating officers, namely: General manager, assistant general managers, superintendent and assistant superintendents. When the system is perfected on roads such as the Harriman lines in Louisiana and Texas, which are divided into districts, there will be on those lines six grades of operating officers, namely: General manager, assistant general managers, general superintendent, assistant general superintendents, superintendent and assistant superintendents. It is understood that the system, which is already in satisfactory operation in the general offices of the Oregon & Washington at Seattle, will shortly be extended to other general offices of the Harriman lines.

That the unit system is the best operating organization the managements of the Harriman lines are pretty thoroughly convinced, after having given it more than a year's trial. Officers of numerous roads have visited these lines to study its workings; some "who came to scoff remained to pray"; that is, they started their inquiry with an impression of the system formed from reading the necessarily skeleton-like outlines of it which have been published and got a very different impression of it when they came in contact with the *spirit* in which it is being carried out. Like any other organization, the way it works depends more on the unwritten than on the written law. It is an interesting development of railway organization which will be studied by the officers of other roads with even more interest, now that it has been extended to the general offices, than it has been in the past.

RAILWAY TELEGRAPH SUPERINTENDENTS.

The twenty-ninth annual convention of the Association of Railway Telegraph Superintendents was held at Los Angeles, Cal., June 20-25. It was largely attended, and most of the leading railways of the country were represented. I. T. Dyer, superintendent of telegraph of the San Pedro, Los Angeles & Salt Lake and vice-president of the association, called the meeting to order, and Joseph Scott, president of the Los Angeles Chamber of Commerce, extended the freedom of the city to the visitors. F. H. Van Etten, of Chicago, in the absence of Secretary P. W. Drew, was elected secretary pro tem.

On account of the resignation of J. L. Davis, president of the association, some two months ago when he severed his relations with the railway telegraph service, George A. Cellar, of Pittsburgh, and John B. Sheldon, of Omaha, were added to the executive committee. There are now 116 active and 63 associate members in the association, making a total of 179.

On Tuesday E. P. Griffith, for the committee appointed in March, reported on a system for delivering messages to passengers on trains. The committee conferred with A. G. Saylor, general superintendent of the Western Union Telegraph Company, and M. M. Davies, electrical engineer of the Postal Telegraph Company. It was found that the methods of making deliveries to passengers on trains varied considerably, and that a large percentage of the telegrams of that character failed of delivery. In 1905 the Pennsylvania Lines, west of Pittsburgh, issued a general order instructing agents, conductors and employees generally to co-operate to make deliveries. If railways will do no more than adopt the Pennsylvania Lines' order great progress will be made; but this association may go further in the matter, by recommending to the General Passenger Agents' Association, to instruct agents to aid the telegraph company's messenger to reach the conductor and instruct the conductor to receipt for

messages addressed to his train, or in his care. In case the conductor be unable to find the addressee on his train, he can note on the envelope "Unable to find addressee," etc., and return it to the agent of the station where the message was delivered. The telegraph company's receiving office should place full address on the envelope as a guide to the conductors in returning undelivered message to the proper station. The old method of having the telegraph company's messenger page the trains, while stopping at a station, is unreliable. At stations where a stop of five minutes or more is scheduled passengers take advantage of the stop to exercise themselves on the platform, while the messenger is passing through the train.

The Pennsylvania order referred to says that the messenger should be permitted to pass through the train if the stop be of sufficient duration; but direct delivery to the conductor of the train eliminates the danger to the messenger and releases the railway company from liability of injury to such messenger. A committee of five was appointed to formulate a plan. This committee consists of E. P. Griffith, C. L. Lewis, W. J. Camp, William Bennett and J. C. Johnson.

After an inspection of the exhibits, M. E. Launbrauch read a paper on "protecting telephone lines from lightning and other disturbances."

On Wednesday morning the meeting listened to a paper on "Education for Efficiency in Railroad Service," by D. C. Buell, describing the educational department of the Union Pacific. F. D. Mackay, manager of the Southern Pacific school of shorthand and telegraph operating, said that the school received the co-operation of the S. P. Out of 347 examinations for efficiency to accept positions since the school was established 300 were accepted and 47 rejected. Over 100 graduates of the telegraph department have been employed by the Southern Pacific. A paper on "Wireless Telegraph as Applied to Railroad Lines" was read by Dr. Lee De Forest. The first experiments on moving trains were made on the Chicago & Alton in 1905. Last year the Fred Thompson Theatrical Special "Via Wireless" train from New York to Chicago was equipped with a telegraph transmitter and several trackside wireless stations installed for the purpose of keeping in touch with this train throughout its journey. These tests, it is understood, were successful. Dr. De Forest said that the wireless waves acted strongly only on special detectors, like the crystal silicon, the "audion" and the like. If necessary choke coils, without iron cores, can be inserted in the wires outside of stations to effectually prevent the electric waves from entering the wire telephone and telegraph instruments.

Further notice of Dr. De Forest's paper, as well as those of Messrs. Launbrauch and Buell, must be deferred to a future issue.

Mr. Griffith, superintendent of telegraph of the Erie, calling attention to the report that the first railway station at Turner, N. Y., has been or is soon to be demolished, and, quoting from the history of the Erie Railroad, the statement that the first telegraphic train order ever sent was despatched from that station by Charles Minot in the autumn of 1851, offered a resolution that the telegraph superintendents, in conjunction with the *Electric Telegraph and Historical Association*, appoint a joint committee to raise a fund to erect a suitable monument at Turner to commemorate that event. The resolution was adopted and a committee of five was appointed to take charge of the matter, namely: E. P. Griffith, of New York; Charles Selden, of Baltimore; W. J. Camp, of Montreal; E. A. Cheney, of St. Louis; and I. B. Fitchell, of New York.

W. F. Williams, superintendent of telegraph of the Seaboard Air Line, gave an account of his successful experience during the past four years in block signaling by telephone on a single track line which has been up 40 years. The wire is "composited" and it is still used for long-distance telegraphing. No station has occasion to telephone a long distance and all block-signaling operations are carried on without telephoning through any telegraph relay. These operations extend over 154 miles of line.

On Thursday evening, after a delightful trip over the kite-shaped track of the Santa Fe, which consumed the entire day, the meeting discussed high tension crossings. William Bennett, speaking for the chairman of the committee, outlined the position of the association and explained the proposed specifications for a safe crossing. Among those taking part in the discussion were: Messrs. Camp, Gilkysen, Davis, De Forest and Groce.

Boston, Mass., was selected as the place for the next meeting and the date will be June 19-23, 1911. The following officers were elected for the ensuing year: President, I. T. Dyer, Los Angeles; first vice-president, John B. Sheldon, Omaha; second vice-president, William Bennett, Chicago; secretary and treasurer, P. W. Drew, Chicago.

During the three days that the members of the association were in Los Angeles their spare time was completely filled up with tours and excursions, and the ladies were entertained with automobile rides. Among the hosts were the Los Angeles Pacific Railway, the Pacific Electric Railway, the Atchison, Topeka & Santa Fe and the San Pedro, Los Angeles & Salt Lake. After the ride on a special train on the San Pedro line, a trip was made by the steamer Cabrillo to Catalina Island.

COSTLY GOVERNMENT RAILWAYS.

Count Witte, formerly Prime Minister of Russia, but who first distinguished himself as a railway man, has recently lectured before the Russian Institute of Transportation Engineers on the cause of the deficits of the Russian railways. It was Witte himself who, shortly after the last war with Turkey, converted a large part of the corporation railways into the state system. This, he says, was unavoidable. The Russian lines had wholly failed when the army was to be mobilized. It must be remembered that interest on the capital of these lines was guaranteed by the state, and in 1886 these guarantees on the comparatively small mileage then existing, cost the state about \$32,000,000. When the lines came into the hands of the state the deficits were rapidly reduced, becoming only \$2,000,000 in 1894, and then for five years disappearing entirely. But beginning with 1900 there was again a deficit of \$1,300,000, and this has increased with frightful rapidity, and in 1907 reached \$60,000,000, an average of about \$1,500 per mile of road.

The cause of this has been, so Witte says, the construction of new lines not for economic, but for strategic purposes while even so they failed the strategic purposes for which they were planned. If the army could have been moved to the east of Lake Baikal twice as quickly the result of the war with Japan probably would have been different, and that war cost \$1,500,000,000, which is two-thirds of the cost of the whole state railway system. On the western border also lines have been located especially with reference to assembling the army on that frontier, and the result is, that the army can be massed there *two weeks after* the countries on that side would have massed their armies there, with results easy to imagine. The latest and worst of these strategic lines, he says, is the railway down the Amoor, which is sure to increase the deficit for years to come.

Again, the efforts of the authorities have aimed rather at improving transportation than at making it profitable; and, especially, rates were established on a uniform scale for the whole of the vast empire, and so low as to be profitable only where traffic is heavy; and when attempts have been made to make them more profitable, this has again been done by a general advance, which in some cases tends to destroy traffic.

On the Prussian-Hessian state railways there are now 1,100 miles operated with electric accumulator cars and this will shortly be increased to about 1,550 miles, with a total of 100 cars. These cars are capable of running 60 miles without being recharged and at a speed of 30 miles per hour. The batteries consist of 168 elements weighing 49 lbs. each.

MECHANICAL TRANSFERENCE OF WATER BORNE FREIGHT.

BY H. M. L. HARDING,
Consulting Engineer, New York.

Before adapting machinery to the handling of water borne package or miscellaneous cargo freight, it is essential to understand all the details of the methods now employed at steamship terminals. Knowing these, we can comprehend what would be the requirements to be fulfilled by any mechanical appliances which could successfully replace man's muscle and the ancient hand truck. Not thoroughly realizing, from the pier superintendent's standpoint, the work to be done, may be the reason that more modifications have not been made. The local superintendent must have certainty and a positive sureness of freight movements, and an ample reserve capacity for any unexpected rush of freight. For the above operation he is responsible, more so than for electrical and mechanical devices. This is his position and this should be kept in view.

It is difficult to understand why so little information and so few descriptions have been given as to the everyday working movements in handling cargo freight upon piers and bulkheads. It is more complex than it appears. The assorting and distribution without errors require no little care and supervision. From the great carriers, with their enormous capacity, pours forth such a flood of merchandise that the floors of the larger piers will scarcely hold it. Larger vessels are being built and more frequent trips are made, which call for a quicker clearing of the floors than ever before. This means intensity of service.

There is a marked difference in operation in handling railway and steamship freight, but as most railway companies control steamship lines, any improvement in water terminals should be of equal interest to them.

There are two important reasons for changing from the two-wheeled truck and man power to machinery. These are: Congestion, lack of capacity—that is, crowded floor space—and the increasing expense per ton handled. These causes are interrelated; congestion reduces the efficiency and so augments the expense.

If the tonnage of freight to be handled in a certain time falls below a certain figure, the expense per ton handled increases. If the tonnage rises above another fixed higher figure, the cost again rises. The former cause is due to the fixed charges; the latter to congestion, strikes and the difficulties due to man-labor. The above rule, however, does not apply when the machine takes the place of man.

The cost of handling freight at water terminals has increased because of rise in the cost of labor, greater rent, the larger investment for piers and sheds, etc. Another cause, not so well understood, is due to the larger number of marks and cross-marks, which add to the length of the truck travel. On some piers in New York more than 4,000 tons of coastwise freight are cared for every 24 hours of the day, except Sunday; that is, averaging 2,900 inward and 2,000 outward on the same pier.

A liner's manifest, to a greater degree than those of other ships, has many curious hieroglyphics called marks and cross-marks, designating the different consignees. A large tonnage of freight in one shipment is imported under one chief mark, name or figure upon the packages or cases. The importer using this chief mark may be a wholesale merchant. This consignment before shipment may have been sold to smaller dealers, or the smaller dealers may have combined under one main mark.

The ordinary way would be for the wholesaler to cart the goods to his warehouse and there assort for the retailers. Instead of this method, on many cases there are sub or cross-marks, indicating the small dealers, and the steamship company assort the consignment according to the cross-marks in

separate piles on the pier floor ready for the draymen. There are often several thousand marks and cross-marks in one steamship cargo, and by the law of some states there must be a separate pile for each. These separate piles require greater floor space, hence larger piers and much longer truck travel. The number of marks and cross-marks seems to be increasing, especially raw material, at its place of origin, is converted into manufactured products.

While the liner has many hatches for receiving and delivering cargoes, the coastwise steamship and river boats have side ports as well as hatches. This condition must be considered.

A large consignment is often tiered by manual labor, but if it piles above 5 or 6 ft. in height, it is more expensive than long trucking. On account of limited floor space, tiering, though so expensive, is often necessary.

Some pier sheds are now 800 and 1,000 or more feet long and 150 ft. wide. It is a customary sight, as soon as the steamship is unloaded, to see the whole floor covered with piles of this cross-mark freight, leaving a little space for ingress and egress of drays. On account of the method of loading at foreign ports, the different consignments being stowed together, there may be several cross-marks coming from the hold in one sling load.

The following description will now help to make plain the system of transferring by hand truck:

For unloading miscellaneous freight, stationary platforms are usually placed at the entrances of the pier doors, partly within them and partly without, and on these is swung the cargo freight, whether miscellaneous boxes, barrels, packages of every kind, bags of coffee, sugar or similar material. At some piers the freight is unloaded from the ships on the floor, but the platform is better, as it saves lifting. This miscellaneous cargo freight, as soon as the slings or nets are loosened from the hoisting rope hooks, is pulled over the platform on one or more hand trucks, which are backed up to the platforms. The packages are arranged with the manifest marks or cross-marks uppermost, for delivery to sections of the pier designated by letters or numbers. A copy of the manifest is given to the pier superintendent and he arranges these sections on the pier floor according to the manifest.

As soon as the truckman receives a load from the platform he starts off, being directed according to the marks, to the section designated on the pier floor or wall. At various intervals men are stationed to show these hand truckmen where to go. If the hand truckman has, say, four packages, and these are all for one consignee, he has only one place to which to truck. But the packages may be for four different consignees. One consignee might be 400 ft. to the left of the door and another consignee 400 ft. to the right.

The hand truckman does not generally depend upon his own intelligence to find the right floor section, but on the platform man and the men on the floor, who may be called routing or direction men. A man is at each pile to receive the load from the truckmen and to check against any mistakes. If there is any tiering, there are two or even four men at each pile to lift the load from the truck to the pile. The truckman rarely tiers. The assorting is in reality done at the different consignees' sections. The truckman therefore takes a number of packages, unless too heavy, and delivers them one or more at the different places.

To illustrate the number of men employed in one movement, for one consignee, the following is from actual observation: Six medium sized boxes containing mineral water were swung by the ship's winch over the vessel's side to the pier floor, where it was received by three men. As soon as the truckman appeared he wheeled his truck to the door and waited. One man unloosed the sling, the other two men lifted one box at a time and placed it on the truck. As soon as three boxes were loaded the truckman started towards the end of the pier. At the first turn a man directed him, 200

ft. further another man hurried him along and several more assisted him, expending 800 or more foot-pounds of energy in the vigorous, virile language of the longshoremen. When the truckman arrived at the proper pile, 600 ft. away, he backed up his truck, two men on the floor raised one box at a time from the truck to two other men a little higher, who passed it to two others, who finally placed it on the top of the pile 8 ft. high. The same process was repeated for the other two boxes. Another truckman with three more boxes was awaiting his turn. Eleven or twelve men expended muscular or verbal energy in the movement of these three boxes.

As the truckman, including loading and unloading, even when moving fast, will not average over 125 ft. a minute, during the whole day from morning to night, it will seem how long a time it may take to deliver a few packages and the necessity for the employment of many men.

The chief reason why packages with different cross-marks are so often placed on the same hand truck is because of the loss of labor-time if the men waited for a full load for one consignee. Another is the limited space for the men and the trucks about the platforms. This class of labor generally receives 30 cents an hour for day and 45 cents for night labor.

Even as it is, owing to the irregular way in which the same cross-marks come from the ship's hold and to the location of the different consignees upon the pier floor, it often happens that at one time there is a long line of truckmen waiting at a platform and at another time the platform is full of packages waiting for the truckmen; this holds back the vessel's hoisting machinery and the men unloading in the hold of the vessel, as well as the deckmen. More packages cannot be placed on this platform until space is provided by the removal of the merchandise already there.

Owing to the necessity for speed, on some piers hundreds of longshoremen are employed and often 20 or 30 are waiting in line at one platform. The trucks with the men occupy much valuable space upon the pier floor, not only about the unloading platform, but for coming from and going to the platform.

The outward manifest from the United States is much the same as the inward, except there is not the variety of packages. These packages are brought from the consignors by drays or by barges and lighters, and, as far as possible, are piled on the piers in some order. There is not, however, the same necessity of keeping them separated. Should the vessel be alongside the pier, lighterage freight is often loaded directly from the lighter to the ship.

This outgoing freight is, however, measured as received, and later trucked to the nearest loading door, placed in nets or slings and hoisted over the ship's side into the hold. Ordinary outbound freight is not weighed, but measured, 40 cu. ft. being equal to a ton. Heavy material, such as metals, are weighed, except where it is transfer freight from other lines or where the weights are well known.

There are many types of electric overhead conveyors which can hoist and convey steamship freight of every kind, size and weight from any place on the pier and place it at any other place without rehandling. By the electric overhead traveling cranes seen in every machine shop this can be done slowly with a very limited degree of efficiency. These shop cranes are not adapted to the quick movements of the many cargo packages, which should follow each other so quickly as to be almost continuous.

In English and German ports, wherever freight is to be handled, even though the tonnage is small, there are elevated gantry cranes, as at Hamburg and Liverpool, or the roof cranes at Bristol, or even a traveling crane at the smaller towns. These cranes are everywhere in evidence, from the thousand cranes at or near Hamburg to one crane at a small port of call. France has floating cranes; Rotterdam has barges equipped with hoisting machinery.

These pigmatory cranes do only part of the work. Their

range of movement with load is not over 100 ft., of which 50 ft. is inside the pier line, and though they can cover the nearby cars and platforms they cannot serve the length and breadth of the large warehouses to the rear of the platforms, which at most American ports is the chief labor expense.

Telpherage has been used most successfully in hoisting and conveying raw and manufactured material, as well as miscellaneous freight of every kind, weight and size, and for serving even remote space, without rehandling, when it is directly beneath the overhead tracks. There are at least 50 manufacturers of telfers in Europe, and overhead electric travelers, transporters or telfers are in use in most of the important industrial works, handling almost every kind of freight which later makes up the steamship's cargo. This is not only conveyed about the works, but is transferred between the different stories or between the upper stories and the ground.

Any objections by transportation companies to extending the range of mechanical conveying so as to serve every square foot of space of the pier shed or warehouse has been due to not knowing or comprehending what advances have been made in terminal transportation during the last few years. They consist not in the development of new machinery but in a combination of the shop crane, to which are attached movable tracks, with fixed tracks, switches and loops and the overhead electric conveyors or telfers. These form parts of the most advanced system.

Among the questions which naturally arise in the mind of the practical operating pier superintendent are:

The first and always the question, Can machinery do the work of the hand truck? Can man power be replaced by electricity? Can the inbound freight be assorted, distributed and placed anywhere, without rehandling, on any and every square foot of the pier shed and tiered in high piles for each consignee according to the marks and cross-marks? Can the cargo be moved by machinery away from the doors of the pier sheds as fast as it swung over the side of a liner equipped with the most rapid hoisting machinery for unloading, such as winches, hydraulic and steam hoists? Can there be achieved a greater rapidity and efficiency in all freight movements to the most remote portions of the pier sheds? Can provision be made for the yearly increase of freight without new installations? Can there be a transference of the freight equally well in both directions without interference and rehandling, including the movement of both the outbound and inbound freight? If desired, can mechanical devices with extended movable and adjustable loop tracks take freight directly from the liner's hold, from the side port of the coastwise and river steamers, from floats, barges and lighters, to and from any portion of the pier?

As previously stated, the whole tenor of the questions of the pier superintendent is not the engineering details of the design and construction of the machinery, but positive quick operation, which must not only be able to duplicate exactly existing methods, but give greater capacity in the same pier shed and also freedom from mistakes in assorting.

Let us now compare the hand-truck methods with the mechanical, step by step, in each detail of operation; first with special reference to the unloading of the ocean liner. The freight is swung from the vessel, either to the floor or to a platform, in the same manner as when hand trucks are used. This platform, which is movable, is placed a short distance above the floor, inclined and depressed slightly towards the inner side so that the inward freight can be moved with the least resistance. It has a width of 3 or 4 ft. and can be made rectangular or circular, preferably the latter.

The object of this platform is for the quick assorting for the different piles. When the freight has been deposited on this platform it can be separated and pulled on flatboards, slings or nets, which are placed on the floor near the inside edge of this platform. These flatboards are only 2 or 3 in. thick, so that they can be placed upon one another, as many as three or four in one pile. Instead of these flatboards, rope canvas slings or nets can be similarly placed.

When there is one large case, or a number of boxes or pack-

ages known to be for one consignee, it will not be necessary for these to be placed on the platform or floor, but the beam of the overhead electric carrier hoist can be inserted in the ship's sling and the load conveyed directly by the overhead carrier, after releasing the ship's hook. This transferring of hooks is common practice in the loading and unloading cargo freight. The slings or nets may have two small rope loops to facilitate quick changes. Any pier superintendent will appreciate the great advantage of changing hooks and, without any rehandling or even touching the packages, conveying the load in the original net or sling to any portion of the pier and depositing it, this conveying being done at a speed of 700 to 1,000 ft. per minute. And in addition, provision, as above, has been made for assorting and distributing other sling loads according to the different cross-marks.

For the transference of cargo, to and from the ship in connection with the mechanism, there are employed slings, nets, flatboards, nets with flatboards or boxes in them, and flatboards with a few inches of side boards and their nets attached to the sides or ends. The side and end nets thus attached are to prevent smaller packages from falling out. A sling consists of a closed loop of manila or wire rope. It is single or double. In some cases it is of two or more single ropes with rings at the ends. Often two separate loops are joined together. By releasing one end of the loop the load is released. These slings are inexpensive. A canvas sling consists of strong canvas sewed around the middle of each sling rope. Nets are made of manila or wire rope, of chain or of a combination of rope and chain. The bridle is often of manila rope for ease of handling, while the center may be of chain. There are four, six or eight lifting ropes suspending the nets. By releasing half of these from the hook the load is as easily dumped as with slings.

Suppose that there are, in the sling, packages with six or more cross-marks. There would be eight or more slings, nets or flatboards arranged about the platform. As soon as the loaded ship's sling is lowered to the platform and loosed, one or several packages are drawn upon each flatboard or sling. If there is no likelihood of other packages coming immediately for the same consignees, the loads are hoisted and conveyed to the sections of the floor which are marked for these consignees. It should be noticed that the movement is vertical and not along the floor, as with the hand truck, so no floor space is used in the conveying movement.

If desired, when assorting, each flatboard can be held for a full load if there is a possibility that the following slings may contain additional packages for any of the same consignees whose flatboards are partially loaded. It is, however, not necessary to hold any slings or flatboards for greater loads, as most of the movement is automatic. The load is raised and started by the door man or telfer man closing a switch.

The door or side wall of the pier shed is marked with letters or numbers for each consignee. As soon as a flatboard has a full or even a partial load as above, the marks being known and designated, it is carried by the overhead electric carrier to the proper lettered or numbered section of the pier, as at present by the hand truck. A number of two-wheeled electric carriers, having electric hoists suspended from them, are placed above the edge of each platform on the elevated conveying track, just beneath the cross girders of the pier-shed. As soon as a flatboard is ready, it is raised and carried around the circuit and each load left at its proper place. A combination of automatic or non-automatic telfers will in most cases be the most efficient. The greater portion of the cargo will often consist of many tons in each consignment. These will be piled together. The slings and flatboards can therefore transport full loads weighing many times the capacity of man power and move over the floor at a much faster speed.

As soon as the carrier, marked by a plainly visible number or letter attached to the carrier, arrives at the corresponding floor section, the load is lowered upon the floor or pile, being

tiered. Tiering costs no more than placing on the floor. The lowering and unloading is done either by the telfer man or by a man upon the floor who has charge of that section of the pier.

When the freight is tiered on the pier from barges before the arrival of the steamer and must be again moved in loading the steamer, it is often advisable to leave the slings or flatboards in the pile so that the load can be raised as it is, without any rehandling. As freight can be raised or lowered over every square foot of space upon the pier, the overhead hoist would enable loads to be taken to and from drays standing on any portion of the pier floor and moved to any other; in fact, drays could be unloaded outside in front of the pier and the loads carried into the shed or even to the ship's winch or to the hold itself as soon as measured. This would prevent the congestion of many teams upon the pier waiting to be unloaded or loaded.

It can now be seen whether the superintendent's questions have been answered. By overhead conveyor hoists or telfers, loads of every description, weight and size are being moved daily with the greatest rapidity and certainty. These conveyors can raise and convey a loaded hand-truck as well as a flatboard, sling or net. By means of the movable cross track every square foot of pier floor space can be served. These movable cross tracks with switches eliminate the labor of rehandling, and duplicate the movement of the hand-truck, serving all parts of the pier. These telfers can follow each other so closely that the service is almost continuous. The further mechanical details are described in other papers. The description of the way the cargo is received, conveyed and tiered shows that machinery can be adapted to any of the described branches of this transportation problem.

Machinery will travel six times as fast as man, and easily carry eight or more times the load. The many electric carriers, therefore, will move the loads at such a speed from the pier doors that more rapid methods of unloading from the hold and swinging over the ship's side than at present will soon be necessary. The most remote portions of the pier can be served inexpensively, due to the quick action of the electric conveyors. Reserve conveyors and hoists are provided for a rush of freight.

Many superintendents seem to prefer the ships' winches and hoists. On this account special attention has been given to the work in the pier shed. The loads, however, can be hoisted from the deck-hatches, from side ports or lighters and conveyed equally well and as directly as on the pier. The assorting would be on elevated platforms. It is only necessary to extend straight tracks or loops out over the water upon which the electric telfers can travel. The loops or tracks have both a horizontal and vertical movement to serve all the hatches and to avoid interference with the vessel's rigging. The extended tracks can support a temporary roof to protect the cargo from the elements. The rise and fall of the tide does not interfere with the operation of overhead conveying, it only causing a few feet more or less of hoisting.

Where the unloading is from the side ports of coastwise steamers or river boats, it is not necessary for the load to be first placed upon the pier before hoisting, but it is raised directly from the side of the ports. The assorting would not in this case be done at the pier doors, but at convenient locations away from the doors, thus facilitating the transfer. The slings or flatboards would be loaded from all four sides of this space, giving freer movement than at the pier doors. Barge freight can be unloaded and conveyed directly to the steamship or tiered on the pier with slings left around the loads, so that later the load can be taken to the steamship without any rehandling. The same facility can be observed in the reverse movement to the barges or lighters from the steamship or pier.

In providing for the yearly increase of this miscellaneous

freight, it is only necessary to provide more electric carrier hoists, no changes being necessary in the first installation, equipment or tracks. All movements are in the same direction as the hands of a watch, therefore there can be no interference in the movements of the carriers, whether handling the inward or outward cargoes; nor would there be any interference with present methods, either in installation or operation. In fact, the old and new methods could go on simultaneously.

It is of the greatest importance in designing new piers, pier sheds or warehouses to consider the future installation of mechanical appliances, even though it be not the intention to use machinery at the outset. If provision be made in the design itself for machinery, it will cost less for installation, and the buildings will be better adapted for operation. If the overhead trackage be placed in position at the same time the steel structure is erected, it will cost less than later.

While the outward foreign freight is measured, much of the inward must be weighed on account of custom duties. The weight of all outward coastwise freight must be known to determine the transportation charges. Provision is made for the quick weighing of each when the carrier passes over a section of the overhead track which is connected with scales.

The total cost of an installation, when recommended, should show a net saving on the investment of at least 25 per cent. per year. This is after deducting interest, maintenance and amortization. Finally, these are the principles upon which this success depends: The electric hoist eliminates the great expense and difficulty of vertical movements; the electric conveyor annihilates time and excessive cost in horizontal traveling; these two combined form the telfer, enabling long lines to be covered; the movable cross tracks and connecting switches enable areas as well as lines to be equally well served. These tracks and machinery, being all overhead, occupy space not now available.

THE A B C RULES ON THE NORTHERN PACIFIC.

At the convention of the Train Despatchers' Association in Spokane, June 22, Alfred Beamer, originator of the A B C rules for train despatching, gave an account of his experience in the operation of these rules. Prefacing his remarks by observing that the rules were the outcome of the lessons which he had learned in an experience of thirty years in the operating department, and the conviction that the ordinary train despatching rules are wrong in principle, Mr. Beamer said:

It is easy for a superintendent to ask Conductor Jones why he did not protect his train by flagging as per rule 99, but it is hard for Jones, who is trying to save as much of his job as he can, to tell the superintendent that if he complied literally with rule 99 in every instance he would not get his train over the road in a week; but the superintendent knows it, just the same; and he knows further that the matter of taking chances on the flagging rule is of hourly occurrence. But the rule, like other rules, proves that the company has done its duty in showing the men what should be done under certain conditions and that the men, not the company, is at fault. But is this a fact? Is it not true that our rules are simply a record of accidents that have happened?

If it is true that when a situation of an accident develops a condition not provided for in the book of rules, we adopt the line of least resistance and immediately insert therein a rule that will cover such condition, thereby throwing the responsibility upon the men and not the company, we are justified in our conclusion.

Is it not better to recognize our responsibilities and the conclusion that the bulk of blame is the conclusion I get at wrong? Instead of contenting ourselves with shifting the burden, why not assume it by trying to formulate a method that will not be so exacting? It can and has been done on 700 miles of the main line of the Northern Pacific, where the A B C system of operation has been in effect nearly two years. On the

speaker's division the wrecker has not been out to clear either a head or rear end collision in that length of time, a record seldom made with 188 miles of single track, carrying from twenty to thirty trains in both directions daily.

Much of the success that has attended its introduction is due to the attitude of the men toward it. With very few exceptions they view it as a great assistance in doing their work, simplifying the train movement and relieving train and engine men of nearly all of the burdensome rules and orders under which they formerly worked, simplifying the work of the operator and confining it to the two blocks, one on either side of him; and, last and best, making the train despatcher all that the name implies; a train despatcher in reality, with complete control of the movement of every train on his district, unhampered by rules conferring right by class and direction, time card rights and all the special rules heretofore thought necessary for the movement of business, many of them possible of wrongful interpretation. The despatcher has a modern arrangement of train slips for use in recording the movement of trains, and the cumbersome train sheet and train order books, are done away with. It is possible for despatchers to make a transfer from one to the other simply by noting the time the transfer is made. That the employees generally appreciate the changed conditions under this system was recently evidenced when delegates from the Brotherhood of Locomotive Engineers in A B C territory were instructed to bring the matter before the annual convention of that body at Detroit, Mich., this month. After explaining the operation of the system they urged the members to work for its extension on other lines. When the men on the locomotive, who have more at stake than any other person concerned in train operation, take such action voluntarily it certainly must mean that in their opinion at least it is an improvement over the old method. The delegates did as they were instructed and presented the subject to the Grand Lodge of the Brotherhood of Locomotive Engineers; and the Grand Lodge appointed a committee to investigate the matter and review the testimony given in behalf of the system by the delegates. Following this action the convention unanimously indorsed the system and made it a matter of record in its proceedings.

LOW CARBON STREAKS IN OPEN HEARTH RAILS.*

BY M. H. WICKHORST,†

During 1908 and 1909, the Chicago, Burlington & Quincy obtained some open hearth rails which developed a peculiar kind of failure, the study of which proved very interesting. The nature of the failure caused considerable alarm at first, but the remedy was easily applied after the cause was determined. The failures consisted of the rails splitting through the head in various directions, through the web vertically or diagonally, vertically from the head to the base, and in other ways. As part of the investigation, the rails were examined by cutting sections from the defective portions, polishing highly and etching with picric acid solution in alcohol. The picric acid does not color the ferrite, or carbonless part of the steel structure, but the carbon bearing part of the steel is colored somewhat, in proportion to the content of carbon. Streaks of low carbon material are left with their full brightness.

Some typical etched sections of 90-lb. rails are shown herewith, and it will be noticed that the failures occurred along the streaks. The rails shown in Figs. 3 and 4 had light areas, big enough to allow getting samples for analysis, and the results obtained are shown in the following table:

	Fig. 3		Fig. 4	
	Normal.	White metal.	Normal.	White metal.
Carbon	.69	.78	.78	.86
Phosphorus	.032	.091	.036	.073
Sulfur	.024	.048	.020	.040
Manganese	.84	.81	.85	.83
Silicon	.40	.40		.43

*From a paper presented before the American Society for Testing Materials, June 20.

†Engineer of tests, Chicago, Burlington & Quincy, but recently granted a year's leave of absence to act as chief chemist in charge of rail tests for the Committee on Rails of the American Railway Engineering and Maintenance of Way Association.



Fig. 1.



Fig. 3.



Fig. 2.



Fig. 4.

Small white streaks examined under the microscope show a nucleus of slag, indicating that the slag in some way causes a reduction of the amount of carbon, and the rail shown in Fig. 4 also shows a large mass of non-metallic material contiguous to the white band; so it was at first thought that slag in the metal caused the white streaks by possibly oxidizing the carbon. This may perhaps be true of small streaks, but it was later learned that it was the practice at the mill that made the rails shown to put small soft bessemer steel plates on the stools of the molds to reduce the cutting out of the stools by the hot metal when it was poured into the molds. These plates, it seems, get churned up with the rest of the metal, melt partly or wholly, but before becoming thoroughly mixed with the main body of steel the metal sets, leaving streaks as shown in the figures. It had been thought that the first metal would set and hold the plate at the bottom of the ingot, where it would be sheared off, but as soon as it appeared that the plates caused streaks as shown the practice was promptly stopped. A few similar failures have been noted in rails from other mills, but whether due to a similar cause has not been determined.

THE TRAIN DESPATCHERS' CONVENTION.

The 23d convention of the Train Despatchers' Association of America opened at Spokane, Wash., on June 21, with an invocation from Rev. J. Elvin, pastor of the Pilgrim Congregational Church of Seattle. Mayor Pratt of Spokane welcomed the members of the convention, and was responded to by President Dellmin and Secretary Mackie. No business was done at the opening session.

At 1:30 p. m. the convention opened for business, the president making his annual address. Over 70 members were present and 23 new members were elected. A paper by S. H. Brown, of the Great Northern, Spokane, was read, and its discussion occupied the rest of the afternoon. The subject was "The Train Despatcher's Office: How It Should Be Equipped and Furnished."

The morning session of Wednesday was devoted to a paper by Alfred Beamer, late superintendent of the Northern Pacific, Spokane, on the A B C Rules. A telephone office had been opened in the convention hall, at which a despatcher, having before him the A B C record board and slips, copied, for the benefit of the members present, the various cards and other entries precisely as this is done in a dispatching office under these rules, while there were 10 or 12 telephone receivers at the service of members of the convention, enabling them to listen to the work being done. Mr. Beamer's paper was listened to with great interest, and inquiries as to practically all phases of the operation of the A B C rules were addressed to him at its conclusion, to all of which he replied in a perfectly clear and satisfactory manner, and the convention, by an overwhelming majority, adopted the following resolution:

"Resolved, That this Convention of Train Despatchers, having heard the reading of the paper presented by our fellow member, Mr. Alfred Beamer, and the entirely satisfactory answers made by him and by despatchers who have worked under these rules to every objection raised, and having ourselves, in large measure, observed their operation, we desire to express ourselves as deeply impressed with the merits of these rules and recommend their use, which experience has shown to be eminently safe and effective in moving traffic, to all railroad companies as a substitute for the Standard Code, when conditions, such as the necessity for a block system, warrant their adoption."

The form of the original resolution was different from the foregoing, and it was reconsidered during the last day of the convention, the modification here given being adopted by a large majority. Extracts from the paper are given elsewhere.

The convention adjourned at an early hour in the afternoon of Wednesday, without any recess for luncheon, in order to accept the hospitality of the Chamber of Commerce, which had provided an excursion through and around the city.

On the morning of Wednesday the report of the executive committee was taken up. It showed the income of the year to be \$2,799, an increase of \$246 over the previous year, and the expenses to be \$192 more than the previous year, a net gain of \$4 for the year, with a cash balance of \$615. The membership account showed a net decrease of 26 members during the year, the total membership at the close of the fiscal year being 938. A change in the publication of the "Train Despatchers' Bulletin," the official organ of the association, was ordered, and hereafter the place of publication will be Chicago instead of Toledo. The president and the editor were empowered to make all arrangements.

An amendment to the constitution was adopted, permitting the admission to membership of train despatchers of interurban electric railways working under any approved system of train despatching.

Two papers by J. E. Scott, inspector of transportation of the Gulf, Colorado & Santa Fe, were read and discussed. One was on "Train Despatching by Telephone," as practised by the G, C. & S. F., the other on "Inconsistencies of Instruction in Train Rules." They were received with appreciative applause and ordered printed in the proceedings.

Mr. Scott's account of his experience with telephones has been similar to that of other despatchers, as heretofore published, but some parts of his narrative were particularly graphic. On his road the wires are so well managed that a despatcher realizes no difference in distance between the nearest station and that farthest from him. All hard and grinding work is done away with. The bells used at the stations are so large that an operator can do nothing else until he silences the bell. The despatchers write out the orders as they dictate them and there is practically no breaking to grate on the despatcher's nerves and use up time. Experienced telephone operators can repeat an order faster than the despatcher can underscore the words. The Atchison system will soon have 6,948 miles of telephone lines in use. The progress in the use of telephones for despatching has seemed surprising, and yet it should not be so, for are we not all familiar with the rapid deterioration of the telegraph service during the past few years? The despatcher who to-day has a set of good operators, is exceptional and is envied.

Mr. Scott's paper on faults in the methods of instructing trainmen and telegraphers evidently is the fruit of his experience as an examiner, and he points out the needs of this branch of the service with incisive accuracy. There is a noticeable absence of team work. General officers are too busy to attend to matters of instruction in detail, and subordinate officers often prove reluctant to adopt such a radical innovation. Differences of opinion, arguments and contentions concerning rules are so common as to be an element of danger, and the need of a uniform system of interpretation, examination and instruction is vital. In many cases, it has come about that employees no longer look for consistency either in the rules or in the officers. Differences between the views of different trainmasters are inevitable so that the establishment of a consistent policy for the whole of a railway is absolutely essential. Critics have sometimes said that satisfactory examination and instruction of trainmen is practically out of the question; but can this be true? The trouble must lie rather with the manner in which the system is handled than with the system itself. Two large railways, the Santa Fe and the Rock Island, already have thorough, uniform and systematic interpretation and instruction. This good result has been brought about by co-operation among the officers, high and low, and by energetic team work. The Santa Fe has for some years required a written, in addition to an oral examination, of trainmen and telegraphers. In the examination of conductors there are 600 questions, and of trainmen 603. No one who has tried both will fail to appreciate the superiority of a written over an oral examination. The oral questioning is entirely too elastic and too largely subject to the personal inclination of the examiner.

The report of the train rules committee was read and discussed. It proposed an additional example to Form C, for giving right to one extra over another; an additional example to Form G, for starting extras when an opposing extra has to be waited for; a form for use in starting trains from a point where a dispatcher's clearance is necessary; recommended the new Rock Island rules for the movement of trains by telephone, substituted a new Rule 4 for that suggested a year ago; recommended that Form K orders be excepted from the operation of the principle that orders addressed to a train become void when the train ceases to exist; asserted the unsoundness of the practice of addressing train orders to "All concerned." They should, in preference, specify the trains or classes of trains addressed; also asserted the undesirability of using train order forms for slow orders, and recommending the "Pink Bulletin" of a separate form and color for this purpose; objected to requiring train dispatchers to obtain acknowledgments of receipt of new time-tables by train order when general orders are also used for that purpose, as an unnecessary burden upon train dispatchers; stated the desirability of furnishing a separate bulletin board in dispatching offices for the use of dispatchers alone; and recommended the substitution of other devices retainable by the operator for the usual hoop used in the delivery of "19" train orders. All of these recommendations were approved with the exception of some slight changes in the telephone rules. For delivering orders to moving trains the committee recommends in place of hoops a cord, which can be stretched over a frame so as to be easily taken by the engineman. The cord could be thrown away and the returning of hoops to stations would be done away with.

F. C. Dow (C., B. & Q.), Sheridan, Wyo., was elected president; J. B. Alvey (Illinois Central), Fulton, Ky., vice-president; J. F. Mackie (C., R. I. & P.), Chicago, re-elected secretary, treasurer and editor. The four members of the executive committee elected were B. S. Sperry and S. H. Brown (Great Northern), S. S. Conley (B. & O.), and T. W. Kane (Northern Pacific). The place selected for the next meeting was Baltimore, Md., and June 20, 1911, as the date.

The entertainment provided was exceptionally good, and the Spokane dispatchers excelled themselves as hosts. The Inland Empire Co. gave an excursion on Wednesday night to Cœur d'Alene, with a trip by moonlight on the lake and a dance on the steamer. On Friday, the convention having finally adjourned, the Idaho & Northern gave an excursion from Spokane to Newport on the Pend d'Oreille river, with a three hours' steamer trip down the river to Ione, Idaho, the present terminus of this railway. There is a great wealth of timber along this line and fertile soil, out of which it grows, for the settler who will succeed the lumberman.

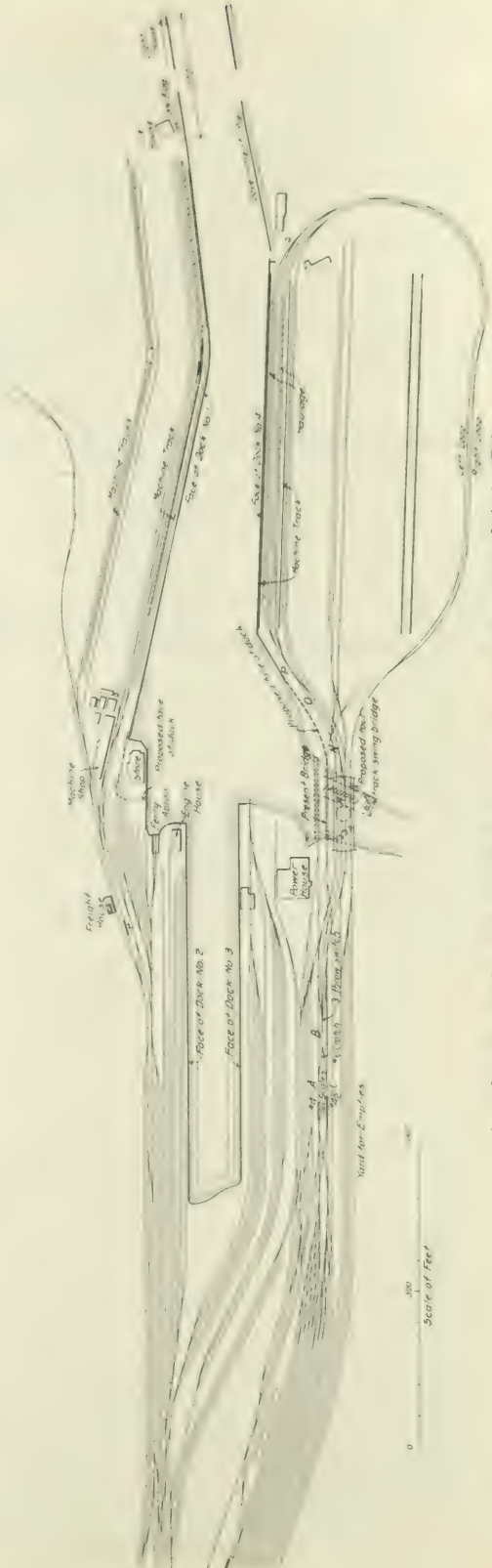
DOUBLE TRACK TRUSS BRIDGE WITH SUSPENDED TRACKS.

At Conneaut Harbor, Ohio, about 65 miles east of Cleveland, the Bessemer & Lake Erie is erecting an interesting four-track truss bridge, styled technically a double-track bridge, because two tracks are outside the trusses.

The bridge is a 235-ft. draw span, heavily braced on top to carry an additional track on each side, suspended from the top cross frames, the depth of the floor being too shallow to permit sufficiently rigid construction to carry the tracks on cantilever beams. The cross sections herewith show the bracing. The bridge was designed for Cooper's E-60 loading.

Construction was started late in March of this year. The piers and abutments are being built by the railway company, the American Bridge Company having the contract for the steel superstructure. The layout and masonry were designed in the office of the chief engineer of the railway, and the steel work was designed by the American Bridge Company. The estimated cost of the substructure and superstructure complete is \$151,000.

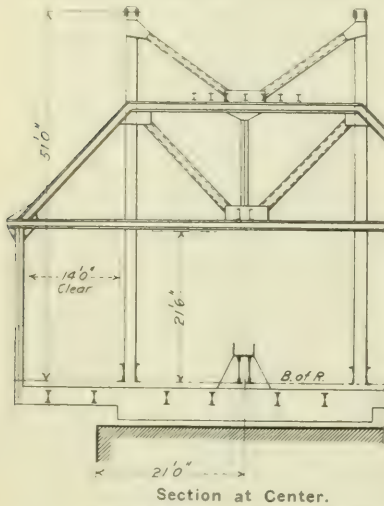
The layout of the new Dock Four yard, including this new



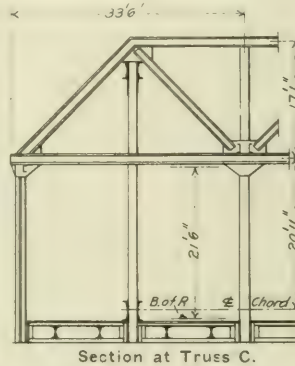
Layout for Bridge and Yards at Conneaut Harbor, Bessemer & Lake Erie.

bridge, is shown herewith. On Dock Four are four hydraulic 10-ton bucket machines and four electric 5-ton bucket machines, to load cars on tracks 51, 52, 53 and 54. To load cars on track 55 a 15-ton bucket electric machine will be installed. Track 1 will be used in hauling ore from tracks 51, 52, 53 and 54; and track 3 will be used in hauling ore from track 55. Track 2 will be used by all engines returning.

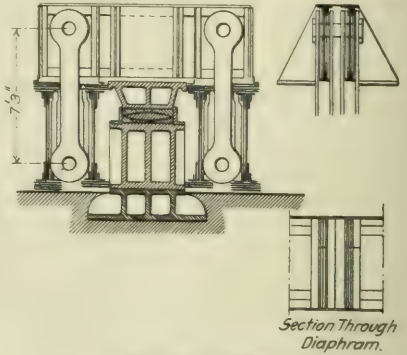
Track 4 will be used for delivering empties, which are fed in at the rear of Dock Four and handled by a haulage system around the loop and under the machines. The ore is pulled by



Section at Center of Truss C.



Section at Truss C.

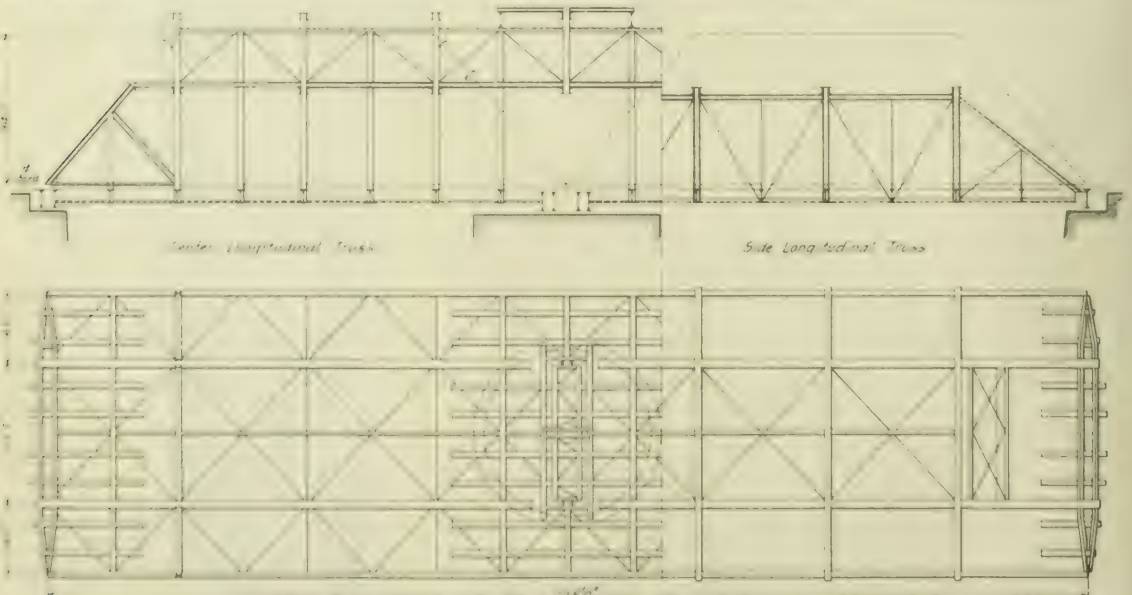


Detail at Center.

an engine from Dock Four to a point about opposite B. The head engine then shifts over to track 2 by the crossover A-B or C-B. An engine from track 2 comes up from the rear, through one of the crossovers M-N or O-P, and pushes the cars over the hump to the scales. The machinery when completed will have a capacity of 100 cars an hour.

We are indebted to H. T. Porter, chief engineer of the Bessemer & Lake Erie, for the description and illustrations of the road and bridges.

recently made Federated Malay States Lines from Singapore. About 120 miles of the Malay line was opened last year, and another 76 miles has recently been opened, leaving an additional 150 miles now under construction to the Siamese terminus. Through railway communication will thus be afforded between Singapore and Bangkok, and the connection of the Southern Burmese and the Malay State lines, by way of the Siamese railways, will eventually be possible. Two of the bridge spans ordered from Darlington are required for the Petchaburi river, nine more spans are soon to be shipped from the Tees to the eastern side of the Malay Peninsula at Singora Roads, and the remaining four will be sent to the western seaboard at Trang Roads.



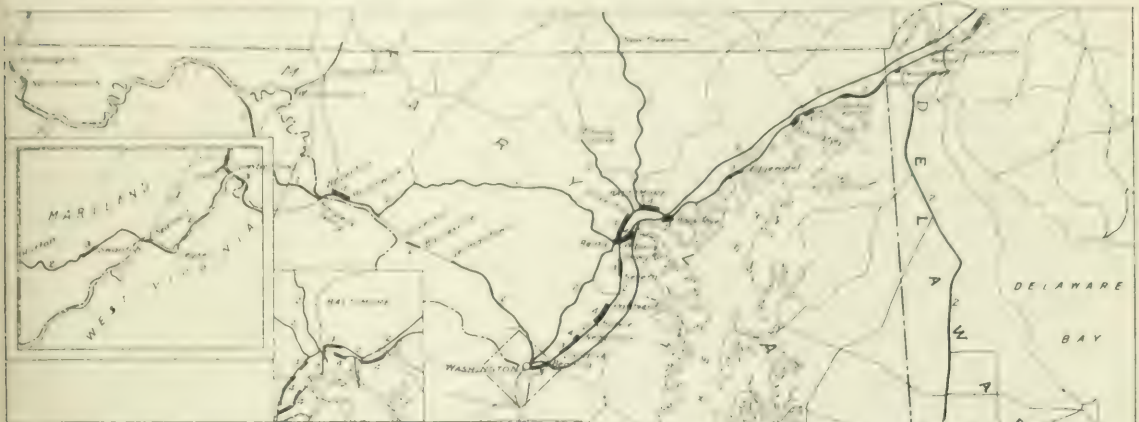
Plan and Longitudinal Sections of Four-Track Draw Span.

MULTIPLE TRACK RAILWAYS IN DELAWARE, MARYLAND AND THE DISTRICT OF COLUMBIA.

The map, shown herewith, includes the states of Delaware, Maryland and the District of Columbia and is designed to show

Wilmington to Philadelphia
 Wilmington to Baltimore
 Wilmington to Washington
 Baltimore to Washington
 Baltimore to Philadelphia
 Washington to Philadelphia

Line	Stations
1	2
2	3
3	4
4	5
5	6
6	7



Two-Track, Three-Track and Four-Track Railways in Delaware, Maryland and the District of Columbia.

all of the railways within this territory on which there are two or more main tracks.

Although this series of maps is intended to show only standard (steam) railways, we have included in this case the main line of the Washington, Baltimore & Annapolis (electric) railway, between Baltimore and Washington, which was built originally as a double-track railway and which, outside of the short sections in the streets of the two cities named, is built and designed for high speed.

The termini of the sections shown on the map are as follows:

**MARYLAND AND DELAWARE
 Baltimore & Ohio**

	No. tracks.	Approx. miles.
Chester, Pa., to Elsmere, Del.	2	10
Elsmere to West Junction	2	2
West Junction, Del., to Huntington Ave., Md.	2	63
Huntington Ave., to Mount Royal	4	3
Mount Royal to W. Baltimore	4	4
W. Baltimore to Relay	4	5
Relay to Washington, D. C.	2	31
Washington to Germantown	2	26
Germantown to Dickerson	2	3
Relay to Brunswick	2	60
Brunswick to Weverton	4	3
Weverton to Harper's Ferry, Va.	2	3
Baltimore to Lacoste Point	2	3
Patterson, W. Va., to North Branch	2	6
North Branch to Mt. Savage Junction	2	6
Mt. Savage Junction to Penn. State line	2	5
Cumberland to Keyser, W. Va.	2	24
Piedmont, W. Va., to Swanton	2	12
Swanton to Alamont	2	4
Alamont to Hinton, W. Va.	2	14

Northern Central.

Baltimore to New Freedom, Pa.	2	37
-------------------------------	---	----

Philadelphia, Baltimore & Southern

Penn. boundary to Wilmington	4	7
Wilmington to Mill Creek	2	1
Mill Creek to Newport	2	3
Newport to Pender	2	8
Pender to Newark	2	1
Newark to Iron Hill	2	10
Iron Hill to Northeast	2	6
Northeast to Principio	2	2
Principio to Perryville	4	2
Perryville to Havre de Grace	2	1
Havre de Grace to Oakland	4	1
Oakland to Edgewood	2	12
Edgewood to Magnolia	2	2
Magnolia to Back River	2	10
Back River to Bayview	2	2
Bayview to Baltimore	2	2
In Baltimore	4	1
Baltimore to Lafayette	2	2
Lafayette to Calverton	2	1
Calverton to Frederick Road	2	1
Frederick Road to Wmms.	2	1

Landsdowne to Berwyn	2	4
Pennington to Washington	2	3
Magruder—Union Station, Washington	2	5
Wilmington to Philadelphia	2	16

Wilmington & Maryland

Baltimore to Emory Grove	2	20
Wilmington to Pennsylvania State line	2	12
New York, Philadelphia & Norfolk	2	22
Denton, Del., to Kings Cross, Md.	2	22
Washington, Baltimore & Annapolis	2	35
Baltimore to Washington	2	35

LOSS AND DAMAGE—CAUSES AND REMEDIES.*

BY OTTO FESL,

Att. Coun. to the Nashville, Chattanooga & St. Louis

The question of loss of and damage to freight is receiving general attention, and three railways are spending large sums for its prevention—the Southern, the St. Louis & San Francisco and the Atlantic Coast Line. The first two roads are maintaining loss and damage bureaus at an expense of at least \$30,000 yearly, but you will agree with me that the money is well spent when I say that the Southern saved \$800,000 in the last fiscal year, while the Frisco saved \$90,000, it being the first year of its bureau's existence.

The payments for loss and damage, which are all pure waste, are conservatively estimated at \$20,000,000 per year for twenty-one railways alone, doing approximately half the business of the United States. I am glad to say, however, that the end of this state of affairs is in sight. Now that interest has been awakened, some of the best brains in the country are giving the matter serious consideration. In fact, there is nothing new in the whole proposition. It is simply a question

*Abstract of an address before the Nashville (Tenn.) Association of Railroad Officers.

of securing a general and rigid observance of the rules and regulations which have been in effect for years.

In the beginning let me say that the prime requisite for the successful transportation of any commodity is proper packing and marking by the shipper. You may load freight by the best methods ever devised and stack it with the greatest care that human ingenuity is capable of, but if the crating is insufficient to begin with it will be damaged, and if not properly marked it will go astray, in spite of all that can be done to prevent it. On the face of it, this is a simple problem, and it would be if the traffic people of all lines would get together and agree on a uniform classification with regard to marking and packing. There are indications that this will be done in the near future, as steps have already been taken in that direction, but I am afraid the years of indecision have done their work too well, and shippers have become too thoroughly imbued with the "let-the-railway-pay-for-it" idea for us to expect a revolution. There are any number of rates, made for the most part years ago when conditions to some extent justified them, but which have been maintained long after their usefulness has been outgrown, simply because each of the traffic men was afraid to be the first in the field and all of them could not agree on just what changes should be made. Everybody seemed to be afraid they might lose a little business. They were all out for tonnage and the net earnings could go to smash. As a result, agents are compelled to go on accepting freight that is not properly crated, or, rather, not crated at all, and the claim agent pays for it.

Let us follow a shipment of merchandise from loading station to destination. The shipper's dray drives up to the freight house, backs up to the door, and the trouble begins. The receiving clerk has from five to fifteen doors to look after, and in the rush hours he has all he can do to sign the tickets, so the inspection of the freight unloaded at each door is out of the question. Besides, this man, and in some cases, boy, whose signature on a bill of lading binds the company tighter than Dick's hatband, receives the magnificent stipend of \$50 per month. Most of them will sign for anything and everything that is unloaded, and some of them will even go so far as to sign for goods that the driver does not take out of his wagon.

The freight is now piled up in the doorway and subject to the tender mercies of the truckmen. At most of the larger freight houses the loading is handled by some kind of a tally system, a number of which are in vogue, but the principle is practically the same in all. Personally, I favor what is known as the "Veri-Check" system of loading freight, and we are using it now at Atlanta, Chattanooga and Nashville. Let me say, however, that almost any kind of a loading system is practical as long as it is handled strictly according to rule, but the minute the discipline is relaxed the system goes to pieces and becomes a hindrance rather than a help. This is the fate of most of them.

It is now time to load the freight in the cars. The bill of lading has been signed and goods "received in good order," although the receiving clerk doesn't know whether the box of groceries for John Smith, Smyrna, Tenn., is actually marked John Smith or John Jones, Smyrna, Tenn., or Smyrna, Ga. The car for Smyrna is indicated by the number "1," let us say, so the clerk makes a figure "1" on the box with a piece of blue keel. I say the clerk does this, but in most cases he is too busy, and the work is too simple for a white man to bother with, anyway, so he, by tacit consent, delegates it to the negro boss of the loading gang. This man is usually a pretty bright sort of a fellow and far better posted than the clerk, so it practically makes little difference. So Sam or Jim drives up with his truck and is given a slip of paper directing him to car No. 1. We will suppose the slip in this case is legible and reads more like a figure 1 than a 7 or anything else, or if the number happens to be a 16 we will trust it doesn't get turned upside down so it will be taken for 91, and if the trucker isn't more than usually reckless the box will finally reach the car to which it

belongs. Here is where the loading clerk comes in for his share of the dirty work. The car may be filthy, but he doesn't see it. It may be leaky, but the loading is done in a freight house and the rain never enters there. It makes no difference whether the car has been used for phosphate or coke loading, and shows it, or has been emptied of lime, oil or salt pork. In goes the freight—flour, print cloth, meal, anything susceptible of damage from dirt, grease, nails or water. He puts in freight that belongs in other cars and leaves out freight that should go in this one. The main thing is to get the stuff out of the house before quitting time, so why bother about the way it is loaded? Throw the flour up against the can of oil, set the stove up on the cracker boxes, put the little parlor table astride the coffin and top it with the heaviest castings you can find to hold it all down! Find a nice clear space for the carboy of sulphuric acid, it will need exercise and it won't hurt to let it roll about a little, no matter if it does find an old affinity in the half-crated showcase a few feet away and crushes it to pieces in its loving embrace before the journey is over. And remember that the lightest stuff must be loaded as close to the floor as possible and the heavy freight piled on top to hold it down. And always stack the load up as high as you can so it will all tumble down at the first coupling. This loading clerk may be honest, but evidently he does not consider it dishonest to overlook the bad order of a package, or even help himself to any little thing that will most likely not be missed. It has all been receipted for and his record must show it "loaded O. K. as billed," so it will never be known where and how the loss or damage occurred. Again, he is not always careful about checking into the car, and if the goods which were unloaded from the dray have disappeared and he has any items unchecked he marks them off on his tally-sheet just the same. He knows that the all-powerful rubber stamp in the station master's office will shield him from all harm. And the "O. S. & D." clerk in the superintendent's office finds himself "up against a blank wall" some days later when he attempts to investigate.

This matter of properly stacking the merchandise in the car is by all odds the most important single feature in the prevention of loss and damage. It is hard for the average station-master to realize that the old link-and-pin days are past and gone and that coupling nowadays is done by impact, necessitating the stacking of freight in such a manner as to withstand a considerable number of heavy shocks. We can't handle cars without these shocks, and this fact should be given due consideration. But it is astonishing the amount of carelessness, or rather the lack of plain common sense, that is displayed. Why, the other day I had occasion to examine a car of eggs which was received at Nashville from a station on one of our branches about twenty miles away. The car contained about 200 cases of eggs and the crates were stacked high in each end of the car, leaving a clear space in the doorway. Of course the very first hard jolt the car received resulted in an avalanche of egg cases, and the way they piled up and burst in the doorway was a sight to behold. Again, I saw a car from a small local station, one end of which was saturated with oil. In this end the agent had loaded flour, and in the other, which was perfectly dry, he had loaded a lot of sash weights.

Now, the loading of a straight carload of any commodity, where the packages are all the same kind, is a comparatively easy matter and is simply a question of stacking the packages in a solid, compact mass. But the usual merchandise or package car, such as compose the output of the freight houses, is a different proposition, and here the loading becomes a matter of the utmost nicety of judgment and a great deal of skill. In the first place, the freight must be loaded in station order, and it must also be put in the cars as fast as it reaches the freight house, so the loading clerk can hardly be blamed if in a great many cases the loaded car presents the appearance of the aftermath of a cyclone in a junk shop. He is compelled to load in station order, and butter and cheese for

station A must be placed in close proximity to the coal oil for station B, or there will be a howl from the local conductor while if the coal oil flavors the latter there will be a kick from the claim agent, so, between the devil and the deep sea, he naturally chooses the lesser evil. It is a certainty he will hear from the conductor in the next day or two, while the claim agent's complaint, if it ever reaches him, will be a year old. It is a heinous crime to delay a local train at a station two or three minutes in order to find a piece of freight, while it is the claim agent's business to pay claims. So the loss and damage account grows.

Of all the awkward, unhandy stuff to load, household goods take the cake. And here again our friends in the traffic department have thrown us down. Furniture, bedsteads, dressers, washstands, chairs, rockers, cots, lounges, wardrobes, are accepted in less than carload lots, with practically no protection whatever. Bed ends and rails are tied together with the varnished surfaces exposed, chairs are placed seat to seat and tied with a piece of string, expensive furniture of all kinds is merely wrapped in paper, with now and then a handful of excelsior to prevent chafing. It is impossible to load this kind of freight so it will not be damaged. Rockers are exposed to anything that will break them off, or else they punch holes in the half-crated mirrors and family portraits. There are no hard and fast rules for loading this kind of stuff. You just have to use the best judgment you are capable of and trust in Providence.

While we are on the subject, let us take a look at pianos and organs. The classification is all right here, and expressly provides that pianos not boxed shall not be taken. But there used to be a time when we would accept them any old way, and some of our agents seem to be living in the past, as far as this is concerned, as you will see one every now and then moving without proper protection. Pianos and organs should always be loaded "fore and aft" or lengthwise in the car, and when trucking the truck blade should go underneath the box containing the instrument.

On our line, claims for damage to flour and mill products represent one of the largest items. And let me say here that the common flour sack is an abomination. It is made of the very flimsiest fabric, which has to be filled up with sizing before it will begin to hold anything. It is often poorly sewed; the stitches are taken too far apart and tear out in handling, and you lose a couple of handfuls of flour every time you pick the sack up by the wrong end. The cars are studded with hundreds of projecting nails and, as if this were not enough, the tags with which the sacks are marked are fastened with a wire staple. When a tag is sheared off, as 50 per cent. of them are, a gaping hole from one to two inches long is left. Or the negro truckman or a brakeman will cut his hand on the wire and jerk the tag out by the roots by way of retaliation. You can sweep up a half-bushel of these tags in almost any freight house. Flour is a commodity which requires a first-class car, one that is clean inside, with a good roof and door and with no projecting nails to tear the sacks. The floor should be covered with clean, odorless sawdust or heavy paper to keep out the dust and dirt. The nails should be removed from all cars before they are loaded with any kind of merchandise. We are doing this at all our stations, and it is well worth the trouble. And for flour and cement loading, or for any freight that can be damaged by water or moisture, the doors and windows should be cleated. Not more than one car door in three is water-tight when exposed to a hard, driving rain, and this will have to be guarded against if you do not want your flour to reach the consignee in the shape of dough.

Did you ever see a shipment of oil which didn't leak? The ordinary jacket can is responsible for a lot of trouble. The jacket is not sufficient protection and very little care is taken to prevent damage, so if the can isn't mashed it falls over and rolls about, the stopper comes out, and the result is a puddle of oil on the floor. These cans should be placed against

the side of car and a piece of wire used to fasten them upright.

Barrels, casks, kegs and any heavy cylindrical containers which are liable to roll about and damage other freight should be blocked.

Green hides are hard to handle. They always leave a puddle of foul-smelling brine to mark the place where they have been, and everything this brine comes in contact with is damaged. The car floor under the hides should be covered with sawdust several inches deep so the brine will be absorbed.

Hollow ware and stove furniture come in for a large amount of breakage. Pots and kettles are often nested, causing them to wedge down and those at the bottom to burst apart, or they fall over and roll about or other freight falls on them. The present practice of accepting such articles in bunches fastened with wire should be discontinued and shippers required to box or barrel them and pack them in straw. Until this is done we shall have to go on accepting them loose and should handle them as carefully as we would so many eggs.

I might go on and cite practically every item listed in the classification, but I would not cover any ground that has not already been gone over time and again by men much better qualified than I am. The matter of loading any kind of freight is largely one of just plain common sense and judgment and is governed to a great extent by circumstances.

In conclusion, the first requisite for the success of any steps toward the prevention or reduction of loss and damage is the hearty, whole-souled co-operation of every man in the service, from the general manager down. When you have this you are sure of results. There never was a reform or improvement, however badly needed, which did not meet with opposition in some quarters, and my experience has been no exception to the rule. We have some obstructionists on our line, men who have been plodding along in the same old rut for years, but to offset these we have any number of wide-awake, progressive agents who are with us heart and soul and who will even go a little out of their way to help us make a good showing. It is to this we attribute the fact that our efforts are meeting with most gratifying success, and that our loss and damage expenses for the last two months reported show reductions of 64 and 74 per cent., respectively, from the same months of the previous year.

THE PAINTING OF CEMENT AND CONCRETE STRUCTURES.*

BY CHARLES MACNICHOL.

Practical requirements compel direct treatment of the freshly built cement surfaces so as to adapt them to receive the materials which the paint trade is familiar with and which are in common use. Numerous methods have been tried for years. Their failure in most cases is due to the painter's lack of knowledge of the oil destroying property of the alkali in the cement and of the value of such chemicals which science has given us for the neutralization of these alkalis.

We need a paint combining three properties, as follows:

First—Reasonable permanency of the painted surface.

Second—Freedom of chemical action on the oils.

Third—Assurance that the tints or colors will remain unimpaired.

The writer desires to submit a method which has given the nearest approach to fulfilling these requirements. I have used it in my business for years with success, and it has proved not only practical in application but successful in results, combining, as it does, freedom from danger to those handling it, simplicity of preparation and application, and reasonableness of price.

The cement surface is treated with a solution of zinc sulphate and water, mixed equal parts by weight, and applied with an ordinary bristle brush after the cement is dry. If one precaution is observed, that of allowing 48 to 72 hours as a drying

*From a paper presented before the American Society for Testing Materials, June 30.

period, this treatment will render a cement wall as safe to paint as an ordinary plaster wall.

Dr. Allerton S. Cushman, chemist in charge of physical and chemical investigations, Office of Public Roads, United States Department of Agriculture, gave me the following explanation of the chemical action of the zinc sulphate:

"It is my belief that the zinc sulphate is very well adapted to this purpose, owing to the fact that when zinc sulphate is brought in contact with the calcium hydroxide (hydrated lime) a chemical reaction results in the formation of calcium sulphate (gypsum) and zinc hydroxide (hydrated oxide of zinc).

"It is apparent from this that after the surface has become thoroughly dry again it will contain within its pores a mixture of gypsum and zinc oxide. These materials have no bad influence on linseed oil and, in fact, are frequently used as paint pigments.

"The reason why such treatment should be necessary before applying a paint coating to the surface of concrete must be apparent to every one. When Portland cement sets a certain amount of lime is set free in a hydrated condition as calcium hydroxide. This is a strong alkali, and tends to saponify the oil in the paint coating, and thus destroy it. The work done by the application of zinc sulphate is to destroy this alkalinity and change the calcium hydroxide into a mixture of calcium sulphate and zinc oxide. I do not know of anything that would answer this purpose better than zinc sulphate."

A very important point is the filling of the pores of the concrete, thus keeping the oil paints applied from penetrating too deeply into the cement.

THE SINGLE-PHASE RAILWAY BETWEEN ROTTERDAM, THE HAGUE AND SCHEVENINGEN.

BY C. VAN LANGENDONCK.

This new railway is to deal with the traffic between Rotterdam, The Hague and Scheveningen, which is specially heavy in the summer months, and will relieve the present steam railway of some of its congestion. From the station at Rotterdam, whence the line starts on an armored concrete viaduct 5,200 ft. long (described in the *Railway Age Gazette*, November 26, 1909), the railway runs in a northerly direction, and in practically a straight line, for 12½ miles. At this point it divides, one part of the line running north to Scheveningen and the other west to The Hague. To facilitate direct service between The Hague and Scheveningen there is here a triangular junction. The distances are: from Rotterdam to The Hague, 15 miles; from Rotterdam to Scheveningen, 19 miles, and from The Hague to Scheveningen, 7½ miles. The length of double line is 20 miles, and length of track, including that in the stations, about 47½ miles. Owing to the marshy nature of the ground, the building of the railway itself has given rise to many difficulties and for a part of the line a pile foundation has had to be used.

The power station for supplying energy to the railway is at Leidschendam, 11 miles from Rotterdam. Three-phase current is generated, and this is transformed by the alternators to two-phase current at 10,000 volts.

The line is divided into two parts, corresponding to the two phases. The separation of the two phases occurs at a point near the power house, and in ordinary working the loads on the two phases are separated. The overhead wires are broken and divided by a dead section of about 10 ft. long. The northern section is fed at a place 8 miles from Rotterdam and quite close to the power station. The arrangement is shown in Fig. 3, in which the letters indicate as follows: i, ii, iii, iv.—feeding points; a—feeder for Rotterdam phase; b—feeder for Scheveningen phase; m—messenger wire; D—power station; i, i, i.—section insulators; K—phase separation.

The rails are connected through the earth to the power station by means of bare copper wires. Similar leaders supply the southern section of the line. The supporting wires

have all been erected on the well-known Siemens patent multiple catenary system. The testing of the insulators on this line (which is carried out at a voltage between 25,000 and 30,000 volts) is done during the time that the line is shut down. For testing, an accumulator locomotive is used, on this is a converter driven by a direct-current motor; from which the necessary high-tension three-phase current can be obtained.

The posts for the most part are fixed in concrete foundations, each cast in a special cast-iron box sunk into the earth; this because of the spongy nature of the ground. The trolley wires are automatically stretched by a weight, and are continually under a tension of about 1,000 lbs. Two cross-wires are provided at each station, making it possible to make dead the trolley wires at the station without affecting the working of the rest of the line; and each wire can be entirely cut out between any two stations. Two kinds of bonds are used on the rails for the return circuit, copper bonds being employed in the stations. These are fixed into the rail holes by means of two heavy copper plugs and a steel key. On the open sections copper strips are used, which are fastened to a brass plate at each end and soldered to the rail.

The cars are arranged with central corridors, the seats being placed each side and separated from each other by a low partition. The roofs are specially designed to reduce air resistance to a minimum—in other words, they look like American passenger car roofs. Two types of motor cars are being used, the first of which is intended for both second and third class passengers and the second for second-class. The first kind of cars have 24 seats for second-class passengers and 49 for third-class passengers, together with room for 14 standing. The second-class car has room for 56 passengers sitting and 14 standing.

Each car is fitted with electric lighting and heating, the cold in winter being sometimes intense. The driving platform contains, besides the controller, a switch for working the brakes both automatically and by hand, a lever for raising and lowering the collector and the valves for working the sanding equipment, the whistle, etc. The car body rests on a frame of channel iron. The bogies have been designed with special reference to the high speed at which the trains are to run, and they differ from the usual arrangement in that there are no bolsters but only a king pin, which can move in a direction at right angles to the length of the car, and is held in the middle position by means of strong springs. The weight of the car body is carried by two rubbing side plates on the bogie. These, by their friction, reduce the side motion of the king pin when going around curves. In the bogies both plate and spiral springs are used, and each wheel is fitted with two brake blocks. For driving purposes, only one bogie of each motor car is fitted with motors, while to the other is fixed a 5-h.p. alternating current motor, working at a voltage of 110, which drives the air pump supplying the necessary compressed air to the brakes, etc.

Only low tension conductors appear on the driver's platform and in the cars, the maximum voltage being 300 volts. All high-tension parts are exclusively fixed in a special chamber, all accessible parts of which are well grounded. The conductors are carried in iron and steel troughing, which is fixed on unflammable supports. A lightning arrester is fixed on the roof of the car to protect the train against atmospheric discharges. Besides the motor cars there are also a certain number of trailers. These have room for 88 third-class passengers sitting and for 20 more standing. The lighting and heating of these cars are carried out from the motor cars by means of flexible connecting cable, while the control cable is also led through the cars so that multiple control can be employed. The motor cars have the following main dimensions: length between buffers, 61 ft.; available length, 57 ft.; total height, 14 ft.; height of bodies, 10 ft.; breadth, 10 ft. 6 in.; weight, 51 tons. The weight of the trailers is 30 tons.

The high-tension current is led into the car through two



Fig. 1—Rotterdam-The Hague-Scheveningen Electric Railway Terminus at Scheveningen.



Fig. 2—Rotterdam-The Hague-Scheveningen Railway Yard at Leidschendam.

collectors placed on the roof, these being fixed on 12 insulators. The collector is spring controlled as regards rotation, and can be raised and lowered by chain gearing which is worked either by hand or by a compressed air arrangement. By the compressed air equipment all the collectors on the train can be lowered at once from one driving platform or the other. The high-tension conductor is connected to two high-tension fuses, placed in a special chamber, through a choking coil, and where it passes through the roof is protected by means of an air-tight micanite tube. From one of the high-tension fuses a circuit is tapped off to the lighting and auxiliary apparatus transformer. This latter is fitted with a magnetically operated switch, a charging resistance and an overload relay, which can also be worked by the emergency alarm current from the driving platform. In case of danger it is thereby possible to cut out all the high-tension switches from the foremost driving platform.

The main transformer, besides supplying the driving motors, also supplies the motor for driving the air compressors. The driving of the car is effected by means of alternating current series motors of a capacity of 180 h.p. when running at 750 r.p.m. The driving bogie is fitted with two motors which drive the axles through gearing with a reduction of 1 to 3, the maximum speed of the train being 55 miles an hour. The motors, which are totally closed and of the Siemens Schücker compensated series type, are provided with auxiliary poles which are excited by current of such a phase that at any determined speed the transformer and reactance voltage are both neutralized to such an extent that all sparking is quite overcome. The armature is built of

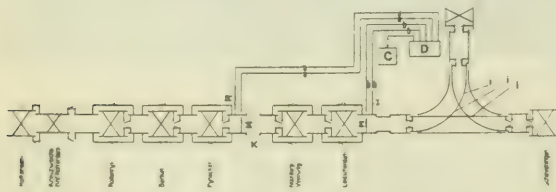


Fig. 3—Arrangement of Feeders.

slotted laminations in which the winding is embedded as in a direct-current motor. Between the windings and the commutator are connected resistances designed to reduce the short-circuit current under the brushes during running. These resistances are fixed in the upper part of the slot in such a way that they increase the torque of the motor to a useful extent. There are eight collecting points, at each of which are fixed four brushes, the brush-holders being fixed to one ring, which, by loosening a set screw, can be moved around for inspection and maintenance of the brushes. The stator winding is distributed equally over the whole circumference and consists of two parts: an exciter winding, which is used for generating the main magnetic field, and the compensating winding, which neutralizes the armature field. A part of the latter is also used for generating the auxiliary field. Only one part of the exciting winding is connected in circuit according to the direction in which the train is running. The control of the train is effected by means of electromagnetic apparatus. The contactors are worked by alternating current magnets and operate practically sparklessly, requiring very little current. The various contactors are so connected by a simple lever arrangement that short-circuiting of single transformer coils can never take place. The operation of the contactors can be effected from either end by means of a master controller. The control current is taken from the lighting transformer. The regulation of the motors is effected in the usual way. Only four contacts are needed for each motor, although it is possible to work with seven in all. Of the eight contacts two are always in circuit. The secondary winding of the main transformer is divided

into two parts, which are so connected with the two motors that each motor and one part of the winding alternates both motors and the two halves of the winding making up one series circuit. Each motor, therefore, takes the same current, while the sum of the voltages in the two transformer windings is divided equally between the two motors. The four voltages obtainable from the first winding are 116, 175, 244 and 314 volts, while from the second winding they are 151, 210, 280 and 361 volts. On the first stop the two voltages of 116 and 151 volts are obtainable; the sum of these is 267, half of which is applied to each motor. It should be noticed that on account of this special switching arrangement and in spite of the series connections, there is never between any two points of the circuit a higher potential than in parallel working. In the motor circuit is also connected a special transformer with a ratio of transformation of one to one. The two ends of the primary of this are connected to one end of the motor's windings, and the two ends of the secondary to the others. The idea of this transformer is a double one; firstly, to enable one motor to be cut out in case of damage, and secondly, to prevent the circuit being wholly broken by the opening of the contactor. In this case the motor on which the contactor has opened receives its current from the secondary winding of the above transformer.

When two or more motor cars are coupled together the controlling current is passed along the train by means of flexible cable, which is fixed to special plugs on the car ends. For testing the lighting and the compressor circuits the cars are fitted with plugs by means of which current at 300 volts or 80 volts can be supplied to them.

At the present writing 52 trains are running during a working day of 16 hours. In the summer it is expected that 160 trains will run a day.

The whole of the electric equipment of this line was supplied by the Siemens-Schücker Company of Berlin.

STEEL IN FREIGHT CAR CONSTRUCTION.

BY C. A. SELEY,

Mechanical Engineer, C., R. I. & P. Ry.

In the history of American railway car building and especially of freight cars, it is found that steel did not play an important part as a body material until very recent years. Iron and steel have always been used for bolts, rods and other fastenings, but wood has been the principal material for the framing, flooring, lining and roofing of the majority of cars. Wood was first displaced by iron or steel in the truck construction and side frames; cross frames and bolsters have been successively changed so that now wood is seldom found in modern freight car trucks. In car bodies steel was slower in obtaining recognition and use in lieu of wood; first in bolsters and then gradually into the sills and framing.

There is very little authoritative literature on freight car construction. It is mainly found in technical journals, club and society proceedings, and the M. C. B. Association standards and rules which have undoubtedly contributed most to the uniformity of car design in its general features.

In the designing of wooden cars, particularly those having superstructures, it was the common practice to provide for the carrying strength in the underframing and not depending on the superstructure framing for carrying any part of the calculated load. Not only was this the general practice of car designers and builders but the principle has been discussed and approved at railway club meetings which are on record.

The writer could not agree to this theory of design as applied to general car construction. It might be advisable as regards ordinary house cars of wood construction, but with other types of cars, particularly those presenting an unbroken side, such as flat bottomed or hopper gondolas, there is such an opportunity presented for a truss or a plate girder of proper depth as to give any strength required with a minimum of

material. The writer has since tested the same principle to apply in house car designs. There was no opportunity to make a demonstration of this belief that the stiff framing of a car could be successfully used in carrying a considerable proportion of the load until the year 1900, when an mechanical engineer of the Norfolk & Western, he designed a steel framing for a 40-ton flat-bottomed, drop-door gondola, using steel for floor, side and end lining. Five hundred cars were built at that time and 2,500 cars two years later, thoroughly and successfully demonstrating the principle involved.

The photographs show the design of these cars, using channel center sills, built-up body bolsters and trussed side framing made of standard sections of angles, channels, etc. Fig. 1



Fig. 1—N. & W. Composite Drop Bottom Gondola.

is of a completed car with load and was the first one of this kind and series ever built. Figs. 2 and 3 show the steel framing before the application of the wood floor and lining. Attention is called to the neat, trim appearance of these cars, the readiness with which they can be inspected, their light weight, yet withal a stiff, stanch construction. Drawings and description of the first car were published in the *American Engineer and Railroad Journal* of April, 1900, and also in other papers.

Following the successful application of the trussed side frame to the flat-bottom gondolas, designs were made for hopper cars which have been copied more or less exactly in many thousands of cars on various railways. Fig. 4 is of a steel underframe with wooden stakes and box, designed before the writer's connection with the road owning them and a lot of 1,000 were built with which we had some varied experiences. There being nothing on the diagonal except the chute planks, these had to take the full effect of fore and aft movement of the body when shocks occurred in trains of these cars when empty, and we had the fastenings of these planks fail in large

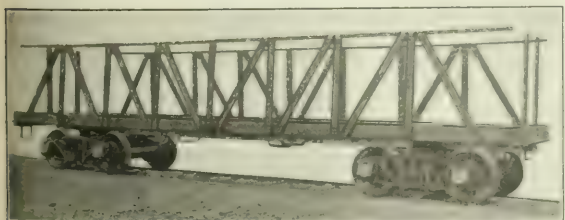


Fig. 2—Side View, Framing of N. & W. Composite Drop Bottom Gondola.

numbers, so as to require a modification that would permit a certain amount of swing. When loaded the wedge effect of the load did not permit the movement which so strongly manifested itself in cars running empty.

After our experience with the trussed-side, flat-bottomed gondolas, shown in Figs. 1 to 3, it was determined to apply the principle to the hopper design, which resulted in the car

Fig. 3, this photograph being of the first car of the design and series ever built. It will be noted that there is an open center panel and that several of the vertical members are extended below the bottom chord of the truss to assist in carrying the door supports. The steel frame work for one of these cars is shown in Figs. 6 and 7. Drawings and descriptions were first published in the February, 1901, issue of the *American Engineer and Railroad Journal*, and also in other papers.

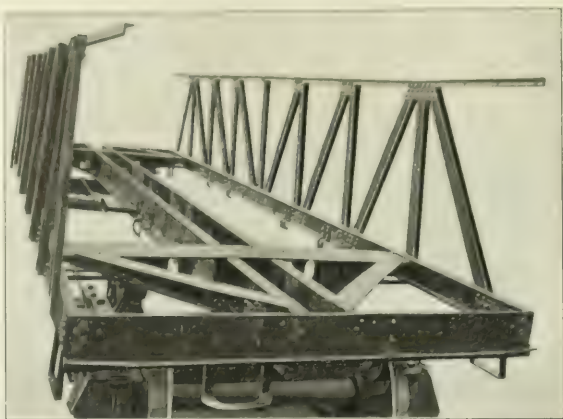


Fig. 3—End View, Framing of N. & W. Composite Drop Bottom Gondola.

The Delaware & Hudson copied the truss side feature, but with a different door arrangement; the steel frame is shown in Fig. 8, and a completed car in Fig. 9.

Ordinary bridge truss formulas were used in calculating the foregoing Norfolk & Western designs and subsequent performance shows these to have been properly used. In 1902 it was determined to build some box cars with complete steel framing, but with wood flooring, lining, sheathing and roofing. Box cars have side doorways, which do not permit of an uninterrupted truss. The center panel of the Burr truss of five panels which most closely approximates car framing is filled with an X-bracing which serves to carry over to the other side strains resulting from unsymmetrical loading of the structure. We must, however, leave the side doorways of the box car clear openings and just how to take care of the shear in case of unsymmetrical loading was first to be settled.



Fig. 4—Steel Underframe Hopper with Wooden Stakes and Box.

A wooden model of the side frames was made on a scale of 1 in. equal to 1 ft. The posts and braces were notched over sills and plates and the latter was reduced so as to have no strength as through members or sills. A floor was laid and the whole structure mounted on the bolster bearings. A silk line was stretched and marks made for indicating deflection. The floor was then covered with cast iron washers and although the com-

plete model weighed but 2 $\frac{3}{4}$ lbs., it sustained over 200 lbs. of loading. The load was then removed from the ends which resulted in increasing the center deflection.

A considerable number of unsymmetrical arrangements of the load were tried and the gaging points on the frame showed the "S" curve, indicating shear in the center panel, but from deductions assumed from the results of these tests, use of some formulas on models and other calculations it seemed as though the X-bracing in center doorways might be omitted if the top and bottom members were slightly reinforced. As a matter of fact, however, the sections used in these side trusses are excessive for the strength required in order to have thickness of material that will stand the wear and corrosion in railway service, and as



Fig. 5—N. & W. Composite Hopper Car.

some of the members are combined in the structure for other purposes as well, it is not difficult to get proper strength to resist shear in the doorway.

The first box cars built after this fashion proved that the calculations were correct and now many thousands of steel-frame box cars, stock cars, and other house cars have demonstrated the feasibility of the design.

The writer regrets not having a photograph of the very first steel-frame box car built from the design, but one from a later series is shown in Figs. 10 and 11. The open center panel at doorway in the sides may be particularly noted; and it will be noticed that in a general way there is a consistency and similarity in all the designs whether hopper or flat-bottomed gondolas or for box or other house cars.

Fig. 12 represents a complete steel-frame box car, and the only way to identify its construction is by the absence of truss rods under the car and its clear, open appearance, facilitating inspection and examination. This car is of the American type

end wooden lining 1 $\frac{1}{4}$ in. thick, making an end construction that cannot be approached in wood construction. A new design of furniture car was built along these lines, 40 ft. long, 9 ft. wide and 10 ft. high, in which the side doors are each offset 27 in. from the center line. This is to facilitate loading of automobiles and other vehicles. It was somewhat of a problem to the designer, as it called for unsymmetrical

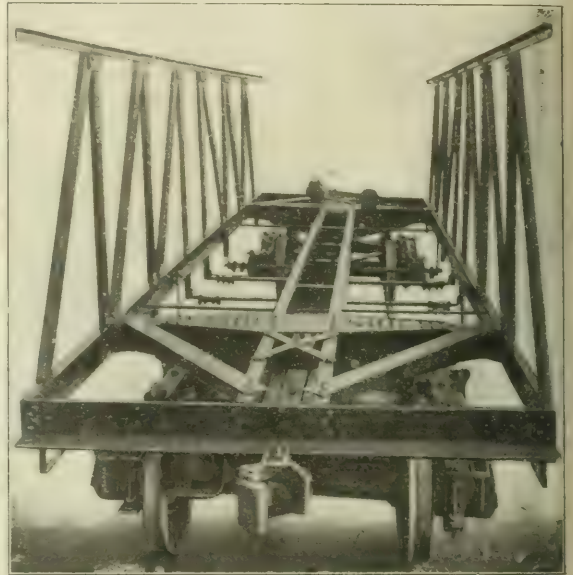


Fig. 7—End View. Framing of N. & W. Composite Hopper Car.

side framing and a diagonal connection in the underframing between door posts.

There are over 6,000 box cars of this design in service on the Chicago, Rock Island & Pacific and the St. Louis & San Francisco. These cars are 40 ft. long inside by 8 ft. 6 in. by 8 ft., and as the 4 ft. of extra length goes in between the bolsters the car is quite as strong laterally as those of the standard length of 36 ft. made up of similar sections. The



Fig. 6—Side View. Framing of N. & W. Composite Hopper Car.

very American design, 40 ft. long by 8 ft. 6 in. wide by 8 ft. high, inside measurements.

The 13 is another complete and more up-to-date box car, a later design, and a somewhat more complete than Figs. 10 and 11 in showing the steel girders in side and end. These assist materially in holding the ends of the car to resist the shock of shifting loads. The corner and end intermediate posts are firmly riveted top and bottom and with an inside



Fig. 8—End View. Framing of D. & H. Composite Hopper Car.

Norfolk & Western steel frame box car was first described in the May, 1902, issue of the *American Engineer and Railroad Journal*, and also in other papers.

Fig. 11 shows a stock car which is an interesting example of this type of construction. The wooden slats are secured to the inside of the steel frame, leaving the latter outside and exposed.

A number of designers have used steel underframes for

freight cars, placing thereon a wood superstructure. In the case of house cars, however, there are few reasons why a complete steel frame is superior to the above arrangement. Any steel frame is designed to work within small limits of deflection, while the wood structure cannot be so utilized so that the two do not combine well. The requirements of a system



Fig. 9—D. & H. Composite Hopper Car.

tram service are better met by steel framing, as it is almost impossible to so frame an end for a wooden car that it will successfully stand the shocks in switching and road service. Steel framing also resists bulging of the sides as the tension members are given a bowstring effect by the loading. Steel frame cars do not sag, sway or work so as to require the constant tightening up, renailling, etc., as is necessary on wooden cars. It is now very difficult to find lumber at all suitable for car framing and the prices have equalized so that steel can be used for framing at about equal or better cost than wood. As to whether we should go further than that in the use of steel is a question to be decided by local conditions. Lumber is still available for flooring, lining and covering, and probably will be for some years.

Considerations of weight and strength are of much interest in car designing and especially so in introducing steel wholly or in part in place of wood. Composite construction particularly favors economy of weight in open cars, giving high percentage of revenue load with low dead weight and the advantages of strength and durability. In steel frame house cars, however, these percentages of revenue load are necessarily lower, as the proportion of wood is higher than in open cars, this for roofing, lining and sheathing, and the nailing strips for securing them. The well-designed steel frame box car need not weigh more than a well-designed wooden car and be a better, stronger and longer-lived car. The economical ap-

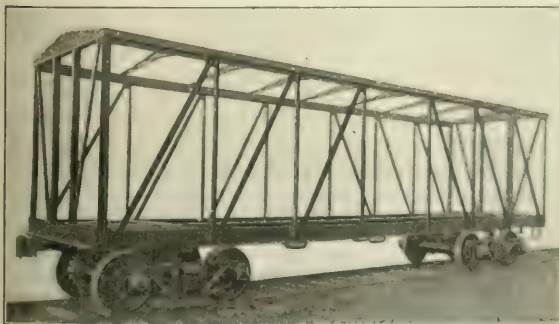


Fig. 10—Side View, Framing of Composite, Steel Underframe Box Car.

plication of wood for lines, nailing strips and fillers is the more difficult part of the design of steel framed house cars in order to keep the weight down and still offer an adequate fastening surface to which to nail sheathing and lining.

Extensive use of cars of these types of construction has developed considerable information of interest. The cost of

expense of freight cars is not generally divided on railway into different detail to show the comparative costs for wooden and for steel or composite cars, but such information as we have is greatly in favor of the steel framed cars. In heavy repairs of wooden cars the cost may be divided into from two-thirds to three-quarters for material and from one-quarter to one-third for labor. When steel is used for framing the proportions are reversed, the larger part for labor and the lesser for material. In other words, the steel is again usable even though more or less damaged. Shocks which would break wooden members so as to require their replacement would in most cases merely bend or distort a steel one, which may be readily straightened and returned to service. A badly wrecked steel frame car looks rather discouraging to one not accustomed to handle such matters, but experience has shown this not to be as bad as it seems. Hand methods have been

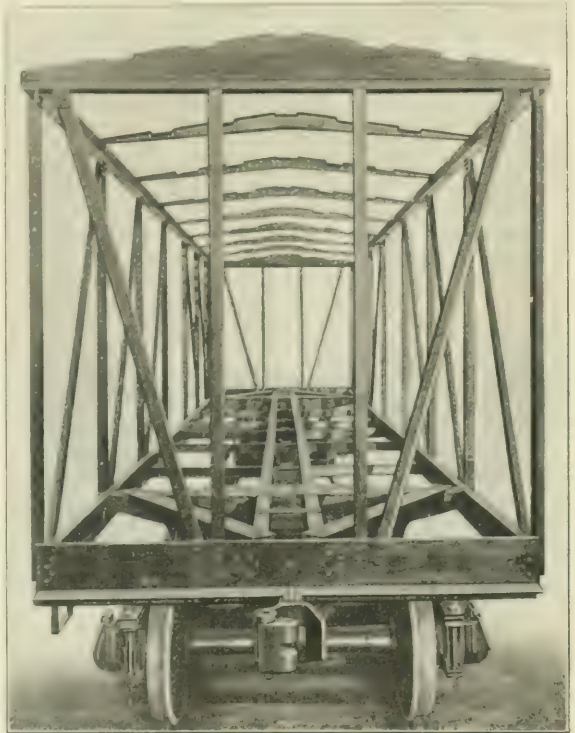


Fig. 11—End View, Framing of Composite, Steel Underframe Box Car.

found most available in handling work of this character, as machinery is of little avail, except in manufacture.

Freight cars get very rough usage and have to stand severe shocks, and oftentimes these are cornering or diagonal, which at the time may not break the wooden car, but result in its springing back and concealing the damage. The steel frame car under these conditions will sometimes yield and stay bent laterally and act as a tell-tale of unfair usage. There is a considerable question as to how far to go in providing lateral strength and stiffening in a car frame. If we consider the strength required for the vertical stresses of loading and impact, we naturally get a proportion of lateral stiffness from the flanges of the channels or other sections used for sills. The crossbearers, bolsters and fastening of the floor serves to bind the bottom framing so as to give considerable lateral strength. There has been some criticism as to lateral weakness of some steel frame box cars which are amply strong for carrying their load in normal operation, but will not stand

severe cornering shocks without distortion, which occurs between the bolsters. It has been found that in most cases these distorted cars can be jacked back to straight lines without the necessity for cutting them apart, and in view of the cheapness of this class of repair it would seem to indicate a desirable economy in the original construction rather than a justification for an additional expenditure for stiffening the frame.

For instance, if these cars are built with a steel side frame and with two-channel center sills not cover-plated but spacer-bolted and riveted to bolsters, crossbearers and end plates, if the center sills by calculation show sufficient strength for carrying their proportion of load, a cover plate would only give an advantage of a certain amount of lateral stiffness. Such a cover-plate would cost, say \$12 per car, and if we are to build 1,000 cars it amounts to \$12,000 for a partial insurance against lateral distortion, as it would not be a complete one. If we should have a dozen distortions a year, and that would be a large proportion for 1,000 cars, they could be repaired for a hundred dollars or so. We can afford to do this each year for the life of the 1,000 cars, and still have a large proportion of the cost of the cover-plating. During the consideration of a certain design it was proposed to splice the sills at the bolsters as this was thought to favor repairs in the case of end damage. It was found that it would cost \$2 more per car than if the sills were run through solid to the ends. On 1,000 cars this would cost \$2,000 and the number of these cars receiving end damage, the repair of which would be facilitated by a splice in the sills, would be so small as to be insignificant and the expenditure almost a total loss.

It is our conviction, therefore, that simple, direct methods



Fig. 12—N. & W. Composite, Steel Underframe Box Car.

of design, looking towards such strength as may be required for normal operation, with such reserve as may be necessary for waste, wear and corrosion to cover average life, will give best economic results, and to provide for more than that adds unnecessary weight and cost for which there is not adequate return.

The question may be raised that if steel is such a good thing for the frame of a car why not cut out the wood altogether and have a complete steel car? This is undoubtedly true in regard to some classes of cars and in some localities. Results so far obtained with all-steel box cars are not favorable. They are excessively hot in hot weather and to an extent that will damage some classes of lading, and as box cars are required to carry all classes of commodities, this feature is prohibitive of all-steel box cars. In cold weather or when exposed to great changes of temperature, steel cars will condense the atmospheric moisture and cause the corrosion called "rust" and this is also prohibitive on account of many classes of lading, which require clean, dry storage when in transit.

For open cars, to which the above objections do not apply, the choice of all-steel or composite construction is governed by service and cost conditions. On roads serving industries where there is a large proportion of hot lading, as at rolling mills, foundries, etc., when hot materials are frequently loaded

direct into cars, all steel construction is the better proposition. If such conditions do not prevail, then the comparative cost of all-steel and of composite construction, together with consideration of repair facilities, may be taken into consideration. It has been amply proven that the questions of weight, percentage of revenue load, cost and facility of repairs, dura-

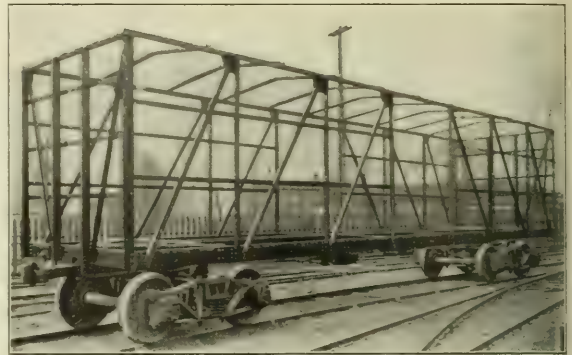


Fig. 13—Side View, Framing of Composite, Steel Underframe Box Car.

bility and general reliability can be as strongly claimed for composite construction as for all-steel when both have an equal weight of other factors affecting the question. Many designs of all-steel cars have given magnificent results, and it is not the intention to detract from their merits. At the same time, having been concerned in the development of the composite construction of freight cars that has grown to considerable proportions, the writer has welcomed this opportunity to present for your consideration some of the features of a very interesting development in railway transportation.

Neither the writer nor anyone connected with the Norfolk & Western made any attempt toward patenting the car designs made by him. It is now several years since they have been public property, and they have been very extensively copied by railways, car companies and others, the only returns to the writer being a sense of satisfaction and pride of achievement as a successful designer. Papers describing and illustrating these theories of car construction have been contributed to the railway press or to railway clubs, some of these being as follows: Paper read before the Richmond Railway Club, May 8, 1902; paper in the *American Engineer and Railroad Journal*, January, 1903; paper read before the Western Railway Club, March 15, 1904; address to students of Purdue University, April 11, 1905.

It is now nearly 10 years since the first developments on the

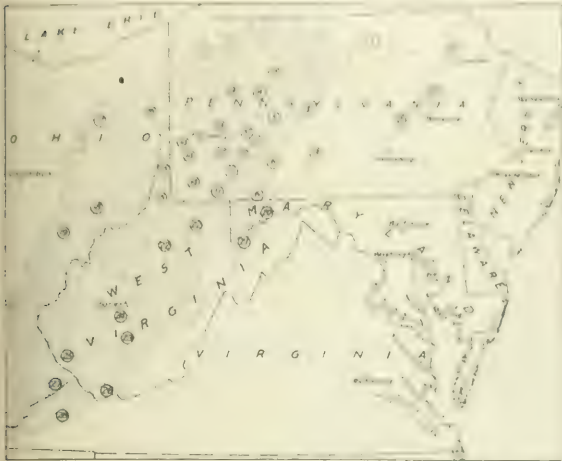


Fig. 14—D. & R. G. Composite Stock Car.

lines described above, and while the freight equipment of the country is still largely of wooden construction, the new cars that are being built are mainly with steel used to a very considerable extent in their framing and the tendency is very considerably on the lines which have been indicated of composite construction.

THE NORTHERN APPALACHIAN, RHODE ISLAND AND NOVA SCOTIA COAL FIELDS.

The report of the fuel committee of the British Committee of Commerce, portions of which have appeared in various issues of the *Railway Age Gazette*, describes the coal districts in the Northern Appalachian, Rhode Island and Nova Scotia coal fields. The given production is the approximate



Appalachian Coal Fields of the United States.

average tonnage produced for the past three years, and the number of mines is the approximate number in operation.

PENNSYLVANIA FIELD.

NO. 1. TIOGA COUNTY OR BLOSSBURG DISTRICT

Production, 800,000; number of mines, 15.
Originating railways—Erie; New York Central.
Coal has been mined for many years from this district with but little change in the output. The coal under the trade name of Blossburg has been largely used for smithing purposes. Through rates by the Erie to N. Y., N. H., & N. J. points.

NO. 2. ANTHRACITE FIELDS.

Production, 75,000,000; number of mines, 650.
Originating railways—Central of New Jersey; Delaware & Hudson; Delaware, Lackawanna & Western; Lehigh Valley; New York, Ontario & Western; New York, Susquehanna & Western; Pennsylvania Railroad, and Philadelphia & Reading.

The smaller sizes of anthracite, which include No. 2 and 3 buckwheat, bird's-eye and screenings, are the only ones used to any extent in New England for the generation of steam. The size of the mesh through which the coal is passed to get the various sizes of anthracite is given as follows:

- No. 2 Buckwheat or Rice through $\frac{3}{8}$ -in. diam., over $\frac{1}{2}$ -in. perforations.
- No. 3 Buckwheat through $\frac{1}{2}$ -in. diam., over $\frac{3}{4}$ -in. perforations.
- Bird's-eye through $\frac{3}{4}$ -in. diameter, over $\frac{1}{2}$ -in. perforations.

NO. 3. BROADTOP DISTRICT.

Includes Bedford and Huntingdon Counties.

Production, 1,200,000; number of mines, 40.
Originating railways—Huntingdon & Broad Top Mountain, and East Broad Top, which connect with the Pennsylvania.

Most of this coal is used for steam purposes, but some coke is made. Three different seams are mined. This coal is low in volatile, and is used for the prevention of smoke. It is usually more lumpy than other semi-bituminous coal.

NO. 4. CLEARFIELD DISTRICT.

Includes Clearfield and Center Counties.

Production, 7,000,000; number of mines, 230.
Originating railways—Penn.; N. Y. C.; B., R. & P.
The coal coming from the eastern part of this district contains about 15 per cent. volatile, while that from the western part runs as high as 28 per cent. volatile. The production is chiefly from the five seams, and has shown little increase

in the past 20 years. While some of the coal is used for making the majority is used as a steam and locomotive fuel.

NO. 5. CAMBRIA COUNTY.

Production, 13,000,000; number of mines, 120.

Originating railways—Penn.; N. Y. C.; Balt. & Ohio.

The district known as South Park lies in the southeastern part of this county. Most of the mines are located on the Pennsylvania. There are five seams mined, but the tonnage from the "B" or Miller vein is the largest. There is considerable range in volatile. This coal is generally used for steam and bunkering purposes.

NO. 6. SOMERSET COUNTY.

Production, 6,500,000; number of mines, 80.

Originating railways—Baltimore & Ohio; Pennsylvania.

The production of coal has greatly increased during the last 10 years.

The Quemahoning district is located in the northwestern part of this county and the Meyersdale in the southern part, near the Maryland line. The coal from the six seams which are being worked is used almost entirely for steam purposes.

NO. 8. JEFFERSON COUNTY.

Or the Reynoldsville District.

Production, 4,700,000; number of mines, 50.

Originating railways—B., R. & P.; Pennsylvania.

This coal is higher in volatile than those lying further east, and is less used in New England as a steam coal. It is much used for locomotives and for power plants requiring a fast burning coal, which are not much restricted in regard to smoke. Three or four seams are worked.

NO. 10. INDIANA COUNTY.

Production, 6,000,000; number of mines, 70.

Originating railways—Penn.; N. Y. C.; B., R. & P.

Five seams are being worked, and the production has increased rapidly in the last 10 years. The character of the coal is very similar to that mined in the central and western parts of Clearfield county.

NO. 11. WESTMORELAND COUNTY.

Production, 27,000,000; number of mines, 160.

Originating railways—Pennsylvania; Baltimore & Ohio.

Westmoreland county is divided into three general districts—Connellsville-Latrobe basin, the Greensburg basin and the Western or Pittsburgh district. The coal from the latter is largely used for the manufacture of gas, and therefore not considered in this report. The coal from the other two districts is largely used for making coke, but some of it goes to New England for locomotive fuel and power plants.

There are four groups of freight rates which are not divided according to the mining regions. Group V of Pennsylvania has a \$1.25 rate to Philadelphia (same as the Clearfield, Cambria and Somerset rate), and includes all mines from the eastern part of the county to Latrobe on the Pittsburgh division, and to Tunnelton on the Conemaugh division. Group VI of Pennsylvania, or \$1.35 rate to Philadelphia, applies to all mines on the main line and branches of the Pittsburgh division between Latrobe and Radebaugh, but only to Youngwood on the Southwestern Pennsylvania branch. It also includes the Conemaugh division from Tunnelton and Apollo. Group VII of Pennsylvania, or \$1.50 rate to Philadelphia, applies to all mines in the county on the Baltimore & Ohio, and to those on the Pennsylvania that lie in the district from which coal is shipped for gas purposes. This includes all mines on the Pittsburgh division and branches between Radebaugh and the western county line, as well as New Station, Hunkers and Yukon on the southwestern Pennsylvania branch, and all mines between Vandergrift and Kisiminetas junction on the Conemaugh division. Group VIII of Pennsylvania, or a \$1.65 rate to Philadelphia, applies to the remaining mines of this county, which are located in the lower end of the Latrobe-Connellsville basin.

NO. 14. PITTSBURGH DISTRICT.

Includes Allegheny, Washington, Fayette and part of Westmoreland County.

Production, 72,000,000; number of mines, 350.

Originating railways—Pennsylvania; Baltimore & Ohio; New York Central.

This coal comes largely from the Pittsburgh seam, and is high in volatile. It is little used in New England for steam purposes.

There are two groups of freight rates from this district. Group VII of Pennsylvania, or \$1.50 rate to Philadelphia, applies on coal shipped from all mines on the Pittsburgh division between Westmoreland county line and Wilkinsburg. All other mines on the Pennsylvania in Allegheny, Washington and Fayette counties are in Group VII of Pennsylvania, which has a \$1.65 rate to Philadelphia for tidewater shipment. The coal originating on the Baltimore & Ohio takes the same rate as Group VII, but also receives coal from the Pennsylvania in Fayette county known as the Klondike district, where the higher rate of Group VIII applies. Coal originating on the Pittsburgh Terminal Railroad and turned over to the Baltimore & Ohio for tidewater shipment takes the same rate as Group VII.

MARYLAND FIELD.

NO. 20. GEORGES CREEK.

Production, 4,500,000; number of mines, 65.

Originating railways—Cumberland & Pennsylvania; Georges Creek & Cumberland; Western Maryland.

This coal comes from five or six different seams, but the Pittsburgh seam, or "Big Vein," produces about 70 per cent. of the Maryland tonnage. This vein is from 9 to 14 ft. in thickness, and is also mined in the Pittsburgh, Westmoreland, Connellsville and Fairmont districts and to some extent in Indiana and Somerset counties.

The ash from this coal gives very little trouble from clinker, and the coal has the reputation of being little liable to spontaneous combustion and of being very uniform.

The majority of the coal which goes to New England is shipped by tidewater from Baltimore, Philadelphia and Washington. At the present time coal from the "Big Vein" carries a 15-cent higher freight rate than does the coal from Somerset, Cambria and Clearfield counties, Pa.

WEST VIRGINIA FIELD.

NO. 21. UPPER POTOMAC.

Includes Mineral, Grant and Tucker Counties.

Production, 1,800,000; number of mines, 40.

Originating railway—Western Maryland.

The analyses of coal from this district, given in the report, include the coal from the Georges Creek district, which is mined in seams other than the "Big Vein," while the "Elk Garden" from Mineral county has been included with the Georges Creek. This coal lies in the same basin as the Georges Creek and in character is similar, but the volatile increases towards the southern end of the basin.

NO. 22. FAIRMONT DISTRICT.

Includes Marion and Adjacent Counties.

Production, 7,400,000; number of mines, 100.

Originating railway—Baltimore & Ohio.

The greater part of this coal comes from the Pittsburgh seam; it contains from 35 to 40 per cent. volatile, and is largely used for the manufacture of gas and as a locomotive fuel. It is, however, little used in New England for steam. The average analyses given show over 2 per cent. sulphur, but in some parts it is much lower.

NO. 23. NEW RIVER DISTRICT.

Includes Raleigh and part of Fayette County.

Production, 5,500,000; number of mines, 130.

Originating railways—Chesapeake & Ohio; Virginian.

Nearly 50 per cent. of the coal produced in this district goes to New England for steam purposes. The coal varies in volatile from 18 per cent. in the southeastern part to 23½ per cent. in the western part. Three seams are mined, but the majority of the coal produced comes from the Sewell seam.

NO. 24. KANAWHA DISTRICT.

Includes Kanawha and part of Fayette County.

Production, 7,000,000; number of mines, 200.

Originating railways—Chesapeake & Ohio; Virginian.

Only a small percentage of the coal from here goes to New England. This coal is mined from about 12 seams, and varies from about 24 per cent. to 36 per cent. in volatile. Some of it is used for gas and the rest largely for steam and domestic purposes. The coal shipped to tidewater from mines on the Virginian and the Chesapeake & Ohio east of Carbondale carry \$1.40, or same as New River district, while all other mines have a 10 cent higher freight rate.

NO. 25. THACKER DISTRICT.

Mingo County.

Production, 1,800,000; number of mines, 40.

Originating railway—Norfolk & Western.

Most of this coal goes west for steam and locomotive fuel. It is high in volatile, about 30 per cent.

NO. 26. POCAHONTAS DISTRICT.

Includes Mercer and McDowell Counties.

Production, 10,000,000; number of mines, 130.

Originating railways—Norfolk & Western; Virginian.

This coal is similar to that of New River, but as a rule is lower in volatile and sulphur and a little higher in ash. Over 10 per cent. of it is brought to New England by tidewater for steam purposes. Much of it is also used for the manufacture of coke, as the low sulphur makes it suitable for this purpose. Three different seams are mined but the majority of coal produced comes from the No. 3 seam.

About 1,000,000 tons additional are mined in Tazewell county, Va., which belong to this district.

NO. 28. CLINCH VALLEY DISTRICT.

Wise County.

Originating railways—Norfolk & Western; Carolina, Clinchfield & Ohio.

This is a comparatively new field, and probably never will be a great factor in the New England market, on account of its high volatile, as it contains about 30 per cent.

RHODE ISLAND.

While coal was mined from this district almost 100 years ago it has had little bearing upon the fuel supply of New England. At one time this coal was used to some extent for the smelting of foreign copper ore, but for many years the mines have not been operated on a commercial basis. Tests have been made from one car of coal shipped from Cranston to the United States Fuel Testing Plant at St. Louis, the results of which are given in Bulletin No. 332 of the U. S. Geological Survey. [See full page table of analysis, *Railway Age Gazette*, June 24, 1910.]

NOVA SCOTIA.

There are three principal producing districts in Nova Scotia: (1) Cape Breton, Inverness and Victoria counties; (2) Pictou county; (3) Cumberland county. Some of the mines are at tidewater, and all are within 30 miles of the coast. The total production is about 6,000,000 tons per annum, and New England receives nearly 12 per cent. of it.

It will be noted that the total production is no more than that of many single counties in Pennsylvania, and a large part of its production will undoubtedly always find a market in Canada. Nevertheless, the manufacturers of New England, and especially those receiving coal at the northern tidewater discharging ports, should consider Canadian coal among the possible fuels and determine its relative price and value. Some manufacturers consider this coal very inferior, having formed their opinion at some such time as the anthracite strike in 1902-03, but the coal received from any district under emergency conditions is not likely to be representative of the coal that is normally produced. Nova Scotia coal contains about 30 per cent. volatile, and while the ash in the slack is higher than most Pennsylvania and West Virginia coal coming to New England, it can be burned in plants properly equipped. The present duty on this coal is 15 cents per ton for slack through ½-in. screen, 45 cents per ton for larger sizes, and 20 per cent. on coke. Before the passage of the Payne tariff law the duty on the larger sizes was 67 cents per ton, while that on slack and on coke was the same as at present.

General News Section.

The New York, New Haven & Hartford has made an increase of 6 per cent. in the pay of seven thousand organized employees.

Chicago is one of the great centers of the widespread outcry against railways, although business is leaving Chicago because the railways have been unable to provide for terminal improvements.—*J. J. Hill*.

A press despatch from Montreal says that the officers of the Canadian Pacific have reached an agreement with the employees of that road who, it was announced last week, had refused to accept the award of arbitrators in the matter of wages.

In the offices of the Southern Pacific at Houston, Texas, there are now in use 16 phonographs for recording letters dictated by the officers, taking the place of stenographers. The auditing department has four of the machines; the freight department eight, and the freight traffic department four.

A dozen cases charging various railways of Indiana with violations of the state law concerning safety appliances have just been placed in the hands of the attorney-general by the railroad commission with direction to bring suit to enforce the penalties. Virtually all of the important roads operating in the state are included in the list.

F. W. Whitridge, receiver of the Third Avenue (surface) Street Railroad, New York City, has increased by two cents an hour the pay of all of the conductors, motormen, inspectors and starters employed by the company. In the announcement of this increase of pay, Mr. Whitridge says that the receipts of the company during the past year have been greater than had been expected.

The Interstate Commerce Commission is said to be as anxious as the railways or shippers to have the rate advances agreed to before taking effect, because it already is so far behind the docket that otherwise it could not hope to see daylight for a year longer. A fine precedent will be established if the traffic heads of railways and large shipping concerns can be taught the wisdom of conferring with one another freely in advance of important changes in rates. A long suspense over rates, especially when accompanied by litigation and a free-for-all scolding match, has the same effect upon general business as an impending revision of the tariff.—*Exchange*.

The railways of the southeastern states, following protracted conferences under the guidance of the government mediators, Messrs. Knapp and Neill, have agreed that their conductors and trainmen should have an increase of wages. Following the final conference with the mediators last Saturday the vice-president of the conductors announced the basis of the new rates as follows: The increases will be allowed in two installments. The first is dated back to take effect from July 1 and the other is to go into effect next April 1. The following are the new rates per 100 miles: Conductors of passenger trains from \$2.20 to \$2.50, and on April 1, 1911, \$2.75. Baggage masters from \$1.10 to \$1.35, and later, \$1.55. Passenger flagmen and brakemen from \$1 to \$1.32; later, \$1.50. Conductors of through freights from \$3.18 to \$3.55; later, \$3.75. Brakemen and flagmen on through freights from \$1.75 to \$2.35; later, \$2.50. Conductors on local freights from \$3.80 to \$4.15; later, \$4.25. Brakemen and flagmen on local freights from \$2.30 to \$2.63; later, \$2.75.

A verdict for \$8,000 has been given by a jury in the supreme court of Long Island City to John Kasczak, who sued the Central Railroad of New Jersey to recover damages for the loss of a leg five years ago in a freight yard at Penobscot, Pa. This was the fifth time his suit has been tried. How long are we to have such a state of things? Five trials, and five years, to determine the liability of a railway company to a man who has been run over by a freight train and had his leg cut off! The thing is monstrous, whatever the explanation. No system of law administration can prevent the possibility of error, but

any rational system must see to it that a decision, and a decision on as satisfactory a basis as can reasonably be demanded, shall be rendered in a reasonable time. It is preposterous to drag a case like this out for five years; if the truth of it cannot be properly adjudged in a few months, it cannot be properly adjudged at all. To leave the law's delay what it is in this country is a standing reproach to the nation, and especially to the legal profession.—*Evening Post*, New York.

Wages on the Pennsylvania.

The conductors and trainmen of the Pennsylvania Railroad are asking for increased pay, and it is said that votes are being taken in both of the brotherhoods. The men frankly say that the Pennsylvania heretofore has paid higher wages than can be had on other roads, and that this policy ought to be continued. The company, in reply, asks them if it is fair that, because of this good treatment accorded the men in the past, the company should now be punished. In the past, the company has treated its employees "as liberally as its finances would permit." Now other roads have brought their rates of pay up more nearly to a parity with those on the Pennsylvania; but the Pennsylvania, on 90 per cent. of its traffic has to compete with these other roads.

The Philadelphia *Public Ledger* commenting on the situation says:

"Of course, it is well understood that the attitude of the Pennsylvania Railroad management with respect to certain of the demands of the railway brotherhoods which affect the question of authority and discipline is a tender point with the labor leaders, and there is always the possibility that a lack of tact or good judgment on either side in the adjustment of some minor differences may precipitate a struggle over the major question now kept in the background. . . . The existing differences as to the trainmen's hours and wages present no justification for a strike, and if one should be declared the men would be totally in the wrong from the outset."

Railway Travel in Turkey.

There is a very interesting railway ride from Salonika to Constantinople, but you have to get up at 4 o'clock in the morning. Nevertheless, there are compensations. The scenery through the Rhodopo Mountains and along the shore of the Aegean Sea is picturesque. For 20 miles or more the track follows the gorgeous canyon of the Karosha river, which will remind you of the Royal Gorge in Colorado. Although there is a prejudice against Turkish railways as a rule, the line from Salonika to Constantinople is beyond criticism, so far as construction and equipment are concerned. Everything is new—new cars made in England that are very comfortable; new locomotives made in Germany, new stations, clean and neat, and the track is first class, with 60-lb. rails and steel ties. The schedule, however, is very slow. It took us more than 25 hours to make a little more than 300 miles. However, you never get tired of watching the Turks. They are very entertaining people. There were many Turkish women traveling, all wrapped up in shawls and veils. The conductor turned six men out of a compartment and made them hunt other places on the train because a veiled lady appeared at one of the stations with a second-class ticket. And the men submitted with resignation, although some of them were compelled to stand up until places were vacated at stations farther on. There were many veiled women traveling third class, usually attended by some man. When a Turkish woman boarded or left the train she usually had 40 curious looking bundles thrown in or out after her. There were eating stations at several places, and bread, hard-boiled eggs and fresh lettuce are peddled at every stop. We were forcibly reminded of the revolution in Albania by the train loads of soldiers that we met at almost every station between Salonika and Constantinople. The insurrection is supposed to have been entirely suppressed, but there were guards at all the tunnels along the rail-

way and at all the bridges, and looking out of the window as the train swept by there was almost always a sentinel patrolling the right of way to keep the track from being blown up by the Albanians, who would like nothing better than to send a train load of Turks to eternity with dynamite.—*Chicago Record-Herald*.

The Union Station Situation at Chicago.

Plans for the new Union station in Chicago have not yet been decided on. By interviews with officers of the lines directly interested it has been learned that while tentative plans have been agreed on and it is believed that an expenditure of about \$25,000,000 ultimately will be made, matters are a long way yet from settlement.

Some of the roads are merely tenants of the building now used. The Pennsylvania proposes that all the roads using the new station shall become joint owners of it. This would involve deeding of certain land now owned by these tenant roads, and in view of the fact that the property in question is extremely valuable and is in different parts of Chicago, speedy action is not expected.

A new complication has been developed by the opposition of the Chicago Association of Commerce to a permit for bridge spans of 140 ft. over the Chicago river. A minimum clear span of 200 ft. is demanded, which may involve the reconstruction of a number of bridges already spanning the river, and would compel the Pennsylvania to give up 60 ft. of the proposed station grounds on which to build abutments for a bridge at Van Buren street. This would practically mean the narrowing of the station site by cutting off a strip 60 ft. wide along the entire length.

It is believed that the question of the bridge spans will be settled shortly, and with this complication removed the way to an early agreement on the question of joint ownership would be somewhat cleared. The roads interested are the Pennsylvania Lines West, the present owner; and the Chicago, Milwaukee & St. Paul, the Chicago & Alton and the Chicago, Burlington & Quincy, tenants.

A Call for Railway Poetry.

Professor John A. Lomax, of the English Department of the Agricultural and Mechanical College of Texas, College Station, Tex., acting for Harvard University, has set out to gather and publish the folk-songs of the United States; and he asks the assistance of old-timers and others who know of such songs which have not been published. Professor Lomax appeals to miners, lumbermen, sailors, soldiers, fishermen and all classes who have lived in primitive isolation or who have knowledge of such life in the early days of the country. He expects to find that there are many ballads which people familiar with them might send to him if they would. As a suggestion of what he wants he has issued a circular giving the titles of some of the songs that he has already got track of, but the only one which he mentions that has any connection with railroading is "Jerry, Go Ile That Car." Mr. Lomax particularly requests readers of the *Railway Age Gazette* to send him copies of any old ballads that concern the life of the railway man.

Tests of Timber Beams.

The Engineering Experiment Station of the University of Illinois has issued Bulletin No. 41, covering tests of timber beams. The investigation was undertaken to obtain information on the structural properties of full-size timber beams as used in railway bridge practice; the results are applicable to timbers which may be employed in all forms of building construction. The tests include 112 full-size stringers and several hundred smaller test pieces cut from these stringers. The woods tested were long-leaf pine, short-leaf pine, loblolly pine and Douglas fir. The tests involved natural and creosoted timber. In general, the results of the tests show that defects such as knots, cross grain and seasoning checks have a very marked effect upon the strength of large timber beams. The tests also show that many of the values given in engineering literature for the strength of timber are much too high for sticks of structural size. They emphasize the futility of using the results of tests of small sticks of selected material as a criterion of the

strength of timbers of large size. The preponderance of failures in horizontal shear is marked, and considerable information on shearing resistance of wood is given. A careful analysis of the stresses and deformations in the timbers tested is given. Numerous diagrams and reproductions of photographs and several summarized tables assist in giving a comprehensive view of the tests and methods employed. Copies of Bulletin No. 41 may be obtained gratis on application to W. F. M. Goss, director of the Engineering Experiment Station, University of Illinois, Urbana, Ill.

Disastrous Collision at Middletown, Ohio.

In a butting collision between a southbound passenger train and a northbound freight on the Cincinnati, Hamilton & Dayton at Middletown, Ohio, on Monday, July 4, twenty-two passengers and one brakeman were killed, and three trainmen and 37 passengers were injured.

The passenger train was the Cincinnati part of the Twentieth Century Limited Express of the Cleveland, Cincinnati, Chicago & St. Louis, which was running over the C., H. & D. because of a blockade on the C., C. & St. L. The press despatches indicate that the cause of the collision was the failure of the passenger train to wait at Poast Town, three miles north of Middletown; but the statements are not clear. The passenger train was in charge of a pilot man of the C., H. & D., who was seriously injured. The freight train was running slowly, but the passenger train was running fast, and as the scene of the collision was on a curve, the men in the engines had barely time to jump off. Most of the persons killed and injured were in the combination car and the day coach, which were next to the engine of the passenger train. The engines were completely wrecked, and a heavy steel coal car, which was next to the engine of the freight train, crushed the combination car. The second car of the freight contained heavy 6-inch timbers, and these were forced into and through the day coach.

Hearing on Alleged Frauds Against Illinois Central.

A master in chancery has been taking testimony at Memphis, Tenn., in the suit brought by the Illinois Central against the Memphis Car Company for alleged frauds against the road in connection with the repair of cars. T. H. Brebach, formerly secretary-treasurer of the Memphis Car Company, has been thus far the principal witness. Among other things he said that several car inspectors and other employees of the Illinois Central were on the pay-roll of the Memphis Car Company also. He admitted that several cars of lumber destined to the shops of the railway were diverted to the car works, but could not testify as to whether numerous kegs of nails, bolts, etc., consigned to the railway in care of the car company had been used by the shop and charged to the road. It is alleged that by overcharges for repair of cars the Memphis Car Company defrauded the Illinois Central out of about \$300,000.

Railways in Japan.

In November, 1909, the through railway line from Moji, Japan, to Kagoshima was completed, and Kagoshima, the most southerly city of the island, can now be reached from Tokio in about 46 hours. The portion of the line just opened from Hitoyoshi to Yoshimatsu, 20 miles, is a part of the Higo-Satsuma section extending from Yatsushiro to Kagoshima, 94 miles. This section has presented great engineering difficulties. The greatest gradient on the line, between Yatsushiro and Yoshimatsu, is .35, and for the first time in the history of Japanese railway engineering, the loop system has been adopted. The main difficulty was the construction of the Yatake tunnel, 6,877 ft. long, which occupied over three years. The Higo-Satsuma section has 60 tunnels (with a total length of 53,493 ft.), 89 bridges (7,460 ft.) and 199 culverts. The total cost was about \$8,000,000. The total length of the lines of railway in Kiushiu open to traffic is 497 miles, all state owned.

Society of Railway Financial Officers.

It has been decided to hold the next annual meeting of the society at the Hotel Chamberlin, Old Point Comfort, Va., on October 25 and 26.

Traffic News.

EASTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago; Wednesdays, except July and August. Chicago.

The Interstate Commerce Commission has refused to suspend Official Classification No. 36, which was issued by the trunk lines and went into effect July 1. Press despatches say that the commission has been overwhelmed with protests from shippers against this classification. There are in it, however, only twenty-eight reductions and thirty advances. The Commission says: "The principal increases are the carload minimum of horse trailers from 10,000 to 11,000 lbs., and an advance in the classification of automobiles from first-class to 110 per cent. of first-class, and the Commission is not satisfied that these items should be suspended. This ruling, however, will not prevent or delay the hearing of any complaint which has been made or may be made."

made against the reasonableness of these or any other increases effected by the new classification."

The Rock Island and the St. Louis & San Francisco have recently restored most of their passenger rates in Missouri and Oklahoma to a 3-cent basis. It will be recalled that when the federal court in Missouri granted the railways an injunction restraining the officers of the state from enforcing the 2-cent fare law, some of the roads adopted the 2½-cent rate, while others adopted a 3-cent rate. The roads which adopted the 2½-cent rate were the Rock Island, the Frisco, the Alton and the Burlington. The restoration of the 3-cent rate by the Rock Island and the Frisco almost completes the restoration of all passenger rates in these states to the 3-cent basis. The roads are giving passengers claim coupons, so that if the litigation goes against them passengers can recover the difference between the rate they pay and the 2-cent rate.

Shippers at Chicago, St. Louis and other cities in Central Freight Association territory are joining with the western railways in asking the supreme court of the United States to rehear the arguments in the Missouri river rate case. One of the petitions is filed by nine merchants and manufacturers at Chicago, including such large houses as Sprague, Warner & Company and Carson, Pirie, Scott & Company. They say that the court failed to appreciate the fact that the rates from the seaboard to the Missouri river and to Denver are not single through rates, but are made by the combination of separate and distinct rates, those from the seaboard to the Mississippi river and from the Mississippi river to the Missouri river; those from the Seaboard to Chicago and from Chicago to the Missouri river, etc. They point out that the decisions of the commission in the Indianapolis case and the Denver case, as well as the Missouri river case, show that it intends to apply rigorously its so-called "familiar rule," that in transportation over two connecting but separate railways the rate for a haul over both lines should be less than the sum of the rates for the two hauls, and that the application of this principle is, on its face, a discrimination against the petitioning shippers and in favor of those at the Atlantic seaboard and on the Missouri river. "To refuse a hearing," it is asserted, "on the merits of these claims and to send the petitioners for their possible adjustment to the commission is, under the facts of this case—and we say it with the deepest regret—a denial of a hearing in the matter in which, under the order of the commission, their property is taken from them."

The Rock Island's Agricultural Commissioner.

Prof. H. N. Cottrell, for many years director of farmers' institutes at the Kansas and Colorado agricultural colleges, has been appointed agricultural commissioner of the Rock Island lines. In this office he will work in close harmony with the immigration department, and will keep in touch with conditions throughout the territory in which the Rock Island operates. He will devote himself to disseminating information as to the crops best adapted to different localities, and will hold meetings with farmers to discuss every important subject of mutual interest. A circular which the Rock Island has issued says: "His services are at the disposal of all without cost to any. Every farmer with a problem upon which he needs help, every settler who

needs advice as to what he should plant and when he should plant it, will find in the Rock Island's agricultural commissioner the kind of co-operation which is really practical and of immense value. While Mr. Cottrell's headquarters will be in Chicago, his time will be spent in traveling throughout the Rock Island's territory in the interest of those who require his services."

Conference on Rate Differentials at St. Louis.

A long conference was held at St. Louis on June 30 by the committees appointed by the railways, the municipal assembly and the shippers to negotiate regarding the rate differentials within the 100-mile zone. The representatives of the shippers and of the municipal assembly contended strongly for the complete abolition of the so-called bridge arbitrariness, but the representatives of the railways showed no signs of granting this demand.

Condition of the Cotton Crop.

The crop reporting board of the department of agriculture estimates that the condition of the cotton crop on June 25 was 80.7 per cent. of a normal, as compared with 82.0 on May 25, 1910; 74.6 on June 25, 1909; 81.2 on June 25, 1908, and 79.5 the average of the past ten years on June 25.

Comparison of Conditions, by States.

States.	1910		June 25		10-yr. av.
	June 25.	May 25.	1909.	1908.	
Virginia	81	90	76	92	83
North Carolina ..	72	84	75	89	82
South Carolina ..	75	78	77	84	80
Georgia	74	81	75	83	80
Florida	82	80	88	84	85
Alabama	81	83	64	82	78
Mississippi	81	82	61	84	78
Louisiana	77	76	62	80	79
Texas	84	83	79	80	79
Arkansas	77	81	76	85	81
Tennessee	82	86	80	89	84
Missouri	80	87	83	87	83
Oklahoma	88	84	84	64	82
California	95	90	..	..	..
United States	80.7	82.0	74.6	81.2	79.5

For the purpose of comparison, the condition of the cotton crop in the United States monthly for the past ten years is given below:

Years.	May 25.	June 25.	July 25.	Aug. 25.	Sept. 25.
1909	81.1	74.6	71.2	63.7	58.5
1908	79.7	81.2	83.0	76.1	69.7
1907	70.5	72.0	75.0	72.7	67.7
1906	84.6	83.3	82.9	77.3	71.6
1905	77.2	77.0	74.9	72.1	71.2
1904	83.0	83.0	91.6	84.1	75.8
1903	74.1	77.1	79.7	81.2	65.1
1902	95.1	84.7	81.9	64.0	58.3
1901	81.6	81.1	77.2	71.4	61.4
1900	82.5	75.3	76.0	68.2	67.0

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 73-A, giving a summary of car shortages and surpluses by groups from February 17, 1909, to June 8, 1910, says:

"There is a decrease of 3,864 in the surplus, bringing the total

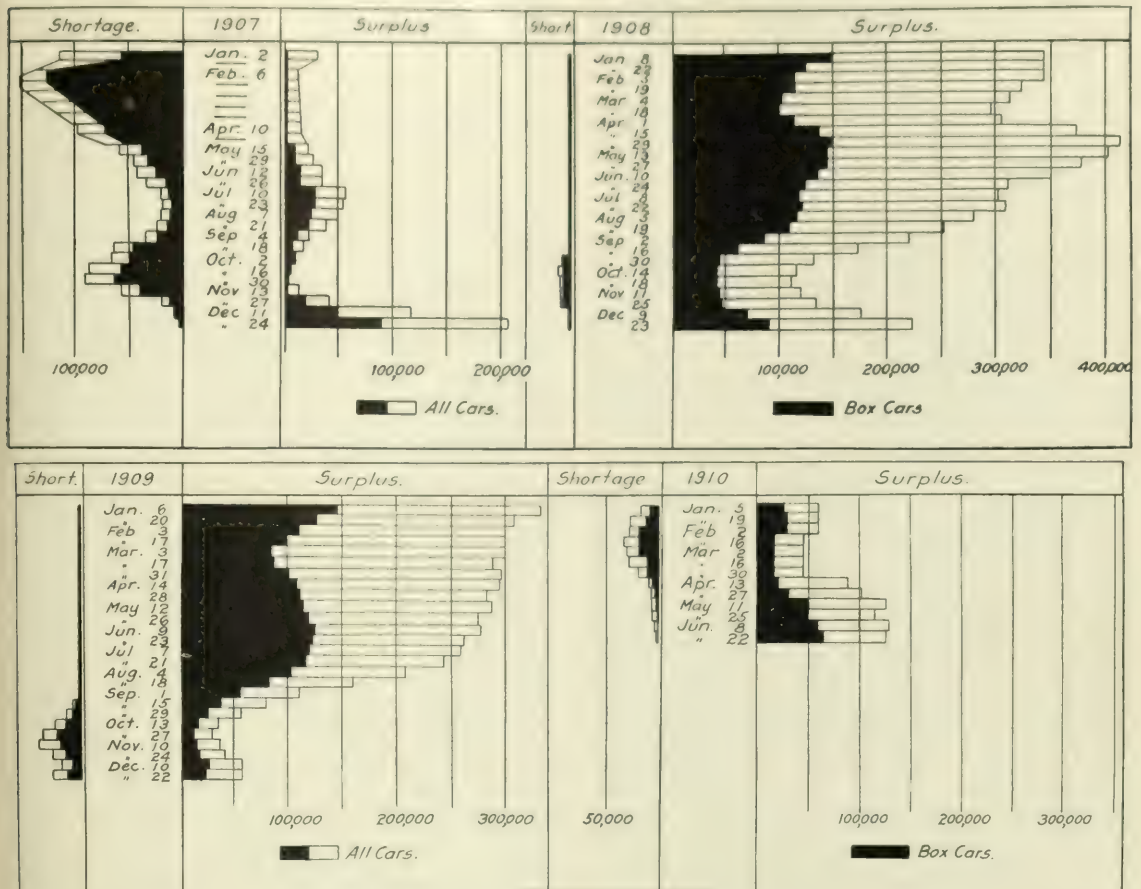
CAR SURPLUSES AND SHORTAGES.

Year.	No. of roads.	Surpluses					Shortages				
		Box.	Flat.	Coal, gondola and hopper	Other kinds.	Total.	Box.	Flat.	Coal, gondola and hopper	Other kinds.	Total.
1909	8	60	..	634	81	778	113	172	10	..	295
" 2 "	22	11,807	291	8,854	12,139	33,163	4	36	2	4	46
" 4 "	22	18,702	436	8,742	3,761	31,641	..	115	185	180	480
" 6 "	22	1,920	1	297	1,035	3,253	39	366	400	..	805
" 8 "	19	3,156	188	439	1,211	4,994	48	80	315	10	453
" 10 "	21	7,497	369	2,553	4,590	15,009	9	..	9	101	119
" 12 "	4	1,237	65	..	347	1,896	..	..	..	..	..
" 1 "	15	7,205	390	5,115	2,660	15,666	2	20	..	2	24
" 3 "	11	1,642	407	179	69	2,397	..	..	..	3	3
" 5 "	23	5,077	846	1,987	6,285	14,095	8	46	3	101	158
" 7 "	5	1,230	244	..	837	2,312	300	27	..	..	337
Total	138	99,611	3,237	28,662	34,034	129,644	623	862	934	410	2,729

Group 1—Composite of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan, and Western Pennsylvania lines; Group 4—West Virginia, Kentucky, and North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia, and Florida lines; Group 6—Texas, Illinois, Wisconsin, Minnesota, and North and South Dakota lines; Group 7—Montana, Wyoming, and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Utah, California and Arizona lines; Group 11—Canadian lines.

down to 125,644 cars. Box cars increased 747, while coal cars decreased 1,589. Miscellaneous decreased 439, due primarily to an increased demand for coke cars in the eastern and middle groups and for stock cars in the West and North.

Charges to Spokane were unreasonably high, and named certain class rates which would, in its opinion, be reasonable. The railway were then required to submit a scheme of rates for the approval of the commission, which they have now done.



Car Surpluses and Shortages in 1907, 1908, 1909 and 1910.

The table gives car surpluses and shortages by groups for the latest period covered by the report, and the chart shows total surpluses and shortages bi-weekly since 1907.

A Cheerful Prospect.

The July tariff bulletin of the Indiana State Railroad Commission contains a warning to all shippers of the state to place little, if any, faith in any tariff sheets which they may have at hand at the time shipments are made. In such a chaotic condition is the question of rates in Indiana as well as other states that the commission declares that a rate sheet received by the last mail may be entirely wrong and liable to lead the shipper into all sorts of confusion if he uses it as a basis for making prices on goods on which he pays the freight. The commission continues to be deluged with new tariffs on class freight, notices of changes and exceptions to class rates, and there is yet to come the great mass of commodity rates.

INTERSTATE COMMERCE COMMISSION.

Reductions Ordered to Spokane.

City of Spokane, Wash., et al. v. Northern Pacific et al. Opinion by Commissioner Prouty. In disposing of the original *Spokane case*, 15 I. C. C. Rep. 376, the commission held that the class rates from St. Paul and

To determine whether the scheme of the defendants shall be approved we must first understand clearly what that scheme is.

It was claimed by the defendants and found in the original decision that rates from eastern points of origin to Pacific coast terminals were induced by water competition. While these terminal rates are influenced by, they did not fully meet this competition by sea, since large quantities of traffic still move to all Pacific coast terminals by the various water and rail-and-water routes from the Atlantic seaboard. The defendants, in constructing their plan, started out with the assumption that rates 25 per cent. lower than the present rates would be required to fully meet this sea competition.

Traffic from the Atlantic seaboard to an interior destination, like Spokane, may move by water to a Pacific coast terminal, like Seattle, and from that terminal by rail, the through rate being the sum of the water rate to Seattle and the rail rate from Seattle. A rate from the eastern point of origin to Spokane, which fully met water competition at Spokane, would be constructed, therefore, by taking the water competitive rate to the terminal and adding to it the full local from the terminal to the interior point.

It was claimed by the coast cities in this proceeding, and is being insisted upon by them in other proceedings, that the present rates eastbound from these terminal points are unreasonable, and the carriers apparently concede that these rates must be reduced. For the purpose of constructing the proposed rates to Spokane, not the present local, but a rate 16% per cent. less

than the local, was used. Spokane rates are therefore constructed by taking 75 per cent. of the terminal rate from eastern territory and adding thereto a rate which is 16 2/3 per cent. less than the present local rate from Seattle to Spokane.

The rate thus created is applied from Chicago. From the Mississippi river the same rate is established, but from the Missouri river the rate is about 10 per cent. less. The theory of the defendants seems to be that ordinarily the cost of producing commodities sold in Spokane is somewhat greater on the Missouri river than in the vicinity of Chicago and St. Louis, and that therefore a somewhat less freight rate should be made to equalize the cost of laying down the article in Spokane. In cases where this is not true or where the reverse is true, the rate from the Missouri river is the same as from Chicago and the Mississippi river.

The idea seems to be that so long as Spokane can purchase either at Chicago or at some more easterly point it shall purchase at Chicago, but that if it cannot buy in Chicago territory then it shall be given a rate which will enable it to buy in the same market with its competitor at Seattle or Portland.

The complainants object to this proposed scheme of rates upon two principal grounds:

It is said that the proposed rates are not as favorable to the jobbers of Spokane, in comparison with the rates enjoyed by their competitors at the coast cities, as the present rates. It will be found on examination that this is not, on the whole, true.

Even if the contention of the complainants in this respect was true, it would not be conclusive against the approval of the proposed schedule. It must be remembered that the present rates are the result of a deliberate attempt to carve out a certain territory in which the jobber of Spokane should have the advantage in rates over his competitor upon the coast or elsewhere.

The second objection of the complainant is that the proposed rates are no substantial reduction from the present rates. This is hardly true. The proposed rates afford a very substantial reduction from the rates now in effect. In many cases they are less than rates would be if established on the basis adopted by the commission. The most serious objections to this scheme from our point of view are not those urged by the complainants and interveners. The rate constructed as above detailed is applied from Chicago to Spokane. Why should this be applied from Chicago rather than from New York or from the Missouri river? The rate is constructed by taking 75 per cent. of the terminal rate, and this terminal rate applies to the coast from all territory east of the Missouri river. It is said that this blanket rate from eastern territory to Seattle has been forced by water competition. Now, if 75 per cent. of this rate is necessary to fully meet water competition and if the theory of this scheme of rate making is to meet water competition at Spokane, why should not the rate which results from the addition of the local rate to Spokane be made to apply from all eastern territory? In other words, why does not water competition require the same blanket rate from eastern territory to Spokane which it produces at Seattle?

The defendants were asked this question and answered in substance that logically this might be true, but that in meeting this water competition the defendants were at liberty to meet it in whatever way and at whatever point and to whatever extent they saw fit. This cannot be admitted.

When the commodity originates both at Chicago and at New York, so that the Spokane buyer can purchase in either market, he is compelled to pay the local rate from New York to Chicago, which means that he must ultimately buy in Chicago rather than in New York. If the commodity can be purchased only in New York, then the rate from Chicago is made lower than it otherwise would be, for the purpose of permitting the Spokane merchant to purchase upon the Atlantic seaboard. The manifest purpose of this is to compel Spokane to buy in the middle west, that being in the interest of the defendant carriers.

The scheme of the defendants assumes that water competition exists at Spokane which must be met. The testimony in this record tends to disprove the existence of such competition to any appreciable extent. While a reduction in the rates from the coast to Spokane would tend to stimulate the movement of traffic through Seattle and Tacoma, still it does not appear probable that such a movement could ever assume considerable

proportions, even with the present westbound rates to Spokane.

This scheme of the defendants therefore is founded on facts which do not exist, is constructed on a theory which cannot be approved, and is of no assistance in solving the general problem before the commission. While we recognize that these defendants have made an honest effort to meet the situation, by the construction of these schedules, we are constrained to withhold our approval.

If the rates suggested by the defendants are not to be approved, what rates shall be established by the commission?

The original complaint attacked the class rates from St. Paul and Chicago to Spokane, and in our decision we held that the existing rates were unreasonable and fixed certain lower rates for the future. The complaint also named some 34 different commodity rates which were alleged to be excessive. We held that these rates were unreasonable and established lower rates as substitutes. The complaint contained a statement that all rates from St. Paul and Chicago to Spokane were unreasonable, but we held that a general allegation of this kind could not lay the foundation for an order reducing those rates; that there must be a specific attack upon each specific rate, which would put the defendant upon notice of the exact thing complained of. We therefore declined to express any opinion or to make any order as to the great mass of commodity rates.

The complainant has now filed a supplemental petition in which it attacks in detail 580 commodity rates. In the hearing at Spokane each one of these items was taken up by itself and particularly investigated. The commission is therefore in a position to determine what are reasonable rates upon these commodities. Both parties are highly dissatisfied with the few commodity rates which were fixed by the commission. The complainants renew, with great earnestness, their claim that no rate should be permitted at Spokane which exceeds the rate to Seattle. We have, however, on full consideration, held that, under the decisions of the Supreme Court of the United States, the Seattle rate cannot be made the measure of the Spokane rate; that our only power is to establish rates to Spokane which are just and reasonable under all the circumstances, and to this ruling we must adhere.

The defendants urge that our decision, carried to its legitimate conclusion on the whole commodity list, in view of reductions which must elsewhere result, will be disastrous. They further show that since the submission of the original case large expenditures have been made on their properties, which, of itself, might well call for a reconsideration of the conclusions reached upon the record as it then stood.

In the former hearing the Northern Pacific and the Great Northern companies attempted to show the cost of reproducing their respective properties. This testimony was given as of the spring of 1907. The Northern Pacific now shows that since then it has expended approximately \$93,000,000, while the Great Northern shows an expenditure of approximately \$75,000,000. These sums would in each case equal approximately 25 per cent. of the entire cost of reproduction as found by the commission, and would, if not accompanied by increased earnings, perhaps justify the claim to a greater return.

An examination of the nature of these expenditures does not, however, lead to the conclusion that they can have any legitimate bearing upon the correctness of our former decision. While some small part of the outlay is on the property, the cost of reproducing which was given in the former case, the great bulk of the expenditure is not.

For example, the Northern Pacific shows that it has expended since 1907, \$15,000,000 for new equipment. The former testimony showed that the equipment of this company was sufficient for the performance of the service from which its revenues had resulted. Large sums had been charged against the depreciation of that equipment. It was carried into the estimate of value at substantially the figures put on it by the engineers of the Northern Pacific itself. If that company has since then expended this large amount in the acquiring of new equipment, it must have been in contemplation of new business which will yield additional revenues at the former rates.

The same remark applies to the large expenditures shown in the construction of branch lines.

The Northern Pacific and Great Northern have each advanced in the construction of the Spokane, Portland & Seattle some \$25,000,000, which is a part of the total expenditure above named.

This railway has been constructed jointly by these two com-

panies. While it does not definitely appear, it is our understanding that it is to be operated as an independent proposition. It has just been opened for business, and up to the present time its earnings are small. This property, like the rest of the territory of the Northern Pacific and its branch lines, ought to be worth what it has cost and ought to earn a return upon that investment. Certainly the patrons of the Northern Pacific and the Great Northern should not be taxed on account of the contribution of this railway.

A word of explanation should perhaps be given as to the use which has been made or should be made by the commission, in the fixing of these rates, of this testimony as to the value of the properties involved.

The defendants assumed in the argument of this case at Spokane and again in the argument of the *East and Salt Lake* cases, 191 U. S. 1, 218 and 238, that the commission had reduced the rates to Spokane because it found that the revenues of the carriers were excessive and for the purpose of reducing those revenues. This is an entire misconception both of the purpose and of the effect of our inquiry into the financial operations of these companies.

The complaint was that the rates of the defendants to Spokane were unlawful, first, because they were higher than corresponding rates to more distant points, and, second, because they were excessive in and of themselves. There is no better way to convey an accurate idea of the exact question presented than by giving instances of actual shipments from the expense bills, great numbers of which were introduced by the complainants on the hearing.

On a carload of drugs shipped from New York to Spokane, carriers from New York to Chicago, 900 miles, received \$139.33; from Chicago to St. Paul, 400 miles, \$59.69; and from St. Paul to Spokane, 1,500 miles, \$543.48; a total of \$742.70. Had this carload been moved through Spokane and over the Cascade mountains to Seattle, 375 miles further, the total charges would have been \$556.12, and the receipts of the defendants for the haul of 1,875 miles from St. Paul to Seattle, \$356.90.

The attack of the complainants was not upon a single rate nor on a comparatively small number of rates, but on the entire schedule from the east to Spokane.

Before these rates, involving as they do whole schedules, can be reduced, we must decide whether the result will be to deprive the defendants of a fair return on their property. A considerable part of the discussion necessarily centered around this issue, which was, in that sense, a controlling one. But the purpose of that discussion was not to ascertain whether rates should be reduced, but whether they could be reduced.

The commission held that the earnings of the Northern Pacific and the Great Northern for the ten years preceding 1908 might fairly be termed excessive and that reductions in revenues might therefore be made without violating the constitutional rights of those companies. Having determined that question, we did not make reductions in rates to Spokane for the reason that these revenues were excessive and for the purpose of reducing those revenues. Without attempting to say whether this commission might in any case reduce rates for the sole reason that revenues were found excessive, it has not attempted to do so in this case.

In some respects the Northern Pacific has cost more and in some respects less than a similar railway east of the Missouri river. The cost of operation is somewhat more, and in our opinion the corresponding freight rates may properly be somewhat higher in this territory than east of the Missouri river, but we were unable to see, when our first opinion in this case was promulgated, and we are unable to see now, any excuse for these abnormally high rates between St. Paul and Spokane. What is said of the Northern Pacific applies to the Union Pacific lines leading west from the Missouri river, and to the Great Northern, although the amount of business handled by the latter line is somewhat less than that of the other two.

We are of the opinion that the present rates charged by the Great Northern and the Northern Pacific on the commodities specified in the supplemental complaint from the defined territories mentioned in that complaint to Spokane are unreasonable, and that just and reasonable rates, which ought not to be exceeded for the future, would be those which are set forth in Schedule A.

In fixing these rates we have proceeded upon the view that, under the present decisions of the Supreme Court of the United

States, we could not use the rate to Seattle as a standard by which to measure that to Spokane. If this were otherwise, if we were free to take into account all the competitive conditions existing both east and west and to determine what, in the light of all these conditions, would be a just and reasonable relation between the rates of Seattle and Spokane, a somewhat different question would be presented.

The next question is, From what point or points in the east shall we establish rates to Spokane?

As a rule transcontinental commodity rates apply as blanket rates to Pacific coast terminals from all territory on the Missouri river and east, but to this there are some exceptions.

At the present time class rates to Spokane from territory east of Chicago are made by combination upon Chicago or St. Paul, the Official Classification governing up to Chicago or St. Paul and the Western Classification beyond.

We are of the opinion that joint through rates, both class and commodity, should be established from defined territories east of Chicago to Spokane. Schedule A defines certain territories as they are now to be found in the Spokane tariffs and names class rates governed by Western Classification and commodity rates from these territories to Spokane.

The lines east of Chicago parties to this proceeding are the Lake Shore & Michigan Southern, the Pittsburgh, Fort Wayne & Chicago, the Pennsylvania Railroad, the New York Central & Hudson River, the Boston & Maine, and the New York, New Haven & Hartford. Where joint through rates do not now exist from points upon these lines to Spokane, we find that there is no reasonable and satisfactory through route, and that such through route and joint rate ought to be established.

In the past, transcontinental and Spokane tariffs have both recognized a territorial division known as Mississippi river points and another division known as Chicago points. Commodity rates to Spokane have usually been the same from both these territorial divisions; rates upon the higher classes have usually been somewhat less from the Mississippi river. In disposing of the original case no inquiry was made as to whether the rates fixed for Chicago should apply at the Mississippi river. Examining this question now in this case and similar cases before us, it seems to us that both class and commodity rates should be slightly lower from Mississippi river points than from Chicago points.

In the original case, certain arbitraries were added to the St. Paul-Spokane rate in constructing the rate from Chicago. In further examining this question with a view to establishing class rates from eastern defined territories, we have reached the conclusion that the spread between the St. Paul and Chicago rates was somewhat too great, and class rates have been named in Schedule A which are slightly less than those formerly prescribed. The previous finding of the commission is amended accordingly.

With respect to commodity rates upon the few commodities dealt with in the original case, the opinion was expressed that the Chicago rate should exceed the St. Paul rate by about 16 per cent. On further reflection, we are of the opinion that this difference was somewhat too great. In the past no distinction has ordinarily been made by the carriers themselves between Chicago and the Missouri river in their commodity rates to Spokane, and the difference in the schedule proposed by the defendants did not ordinarily exceed 10 per cent.

The final question is, To what points shall the rates which we establish to Spokane be extended? Spokane was the only complaining territory in the original suit, but since our decision Baker City, La Grande and Pendleton, in the state of Oregon, and Walla Walla, in the state of Washington, have filed intervening petitions asking that rates not higher than those established at Spokane be fixed for these localities.

In the past Spokane rates from St. Paul have applied upon the Great Northern as far west as Avery, 111 miles from Spokane, and upon the Northern Pacific as far west as Kennewick, 149 miles. The Northern Pacific has a branch line to Pendleton and has maintained at Pendleton the Spokane rate from St. Paul. We are of the opinion that the rates which we have established to Spokane should be applied by the Great Northern and Northern Pacific to those points at which the Spokane rate has been maintained in the past.

We are of the opinion that the class and commodity rates specified in Schedule A would be just and reasonable rates to be applied by the Union Pacific lines and their eastern connec-

tions from the defined territories therein named to Baker City, La Grande and Pendleton in the state of Oregon, and Walla Walla in the state of Washington, and that the present rates maintained to those points, in so far as they exceed the rates specified in Schedule A, are unjust and unreasonable. We shall not require the maintenance of these rates via the Union Pacific lines at Spokane, but no opinion is at this time expressed as to territory between Walla Walla and Spokane.

We make the same findings with respect to the establishment of through routes and joint rates via the Union Pacific lines and their connections to these destinations which we have already made with respect to the Northern Pacific and the Great Northern to Spokane.

We realize that to establish the rates prescribed by Schedule A, together with those fixed by the commission in other cognate cases now pending before it, will require an extensive revision of the tariffs of the defendants and will entail a material reduction in their revenues. We have endeavored to approximately ascertain this amount and believe the reduction will not be undue. We desire, however, to proceed in this matter with great caution and have therefore determined before making a final order to learn the result of an actual test. Carriers will be required, for the months of July, August and September, 1910, or for such other representative months as may be determined upon by the commission after conference with the carriers, to furnish an accurate and detailed account showing the revenue which accrued upon business actually handled under present rates and the revenue which would have accrued upon the same business had the rates here prescribed been in effect.

This account should be confined to traffic covered by the rates named, but the carriers may, if they elect, indicate what other changes will be required which are not covered by the rates prescribed in this and other cases and may keep separate accounts, showing the loss as applied to actual transactions. (19 I. C. C., 182.)

Reductions to Salt Lake.

Commercial Club, Traffic Bureau, of Salt Lake City, Utah, v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Prouty.

The two lines mainly involved in this case are the Union Pacific and the Denver & Rio Grande, and these companies have assumed the burden of this defense. They both claim that the reductions asked for would so impair their revenues as to work, if not the absolute confiscation of their property, against which the constitution protects them, at least such an impairment of income as would deprive them of a just and reasonable return on the value of that property.

This statement treats the lines of the Union Pacific, the Oregon Short Line, and the Oregon Railroad & Navigation Co. as a single property. The road interested in these rates between eastern destinations and Utah points is the Union Pacific. The last statistical report of that company to this commission shows a main line mileage of 1,893 miles, with branches of 1,415 miles, a total of 3,308 miles. In round numbers its funded debt was \$226,000,000 and its capital stock \$299,000,000, a total of \$525,000,000, or \$159,000 per mile. In the year 1909 it earned net from operation after the payment of taxes about \$6,900 per mile. These earnings exceed any group in the United States except group 2, which they nearly equal.

The financial showing of the Denver & Rio Grande is nothing like as favorable as that of the Union Pacific. This company introduced and placed great stress on a statement showing its net income from operation for the year 1899 to 1909, inclusive, from which it appeared that for the years 1903, 1906 and 1909 there had been what was styled a "debit," that for 1909 being much the largest and amounting to \$459,000. It was urged that to reduce these rates would further increase this so-called debit.

The main line of the Denver & Rio Grande is 716 miles in length, and its branches, usually short, aggregate 1,813 miles. Its funded debt is now \$107,000,000, or \$142,179 per mile. Its capital stock is divided between common and preferred, \$38,000,000 of the former and \$16,000,000 of the latter, totaling \$54,000,000, or \$75,419 per mile.

The Denver & Rio Grande is situated, for the most part, among the mountains. Its cost of construction was high, and the expense of operation is much greater than that of the Union Pacific. It is the claim of this company that we should determine the reasonableness of these rates with reference to the cost of handling the traffic by its line and with reference to its financial necessities and not with reference to the Union Pacific.

The Denver & Rio Grande was built for the purpose of handling the local business tributary to its line. No railway would ever have been built where this one is for the main purpose of handling through business like that under consideration. To-day its branch lines aggregate two and one-half times the mileage of its main line, over which this traffic passes. The great bulk of its tonnage to-day is from local business. Its line is longer than that of the Union Pacific between all points.

This commission has said that in determining a freight rate which must of necessity be charged by competing lines, it would not look exclusively to that line which could handle the business the cheapest or which was the strongest financially, but would consider as well the weaker rival; yet it has never intimated that the rate should be fixed solely with reference to the weakest line, and it would certainly be most unjust to the public, in establishing these rates, to consider merely the expensive and circuitous route.

Present class rates in both directions between Chicago, the Mississippi river and the Missouri river, on the one hand, and Utah common points, on the other, are found unreasonable. Present westbound commodity rates from the above-named eastern points of origin to Utah common points are found unreasonable, and present eastbound rates on certain products of Utah to the Missouri river, the Mississippi river, and Chicago are found unreasonable.

Present rates on deciduous and citrus fruits from points of production in California to Utah common points are also found unreasonable, and defendants should establish to Utah points proportional import rates on certain named articles which do not exceed those contemporaneously in force to the Missouri river, and the present rates upon sago, tapioca, tea and tea dust are found unreasonable to the extent that they exceed those now in effect to Missouri river points.

Present passenger fares between Utah common points, on the one hand, and between Ogden, Omaha and Portland, on the other, are not found unreasonable; but present fares between Salt Lake City and Los Angeles, Salt Lake City and San Francisco, and between Ogden and Provo and San Francisco are found unreasonable.

The complaint alleges that defendants pool traffic from the east to Utah points; but the record contains no proof of this allegation, and the point was not pressed on the argument.

An order will be issued in accordance with the opinion herein, except in case of class and commodity rates between eastern defined territories and Utah points, as to which no order at present will be made; but defendants will be required to keep account for three months, showing the difference between their receipts on traffic actually moved under present rates and what those receipts would have been had these proposed rates been in effect. (19 I. C. C., 218.)

Reduction in Eastbound Rates.

Traffic Bureau of the Merchants' Exchange v. Southern Pacific. Opinion by Commissioner Lane.

Class rates from Sacramento, Cal., to points on the main line of the Southern Pacific between Reno, Nev., and Cecil Junction, Utah, inclusive, found excessive; reasonable rates prescribed for the future. (19 I. C. C., 259.)

Portland Chamber of Commerce v. Oregon Railroad & Navigation et al. Transportation Bureau of Seattle Chamber of Commerce et al. v. Northern Pacific et al. Opinion by Chairman Knapp.

The defendants' interstate class rates from Seattle, Wash., Tacoma and Portland, Oregon, to points in Washington, Oregon, Idaho and Montana are found by the commission to be unreasonable and reduction of 20 per cent. in said rates proposed. (19 I. C. C., 265.)

Nevada Rate Reductions.

Railroad Commission of Nevada v. Southern Pacific et al. Opinion by Commissioner Lane.

The highest main-line rates to be found in the United States are those from eastern points to stations in Nevada. For carrying a carload of first class traffic containing 20,000 lbs. from Omaha to Reno the Union Pacific-Southern Pacific line charges \$858. If a like carload is carried 154 miles further, to Sacramento, the charge is but \$600. The first class rate to the more distant point, Sacramento, is \$3 per 100 lbs. and to the nearer point, Reno, \$4.29 per 100 lbs. If a like carload of freight originates at Denver, 500 miles west of Omaha, the same rates to Reno and Sacramento apply; and if the freight originates at Boston, 1,700 miles east of Omaha, the rates are the same. This interesting rate condition arises out of two simple facts: (1) The whole of the United States from Colorado common points to the Atlantic seaboard, barring a few of the south-eastern states, is one wide group or zone from which practically uniform rates to Pacific coast water points are made, and (2) the rates to Reno are based upon these blanket rates to coast cities, and amount to the sum of the rates to the coast plus the local rates back to point of destination.

This great zone, extending from the Rocky Mountains to the Atlantic, a distance of over 2,000 miles, from which practically uniform rates are made to Pacific coast terminal cities, is probably without parallel in the railway world, excepting for a similar eastward blanket extended to Pacific coast producing points. The zone in which the same rates apply on California citrus fruits, for instance, extends from Salt Lake City on the west to Portland, Me. It is manifest that the transcontinental railways have made a near approximation to the postage-stamp system of rate making. Their policy has been to give to all eastern producing markets an opportunity to sell to the terminal cities on a parity as to transportation charges and to give to Pacific coast producing points access to all eastern markets upon a like basis. To the great basin lying between the Rocky Mountains and the Sierra Nevada the carriers have in a limited degree extended this same policy by making rates into Nevada base on the coast cities, and thus, the carriers say, they give to this territory the advantage of its proximity to the Pacific seaboard; that the rates to the latter are made low because of water competition between the Atlantic and Pacific ports—lower than would be justified were Sacramento and San Francisco not on the water—and that Nevada rates would be still higher but for its nearness to the Pacific coast.

The time has come, in our opinion, when the carriers west of the Rocky Mountains must treat the intermountain country on a different basis from that which has hitherto obtained. Nevada asks that she be given rates as low as those given to Sacramento. The full extent of this petition cannot be granted. In making rates to Reno from a territory broader than the whole of continental Europe we have necessarily given consideration to existing rates to other intermediate points and to points upon the Pacific. We are of opinion that the class rates to Reno, Winnemucca and Elko, and other points in Nevada upon the main line of the Southern Pacific, from stations on the lines of the defendants between New York and Denver and other Colorado common points are unreasonable and reductions are ordered.

We are of the opinion that justice cannot be done to Nevada unless Nevada points are put on a practical parity with points in eastern Washington and eastern Oregon, and a further hearing will, in due course, be held after the data here requested have been furnished by carriers and complainant. (19 I. C. C., 238.)

Rates to Arizona Reduced

Maricopa County Commercial Club v. Santa Fe, Prescott & Phoenix et al. Opinion by Commissioner Lane.

Class rates from points within eastern territory between the Missouri river and the Pittsburgh-Buffalo line to Phoenix, Ariz., found unreasonable. The commission reasoning in this case followed that in the Spokane, Salt Lake and Nevada cases. The commission therefore prescribed reasonable rates for the future, to remain in effect for the usual two years. (19 I. C. C., 235.)

STATE COMMISSIONS.

Dr. F. M. Sheppard has been appointed a member of the Railroad Commission of Mississippi, succeeding President Lee, deceased.

At Indianapolis this week, on invitation of the Indiana State Railroad Commission, there is being held a conference of commissioners of Indiana, Ohio, Illinois and Michigan to discuss the general movement for increases in freight rates which has been begun by the railways.

The New York Public Service Commission, Second district, has found that the complaints from commuters in Westchester county against the raising of commutation rates to New York City by the New York Central & Hudson River cannot be upheld. The commission finds that the higher rates were properly filed and published.

The New York Public Service Commission, Second district, completed three years of its existence on June 30. During that time there were submitted to the commission 4,918 applications, complaints, etc. During the first three years of the Board of Railroad Commissioners that body had presented to it 219 matters, and during the entire 24 years and three months of its existence the number was 4,814.

COURT NEWS.

In the United States Circuit Court at San Francisco, July 1, the Southern Pacific Company, pleading guilty, was fined \$18,000 on 18 counts of an indictment for payment of illegal rebates on shipments of matting from Japan to points in this country, and on shipments of lumber from Verdi, Nevada.

The Supreme Court of the United States, in the case of King vs. the Southern Railway Company, has affirmed the judgment against the railway company for damages on account of the death of a man who was killed at a highway crossing, where the law required every engineman to check his speed from the whistling post to the crossing. The decision, however, does not touch the merits of this absurd law, the court basing its opinion on the technical ground that the railway had not presented facts to show that the operation of the statute did really affect interstate commerce to such an extent as to make it an unlawful regulation of such commerce.

Private Railways of Australia.

On June 30, 1909, there were 943 miles of private railways open for general traffic; of this mileage 141 were in New South Wales, 14 in Victoria, 346 in Queensland, 277 in Western Australia and 165 in Tasmania. The capital cost of the lines, excepting that of Hexham-Mimmi, 6 miles, in New South Wales, and the Midland, 277 miles in Western Australia, was \$15,525,960. The gross revenue during the year 1908 was \$2,804,535 and the working expenses \$1,088,165. During the year 924,000 passengers and 1,627,000 tons of freight were carried, the train mileage being 1,389,883. The employees numbered 1,263 and the rolling stock consisted of 94 locomotives, 109 passenger cars and 1,617 freight cars.

In addition to the foregoing, there were, on June 30, 1909, 637 miles of private railways open for special purposes, Western Australia heading the list with 361½ miles, New South Wales being second with 124¼ miles; South Australia, 58 miles; Tasmania, 38¼ miles; Victoria, 32¾ miles, and Queensland, 21¼ miles. The Government railways open for traffic on that date in the Commonwealth had a length of 15,072¼ miles, giving a total of 16,652¼ miles.

Classified according to gage, there were 4,016 miles built to the 5 ft. 3 in., viz.: New South Wales, 45 miles; Victoria, 3,371¾ miles, and South Australia, 590¼ miles. The 4 ft. 8½ in. gage was adopted in New South Wales only, the mileage being 3,894. The 3 ft. 6 in. gage shows the greatest length, viz., 8,622¼ miles, of which 39¼ miles were in New South Wales, four miles in Victoria, 3,784¼ miles in Queensland, 1,492¼ in South Australia, 2,683 miles in Western Australia and 619¼ miles in Tasmania. Victoria possesses 81 miles of line built to the 2 ft. 6 in. gage, Queensland 81 miles of 2 ft. gage and Tasmania 17½ miles.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

A. E. Cauthen, assistant auditor of the Durham & Southern at Durham, N. C., has been appointed auditor in charge of the accounting department.

Meade L. Spicer, chief clerk to G. W. Stearns, president of the Chesapeake & Ohio, has been appointed vice president secretary of the C. & O.

George C. Taylor, manager of the Pacific division of the American Express Company, has been appointed vice-president and general manager, with office in Chicago.

A. C. Hamilton has been appointed vice-president and general counsel of the Texas Mexican railway and general counsel for the National Railways of Mexico, with office at Laredo, Tex.

F. W. Schwarz, secretary of the Monongahela Railroad at Philadelphia, Pa., having reached the age limit, has been retired. Mr. Schwarz has been continuously in the service of the Pennsylvania lines since 1869.

Carroll M. Bunting, whose appointment as comptroller of the Pennsylvania Railroad has been announced in these columns, was born September 15, 1871, at Darby, Pa. He graduated from the Darby Friends School, Philadelphia public school and Bryant & Stratton Business College. Mr. Bunting began railway work in 1887 as bill of lading clerk and stenographer in the office of the freight agent at Philadelphia, of the Chicago, Rock Island & Pacific. He later entered the office of the through freight agent of the Northern Pacific and Wisconsin Central railway companies. On May 19, 1890, he entered the service of the Pennsylvania Railroad as secretary to Captain John F. Green, then third vice-president of the company. Mr. Bunting was made chief clerk to the first vice-president May 1, 1897, assistant to the first vice-president on June 1, 1906, and assistant comptroller March 29, 1909, which position he held at the time of his recent appointment as comptroller.

The officers of the Chesapeake & Ohio Railroad of Indiana, which has been formed to take over the Chicago, Cincinnati & Louisville, are as follows: Frank M. Whitaker, president, Cincinnati, Ohio; Henry C. Starr, vice-president, Chicago, and James Steuart MacKie, secretary, New York. Mr. Whitaker is vice-president and traffic manager, Mr. MacKie secretary and treasurer of the Chesapeake & Ohio, and Mr. Starr is vice-president and general counsel of the Chicago, Cincinnati & Louisville.

Garrett B. Wall, whose appointment as assistant to the president of the Chesapeake & Ohio, with office at Richmond, Va., has been announced in these columns, was born April 6, 1870, at Covington, Ky. Mr. Wall was educated at Washington & Lee University, and at the United States Naval Academy at Annapolis, Md. He began railway work as a clerk in the office of the general manager of the Chesapeake & Ohio in 1889, and was later chief clerk to the assistant superintendent, then to the superintendent, and later chief clerk to general superintendent. Mr. Wall was appointed real estate agent, July 1, 1898, and in addition to the duties of that office he will here-

after perform such other duties as may be assigned to him by the president.

W. T. D. Wilson, general auditor of the Chicago, Milwaukee & St. Paul, the Chicago, Milwaukee & Puget Sound and the Illinois Central, has been appointed comptroller of these companies, succeeding H. G. Haugen, whose resignation has been announced in these columns. The office of general auditor is abolished. J. W. Taylor has been appointed assistant to the comptroller of all these companies, and W. F. Dudley and B. A. Dousman have been appointed assistant general auditors of the Chicago, Milwaukee & St. Paul.

Operating Officers.

James W. Roberts, assistant chief clerk to the general manager of the Vandalia, has been appointed assistant car accountant.

E. Thomason, assistant to vice-president and auditor of the Durham & Southern at Durham, N. C., has been appointed general manager in charge of operation.

Robert W. Baxter has been appointed general superintendent of the Illinois Central and the Indianapolis Southern, with office at Chicago, succeeding Charles L. Ewing, resigned.

R. B. Williams having resigned as general superintendent of the Gulf, Texas & Western, the position has been abolished. F. M. Bowman, assistant to the vice-president and general manager, with office at Dallas, Tex., has assumed the duties of the general superintendent.

Chas. T. Brimson, engineer maintenance of way of the Quincy, Omaha & Kansas City, and the Iowa & St. Louis, has been appointed superintendent and engineer with office at Kansas City, Mo., assuming in addition to his former duties those of W. J. Stone Burner, superintendent, whose resignation has been announced in these columns.

W. S. Wilson has been appointed trainmaster of the Twenty-second and Twenty-third districts of the Grand Trunk, with office at Stratford, Ont., and C. Forrester has been appointed trainmaster of the Fifteenth, Twenty-first and Twentieth (Buffalo and Goderich districts), with office at Stratford, succeeding J. A. McLardy, resigned to go into other business.

Charles Ware, general superintendent; C. E. Fuller, superintendent of motive power and machinery; R. L. Huntley, chief engineer; W. D. Lincoln, superintendent of transportation, and T. M. Orr, assistant to the general manager, have been appointed assistant general managers of the Union Pacific under the Hine system of operation. (See article elsewhere in this issue.)

Homer Leslie Hungerford, whose appointment as superintendent of the Southern Railway, with office at Greenville, S. C., has been announced in these columns, was born on November 16, 1867, at Dowagiac, Mich. He was educated in the high schools and began railway work as a telegraph operator on the Michigan Central in October, 1883, remaining with that company for over six years. He then went to the East Tennessee, Virginia & Georgia, now a part of the Southern Railway, as despatcher, at Selma, Ala. In September, 1892, he was appointed chief despatcher of the Mobile & Birmingham, at Mobile. In May of the following year he was made trainmaster and was general superintendent for a short time in 1899, when the Southern Railway secured control of the Mobile & Birmingham. From June, 1899, to January, 1906, he was trainmaster on the Mobile & Ohio at Meridian, Jackson and Mobile. In January, 1906, he went to the St. Louis, Iron Mountain & Southern as superintendent of terminals at Little Rock, Ark., and the following July was made superintendent of the Memphis division of that road. In February, 1907, he was appointed superintendent of the Southern Railway at Charleston, S. C., which position he held at the time of his recent appointment as superintendent of the Charlotte division at Greenville.

John G. Walber, whose appointment as assistant general manager of the Baltimore & Ohio, with headquarters at Baltimore, Md., has been announced in these columns, began railway work on the Ohio & Mississippi in the office of the president and general manager in February, 1885, and became secretary to that official in 1887. On the consolidation of the Ohio & Mis-



C. M. Bunting.

Mississippi and the Baltimore & Ohio Southwestern in November, 1893, Mr. Walber became secretary to the second vice-president and traffic manager at St. Louis, Mo. He remained in that position until March, 1896, returning to Cincinnati as secretary to George F. Randolph, general traffic manager of the B. & O. S. W., and one month later he became secretary to the vice-president and general manager. In December, 1898, he was made chief clerk to the same officer, and in November, 1902, he was elected also assistant secretary of the Baltimore & Ohio Southwestern. In addition to his duties as assistant secretary he also had charge of the tax and insurance departments. In February, 1904, Mr. Walber was promoted to assistant to the general manager, and two years later he was made assistant general manager. Mr. Walber was transferred to Baltimore as assistant to the third vice-president of the Baltimore & Ohio, January 20, 1908. He was promoted to general superintendent of transportation of the Baltimore & Ohio and Baltimore & Ohio Southwestern lines January 1, 1909.

Traffic Officers.

F. L. Feakins has been appointed general agent of the Denver & Rio Grande at Omaha, Neb.

The title of J. H. Grace, general agent of the Great Northern at Chicago, has been changed to assistant general freight agent.

Edward T. Wood has been appointed division freight agent of the Pennsylvania Co., in charge of a new office at Fort Wayne, Ind.

E. H. Fell has been appointed assistant general passenger agent of the Atlanta, Birmingham & Atlantic, with office at Atlanta, Ga.

C. P. Peterson, traveling freight agent of the Chicago, Milwaukee & St. Paul, has been appointed commercial agent at Davenport, Iowa.

Douglas White has been appointed industrial agent of the San Pedro, Los Angeles & Salt Lake, with headquarters at Los Angeles, Cal.

John A. Wesson has been appointed a soliciting agent of the Central of Georgia, with office at Albany, Ga., succeeding R. G. Parish, resigned.

John T. Bowe has been appointed general agent of the Denver & Rio Grande, with headquarters in Chicago, succeeding R. C. Nichol, transferred.

Alfred W. Obergfell has been appointed westbound freight solicitor of the Union Line at Milwaukee, Wis., succeeding L. E. Clemenson, deceased.

J. H. Davis has been appointed traveling freight and passenger agent of the Colorado Midland at Salt Lake City, Utah, succeeding L. H. Harding, resigned.

C. A. Rouse has been appointed a commercial agent of the Erie Despatch, with office at Indianapolis, Ind., succeeding W. H. Tennis, assigned to special duties.

R. C. Nichol, general agent of the Denver & Rio Grande at Chicago, has been appointed general agent of the Denver & Rio Grande and the Western Pacific, with office at New York.

J. C. Moffatt, division freight agent of the Erie Railroad at New York, has been transferred to Bradford, Pa., succeeding E. U. Baker, transferred. G. R. Wheeler succeeds Mr. Moffatt.

W. T. Dunne, contracting freight agent of the Chicago, Peoria & St. Louis, with headquarters at Chicago, has been appointed traveling freight agent in Wisconsin. W. S. Talmage succeeds Mr. Dunne.

D. Lumpkin, acting general freight and passenger agent of the Durham & Southern, at Durham, N. C., has been appointed general freight and passenger agent in charge of traffic, freight and passenger claims.

W. H. Timberlake, traveling freight agent of the Queen & Crescent, at Shreveport, La., has been appointed a commercial agent, with office at Dallas, Tex., succeeding Charles H. Gomm, resigned to go to another company.

H. C. Piculell, commercial freight agent of the Baltimore & Ohio at Omaha, Neb., has been appointed Pacific coast agent of

the freight and passenger departments, with headquarters at San Francisco, Cal., succeeding E. Anderson, deceased. L. G. Reynolds succeeds Mr. Piculell.

C. W. Fish, general freight agent of the National Railways of Mexico and the InterOceanic Railway of Mexico, at Mexico City, Mexico, has been appointed traffic manager of both these companies, in charge of all matters pertaining to the freight, passenger and customs agency departments.

W. A. Beckler, assistant general passenger agent of the Queen & Crescent, with office at Cincinnati, Ohio, has been appointed general passenger agent, succeeding W. C. Rinearson, deceased. J. C. Conn, district passenger agent at Chattanooga, Tenn., succeeds Mr. Beckler, his headquarters remaining at Chattanooga.

E. A. Watson, New England passenger agent of the West Shore Railroad, has resigned to go into other business and the position has been abolished. The authority of A. S. Hanson, general agent at Boston, Mass., has been extended to cover the passenger business of the West Shore in the New England territory.

Gerrit Fort, general passenger agent of the New York Central & Hudson River, with office at New York, has been appointed passenger traffic manager of the Union Pacific, succeeding to the duties of E. L. Lomax, general passenger agent, whose resignation has been announced in these columns. A portrait and sketch of Mr. Fort's railway life was published in the *Railway Age Gazette* February 14, 1910, page 377.

F. Strayer has been appointed traveling freight agent of the Chicago, Indianapolis & Louisville, with headquarters at Lafayette, Ind. The following changes in title have been announced: H. L. Moore, agent at Minneapolis, Minn., commercial agent; R. R. Hargis, general agent at Atlanta, Ga., commercial agent; D. A. Denmark, general agent at Valdosta, Ga., commercial agent; A. J. O'Reilly, general agent at Indianapolis, Ind., commercial agent.

Engineering and Rolling Stock Officers.

C. W. Power has been appointed resident engineer of the Grand Trunk, with office at Toronto, Ont., succeeding E. L. Cousins, resigned to go to another company.

G. E. Tebbetts, assistant bridge engineer of the Chicago, Burlington & Quincy, has been appointed bridge engineer of the Kansas City Terminal Ry. G. A. Haggender succeeds Mr. Tebbetts.

R. E. Gaut, engineer bridges and buildings of the Illinois Central, has resigned to accept a position with the Leonard Construction Co., Chicago. F. L. Thompson, assistant engineer of bridges, succeeds Mr. Gaut.

T. H. Goodnow has resumed the office of master car builder of the Chicago, Indiana & Southern and the Indiana Harbor Belt, with office at Englewood, Ill., succeeding J. W. Senger, appointed June 1, and who is now transferred.

Purchasing Officers.

Don B. Sebastian, acting fuel agent of the Rock Island Lines, has been appointed fuel agent with office in Chicago.

T. J. Powell has been appointed purchasing agent of the Frisco lines, with office in St. Louis, Mo., succeeding M. E. Towner, resigned.

Railway Developments in Sicily.

The most important projects at present are those made necessary by the great earthquake. Among these are the building of large freight stations at Messina and at Catania Acquicella, plans for which are well under way. The branch lines Castelvetro-Selinunte, Castelvetro-Partanna (in the province of Trapani) and Naro-Camici, in the province of Girgenti, are practically completed. The Castelvetro-Selinunte line will ultimately be continued to Sciacca and Porto Empedocle. The motor-bus service in Sicily is developing, although not so much as the inadequacy of railway communications would have led one to expect, and in some places the preference for more antiquated means of conveyance has discouraged projected ventures.

Railway Construction.

New Incorporations, Surveys, Etc.

AMERICAN FALLS, ROCKLAND & SOUTHERN.—This company has been incorporated in Idaho to build from American Falls, Idaho, south to Rockland, 30 miles. Dr. W. L. Lewis, American Falls, is the principal promoter.

BIG BLACK FOOT RAILWAY.—Grading contracts are let to Clinton & Applegate to build from Bonner, Mont., 55 miles to and to White Brothers, Missoula, from Mile 20 to Mile 55. The company's plans call for a line from Bonner northeast via Clearwater to Ovando. There will be two steel bridges. John R. Toole, president, Bonner.

BLACK BAYOU.—An officer writes that the plans call for a line from Myrtistown, La., southwesterly for 22 miles. Track has been laid on six miles, and plans are made to extend the line during the next seven months. W. H. Welch, of the Southern Lumber Co., Myrtistown, is president, and T. D. Singleton, chief engineer, Texarkana, Ark.

CANADIAN NORTHERN.—A contract is said to have been given to the Northern Company for building a section of 60 miles through British Columbia from New Westminster to Chilliwack, the work to be started at once and finished this summer. Contracts for additional sections of the 600 miles to be built through British Columbia are to be let as soon as plans and specifications are prepared. It is expected that the entire work will be finished within four years.

CANADIAN NORTHERN ONTARIO.—An officer writes that grading has just been started on the line from Hawkesbury, Ont., east to Montreal, Que. J. P. Mullarkey, Montreal, is the contractor.

CANADIAN PACIFIC.—An officer writes that a contract has been let to Foley, Welch & Stewart for grading work on the Kootenay Central, from a point near Wardner, B. C., northerly towards Fort Steel, 25 miles. (June 24, p. 1812.)

CHICAGO & WISCONSIN VALLEY.—Work is to be started at once, it is said, between Portage, Wis., and Janesville. Surveys have been made. The directors include: A. J. Behymer, J. W. Purves and T. W. Potts. (June 24, p. 1812.)

CHICAGO, MILWAUKEE & ST. PAUL.—An officer writes that this company has bought about 800 acres of land for an outside yard near Franklin Park, Ill. The present intention is to construct a receiving yard, of eight tracks, with capacity of 680 cars; also a modern "hump," or classification yard, of 17 tracks, with capacity of 924 cars; a departure yard of 17 tracks, to hold 916 cars, and a grain yard of 10 tracks, for 580 cars. This will represent about one-half the development of the receiving yard. Eventually there will be an outbound yard, about equal in capacity to the yard herein described, when all the traffic in and outbound will be handled in one yard. The receiving yard will be 5,000 ft. long, and the classification, departure and grain yard will extend 9,300 ft. further. About 200 acres will be utilized at present, leaving 600 acres for future development. The purpose of this yard is to receive road and transfer trains from all divisions, and relieve the Galewood and Western avenue yards. The approximate cost of the land is \$375,000, and the present improvements will cost about \$592,000. The only building in the new yard will be the yardmaster's office, as the principal locomotive and repair plant will remain at Galewood. None of this work will be done by contract.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Progress is being made on the improvement and double-tracking work between Anderson, Ind., and Indianapolis. The company plans to have the work finished by November 1. A force of 400 men are at work on the bridges and culverts. Costello Brothers, St. Louis, Mo., the general contractors, have sublet some of the work to Grant Brothers, Champaign, Ill. (May 27, p. 1324.)

COLORADO & SOUTHERN.—An officer writes that a contract for grading and bridging work has been let to the Utah Construction Co., Salt Lake City, Utah, for double-tracking the line from Minnequa, Colo., to Walsenburg, 46.6 miles. This involves the excavation of 1,250,000 cu. yds. of earth, 370,000 cu. yds. of loose rock, 500,000 cu. yds. of solid rock, also 3,100,000 cu. yds. of borrow, 5,000,000 cu. yds. of overhaul and 50,000 cu. yds. of concrete for bridges and culverts. Maximum grades northbound

9.2 per cent., southbound 1 per cent. Maximum curvature 2 deg. Total cuttings 904 degs., 12 min.; tangent 34.37 miles, equal to 17.1 per cent. Total length of bridges 399 ft. The rails will be 5 1/2 ft. or 90 lb., and the total estimated cost of the work is \$1,000,000. This improvement is being carried out jointly by the Denver & Rio Grande and the Colorado Railroad Cos., a subsidiary of the Colorado & Southern. It is expected that the work will be finished by October, 1911. The construction work is heavy but not particularly difficult. There will be several concrete culverts and bridges, also several steel bridges. (March 4, p. 109.)

COLORADO RAILROAD.—See Colorado & Southern.

CROSBYTON-SOUTH PLAINS.—Contracts are to be let in July, it is said, for building from Crosbyton, Tex., west to Lubbock, 40 miles. P. L. Coonley, president, Thirty-ninth street and Stewart avenue, Chicago.

CRYSTAL CITY & GARDENDALE.—See Crystal City & Uvalde.

CRYSTAL CITY & UVALDE.—An officer writes that contracts have been let for building the Crystal City & Gardendale, from Crystal City, Tex., east to Gardendale, 41 miles. The work includes two steel bridges. A. R. Ponder, president, and E. Breaker, chief engineer, Crystal City. (June 17, p. 1567.)

DENVER & RIO GRANDE.—See Colorado & Southern.

FRANKLIN & ABBEVILLE.—According to press reports, work has been finished on the extension from David junction, in Iberia parish, La., northwest to Milton, 17 miles. (March 25, p. 850.)

HIGHLAND PACIFIC.—Surveys have been made and contracts will be let soon, it is said, to build from Santa Rosa, Cal., north via Highland Springs and Lakeport, to Upper Lake, about 60 miles. Dr. A. E. Dickinson, president, Ukiah.

IBERIA, ST. MARY & EASTERN.—An officer writes that the prospects of building this line are good. The plans call for a line from New Iberia, La., southeast via Jeanerette, Charenton, Franklin and Patterson to Morgan City, 52 miles. The work will be light. There will be two steel bridges, each to have a 150-ft. draw span. The company expects to secure its principal revenue from hauling sugar cane and products. F. M. Welch, president; H. A. Genung, chief engineer, New Iberia.

KOOTENAY CENTRAL.—See Canadian Pacific.

MILWAUKEE WESTERN ELECTRIC.—An officer writes that this company was organized in Wisconsin, with \$200,000 capital, to build 100 miles of electric lines. Surveys have been made from Milwaukee, Wis., northwest via Sussex, North Lake, Neosho and Beaver Dam to Foxlake, with a branch from Sussex, south to Waukesha. An extension is eventually to be built north via Markesan to Green Lake after the line is in operation to Foxlake. The company is planning to begin work, and will probably let contracts this fall. Maximum grade will be 1.3 per cent. There will be about three steel bridges. The general contract has been given to W. D. Chapman, Marquette building, Chicago. V. Zimmerman, Jr., president, and C. A. Chapman, Inc., are the engineers, Chicago.

MONTANA, IDAHO & PACIFIC.—This company has filed plats of the survey from Lapwai Junction, Idaho, east to the clearwater section of Idaho and the Lolo pass. The line is eventually to be extended further east to Butte, Mont. J. H. Richards, president, Boise, Idaho, and G. W. Boschke, chief engineer, Portland, Ore.

MOTOR GRAND TRACTION.—Surveys are said to be made on 65 miles, and contracts are to be let soon, for building from Chester, Neb., south via Concordia, Kan., Salina and Newton to Wichita, 165 miles. E. S. Alnutt, president, Canton, Kan., and J. E. Daugherty, chief engineer, Wichita.

NAPLES & NORTHWESTERN.—An officer of the K. & P. Lumber Co., Cincinnati, Ohio, writes that the N. & N. W. is a logging line and work is now under way building an extension from Naples, Tex., to points in Oklahoma, about 20 miles. An extension is also to be built southeast to Shreveport, La. Max Kosse, president, Cincinnati, and A. E. Hinman, chief engineer, Naples.

NORTHERN TEXAS TRACTION.—Work is now under way by the Stone & Webster Engineering Corporation, Boston, Mass., building 14 miles of electric line in Texas. The company now operates an interurban line from Fort Worth, Tex., east to Dallas, 30 miles, and 10 miles of city line in Dallas.

OREGON SHORT LINE.—According to press reports, this company will build a cut-off between Logan, Utah, and Cache Junction. The proposed line is to be built through Benson and will be four or five miles shorter than the present route via Mendon.

PECOS VALLEY SOUTHERN.—An officer writes that a grading contract has been let to T. H. Brigance, Pecos, Tex., for building 45 miles. The plans call for a line from Pecos south via Saragosa and Balmorhea to the San Salmon. Track has been laid on 25 miles. Maximum grades will be 0.75 per cent. and maximum curvature 2 degs. There will be one steel bridge over the Toyah creek and two long trestles. W. L. Carwile, president, and L. W. Anderson, chief engineer, Pecos.

PENNSYLVANIA RAILROAD.—To eliminate congestion on its tracks between Broad street station and West Philadelphia, the Pennsylvania Railroad is enlarging its elevated line between these two points and building a passenger car storage yard east of the Schuylkill river. The present car yard is a mile away from Broad street station. The new car yard between Twentieth and Twenty-third streets will accommodate 60 cars, or about nine suburban trains, and will contain a 70-ft. turntable. The company bought 105 brick buildings, which will be demolished to make room for this yard. The work includes building retaining walls and embankments and the extension of the arch bridges over Twenty-first and Twenty-second streets; also the construction of two new bridges across the Schuylkill river. This will give room for four main line tracks between West Philadelphia station and the Twenty-third street interlocking plant. At the present time there are only two main line tracks crossing the Schuylkill river to West Philadelphia station. An inbound engine and empty car track is to be laid from West Philadelphia yard to the inbound Philadelphia, Baltimore & Washington track. Connection will also be made with the lower end of the passenger equipment yard in West Philadelphia. It is expected that all the work will be completed by December 1, at a cost of about \$750,000.

SEATTLE-EVERETT TRACTION.—Work is now under way by the Stone & Webster Engineering Corporation, Boston, Mass., building 26 miles of railway in the state of Washington. The company was organized to build a line to connect Seattle, Ballard, Edmonds and Everett. About 17.5 miles are now in operation.

SOUTHERN PACIFIC.—The San Joaquin division has been extended from Haiwee, Cal., to Olancho, nine miles (Feb. 11, p. 329).

This company has under consideration the question of extending its Llano, Texas, branch west to a connection with the Fort Worth & Rio Grande division of the Frisco, which is now being extended southwest from Brady to Menardville. The extension of the Southern Pacific will be about 75 miles, and it may eventually be extended to a connection with the Southern Pacific at Sanderson, Tex., 250 miles. The prospects are favorable for the development of the iron ore field near Llano, and the Southern Pacific is said to be making preparations to haul large quantities of ore from the Llano district to Galveston for shipment to eastern works.

SOUTHERN PACIFIC OF MEXICO.—The Sinaloa division has been extended from Escuinapa, Mex., southward to Yago, 93 miles. A new branch on the Sinaloa division has been opened for business from Quila Junction to El Dorado, 13 miles.

It is said that the engineers report that the proposed line between Tepic, Sinaloa, Mex., and Orendain, across the Sierra Madre, would be very costly to build, on account of the great barrenness that must be crossed, also the many mountains that must be tunneled. A new route may be selected. The company has under consideration the question of building directly south from Tepic, following the Pacific coast to a connection with the Manzanillo-Guadalajara line of the National Railways of Mexico at Manzanillo.

This company is said to have under consideration the ques-

tion of building a branch from a point on the Yaqui river line east to Chihuahua, in the State of the same name. A preliminary survey has been made. (April 1, p. 919.)

TEXAS ROADS.—Reports made to the Railroad Commission of Texas show that 735 miles were built in that state during the fiscal year ended June 30, 1910. Additional reports yet to be filed, it is understood, will bring the total up to about 800 miles. On June 30, 1909, the railway mileage, exclusive of sidings and yard tracks, was 13,110 miles. In addition, there are about 1,500 miles of logging railway not included in these figures. The sidings and yard tracks aggregate 3,500 miles. The following companies added new mileage during the fiscal year just closed as follows:

	Miles.
Asherton & Gulf Railroad, from Light to Asherton.....	90
Estacado & Gulf, from McCauley to Norman.....	6
Ahlene & Southern, from Ovala to Ballinger.....	31
Pecos Valley Southern, from Pecos to Balmorhea.....	36
Bartlett & Florence, from Bartlett to Jarrell.....	11
Concho, San Saba & Llano Valley, from Miles to Paint Rock.....	17
Artesian Belt, from Macdonough to Christine.....	39
Gulf, Texas & Western, from Jackson to Seymour.....	75
Crystal City & Uvalde, from Uvalde to Carrizo Springs.....	33
Quanah, Acme & Paducah, from Quanah to Paducah.....	42
Roscoe, Snyder & Pacific, from Snyder to Fluvanna.....	19
Oklahoma, Red River & Texas, from Blossom to Deport.....	11
St. Louis, Brownsville & Mexico, branch from Madeline to Port O'Connor, 39 miles; branch from Buckeye to Collegeport, 16 miles; total.....	55
Stamford & Northwestern, from Stamford to Spur.....	82
Texas & Gulf, from Gary to Center.....	22
Kansas City, Mexico & Orient, from Sweetwater to San Angelo.....	74
Marshall & East Texas, from Marshall to Elysian Fields.....	16
Timpson & Henderson, from Ragle to Henderson.....	25
Pecos & North Texas, from Plainview to Lubbock, 46 miles; Plainview to Floydada, 36 miles; total.....	72
Chicago, Rock Island & Gulf, from Ontario to Findlay.....	35

It is officially announced that grading work is in progress on new lines and extensions of existing roads covering more than 1,200 miles, a large part of which will be finished during the present fiscal year. These include the Santa Fe cut-off that is being built between Coleman and Texico, 310 miles; the Kansas City, Mexico & Orient branch line from San Angelo to Del Rio, 150 miles, and main line extension from San Angelo to Alpine, about 225 miles; the San Antonio, Rio Grande & Tampico, from San Antonio to the Rio Grande border crossing, 260 miles, and the Frisco branch line from Brady to Menardville, 36 miles.

Bids are wanted until Aug. 8 by the United States Reclamation Service, El Paso, Tex., for constructing the roadbed, bridges and culverts for a line from the A., T. & S. Fe, at a point between Engle, N. Mex., and Cutter, to the Engle dam site near Elephant Butte, about 10 miles. The work involves the excavation of about 14,000 yds. of earth, 56,000 yds. of rock and the placing of approximately 400,000 ft. of timber.

WILDWOOD & DELAWARE BAY SHORT LINE.—An officer writes that contracts are to be let in July for building from Wildwood, N. J., northwesterly across the meadows to Rio Grande, about 3.50 miles, thence to Delaware Bay, an additional 3.75 miles. The work includes filling in about 2.50 miles of meadow land. There will be one steel and concrete bridge with a 35-ft. draw span, to have a total length of 250 ft. The company will also put up a power house, a dock and three stations during the coming fall and winter. Connection is to be made with the Philadelphia & Reading at Rio Grande, and at Delaware Bay with boat service to Philadelphia. E. G. Slaughter, general manager, Wildwood.

WICHITA, KINSLEY, SCOTT CITY & DENVER AIR LINE.—An officer writes that a contract has been given to the Air Line Construction Co. for building from Wichita, Kan., via Pretty Prairie, Turon, Kinsley, Jetmore, Scott City and Sharon Springs to Denver, Colo. Sub-contracts are being let for day labor to Bennett & Luttgerding. It is expected that the principal freight to be carried on the line will be wheat, corn and live stock. W. F. Brown, president, and J. E. Thayer, chief engineer, both of Turon. (March 11, p. 548.)

WINSTON-SALEM SOUTHBOND.—An officer is quoted as saying that the company expects to have the line now under construction from Winston-Salem, N. C., south to Wadesboro, 88 miles, finished by the middle of October, and that bids are wanted for putting up 15 passenger and freight stations along the line. The line is being built jointly by the Atlantic Coast Line and the Norfolk & Western. O. H. P. Cornell, chief engineer, Winston-Salem. (Dec. 24, p. 1261.)

Railway Financial News.

BUFFALO & SUSQUEHANNA.—The interest due July 1 on the first refunding 4 per cent. mortgage bonds will not paid at maturity. (May 13, 1910, p. 1237.)

CHICAGO, CINCINNATI & LOUISVILLE.—The Chicago and Louisville has confirmed the foreclosure sale of this property and the following securities are called for payment: Receiver's certificates; first mortgage bonds of the Cincinnati, Richmond & Muncie, with coupons maturing April 1, 1908, and subsequent thereto; first mortgage bonds of the Chicago & Cincinnati, with coupons maturing February 1, 1908, and subsequent thereto; first mortgage bonds of the Cincinnati & Indiana Western, with coupons maturing June 1, 1908, and subsequent thereto.

Bondholders who have deposited their bonds under the agreement of March 14, 1908, are to receive payment as follows: \$1,109.50 for each \$1,000 bond of the Cincinnati, Richmond & Muncie; \$1,120.46 for each \$1,000 bond of the Chicago & Cincinnati, and \$1,100.67 for each \$1,000 bond of the Cincinnati & Indiana Western.

A new company, the Chesapeake & Ohio Railway of Indiana, is being formed, it is said, to take over the Chicago, Cincinnati & Louisville.

CHICAGO, MILWAUKEE & ST. PAUL.—This company has made a payment of \$4,000,000 to the National City Bank of New York, being the second instalment on \$14,000,000 which it borrowed early in the year. The balance sheet of February 28 shows \$5,000,000 of this debt in the form of bills payable. The remaining \$9,000,000 was borrowed during the first part of March. The first payment in the bank amounted to \$6,000,000, and was made the first week in June, when the St. Paul received the initial payment of \$8,000,000 from the Paris bankers on account of the new bond issue. Another \$1,000,000 falls due July 1 and the remaining \$3,000,000 will possibly be paid before the end of that month. The news of this loan has just been made public.

CUBA RAILROAD.—The New York Stock Exchange has listed \$2,510,000 additional first mortgage 5 per cent. 50-year bonds, making the total amount listed to date \$11,310,000. The proceeds of the sale of these bonds just listed is being used to pay for building the Bayamo extension and for ballasting and improving the right-of-way and station buildings on extensions and branch lines.

DES MOINES & FORT DODGE.—The annual dividend, heretofore 5 per cent., payable August 1, on the preferred stock has been passed. The company is controlled by the Minneapolis & St. Louis, which recently passed the 2½ per cent. semi-annual dividend on its preferred stock. There is \$763,500 preferred stock of the Des Moines & Fort Dodge outstanding.

GALVESTON, HARRISBURG & SAN ANTONIO.—Judge Maxey in the suit brought to foreclose \$6,304,000 Western division, second mortgage income bonds has sustained the general demur of the plaintiff. The plaintiffs are given until the first Monday in August to file an amended complaint.

INTERNATIONAL & GREAT NORTHERN.—The Special Master in Chancery has allowed the following claims against the company: George J. Gould, \$3,589,788; Frank J. Gould, \$181,941; George Gould, \$128,531; Helen Gould, \$172,798; Edwin Gould, \$172,798. The hearing on all claims that seek preference over the bondholders will be held in Dallas, Texas, about June 6.

KANSAS CITY, FORT SCOTT & MEMPHIS.—This company has sold to Philadelphia bankers a little over \$1,000,000 4 per cent. refunding bonds of 1901-1936. The road is a part of the St. Louis & San Francisco system. There are \$492,000 Memphis, Colorado & Kansas first mortgage 7 per cent. bonds due September first.

KANSAS CITY, MEXICO & ORIENT.—This company has sold \$5,000,000 first mortgage, 50 year, 4 per cent. bonds to a syndicate of English brokers. President Stillwell is quoted as

saying that this sale of bonds will furnish sufficient money to complete the extension from San Angelo, Texas, to Del Rio, where a connection will be made with the National Railways of Mexico. This will give the Orient road a direct connection between Kansas City and Mexico City.

NEW JERSEY & DELAWARE BRIDGE RAILROAD CO. (LOUISVILLE, ETC.)—The company has arranged to make a new mortgage securing an issue of bonds, of which about \$2,000,000 will be sold to pay for a new double-track bridge over the Ohio river and \$2,000,000 bonds will be reserved for improvements. There are now outstanding \$1,000,000 first mortgage 5 per cent. bonds, due 1911, and \$1,069,000 consolidated 4 per cent. bonds, due 1930. Daniel Willard, president of the Baltimore & Ohio, and Fairfax Harrison, vice-president of the Southern Railway, have been elected directors, succeeding Governor Harmon and C. L. Harris.

MEXICAN UNION.—The Banco di Roma in Paris is offering 9,750 first mortgage 6 per cent. bonds, par value 500 francs (\$100) at 465 francs each (\$93). These bonds are secured on 91 miles of line running from Torres, on the Sonora branch of the Southern Pacific, to Torrich, on the Yaqui river.

MINNEAPOLIS & ST. LOUIS.—See Des Moines & Fort Dodge.

MISSOURI, KANSAS & TEXAS.—The company has sold to Speyer & Co., New York, \$10,000,000 one-year 5 per cent. notes. The proceeds from the sale of these notes are to be used to pay for the new terminal at St. Louis, to buy new equipment and to pay for the stock of the Texas Central. The M., K. & T. has acquired \$3,856,400 of the total authorized issue of \$4,000,000 Texas Central stock. The Texas Railroad Commission is to be asked to approve the exchange of the outstanding capital stock of the Texas Central into \$3,700,000 consolidated mortgage 6 per cent. bonds and \$300,000 stock. It is understood that if the commission approves this exchange, all of the consolidated mortgage bonds and stock will be pledged to secure the present issue of \$10,000,000 M., K. & T. notes. The notes are being offered by Speyer & Co. at 99, yielding about 6 per cent. on the investment.

MUSCATINE NORTH & SOUTH.—The company has filed a mortgage securing \$1,000,000 first mortgage 5 per cent. bonds maturing 1935. The line runs from Muscatine to Elrick Junction, 29 miles.

NATIONAL RAILWAYS OF MEXICO.—This company on June 30 took over the ownership and control of the Mexican International and the Mexican Pacific.

A dividend of 2 per cent. has been declared on the \$28,830,200 preferred stock from the earnings of the six months ended June 30. This compares with 1 per cent. previously paid semi-annually since August, 1908.

PITTSBURGH, SHAWMUT & NORTHERN.—The United States circuit court has authorized the receiver to issue \$1,500,000 receiver's certificates of August 1, 1910, to run five years (subject to redemption at a premium of 1 per cent. to 5 per cent.), for improvements to the Shawmut Mining Company and the Kersey Mining Company's property.

TEXAS CENTRAL.—See Missouri, Kansas & Texas.

WABASH.—The directors have declared a semi-annual dividend of 3 per cent. on the Debenture "A" bonds and 2 per cent. on the Debenture "B" bonds, payable July 1. This is at the same rate as the last semi-annual payment made in January and makes 6 per cent. paid on the "A" bonds and 4 per cent. paid on the "B" bonds in 1910. This compares with 6 paid on the "A" bonds and 2 paid on the "B" bonds in 1909.

WESTERN OHIO RAILWAY.—Stockholders have voted to authorize a second mortgage for \$500,000 to increase the authorized capital stock from \$3,400,000 to \$4,000,000, and lease the property of the Western Ohio Railroad. Holders of railway income stock are offered the privilege of exchanging their stock for one-third in Railroad stock.

WHEELING & LAKE ERIE.—The receiver has applied to the United States district court for authority to issue \$200,000 receiver's certificates to pay for tools, machinery and other equipment for a new shop at Brewster, Ohio.

Supply Trade Section.

T. F. Howe has resigned as general manager of the Milwaukee Car Mfg. Co., and the Milwaukee Refrigerator Transportation Co., to become secretary of the Calumet Engineering Co., Chicago and Harvey, Ill.

N. R. McLure, recently assistant engineer of the Phoenix Bridge Company, Philadelphia, Pa., has been appointed resident engineer at St. Louis, Mo., in charge of the western interests of the company. Mr. McLure succeeds O. J. West, who has resigned.

H. H. Hirschfeld, of the firm of Richards & Hirschfeld, New York, will sail July 16 for a business trip through Cuba and Mexico. Richards & Hirschfeld are export agents for the American Saw Mill Machinery Co., Hackettstown, N. J., and of the American Saw Works, Hackettstown; they also act as purchasing agents for foreign railways.

Isaac B. Connor, formerly with the Galena Signal Oil Co., Franklin, Pa., and Adolph J. Varrelmann, formerly with the Fay-As-You-Enter Car Corporation, New York, have entered the service of the Indian Refining Co., Inc., Cincinnati, Ohio. Mr. Varrelmann will have headquarters at New York. Both gentlemen will be identified with the railway lubrication department.

Among the orders recently placed with the Crocker-Wheeler Company, Ampere, N. J., are the following: Two 1,000-k.w. engine type generators, Republic Iron & Steel Co., Hazleton plant; one 500-k.w. engine type generator, A. M. Byers Co., Pittsburgh, Pa.; one 300-k.w. engine type generator, H. Lauter Co., of Indianapolis; one 175-h.p. auxiliary pole motor, Orford Copper Co., of New Jersey; one 1,000-k.v.a. engine type a.c. generator and one 150-k.v.a. engine type generator, Big River Lumber Co., Saskatchewan, Canada; one 150-k.v.a. engine type a.c. generator with exciter, town of Julesburg, Colorado; one 300-k.v.a. belt type a.c. generator with exciter, York Card & Paper Co., of Pennsylvania; two 500-k.w. synchronous motor-generator sets, Gary plant of the American Sheet & Tin Plate Co.

A suit for infringement of trade mark was brought in the United States Circuit Court over two years ago by James B. Sipe & Co., Pittsburgh, Pa., against the Columbia Refining Co., New York. The Columbia company has for several years past been manufacturing and selling a paint oil under the name "Japinol," while James B. Sipe & Co. have been manufacturing and selling a paint oil for the past 25 years under the registered trade mark "Japan Oil." On May 6, 1910, U. S. Circuit Court Judge Lacombe, of the Southern district of New York, issued a decree perpetually enjoining and restraining the Columbia Refining Co. from using in any manner whatsoever the word "Japinol" or any other word so closely resembling James B. Sipe & Co.'s trade mark "Japan Oil" as to be misleading to the trade. The defendant company also paid James B. Sipe & Co. a substantial sum in lieu of damages, costs, etc.

The note in our issue of June 24, page 1418, concerning the injunction restraining the General Railway Signal Co., Rochester, N. Y., from making or selling certain devices in connection with automatic signals on electrically operated lines, was not complete. Judge Ray, of the United States Circuit Court, had granted an interlocutory injunction in favor of the Union Switch & Signal Co., Swissvale, Pa., as mentioned above. The General company having signified its intention of taking an appeal from this decision, Judge Ray, on June 8, ordered that, pending this appeal, the accounting and the operation of the injunction as against all acts except the taking or filling of new contracts be suspended. This order, however, was made dependent upon certain conditions, the last of which was that the General company could at any time, after giving notice to the Union company's counsel, apply to one of the judges of the Circuit Court of Appeals for the Second Circuit for permission to bid upon, take or fill new contracts. The other conditions were that the General company should take its appeal within 30 days from June 8 and prosecute it with diligence, and also that it should within 30 days file a bond of \$10,000, covering costs and damages awarded by the final decree in case of affirmance.

TRADE PUBLICATIONS.

Fire Expanders.—Gustav Wiedeke & Co., Dayton, Ohio, have issued bulletin No. 130, which describes the flue expanders made by this company.

Railway Supplies.—The Walter A. Zelnicker Supply Co., St. Louis, has issued its list No. 107 covering the rail equipment and machinery supplies which it has on hand.

Sand Rammers.—The Ingersoll-Rand Co., New York, has issued form No. 8108 describing its Crown bench and floor pneumatic sand rammers for foundry and concrete work.

Steel Tie.—The York Rolling Process Co., New York, has issued a pamphlet describing its York steel tie. A number of drawings show sections and the application of rails to this tie.

Six-Wheel Truck.—The J. G. Brill Co., Philadelphia, Pa., has just issued a catalogue describing its No. 27-M.C.B. six-wheel passenger truck. Both line and half-tone illustrations are included.

Wood Preservatives.—The Barrett Manufacturing Co., New York, has issued a pamphlet containing information relative to the decay of wood and the use of its Creo-Carbolin, a liquid oil produced from coal tar.

Railway Frogs and Crossings.—The Conley Frog & Switch Co., Memphis, Tenn., has issued catalogue No. 2 describing the Conley patent frog and all the standard and special frogs, switches, crossings, switch stands, rail braces and track equipment made by this company.

Construction Work.—The Stone & Webster Engineering Corporation, Boston, Mass., has issued a pamphlet which contains a list of completed and uncompleted construction work of this company, covering steam power stations, water power development, railway construction, building construction, sub-stations, etc.

Line Material.—The Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa., has issued catalogue No. 10 on direct suspension, low voltage, line material. This catalogue contains 200 pages, printed on heavy glazed paper, bound in cloth board. The railway line material made by this company is intended to meet all the requirements of either bracket arm or cross span types of direct suspension railway construction, and to be equally applicable to either direct current or alternating current systems for potentials not exceeding 750 volts. All of this material is shown in list form, with specifications and prices in each case.

RAILWAY STRUCTURES.

ALPENA, MICH.—Spier, Rohns & Gehrke, architects, Detroit, Mich., will receive bids until July 12 for building a one-story brick and stone passenger station, 40 ft. x 125 ft., for the Detroit & Mackinac.

CHICAGO.—An officer of the Pennsylvania Railroad writes that the lines occupying what is known as the union station in Chicago have had under consideration for some time the question of rebuilding the station. Plans have not been prepared because of contemplated action of the municipal and federal authorities in requiring bridges with such spans across the Chicago river, that the encroachment of the abutments of these bridges on railway property would be so great that it would prevent the location of a station on the present site. It is now believed that the proper authorities will agree upon such length of span for bridges over the river, that the abutments will not encroach upon railway property to such an extent as to prevent its full use for railway purposes. The railways, however, cannot prepare plans for the contemplated improvements until they know that this is an assured fact. See an item in General News.

CHICKASHA, OKLA.—An officer of the Chicago, Rock Island & Pacific writes that the company is arranging to build a viaduct jointly with the city authorities of Chickasha, at Choctaw ave-

line, over the Rock Island tracks. No definite agreement has yet been made and the design of the structure has not been decided upon.

CINCINNATI, OHIO.—According to press reports, the ordinance was recently passed by the City Council granting the necessary franchises for carrying out the proposed improvements. To include a union terminal station on the north side of Third street between Walnut and Main streets. (May 27, p. 1327.)

GRAVESTON, TENN.—The Gulf, Columbia & Santa Fe has secured property adjacent to the Union Station for the purpose of making improvements on the building and yards.

GOLDFIELD, NEV.—The Tonopah & Goldfield has let the contract to Charles Kline for building the three roundhouses and other buildings mentioned in the *San Francisco Gazette* of June 10.

GRAFTON, W. VA.—The Baltimore & Ohio has let the contract to J. J. Walsh, Baltimore, Md., for building a \$100,000 passenger station.

GREENVILLE, PA.—According to press reports, the Bessemer & Lake Erie will put up a new roundhouse in Greenville.

LOUISVILLE, KY.—The Kentucky & Indiana Bridge & Railroad Co. has let the contract to the Foster-Creighton-Gould Co., Nashville, Tenn., for the substructure of the new Ohio river bridge. The contract includes eight concrete piers requiring about 25,000 cu. yds. of concrete. (July 1, 1910, p. 57.)

MCComb, MISS.—The Illinois Central has bought 100 acres of land on which to build reservoirs to have a capacity of 1,000,000,000 gallons. A pumping plant and pipe line will distribute the water to shops.

MEMPHIS, TENN.—The Memphis Union Station Co. has let the contract to J. A. Omberg, Memphis, for building a concrete viaduct from Railroad to Calhoun avenue. The estimated cost is \$80,000.

NEWBERN, N. C.—A contract has been given to D. J. Phipps and work was started July 1 on a brick passenger station at Queen street, in Newbern, for the Norfolk Southern and the Atlantic Coast Line. The building is to be two stories high, 32 ft. x 138 ft., and will cost about \$35,000.

OMAHA, NEB.—An officer of the Missouri Pacific writes that nothing definite has yet been decided regarding the construction of a viaduct over the railway tracks at Nicholas or Izard streets in Omaha.

OTTAWA, ONT.—Bids have been received by the department of railways and canals for the superstructure of a bridge over the Saskatchewan river on the line of the Hudson Bay Railway. The structure will consist of four fixed spans of 147 ft. each and one swing span of 262 ft.

PALMYRA, PA.—The Philadelphia & Reading, it is said, will put up a new passenger station at Palmyra to replace the present wooden structure.

PROVO, UTAH.—The contract has been let for building the new union station at Third, West and Sixth South streets in Provo. The estimated cost of the building is \$50,000, and it is expected that it will be completed by next October. (Aug. 6, 1909.)

SACRAMENTO, CAL.—According to press reports, the electric lines in Sacramento have asked permission from the War Department to build a bridge at M street, in Sacramento. (Jan. 7, p. 71.)

SEATTLE, WASH.—The Oregon & Washington has let the contract to Grant, Smith & Co., Seattle, for building the concrete viaduct and retaining wall in connection with the new passenger station. (June 3, 1910.)

SOUTHEAST, N. Y.—The New York Public Service Commission, Second district, has ordered the highway crossing, known as Griffins Highway passing over the New York & Harlem Railroad in the town of Southeast, Putnam county, closed and discontinued. The highway is to be carried over the existing tracks by a steel viaduct and other adjacent tracks to be constructed. The New York Central & Hudson River is to pay the entire cost of the improvements.

WINSTON-SALEM, N. C.—See Winston-Salem Southbound under Railway Construction.

Late News.

The items in this column were received after the classified department were printed.

At conferences between the Delaware, Lackawanna & Western and the locomotive engineers a proposition was submitted to the grievance committee representing the men, which carries with it an increase roughly estimated at 9% per cent. This means that the original demand of the engineers for higher wages is refused on the ground that the demand is exorbitant.

The Interstate Commerce Commission on complaint of the St. Paul Board of Trade v. Minneapolis & St. Paul has decided that the defendant may make a distinction in its rates between shipments originating at the concentrating points, so far as its line is concerned and traffic on which it has had a haul into the concentrating points; but it may do this only under proper tariff provisions connecting the inbound with the outbound movements and then only when the inbound movement to the concentrating point proceeds under rates on file with the commission.

A press despatch says that the Blue Island Rolling Mills & Car Co., formerly the Blue Island Car & Equipment Co., one of five corporations charged with defrauding the Illinois Central out of about \$1,500,000 in connection with repairing freight cars, has settled out of court by the payment of a sum variously stated to be between \$400,000 and \$500,000. The total claim of the Illinois Central road against the car company was \$600,000. The settlement was followed by dismissal of all court proceedings. See page 92 in regard to the I. C. suit against the Memphis Car Co.

The Erie and the Delaware, Lackawanna & Western in the supreme court at Binghamton, N. Y., July 6, entered pleas of guilty to the indictments charging violations of Section 11 of the state labor law, which requires the semi-monthly payment of employees. Last year 12 indictments were found against the two roads, six against each, covering violations of the law. Action on the indictments has been suspended pending appeal. Judge Gladding imposed fines of \$100 on each indictment; \$600 against each defendant. Officers of the Erie are quoted as saying that it costs that company \$60,000 more a year in its book-keeping and timekeeping system to comply with this law.

Governor Fort, of New Jersey, in refusing to call a special session of the legislature to consider the increase in commutation rates, said: "I think, with many others, that the railways in raising rates have acted hastily. Still all must concede that they are within their legal rights, if it is shown that the increase is reasonable and just. This presents, in my judgment, a judicial question and should be determined on the proofs adduced in evidence. It cannot be rightly settled by prejudice nor by what is even worse, partisan political considerations. These changes in the schedules, for the most part, affect those who make daily journeys from New Jersey into New York. In respect to such interstate travel New Jersey has no jurisdiction, and, therefore, can exercise no control, either directly or indirectly. Any attempt by the legislature of this state, whether in special or regular session, to deal with this question, would be unwarranted and unlawful.

The Canadian Northern has given a contract for the construction of the line from Virginia, Minn. south to Duluth, 75 miles, to Foley, Welch & Stewart, of St. Paul. This new line will form part of a through line from Winnipeg to Duluth, while connections with Chicago will be complete within a year.

The cost will be \$35,000 a mile, a total expenditure of over \$2,500,000. The right of way for the entire distance has been secured. The company contemplates the erection in Duluth of independent terminals at the waterfront and part of the wharfage is already secured. (June 3, p. 1390.)

The initial step in the construction of the government line to Hudson Bay was taken recently when a contract was let for the construction of the superstructure of the bridge across the Saskatchewan river at Lepas Junction, the present terminus of the Canadian Northern line. This bridge will provide a route for supplies to the far North for the Hudson Bay line. Actual work will be started this month.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Atlantic Coast Line has ordered six consolidation locomotives from the Baldwin Locomotive Works.

The Central South African Railways have ordered 10 Mallet locomotives from the American Locomotive Co.

The Delaware & Hudson has ordered one six-wheel saddle tank locomotive from the American Locomotive Company.

The Nashville, Chattanooga & St. Louis has ordered 10 consolidation locomotives from the Baldwin Locomotive Works.

The Central South African Railways have ordered 10, 2-6-6-2 Mallet locomotives from the American Locomotive Company.

The Chicago Short Line Railway has ordered one eight-wheel switching locomotive from the American Locomotive Company.

The Baltimore & Ohio has ordered 50 Mikado locomotives from the Baldwin Locomotive Works and is asking prices for 30 Mallet locomotives.

The National Railways of Mexico have ordered six Mallet locomotives from the Baldwin Locomotive Works for use on the Mexican International.

Haney, Quinlan & Robertson, railway contractors, Toronto, Canada, have ordered four four-wheel saddle tank locomotives from the American Locomotive Company.

The Illinois Traction System is building six heavy electric locomotives at its shops in Decatur, Ill. They will be equipped with four General Electric, 600-h.p. motors with Sprague-General Electric, multiple unit type M control. The trucks will be furnished by the American Locomotive Company and the air-brakes will be Westinghouse EL. The locomotives will resemble in general outline the steel turtle-back cars in use on this line, and will be 34 ft. long, 9 ft. 3 in. wide. They are to be equipped with M. C. B. couplers and steel pilots.

CAR BUILDING.

The Illinois Tunnel Co., Chicago, has ordered from the Kilbourne & Jacobs Mfg. Co., 500 tram cars for operation in the Chicago freight tunnel.

The Carolina, Clinchfield & Ohio, reported in the *Railway Age Gazette* of June 3 as being in the market for 250 box cars, has added 100 stock cars to this inquiry. Bids on this equipment have been received.

The United Fruit Company, reported in the *Railway Age Gazette* of June 10 as being in the market for freight cars, has ordered 100 steel underframe, narrow gage box cars from the Wonham-Major Car & Mfg. Co.

MACHINERY AND TOOLS.

The Chicago, Rock Island & Pacific is in the market for 12 machine tools.

The Baltimore & Ohio has ordered from the Allis-Chalmers Co., Milwaukee, Wis., one 300-k.w. synchronous motor generator set which will be used in generating the power for the new ore dock being erected at Lorain, Ohio.

The General Traction Development Co., Cleveland, Ohio, is financing and building a 4,000-h.p. hydro-electric power plant for the Georgian Bay Power Co., Ltd., Toronto, Can. Bids will shortly be asked for the power plant equipment.

The Wheeling & Lake Erie is understood to be in the market for a large number of machine tools for its new shops at Brewster, Ohio. A list of tools required for these shops was given in the *Railway Age Gazette* of July 1, in connection with a descriptive article on these shops.

The Chicago, Milwaukee & St. Paul is in the market for the following machine tools:

One 16-in. upright mill.
One 30-in. gear cutting machine.
One 24-in. lathe.
One 16-in. lathe.
One 16-in. lathe.
One 16-in. lathe.
One 16-in. lathe.
One 16-in. lathe.

The Chicago, Burlington & Quincy machine tool inquiry, previously reported in the *Railway Age Gazette*, includes the following:

One 50, one 30, one 10 ton forging presses.

One 36-in. vertical turret lathe.
One 30-in., two 15-in., one 51-in., and one 100-in. boring mills.
One 54-in. car wheel boring mill.
One 30-in. boring machine.
One double head drilling machine.
One four-spindle drill.
One 24-in. and one 36-in. vertical drills.
Three centering machines.
One link radius grinder.
One 3-in., and one 1½-in. arbor presses.
One 24-in. gear cutting machine.
Two 24-in. gear planers.
One 64 x 20-in., one 44 x 30-in., and two 24 x 20-in. turret lathes.
One 24-in. shaper.
One 15-in. and one 18-in. slotter.
Two four-spindle turret lathes.
Two 22-in. drills.
Three 18-in. portable boring lathes.
One 20-in. and one 18-in. engine lathes.
Two 3 x 36-in. and two 3½ x 36-in. turret lathes.
One four-spindle staybolt drill.
Two 72-in. radial drills.
Four 24-in. post drills.
One 20-in. vertical drill.
Two power hack saws.
One 3½-in. drill grinder.
Four double head grinders.
One cutter and reamer grinder.
One die grinder.
One 12 x 40-in. universal grinder.
One six-spindle staybolt machine.
One 1-in. single head bolt cutter.
One 1-in. three-spindle bolt cutter.
One 1-in. four-spindle nut tapper.
One 100-lb. and one 200-lb. power hammers.
Two 1500-lb. steam hammers.
One 100-in. quartering machines.
One cold saw.
One pipe bending machine.
Two pressure blowers.
Two 36-in. double punch and shears.
One staff riveter.
One horizontal flanging punch.
One 18-in. single-end punch.
Two 18-in. single end shears.
Three double head dry grinders.
One 1-in. forging machine.
One rotary sand shifter.
One car wheel press.
One flue welder.
One tool, one babbitt, one brazing, two blowing out, one heavy forging and one case-hardening furnaces.
One metal melting furnace.
One brass rattle.
One lifting magnet.
Two double head dry grinders.

IRON AND STEEL.

The Erie is taking prices on 1,500 tons of structural steel

The Florida & East Coast is taking bids on 6,000 tons of structural steel.

The Cleveland Railway has ordered 3,500 steel ties from the Carnegie Steel Co.

The National Railways of Mexico are in the market for 25,000 to 30,000 tons of rails.

The Pennsylvania is taking prices on bridge steel for two bridges of 190 tons each.

The Chicago, Milwaukee & St. Paul has ordered 450 tons of bridge steel from the Wisconsin Bridge & Iron Co.

Steel Frame Tank Cars.

The Kennicott Co., Chicago Heights, Ill., has built and equipped a special shop for the construction of steel frame tank cars, and has added this department to its older lines of building water softeners and fabricating steel plate work, such as boilers, stacks and caissons. The company has made car tanks for some time and can still furnish them separate, but it is now prepared to build complete cars of special patterns to suit the purchaser, and can fill such orders promptly.

The accompanying cut shows one of the cars recently built by the Kennicott Co. for a private car line. This car conforms to M. C. B. standards and has the following points of merit: a strong diamond frame arch bar truck, a four sill steel car body, a substantial head block, and a stout support for the tank. A heater is provided to enable commodities such as lard and molasses to be handled in these cars.



Steel Frame Tank Car.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY EXCEPT SUNDAY, BY
THE RAILROAD GAZETTE, (INC.), 38 FIFTH ST., NEW YORK

(CHICAGO: Plymouth Bldg. (CLEVELAND: Western Bldg.
LONDON: Queen Anne's Chambers, Wood Street)

W. H. BOARDMAN, *Editor*

F. A. SIMMONS, *Exec. Pres. & Treas.* H. C. LEE, *Gen. Mgr.*
The address of the company is 38 Fifth St., New York.

EDITORS

W. H. BOARDMAN, <i>Editor.</i>	ROY V. WELCH	E. B. ALMS
SAMUEL O. DUNN,	ERNEST MCCULLOUGH	W. E. HOOPER
<i>Western Edit. Mgr.</i>	G. I. POWELL	F. E. LISTER
BRADFORD BOARDMAN,	WILLIAM FORSYTH	F. W. BRADGER
<i>Eastern Edit. Mgr.</i>	S. W. DENNIS	H. H. SIMMONS
	CLARENCE DEMPING	

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico	\$5.00 a year.
Canada	\$6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 19. FRIDAY, JULY 15, 1910. NUMBER 3.

CONTENTS

EDITORIAL:

Editorial Notes	109
Hopes and Fears of the New Law	110
Growth of the Expense of Preparing and Printing Tariffs.....	111
New Books	112

ILLUSTRATED:

New Tank Car	116
Tests of Self-Cleaning Front Ends; Pennsylvania Railroad.....	124
New Chicago Station of the Chicago & North Western.....	128

MISCELLANEOUS:

Car Distribution	112
The Bill of Lading Controversy	119
Train Accidents in June	121
Electrified Steam Roads and Electric Trunk Lines.....	121
Co-operative Engineering Education.....	122
Annual Meeting of the Freight Claim Association.....	126
Foreign Railway Notes	120, 121

GENERAL NEWS SECTION

133

SUPPLY TRADE SECTION

144

AN engineer is not only a designer and constructor; he must know how to get the highest efficiency from the men working under his direction. As stated concretely by Dean Herman Schneider in an address before the Society for the Promotion of Engineering Education, which appears on another page of this issue: "A working knowledge of the toxins of fatigue is as important, to say the least, as the ability to discover and eliminate the impurities in castings. To conserve the years of labor is as much a part of economical engineering as to find a good preservative coating for bridges. A knowledge of the limitations, the weaknesses and the group subtleties of men is as requisite as a similar knowledge of materials." Judging roughly from the salaries of men who are engaged in "pure engineering," as it is sometimes called, and those who practise the broader engineering as outlined above, the latter are much more valuable than the former. To develop this broader type of engineer should require

a very different kind of education or training than is furnished in the time-honored methods in use in most of the engineering colleges. It is true that many of the men who possess the qualifications for this sort of work will develop themselves, as they come on the job, but the great need of such talent at the present time makes it imperative to adopt improved methods of training in order to develop them more quickly and more thoroughly. It was to fill this need that the co-operative engineering courses were established by Dean Schneider at the University of Cincinnati four years ago. Few men have been unkind to these severe or bitter criticism. It is greatly to the credit of the Cincinnati machine tool builders that they realized the possibilities in the new scheme and backed it up as they did. To-day it stands as an unqualified success; its principles are being adopted by other engineering colleges, and, what promises to give results of even greater and more far-reaching importance, by manufacturing concerns in the training of their apprentices and by department stores and similar concerns for the training and broadening of their employees.

DR. J. N. HURTY, secretary of the Indiana State Board of Health, is credited with having induced the steam and interurban railways of that state to refuse absolutely to carry drunken passengers. The doctor was led to act, it was said, because police officers have been in the habit of loading drunken men on the cars to get rid of them. He intends that this shall no longer be tolerated in Indiana. As the railways in Indiana no doubt have, like those everywhere else, rules forbidding the presence of drunken persons on their cars, it must be assumed that the vital element in this statement is the word "absolutely." That is to say, the doctor has induced the roads to enforce their own rules. If we may judge by the conduct of trainmen in certain states nearer the Atlantic ocean the policemen are not the only men at fault; trainmen, also, are blameworthy for having winked at the policemen's lazy course. And we can readily believe the intimation conveyed with this statement about Dr. Hurty, that it was on the interurban lines that he found the most offensive looseness in policing. Where dignity, decency and propriety prevail on a passenger car that condition is due to a combination of law and tradition, and a disposition to good behavior on the part of nearly all of the passengers, and finally to a good degree of backbone in the conductor and trainmen. In most or all of these elements the interurban car is less strongly fortified than are the cars of the standard railway passenger train. But how is Dr. Hurty going to make permanent this commendable action on the part of the railways? The drunken person has no right whatever on a train; but to repress him rigidly, and consider only those persons who do have rights—the passengers—is not always easy, even for the best disposed conductor or brakeman. To induce trainmen to be vigilant in this unpleasant part of their work, and to stimulate in them an intelligent devotion to their duty of promoting the comfort of the respectable passengers, a premium or prize ought to be offered.

THE "comfort" of passengers includes peace of mind. Too many trainmen seem to think, when a drunken man is aboard, that they have done their duty if they prevent him from directly insulting passengers and from soiling their clothes or coming unpleasantly near. This is a very narrow construction of the rule. The writer recalls an outrage on a sleeping car, at midnight, in which the intoxicated passenger seemed to be in fair control of his faculties and neither filthy in person nor improper in language. He simply sat in his upper berth and yelled; yelled murder, loudly enough to seriously frighten every woman in the car, though all had retired within their berths. And, curiously, the yelling did not sound like that of a drunken man or a lunatic but like that of one nearly or quite sober, and perhaps semi-humorous provided he had been in a forest or on the ocean. The incident is recollected because of the pusillanimous conduct of the porter and the conductor, who ought to have ejected the passenger at the first stop, but who did not do so.

(In this pusillanimity the writer must share, as he did not call the trainmen to account for their neglect). After a half hour the obstreperous passenger subsided. The case is cited here simply to illustrate the difficulty of the trainman's task. To have arrested and punished that passenger would have necessitated at least a day's lay-off for two men, to attend court, involving a 200-mile journey; and the offending passenger, sobered, probably would have wheedled the judge into letting him off with a five-dollar fine. The outraged passengers, having been in their berths, would have objected to being called the next day to testify in court, at great inconvenience. And yet, in spite of the difficulties, the railway or sleeping car employee charged with the care of passengers is bound to do his best, always. One difficulty is that passengers are often too lenient; and so is the trainmaster, who sympathizes with the conductor or brakeman in his thankless task. It would be a good thing to have inspectors (to voice the just complaints of the passenger who is not aggressive enough to demand his right), who should be strangers to the trainmen, and so not unduly tender-hearted toward them. In this matter, as in surprise checking of engineers, there will be those who will declare that inspection by strangers is unjust; but those who reflect and who have had experience with the refinements of discipline do not espouse that idea. A stranger is not necessarily unfriendly; he must, however, be cold. Railway men who have made themselves conspicuously proficient in their work have done so by being cold—in the correction of their own faults.

IT has been said, with truth, that during a considerable number of years past the railway companies have been able to offset measurably the increased cost of supplies and higher wages by increased physical and mechanical efficiencies. New economies have been running side by side with new costs. But they have not run in parallel lines, whether we take separate periods or separate railways, for at one particular period the two currents may diverge widely, just as at any period the railway which has not adopted mechanical economies recedes in the race from the railway which has done so—indeed is not in the race at all. But in studying this great economic competition of railway resourcefulness versus higher costs, one vital point must not be overlooked. In the railway improvements that make for larger efficiency there are natural and fairly distinct bounds. The train load cannot be stretched beyond a certain point now approached on some lines. The new and strong bridge of modern pattern will stand for years without any change that adds to operating efficiency. The reduction of grade reaches its limit when the track becomes level and the curve when it becomes a straight line. Thus the railway labors had a physical limitation in well-nigh every direction. But how about the rival in the race? Will the seller of railway supplies, whether an individual or a corporation, ever fail to get the highest price he can? Will organized labor, resting on the desires of its individual units, ever cease its demands? On the one hand we have an economic force which cannot go beyond natural bounds—and they are probably not far away—and on the other a boundless, nay almost eternal force, based on the enduring law in human nature of get-what-you-can. A material limitation is up against unlimited and very human psychology. What the railways are asking for now in their higher rates is at bottom, a share in that flexible and elastic rule that profits the seller and the wage-earner—in other words, the right to apply to their single commodity, transportation, the principle of varying price which the manufacturer now applies to many railway commodities and the wage-earner applies to his service. It is true that the railways will never be able to derive that principle to the point now attained by the manufacturer, unless an alleged trust and by the wage-earner, for the railway and its rates are in an age of public "regulation," while most manufacturers and all wage-earners are not. But that fact should not clinch a situation in which limited physical economies wage war a losing fight against higher prices and larger pay, with the one situation beginning to be further exposed to higher capitalization and decreased net earnings.

HOPES AND FEARS OF THE NEW LAW.

LETTERS received from the presidents of the principal railways of this country, in reply to our inquiry, give some idea of the enormous cost of complying with the requirements of the national and state commissions and other federal and state authorities. They also show apprehension concerning the increased power of control given by the Mann-Elkins act of June 18. Some have the hopeful view that this grant of greater power will have a sobering effect on the authorities.

As to the cost of it, in the past, quotations from some of these letters are interesting:

"I think it is safe to say that fully 50 per cent. of the time of all of the traffic officers of this company has been taken up in the last two or three years because of the extra duties imposed on us by these commissions. It has also been necessary to make wholesale additions to the clerical force in the traffic department."

"In complying with the requirements of the Interstate Commerce Commission, State Commissions and other federal and state authorities, we judge that it takes about 25 per cent. of the time of the administrative forces. There is always a very large amount of statistical work."

"We are spending an undue amount of time in dealing with federal and state regulations with little, if any, results that are of benefit either to the public at large, whom the carriers serve, or the railways themselves."

"Since the passage of the Hepburn Act, we have kept an experienced lawyer, with from two to three other lawyers assisting, for the purpose of attending to our appearances before the commissions. The time of our general solicitor is largely devoted to commission work. The operating and traffic department officers are frequently called off from their work for the same purpose."

"Nearly one-half my time, and certainly one-third of our other officers' time has been devoted to commission work."

"In order to meet the requirements, we are obliged to carry larger forces in the clerical departments and in the line of staff officers."

Perhaps it is idle to attempt to estimate the direct costs to the railways in meeting what may be called government requirements. This has, however, been done in several different ways, and, counting as money the salaries paid to officers in the proportion of time devoted and adding this to cash paid out directly, these estimates rarely come below \$20,000,000 a year. Although this is a large sum, 2 or 3 per cent. of the net earnings, there are some good results. There is, however, no question whatever that in the general opinion of railway presidents this money is largely wasted; that is, the hearings, the statistics and investigations demanded are apt to be, in their opinion, unnecessary and unfruitful. We find, however, in this correspondence a notable exception; an officer of one of the most important railways in the country. He writes:

"I want to say to you frankly that one-half of this time spent on the commissions and authorities is in attending to things that our own people ought to have seen to themselves, and the fact that it is necessary for any authority to call attention to delinquencies is not creditable to railway management."

This is from an officer of distinguished ability, whom we all respect, and one who is eager to "first cast the beam out of his own eye."

The withdrawal of a considerable proportion of the time of the higher officers of a railway might naturally be expected to impair efficiency in their regular work. Their routine work must be attended to first, and there is left less time for study and initiative. The following quotations indicate this.

"The legitimate duties of railroad officers are certainly being very much hindered."

"Because of the added duties, it has been impossible for traffic officers to go out and visit the cities and towns along the line, to keep in close touch with the shipping public and the requirements of the different communities, and I regret to say that this work has practically had to be abandoned."

Another officer makes a similar statement and adds, "But I would not like to admit that improvement of the quality of the service is retarded or proper check of the cost of transportation hindered."

With two or three exceptions, there appears in these letters from railway presidents a variously indicated feeling of hopefulness and expectation of fair judgment by the public and better working relations with the commissions, because commissioners are all the while learning more and more about railway business, although, as one president remarks, "the railways are paying for their education." One officer goes so far

as to say, "the results of this much patience are worth all of its terrible costs." It is probably true that no other class of people in the country is now so practically free during the railway officers, and perhaps it is this consciousness that leads to this hopefulness. In a desperate situation, nothing is more hopeful and more helpful than a good conscience. The hopeful feeling is indicated more often in the tone of their letters than in their quotable sentences.

"It would seem to me that unless the new law is very deeply framed on the methods of the commission as to whether the time consumed so much with their requirements will be very much greater than in the past, but this can only be determined by actual experience. I am confident that the commission will use every effort to make the burden as light as possible, but I am afraid that it will result in much unnecessary work being done at railway officers."

"Our company does not object to reasonable regulations and neither do we feel that our relations with the various state and federal authorities are onerous or that the time is entirely lost."

The generally feared result of recent legislation is a bad effect on the company credit. The power to withhold judgment on a proposed increase in rates for nearly a year, and the power of refusal, involves the power to reduce and even cut off dividends and the power to increase the cost of getting new capital, or even prevent getting capital to make extensions and do more efficient public service.

There are always some reactionaries, really great men who in the past have guided railway operations and made tariffs unrestrained by law. They studied the needs and the possibilities of the region they served. They cultivated promising infant industries with special rates and special privileges. They were pioneers with imagination, a sense of responsibility and great power. Nominally creatures of the state, they made the state. They were kings; they are no longer kings. The following letter may be regarded as either submissive or humorous, but surely it is straight from the heart.

"I have made up my mind to accept the railway situation as it is and to do and to suffer everything that is necessary for us to do and to suffer in connection with this government interference. But accompanied with this, there is also a high resolve, not to swear, nor to curse, nor to talk, nor to write about it."

GROWTH OF THE EXPENSE OF PREPARING AND PRINTING TARIFFS.

THE rules of the Interstate Commerce Commission are causing a very large increase in the expenses of the railways for preparing, printing and distributing tariffs. The stationery and printing bills of the traffic department of the Wabash have increased, as shown by the following figures: Fiscal year 1908, \$58,608; fiscal year 1909, \$67,504; first seven months of fiscal year 1910, \$60,053. For the first seven months in 1909 this account on the Wabash was \$32,535. Thus there was an increase in the first seven months of the fiscal year 1910 of \$28,000, or 46.2 per cent., which indicates that the total increase for the 1910 fiscal year will be at least \$40,000. The growth in this item of expense on the Wabash is not exceptional. The expenditures of the traffic department of the Burlington for printing and stationery have increased, as shown by the following figures: 1907, \$92,937; 1908, \$114,731; 1909, \$141,861; first nine months of fiscal year 1910, \$179,131. Thus the bills of the traffic department of the Burlington for printing and stationery were 93 per cent. greater in nine months of the fiscal year 1910 than for the entire year 1907.

The expense of six of the New York Central lines west of Pittsburgh and Buffalo (the Lake Shore & Michigan Southern, the Michigan Central, the Big Four, the Pittsburgh & Lake Erie, the Lake Erie & Western and the Chicago, Indiana & Southern) in 1905 for the printing of freight tariffs, exclusive of their proportion of the cost of joint agency issues, was \$33,603.58; including their proportion of the cost of joint agency issues, it was \$47,334.38. In 1908 the expenditures of these roads for the printing of freight tariffs, exclusive of their portion of the cost of joint agency issues, was \$141,234.65; including their portion of the cost of joint agency issues, it was \$187,949.38, a total increase over 1905 of \$140,635, or almost 300 per cent. In 1905 these roads employed

47 clerks in the preparation of tariffs at a total cost of \$3,657.90. In 1908 they employed 72 clerks for this same purpose at a total cost of \$67,308.30, an increase over 1905 of \$33,650.40, or 186 per cent. In 1905 they spent for postage on tariffs \$2,337.16, and in 1908, \$4,199.25, an increase of \$1,862.09, or 80 per cent. The grand total expenses of these roads for the printing and distribution of freight tariffs in 1905 was \$35,359.34. In 1909 it was \$259,456.93, an increase of \$170,097.59, or about 200 per cent. No data regarding the expenses of the New York Central lines in 1909 have been compiled, but they have continued to increase. For example, in 1905 the tariff department of the Big Four had 10 clerks; in 1908, 15; and now it has 30.

A compilation of data similar to the foregoing for all the railways in the United States would show that the aggregate annual increase in the expenses of preparing and distributing tariffs since the revision of the law in June, 1906, amounts to several millions of dollars. The Interstate Commerce Commission has been justified in causing a large part of these additional expenditures. Tariffs were formerly framed, printed and posted in a very unsatisfactory way. But the commission has made and is enforcing some rules which are causing large increases in railway expenses without conferring on the roads, the shippers or the public any proportionate benefits. Some of its rules, which are causing large expense to the railways, are doing no good to anyone.

For example, it requires every tariff containing a rate which applies from a given station to be filed at that station. Now, the tariffs contain many rates applying at small stations on which shipments seldom or never are made. There are numerous small stations from which almost nothing but coal is ever shipped and at which little but occasional consignments of merchandise is received. There are numerous other stations in agricultural districts from which nothing but live stock and grain and an occasional consignment of poultry, eggs and butter are shipped, and at which there are only occasional receipts of merchandise. But as there may at some time or other be shipments of other commodities from such stations, it is necessary for the railway to provide a full line of rates to and from them; and since these rates are provided enormous tariffs containing innumerable rates which are never used are required by the commission to be posted. The only tariffs which are of any use to anyone at such stations are those containing the rates on which commodities are regularly shipped to and from them. If a shipment of any other commodity is to be made, the shipper does not consult the tariffs on file at the local station to find out what the rate is, nor does the agent. Neither would trust himself to wade through the complicated schedules and ascertain the rate. In such a case the agent wires or writes for the rate to the nearest division freight office, and he and the shipper invariably accept and act on the quotation made by the division office. The expenditures for many of the large tariffs filed at small stations and the cases in which they are kept are completely wasted. The money spent on them would just as well be burned.

Again, the commission requires that each road shall every six months print an index of all tariffs in which it is shown as the initial carrier, and that it shall also print a list of all tariffs in which it is a participating carrier. Supplements to these indexes must also be published every month, and no more than two supplements may be effective at the same time. Now, the commission requires each road to keep on file at Washington its concurrences in the tariffs of other roads. By referring to these concurrences the commission can determine controversies as to whether carriers are or are not participants in each other's tariffs. Therefore, the publication by each road of an index of the tariffs in which it is the initial carrier, and also an index of the tariffs in which it participates, involves a complete, unnecessary and wasteful duplication. Surely an index covering outbound issues is all that it would be necessary to file at a local station. The requirement that these in-

Journals shall be republished every six months also seems unnecessarily rigorous. Their republication annually appears to be all that should be reasonably required. Again, the commission prohibits more than one supplement being issued to a one-page tariff. The consequence is that every time the most trifling change has to be made in such a tariff the entire expense of printing it has to be incurred. Such tariffs frequently have to be reprinted every month, and sometimes even oftener.

In reply to complaints, members of the commission assert that the growing cost of publishing tariffs is mainly due to the fact that they were not properly published before the Hepburn act was passed, and that the increase in expenditures has been caused by their necessary initial republication. But the figures we have given show that the increases were not confined to the first or to the second year of the administration of the new law, but are greater this year than in any previous year. Officers of the commission also say that they cannot make their regulations any more liberal without working a practical nullification of the law. The law, however, gives the commission wide latitude. It provides that it may, "in its discretion for good cause shown . . . modify the requirements . . . in respect to publishing, posting and filing of tariffs, either in particular instances or by general order applicable to special or peculiar circumstances or conditions." This seems to give it ample authority to make any reasonable rules which will require the roads to so publish, file and post their schedules and classifications as to make clear what are the legal rates and to render it convenient for shippers to ascertain them, and which will at the same time reduce the trouble and expense of tariff publication, etc., to the practical minimum.

The language used by Congress in the act can hardly, it would seem, be reasonably interpreted to mean that when the New York Central gets out a tariff on business originating at points on its line and destined to points on the Burlington, and the Burlington gets out a tariff on business originating on its line and destined to points on the New York Central, each of these roads should be required to index both the tariffs in which it appears as the initial carrier and those in which it appears as a participating carrier. Nor, it would seem, can the language used by Congress be reasonably interpreted to mean that the commission was to require great stacks of tariffs to be printed for filing at points where nobody ever would make use of them whatever. Such requirements make a farce of government regulation. They also make an unnecessary and unreasonable burden of regulation to the railways directly and to shippers indirectly; for railway expenses must be met out of railway earnings; earnings must be obtained by the imposition of charges; and in the long run the public must pay for every unnecessary and unreasonable expense which the carriers incur.

While the commission's tariff rules have caused an enormous increase in railway stationery and printing bills, they have, in other ways, done a great deal of good, and it would seem that, to make them wholly beneficial, the commission could and should make some modification in them which will eliminate their unreasonable requirements without relieving the carriers of any duty that they ought to perform or depriving the shipping public of any facilities of which it makes real use for ascertaining the legal rates.

NEW BOOKS.

The Valve Gear of Locomotives. By James Kennedy. Angus Sinclair Company, New York, 1908. 72 pages, 7 illustrations. Price, 10 cents.

This little book contains a brief but comprehensive treatise on the three most popular forms of valve gear used on American locomotives, and is intended as an aid in the education of young railway machinists and engineers. The Stephenson, the Walschaert and the Baker-Pilliod valve gears are taken up in the order of their introduction. The valve gear of a locomotive is the most intricate part of the reversible steam engine, and this study of valve gear is intended to develop the faculty of giving thoughtful attention to the details of involved mechanisms.

CAR DISTRIBUTION.*

BY N. D. BALLANTINE,

Superintendent of Car Service, Chicago, Rock Island & Pacific.

The question of car distribution is probably a more vital factor in the efficient operation of a railway than it is generally considered by the public, or for that matter, by many railway officers who have not given the matter careful study. Like many other railway matters, it has not been reduced to anything like an exact science; but progress is being made, and will doubtless continue, as the increased cost of labor and material and the stress of competition force a more scientific investigation into the effect the management of this branch of the service has upon general operating efficiency.

At the outset it should be understood that owing to a great variety of differences in local conditions it is not practicable or proper to compare the operating efficiency of one road with another, nor for that matter, one division of a road with another division, unless a very large number of factors are considered and the data carefully compiled upon similar bases—a thing very difficult to do in practice.

The answer to the question, "What is perfect car distribution?" would depend largely on the viewpoint from which a reply is made. From the standpoint of the public, or the individual shipper, it would doubtless mean that immediately upon demand a railway company should furnish the kind of a car ordered, that it should be in good condition with reference to protection of lading from damage, and that it should carry the lading to destination without being subjected to transfer or undue detention en route on account of physical defects or other causes, and this regardless of the difficulties the road has to overcome or the *expense incident thereto*. From a railway standpoint, the answer would be that perfect car distribution would serve the largest practicable number of people in the most satisfactory manner and at a *minimum cost for the service*.

Before intelligent distribution can be made it is, of course, necessary to know what you have to distribute, where it is wanted, for what purpose, where it is to go. If the conditions are such that if the freight is loaded, can it be moved with a reasonable degree of promptness? Then comes the question of how best to serve the largest number with the least expense and delay.

To the layman it might seem an easy matter to determine where the empty cars are, and their condition. But it is not so in practice, particularly on the larger roads, where the bulk of the business is done. I venture the assertion that practically none of the trunk lines' car reports account for over 85 per cent. of the total cars on their line. The majority of them account for much less. But, for the sake of argument, let us assume the reports account for 85 per cent. of the cars. On a road having, say 50,000 cars on its rails, this would be 7,500 cars unreported. This does not mean that all of these unreported cars are available for distribution or use, because many of them are under load, loading or unloading. But there is more likelihood of empty cars being unreported than cars in other service, because loaded cars are usually accompanied by billing which can easily be checked in an office, and the cars loading and unloading on industry or team tracks are more carefully checked than those in other parts of the yards, on account of the demurrage feature in connection therewith that may accrue on them. It is frequently much easier to sit in the yard office and guess at the number and kind of empties on hand than to get accurate information, and it is safer for the yard office to underestimate than to overestimate, for if it were called on to bill the cars on an order it might be embarrassing to explain what became of the equipment. Then, too, some division officers prefer a surplus of equipment to protect their local requirements in order to avoid explaining

*Condensed from a lecture delivered to the students of "Railway Economics," University of Michigan, Ann Arbor, Mich.

why cars are not furnished, regarding the fact that an adjacent division may in reality be suffering greatly for equipment, on account of the rendering of this service reports from such other division.

With reports as above cited, it is fair to suppose that 50 per cent of the unreported cars are being making 5000 empty cars which cannot be distributed. Now, an average road (one having 50,000 cars on its rails will load approximately 5,000 cars per day, and during the busy season its reports will probably show a shortage of 1,000 to 5,000 cars per day. But what would the situation be if its reports were actually rendered? A surplus of 50 cars.

The next part of the car report is an attempt to make the control of the railways. Human nature is very much alike the world over, and when things are scarce there is always an abnormal demand, and this holds true in the case of cars ordered by shippers; they are prone to order more cars than they can load. Orders for 25 to 50 per cent. more equipment than could actually be loaded is not an unusual condition during times of heavy business. From large centers, where there is much competition, it is frequently the case that an order for 100 cars of a given commodity to move is given to four or five roads. If none of the roads could fill the order promptly, the sum of their reports would indicate a shortage of 500 cars to move 100 carloads of business.

Under the conditions cited above, who can say that the railways of the country, as a whole do not own enough equipment? Simply because a shipper is unable to obtain and load all the cars he orders within a given time does not necessarily imply that there is a "car shortage" in the sense that the road serving him has insufficient equipment. As an illustration, a certain road in the southwest during the fall of 1907 (when it was alleged there was the greatest "car shortage" in the history of the road) had, during a given month, an average of 7,800 cars on its line per day. The same road in the same territory in the same month of the year 1909, with 26 per cent. less equipment on its line each day, made 55 per cent. more car miles than it did in 1907. In the face of such facts, would anyone say that the trouble with that road in 1907 was a "car shortage"? What it probably suffered most from was too many cars in proportion to its other facilities, and the probabilities are that if empty cars had been taken from that section, so as to have enabled them to circulate more freely, it would have resulted in enabling a larger volume of tonnage to be moved. As a student of transportation problems, the view I now hold is that the roads of the country, as a whole, have too many cars in proportion to their other facilities for handling them. As the strength of a chain is its weakest link, so also is a road's strength dependent upon adequate terminals, good track, sufficient side tracks, ample motive power, with the accent on the "ample." A deficiency in any one of these factors may cause delays to equipment which will offset any increase in equipment units that may be made.

As neither the shipper nor the railway man knows definitely very far in advance just what the car requirements are going to be—aside from the uncertainty attending the basic commodity, agricultural products, due to the elements—the mill man, the coal operator and the manufacturer on any given road usually have an exaggerated idea as to the output of their respective plants, which is natural, as they would prefer a surplus of equipment to a shortage, particularly as they do not directly feel the effect of interest and insurance on, and depreciation and maintenance of, idle equipment. A moment's thought on the subject, however, must convince one that a surplus of equipment ultimately means a narrower margin between earnings and expenses, and that the best manner in which to level up is by providing a more uniform traffic instead of trying to move a large part of it in three or four months of the year, and during that portion of the year when,

on account of weather conditions, the difficulties and cost of operation are the greatest. It would, therefore, seem that the question of increasing equipment should be left to the railroad men's judgment, and that in forming such judgment he would need to have a large amount of data accurately compiled so that he could consider at least the questions which follow:

Is the equipment properly proportioned to the motive power?

Is a present proportioned as to kinds of cars to meet the traffic conditions of this particular road?

In the present condition of the road such that it will make practicable reasonably prompt movement of trains?

Are the terminal facilities adequate?

Are passing tracks long enough and sufficiently frequent?

Is the water supply ample and satisfactory?

Is the traffic uniform throughout the year, or is it spasmodic? What are the widest variations from month to month, and are these variations confined to a limited area, or are they general?

During heavy business, what is the prevailing direction of traffic, and what per cent. greater is such business over the light traffic?

What is the density of passenger train miles as compared with that of freight train miles?

Are the facilities ample for keeping motive power and cars in repair?

Is the road one which originates most of its traffic, or is it a receiving or an intermediate road? Numerous considerations are necessary, according to the category into which the road falls.

What is the average haul? As this decreases with a shortening of the distance between producing and consuming centers, it means a larger equipment to handle the business, other factors remaining the same, on account of the increased number of delays incident to loading and unloading.

The kind of car has much to do with the relative efficiency obtained. The tendency should, as far as practicable, be toward equipment which can be universally used instead of toward special classes, as this means less empty mileage, although it may occasionally mean a little more inconvenience to the patrons.

If a long haul is involved, the question of transfer facilities at terminals should be considered; also the commodities, as many patrons will not permit their freight to be transferred and continue giving you the business.

The commodities handled are also a vital factor as to the number of units required, heavy coal-carrying lines requiring more units in proportion than lines carrying large quantities of merchandise, stock, fruit and packing house products, etc.

THE CAR DISTRIBUTOR'S OFFICE.

Let us now consider the every-day working of a well-regulated division office with reference to the car distribution, the duties in connection with which are manifold, and should be executed by high-grade talent. An inexperienced, careless or indifferent man in this position can, by the issuance of one or two improper orders, waste more money than his salary would amount to in a year.

It is the custom of most roads to have a telegraph car report wired to the division offices in the afternoon between 2 and 6 p. m., it being tabulated and classified by the receiving operator on forms provided for the purpose, so as to aid the distributor in readily locating his surplus or shortage of any particular kind or class of equipment. This report should then be cross-footed, balanced, summarized for the division or sub-division, as required, and the totals transmitted to the general office in such details as may be necessary. This report should account for all the cars on the road, regardless of the service or condition they may be in.

In addition to the regular car report, most divisions obtain

a partial car report by wire at 7 a. m., showing the loads and empties on hand for movement, their wants and any special information needed by the distributor.

The afternoon report is used by the distributor in placing orders for the movement of cars during the night and lining them up for the local trains the following morning, while the morning line-up is for the purpose of keeping closer to the movement and having proper disposition made of cars which are ready for movement when locals reach such stations.

In addition to the telegraph car report, a daily mail car report is made by all stations excepting large terminals, showing in detail the car numbers, initials, date of arrival (lined up in accordance with the length of time the car has been at the station, the oldest car being at the top of the blank), the commodities they are loaded with, an analysis of the car's detention at the station; if a foreign car, its home route, and forwarding reference if forwarded during the period covered by the report; the home route information referred to being obtained by a special card which accompanies all foreign cars in their movement over the road, so that in the event the distributor cannot give the car a proper load, it can be disposed of with the minimum amount of empty mileage.

In the case of foreign cars on hand which an agent cannot load in accordance with instructions, a special form is used to give the distributor full information as to its initials, number, home route, etc., so he can order it to some other part of the division in the event that a proper load can there be obtained, or if he cannot utilize the car, he consolidates the wires from various agents into one message and asks the general officer distributing equipment for instructions. The general officer in such case either orders the car to another division for loading, orders it home, or arranges with some other road to accept it and move it home, if by so doing he can save an abnormal empty mileage.

The mail car reports are then checked to see that all are received, that they are properly made out, that the distributor's orders are being carried out, as he can readily ascertain what kind of cars are applied and the commodities loaded. They should be particularly scrutinized to see that the proper kinds of cars are being utilized; for example, stock cars are moving west empty, box cars are moving east empty; a shipper orders a box car to load brick or tile. To furnish a box car under such circumstances means a cross-haul of equipment. In many instances the shipper does not really care what kind of a car he gets, but merely orders a box car because he knows there are lots of them empty going over the road. Another example: Mine props are frequently loaded in box or stock cars which normally are en route to the mines. There are many such instances as these; failure to make proper use of them is what frequently makes car shortage more acute, and increases the cost of conducting transportation. Just how much the increase caused is it is difficult to say, but after eliminating fixed charges, I believe it safe to figure it would cost the average road $2\frac{1}{2}$ to 3 cents per empty car mile. If, then, this factor, or any other that any particular road determines as its average for such service, is used, and the empty car mileage analyzed carefully, I think it will surprise many officials to know what this item on their road amounts to.

The tracing end of the car distributor's work is no small item. As a rule, when business is light, cars move promptly, and information covering their movement is more quickly available, and the tracing in proportion to the total business handled is much lighter. But in the fall, when business is heavy and weather interferences cause the movement to slow up, the shippers expect the same service and prompt information, resulting in an increased number of tracers in proportion to the business. In tracing a car from the general office full information is usually given regarding it in the message, namely, the initial, number, contents, destination and date into a given station. Now, by referring to the mail car report, which should be filed

in a vertical index number, by having the date it moved into such station, it can readily be located if still on hand, or the forwarding information obtained without the necessity of telegraphing the agent. Large terminals keep an index record of all cars, with arrival and forwarding reference, which can be obtained in a moment's time. The files covering transfers are usually kept according to the ending number, using either the vertical system or a series of pigeon holes, separated into 10 or 100 compartments, according to the volume of business being handled.

The diversion of traffic in transit, particularly fruit or perishable commodities, requires a lot of care and attention, as failure to effect a diversion once accepted frequently results in very expensive claims.

Daily advice must be given the general officer distributing the equipment of cars applied on orders.

The handling of each class of car has its own peculiarities. It is necessary to keep further ahead of stock car orders than of orders for most equipment. The distribution of coal cars in a mining territory is an entirely different proposition from distributing box cars for a lumber or grain territory. In the general office all orders are given a number and advices tabulated until the order is filled. A "log" book is kept and notations made currently where unusual conditions occur preventing the carrying out of any particular order of importance.

The detail car reports are tabulated in the telegraph office as received, so that detail comparisons may be quickly made for any particular division. For example, we know in a general way that the interchange of cars between connections and to and from connecting divisions about offset each other; hence, if the reports show a loss or gain of 500 or more cars, we can readily see that there is something wrong with the reports, which may be accounted for by the wires being down and a report being incomplete, or an error made in telegraphing.

Extreme care has to be used in placing a general order affecting several divisions so word it that it is not susceptible of misunderstanding. While it may appear simple to the one issuing it, it would not be to a new yard clerk. I recall an incident in this connection where, owing to a congestion on a certain section of a road, it was desired to divert some traffic via another gateway, and an order was issued accordingly by the traffic department. A yard clerk took it to apply on empty refrigerators and billed them accordingly. It just cost \$333 and 16,500 unnecessary empty car-miles to get the cars back in their proper place.

The checking of an empty cross-haul in the general office is done in a slightly different way than by the local car distributor. The road should be sub-divided according to train terminals, or at shorter intervals, if branch lines radiate between them, and such branches do an appreciable proportion of the total business. The empty car-miles should be computed by classes and direction, keeping all of one direction together; the clerk tabulating the information checking to see that box cars do not move east and west over the same sub-division on approximately the same dates. If he finds such a condition, an inspection of the wheel report indicates whether the car moving opposite to the regular movement was "bad order" and en route to shops; if not, a memorandum is given the chief car distributor, who may know of some reason for such a movement, and if he does not, the division officer's attention is called to it at the time and an explanation made. Continually watching and calling these cases to their attention keeps them on the alert, as it is easier to prevent mistakes by watching the matter currently than to "explain why" later on. At the end of the month the totals are checked and any unusual conditions pointed out and comments requested, the information being sent to all interested officials.

It is important for the officer distributing equipment to know the direction the greatest volume of traffic is moving, and, as far as practicable, to deflect empties in the opposite direction, or take advantage of a short route, either over his own or a foreign line if satisfactory arrangements can be made, so as to keep down expenses. A large amount of money is wasted in making long,

circumstances empty hauls, which is the purpose of a such consideration the cars could be sent via a longer line to the point required, with much less expense and delay. But the best and most economical method of handling a car is frequently overlooked. Rather than pay money to some connection who might make a car, by handling the cars, they are often hauled long journeys and a large amount needlessly expended in "conducting transportation."

The general object in charge of distribution should be with the traffic being loaded with reference to the kind of cars, as in many instances the division man would have no idea of finding out that the furnishing of a certain class of car in his territory was not best for the road as a whole. For example, potatoes move a part of the year in refrigerators from the north to the south; at the same time there is a movement of cotton to the northern points. By utilizing the refrigerators for loading the cotton northbound, exceptionally good mileage with a minimum percentage of it empty is obtained. At other seasons, before cotton begins to move, watermelons move from the south to the north, and by using such cars with the ventilators open, the melons reach destination in better shape probably than if loaded in stock cars, where they are subject to being "plugged" by the hoboes.

It frequently happens that lack of repair facilities make it necessary to move bad order cars with the current of traffic to a repair point, and at the same time move empty cars into a terminal to provide for outbound loading. When this occasion arises it is, of course, necessary to select the kind of cars which will decrease this cross-haul to a minimum.

IMPORTANT ECONOMIES.

The question of transferring long-haul business is a very important one, particularly on the trunk lines, it being a very difficult one to handle. A large number of shippers will not permit their business to be routed via a line which makes a practice of transferring. Many make it an invariable rule to file a claim for damages immediately upon ascertaining that a transfer has been effected. There is no question in my mind but what a good part of the shippers' complaint is well founded, due primarily to the railways neglecting to supervise the transferring to see that it is properly done. As a general proposition, however, it would seem that the question of transfer is one in which the shipper should not be interested. When a road signs a bill of lading for a car of freight in good condition it is in duty bound to deliver the freight in the same condition at destination, and the manner in which the transportation is effected is immaterial. As an illustration of what this means to the carriers, an intermediate carrier, say 1,200 miles long, is offered at Chicago a carload of freight in an eastern line car, destined to California. The commodity is such that with reasonable care it could be transferred for, say \$3, and delay the car one day in doing the work. The intermediate carrier has empty refrigerator cars moving to California, to be used in eastbound fruit business; furthermore, it has no eastbound loading for the eastern line car. To make the transfer would save it 2,400 empty car miles, which at a cost of at least 2½ cents per car mile, would mean \$60, less the expense for transfer, the per diem while car is being transferred, and any claims that might arise. But on a large number of commodities this saving cannot be effected, for the reason that if a road should transfer the goods it would lose the shipper's business entirely to some other road which would not transfer. Under such conditions, however, it is quite evident that there is an economic waste which should be eliminated.

Another illustration of the economy of transferring is brought to mind. Suppose a large shipment of rails from the east moving in low-side gondolas, destined southwest. On the division where they were received empty stock cars were being sent southwest for stock loading. Owing to extreme heat and labor conditions the cost of transferring was very high, about \$6 per car. But this was a nominal cost compared with cost for cross-hauling coal and stock cars to the extent of 1,000 miles.

Tramways as a very large percentage of the total traffic moved is company material, the question of actual cost of transporting it, as well as the best time to move it, is a very important matter to be watched by the distributing officer. A knowledge of the elemental factors of cost, excluding fixed charges, should, as nearly as possible, be obtained by divisions, separated as between conducting transportation, freight car repairs and per diem, for conditions arise when one or more factors enter into the proposition. As an illustration, lumber is desired for use, say at Kansas City. A purchasing department desiring to make a showing for its own department may solicit bids from Oregon, Louisiana, Arkansas and Texas, and take the lowest bidder. But if to the cost of the lumber is added a transportation charge for the movement to Kansas City, considering the factors as outlined above, it might be that the highest bidder's product would in reality be the cheapest for the road, as it might be hauled over divisions the operating cost of which is very low as compared with that of others, and in addition move opposite to the direction of traffic, utilizing cars which would otherwise move empty, in which latter case the cost of freight car repairs and per diem should not be included.

Then, too, the question of moving and storing at points of consumption railway supplies such as lumber, ties, steel and particularly coal, at a time when commercial tonnage is light, will materially aid in equalizing traffic on the road, and it seems to me would appeal to the coal operator to such an extent that he could afford to sell the railways the coal for enough less to offset the extra cost of handling, interest and depreciation, as it would equalize his production, and it is my understanding that mining is similar to the railway business with respect to decreasing the cost with uniform tonnage.

The above are samples of problems which should be carefully studied and I believe indicate the complexity of the situation in determining efficiency. It is a relatively easy matter to order empty cars from one part of a road to another and thereby obtain a high average mileage per car per day, or a low car rental unit, making a nice showing for the car service department, but it does not always follow that such a showing means the best net results for the road as a whole. The results can only properly be judged in relation to traffic requirements, ratio of empty mileage, facilities at terminals, power situation, bad order conditions, etc.

To summarize, then, an effective car service department's requirements are about as follows:

(1) A carefully worked out system of reports adapted to the needs of the particular road, with sufficient force and authority to see that the system is followed.

(2) Thorough organization, building it upon the basis of having it as flexible as possible, and working toward the end of having full use made of information at hand without having to ask division or local offices for data which have once been furnished, and of handling all matters in the regular channel.

(3) The hearty co-operation of and close working with the traffic, fuel and purchasing departments.

(4) A knowledge of the general conditions of the road, including its physical, mental and spiritual characteristics.

(a) *Physical*.—To avoid issuing absurd or impracticable orders, as the issuance of such tends toward a loss of respect.

(b) *Mental*.—To know to what extent each division may be relied upon to figure ahead on its own wants or take advantage of peculiar local conditions to relieve a situation.

(c) *Spiritual*.—To know where there is the real co-operative spirit, which knowledge assures that orders issued to a division where it exists will be acted upon promptly with an idea of being made effective without their having to be checked up. As the human element is such a potent factor, the friendship or acquaintance of the man on the ground is an invaluable asset.

(5) Eternal vigilance and patience without end, everlasting checking of details.

NEW TANK CAR.

The Chicago Steel Car Co., Harvey, Ill., has designed and built a new tank car which has the same capacity as the standard car, 8,000 gals. The feature in which it differs from other tank cars is in making the portion at the bottom of the tank from

car which is illustrated has through center sills of 15 in., 33 lb. channels, the upper flanges of which extend inside the car clear to the heads (Fig. 1), while the lower flanges from the body bolster to the end sill are cut away and replaced by channel draft sills on the outside riveted to the body bolster casting as shown in Fig. 2. These inside channels are braced laterally by

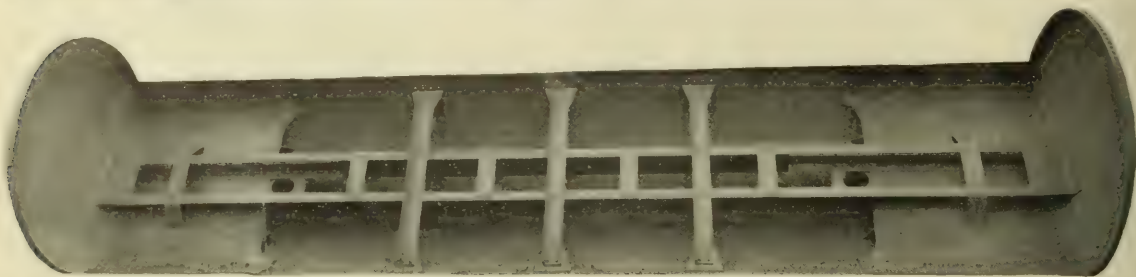


Fig. 1—Interior View of Tank Car, Plan A, with 15-Inch Center Sills.

the bolster to the end sill flat, allowing the cylindrical portion between the bolsters to drop down to the lower level of the draft sills. This lessens the height of the center of gravity of the loaded car 18 in., and, besides preventing rocking, which is



Fig. 2—Draft Sills and Body Bolster of Tank Car.

characteristic of the high tank car, the design lends itself to the construction of a strong underframe, especially at the draft sills.

The tank is 81 in. in diameter, the upper sheets are $\frac{1}{4}$ in. thick to the heads 30 in. and the lower sheet $\frac{1}{2}$ in. The sample

three heavy flanged angles 4 in. x 6 in. x $\frac{3}{8}$ in., with gusset plates connected to the tank. They also have tie plates 6 in. wide between and beyond these lateral braces. The flat bottom of the tank from the bolster to the end is a sheet $\frac{1}{2}$ in. thick and makes a strong construction for the attachment of the draft sills; the latter abut against the large steel casting, which forms the body bolster and provides a projecting flange for ample rivet area in the attachment of the draft sills. The bolster casting also serves to support the brackets for the running boards. The outer ends of these brackets are attached to 6 in. channels which form the side sills and support the running boards. The car as thus constructed, which may be designated as Plan "A," weighs, with the standard M. C. B. 40-ton arch bar trucks, 34,120 lbs.

Other forms for the central portion of the underframe have been designed for the purpose of reducing the weight of the car, and in Plan "B" (Fig. 3) 8-in. channels, 25.2 lb. per foot, have been substituted for the 15-in. channels.

The third plan, "C" (Fig. 4), eliminates the center sills entirely, and the body bolster casting (Fig. 5) is modified to provide a large flange extending toward the center of the car and having a large riveting area. The flat sheet is extended 30 in. beyond the bolster and is bent down and riveted to the circular portion of the shell, forming a tension member over the bolster and strengthening the bottom sheet. The M. C. B. rules require 50 sq. in. of sectional area in the bottom sheet of tank cars, while the plan here described provides 62½ sq. in. The design of plan "C" is intended to overcome the objections which may be made to the use of structural shapes for sills inside the car, as they have a tendency to accumulate residue which is difficult to clean and may contaminate the higher grade oils. The tendency to shear rivets in a construction of this kind will be materially lessened by the use of friction draft gears, and the Cardwell friction draft gear is used on this car.

In the further development of the steel car underframes de-

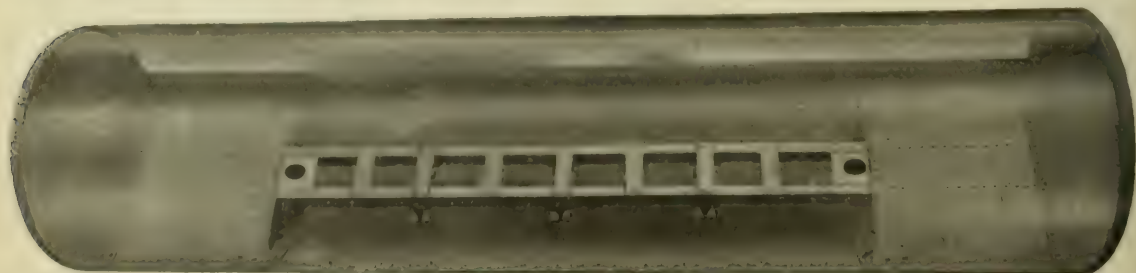


Fig. 3—Interior View of Tank Car, Plan B, with 8-Inch Center Sills.

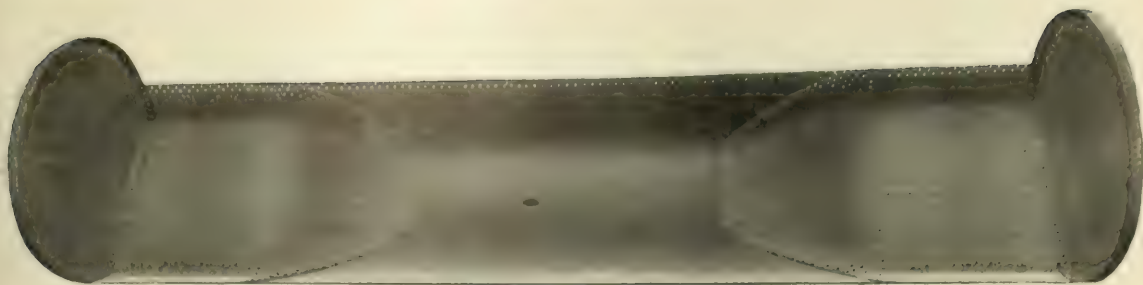


Fig. 4—Interior of Tank Car, Plan C, Without Center Sills.



Steel Tank Car, Chicago Steel Car Company.

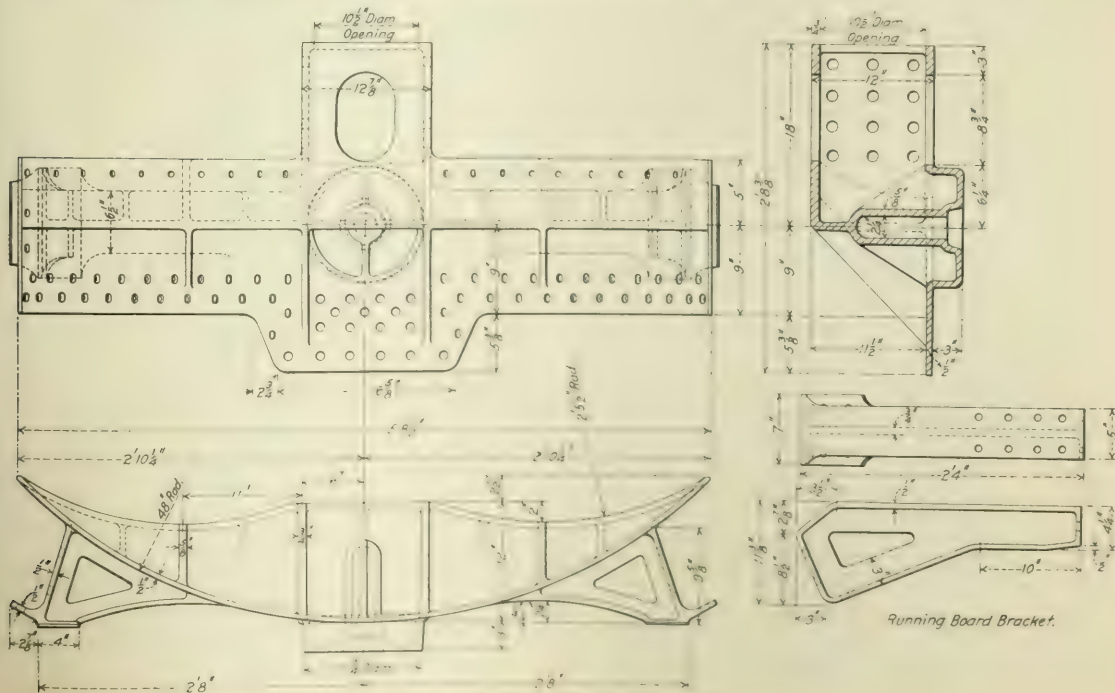
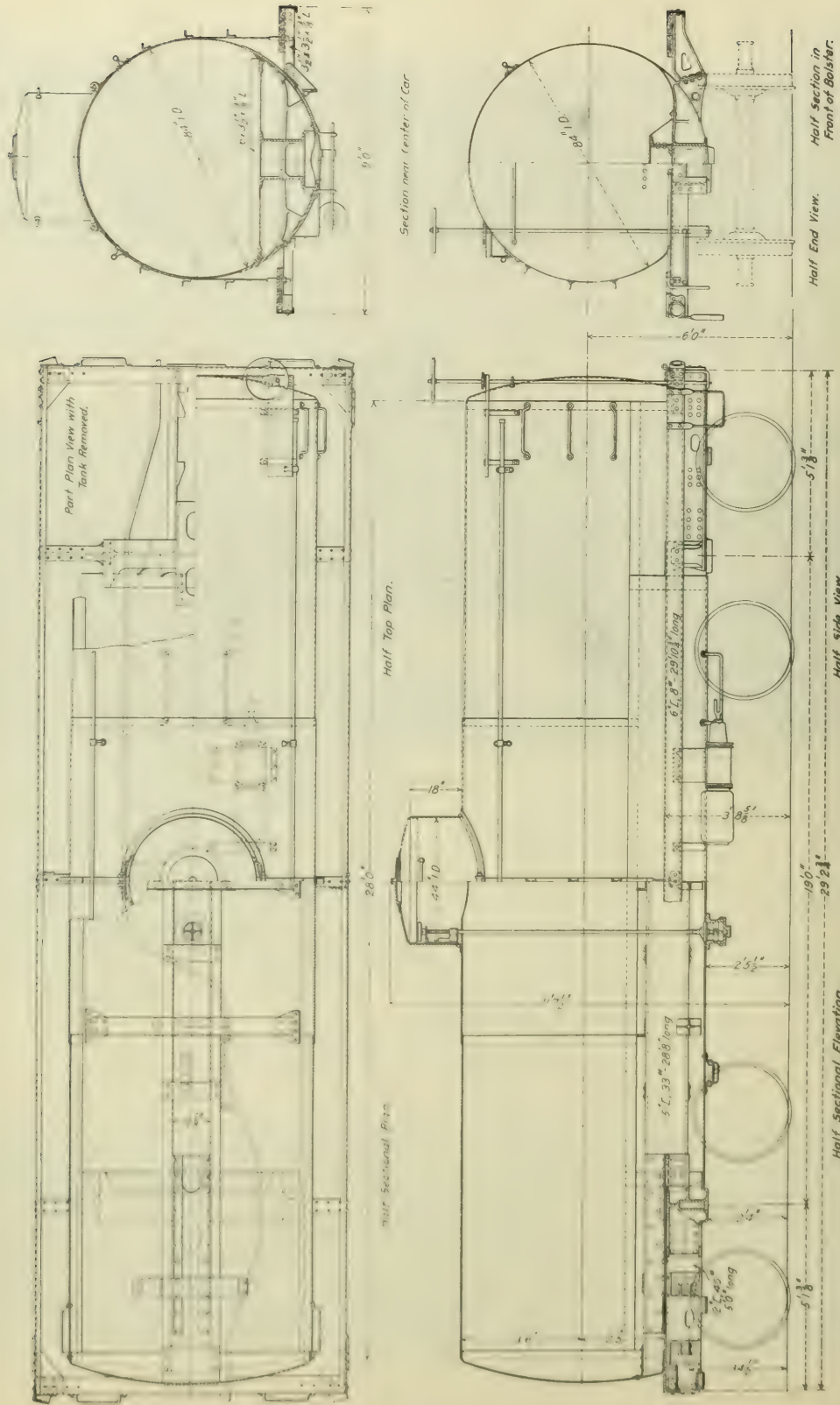


Fig. 5—Body Bolster for Tank Car.



New Type of 8,000-Gallon Tank Car.

scribed, it is proposed to construct a steel mill frame on the same plan, but to fill up the space between the circular shell and the top of the 8 in. channels with cross timbers for the support of a wooden floor, and make the upper part of the car like a box car. Such a car could be used for grain or flaxseed. Designs are being made for the application of this form of tank bottom and underframe to locomotive tenders; it will have the advantage of reducing the height of the center of gravity and will prevent derailments due to this as well as by the more gradual movement of the water sidewise on the circular sheet. These improvements were designed by H. C. Priche, consulting engineer for the Chicago Steel Car Co.

THE BILLS OF LADING CONTROVERSY.

On June 6, after three years of discussion, the House of Representatives passed a bill which made railway companies liable for the acts of their agents in issuing all bills of lading, regardless of whether or not the agents had received the goods specified in the bills of lading. The Senate referred the bill to the Committee on Interstate Commerce, but adjourned June 18 without passing it. The banking interests, and especially recently the foreign exchange banks of New York City, have been the chief promoters of a law to make railway companies liable for the acts of their agents in issuing these order bills of lading, and conferences are now taking place between the bankers and railway men at which it is expected that some working arrangements will be made. The United States Supreme Court, in the *Freidlander* case, held that a railway company was not liable, under the common law, for unauthorized acts of its agent, and that, therefore, since the agent is not authorized to issue a bill of lading until he receives the goods covered by the bill and has himself verified the proper delivery of these goods (and every one who deals with the agents knows this) the railway company could not be held liable on what are known as accommodation bills of lading.

As a matter of fact, it is only a very small part of the total number of bills of lading issued by the railway companies that the bankers are directly interested in. It is estimated that only about 2 per cent. of the total number of bills of lading are shippers' order bills; the remaining 98 per cent. are what are known as straight bills of lading and are non-negotiable. Even of the negotiable bills of lading only a very small part are used as a basis of obtaining credit, and in the hearings before the Senate Committee, which were being held on the House of Representatives bill of lading bill, just before the closing of the last session of Congress, it was pretty clearly shown that the real grievance that the banks had was in regard to order bills of lading representing cotton shipments destined to points abroad, although they also complained of grain bills for export shipments. Nevertheless, the volume of this cotton business alone, measured in dollars and cents involved, is so great that the question is an extremely important one to the country. The failure to reach an understanding on this matter might even necessitate shipments of gold to Europe at a time when the same money was badly needed in the West to move the crops. The bankers, for instance, testified that during the coming cotton season it would be necessary for them to finance drafts on foreign banking houses secured by bills of lading representing cotton shipments amounting to about \$600,000,000. The direct profits to the banks, figured on a percentage basis, are not very great on this cotton financing, a delay of a few days and consequent loss of interest being enough to wipe out all profit on the transaction. Nevertheless, for the proper handling of the cotton crop it is vitally necessary that the banks be able to advance this money without too great risk, and at the same time it is absolutely necessary that foreign bankers shall in their turn be willing to honor drafts drawn on them by cotton shippers and secured by bills of lading.

The direct and great importance to the railways of this cotton bill of lading question lies not so much in the importance of the direct question involved, that is, in the security of order bills

of lading for cotton shipments, as in the possibilities of such general legislation as was threatened by the Stevens bill that was passed by the House of Representatives. This bill did not specify any particular kind of bills of lading on which the railways could be held liable, but contained the sweeping provision that railways should be held liable on all bills of lading. The bankers, in urging the Senate committee to pass the House bill, laid great stress on the fact that the credit of American cotton shippers' drafts accompanied by bills of lading had been thoroughly undermined by the recent exposures of frauds in the Belton, Tex., case, the recent Albany case, and the Knight-Yancey case. It is, however, doubtful whether the House bill would have covered but one of these three cases.

The method of procedure in financing the cotton crop is somewhat as follows: A local firm sends representatives out through the cotton districts, and these representatives buy up, for cash, shipments of cotton from the cotton raisers. The shipments move from the plantation to the compress on bills of lading which may be used, and in many cases are used, by the agents of the cotton firms to obtain cash from the local banks to be used in buying more cotton from the planters. When the cotton arrives at the compresses, in many cases owned by the railways, the local bills of lading are, or should be, surrendered in exchange for compress receipts, which are in turn exchanged for foreign order bills of lading drawn to the order of the cotton shipping firm and calling for the shipment of the cotton to Liverpool or some other foreign city. These bills of lading are attached to a draft drawn by the cotton shipping firm on a Liverpool bank, for instance, and this draft, with its bills of lading, is in turn attached to a bill of exchange on New York, on which the local Texas or Mississippi bank advances money to the cotton shipping firm. These two drafts, the one drawn on New York being endorsed by the local bank, are sent on to the local bank's correspondent in New York City, where the New York bank pays its correspondent's draft. This closes the transaction as far as the local bank is concerned; its liability has been canceled and it has received the money that it advanced to the cotton shipper. The New York bank is now in the position of having advanced the money to the cotton shipper direct, and holds as security a draft on a Liverpool bank with bills of lading attached. It then ships the draft with the bills of lading to Liverpool, and when the Liverpool firm has accepted the draft the New York bank's liability does not cease. He simply has the added protection of the foreign banker's acceptance. But between the time that the New York bank has paid its correspondent's draft and the time that the Liverpool bank accepts the draft drawn on it by the cotton shipper the New York bank is responsible for the entire amount that has been advanced, and has as its only security the bills of lading. The difficulty at present is that, in the first place, the New York banks don't want to assume this responsibility, and, in the second place, the foreign bankers have become so suspicious of the genuineness of the bills of lading that they refuse to accept drafts unless the American bankers will virtually guarantee the genuineness of these bills.

The bills of lading may be worthless; first, because, although issued by the proper representative of a railway, they do not represent actual cotton that the agent has ever received. This may be because the cotton shipper was dishonest and succeeded in tricking the agent into issuing bills of lading against shipments which were never delivered, or it may result from a shipper's getting a bill of lading for cotton which he fully intended to deliver to the agent but for some reason was unable to. In either case the bill of lading itself is apparently genuine. A different situation arises when a dishonest agent conspires with a shipper to give him bills of lading for goods which are not delivered, and the agent and the shipper may jointly share in the money derived from this fraud. It is not so plain in this case whether the bill of lading is or is not a genuine bill; that is, the courts might hold that it was a forgery. Two of the cases especially mentioned by the bankers at the Senate committee hearing,

however, did not come under these heads. In the Texas case the goods were actually received by the railway company, but the agent allowed the removal of these goods by third parties without the surrender of the original bills of lading. In the Knight-Yancey case, apparently, the bills of lading were simply manufactured; the agent had nothing to do with them, and the railway could not under any conceivable circumstances have been held liable.

It is conceded by bankers that the laws of forgery and fraud cover cases where some one other than the railway agent makes a false bill of lading as fully as they can be covered. The avowed object of the Stevens bill was to hold the railways responsible for goods mentioned in the bills of lading issued by railway agents. The trouble with this House of Representative bill, from the point of view of the railways, was that it made them responsible for *all* bills of lading, and it made it possible for a dishonest agent to conspire with some outside party and defraud the railway out of very large sums of money. In other words, it would have made it possible for an agent working at a way station in the backwoods of Mississippi on a \$70 a month salary to bind his railway to pay thousands of dollars on bills of lading on which he himself might raise money and then decamp.

The position taken by the railways is that this is not a subject for legislation. The railways are apparently willing to concede that something must be done to strengthen the credit of order bills of lading for cotton. They claim, with a good show of reason, that if the local banks took ordinary precautions to investigate order bills of lading brought to them attached to a foreign draft it would be easily possible to determine the genuineness of the bills before sending them on to New York. The New York banks hold, with an equal show of reason, that it is utterly impossible for *them* to verify these bills of lading. The drafts and bills of lading come to them in great bundles and must be accepted or rejected at once. The whole trouble seems to be that while theoretically the railways ought to issue bills of lading only against goods which they have received, and, theoretically, banks ought not to accept negotiable paper from parties whose financial standing they have not in any way investigated, nevertheless, in practice the railways, for competitive reasons, or because they have to do business in Texas as the Texans do it, cannot always refuse to give what are called accommodation bills of lading, and in practice the New York banks cannot always put it up to their local correspondents to investigate the financial standing of cotton shippers, although in the Knight-Yancey case an investigation had been made.

Two ways have been suggested by which the credit of cotton bills of lading can be strengthened. First, surety companies may guarantee the genuineness of bills of lading. There has been some talk of a number of surety companies combining and jointly undertaking the guarantee of these bills; but the expense involved would be considerable. More than this, such an arrangement would not fit in with the ordinary business methods of a railway and it is very doubtful how it would be viewed by the Interstate Commerce Commission. Another suggestion is that the railways have a special form of stamped paper, identified by consecutive numbers, which agents should be authorized to affix to order bills of lading of cotton.

The stamp, for which a certain charge might be made, might read somewhat as follows:

SPECIAL LIABILITY STAMP

RAIL OF COTTON.

"Good only if affixed to bill of lading dated and issued at _____, _____, during seven days beginning September _____, 1910, by station agent of N & S R R Co. at said point.

"Not valid unless aggregated number of bales represented by stamps corresponds exactly with number of bales in bill of lading.

"Anything in the bill of lading to which this stamp is affixed

to the contrary notwithstanding, said carrier issuing such bill of lading will be responsible to the lawful holder thereof for the value of the property therein stated to have been received for shipment, whether or not said carrier shall have actually received said property for transportation."

This form, which has been suggested by Robert Walker, of the Rock Island, in a memorandum covering the points under discussion would be a contract by which the railway company voluntarily makes itself liable for the receipt and transportation of the goods named in the bill of lading when these goods correspond with the goods called for by the stamp. These stamps could be made to cover one, two, five, etc., bales of cotton, and could each bear the signature of the traffic manager of the railway. They could be issued to local agents in small quantities and the local agent could be held responsible for their use. It would be a comparatively simple matter for the general freight office to check up the stamps issued by the agent with the stubs of these stamps as shown by the books in the general freight office. The banks could then refuse to accept any bills of lading without stamps attached, and the bills of lading, with these stamps attached, would carry the credit of the railway company with them and ought to be acceptable to foreign bankers. Moreover, under the proposed system, it would be very much harder for a dishonest agent or a dishonest cotton firm to issue fraudulent bills of lading than it is at present.

In thus assuming voluntarily a liability which the common law does not fix on the railway, the railway officers recognize that such a change may mean additional expense. The southeastern roads in particular feel that to ask them to increase operating expenses without any direct return from such an expenditure is asking a great deal at the present time. Nevertheless, some of the railway men who have taken part in the conferences with the bankers do not think that this added responsibility, even though it involved some additional expense, will be an unmitigated misfortune to the railways in the long run. It seems evident that it will involve a more careful selection of station agents, and possibly a correspondingly higher wage paid these employees. At the same time it will make necessary an improvement in the business methods of the local freight agent; it will teach him not to deliver freight to some person who put in a claim for it but can show no order bill of lading. There are any number of agents at present who are lax in this respect, and the railway company in every such case where a second party later presents an order bill of lading is simply liable for the value of the goods, and its only remedy is to discharge the station agent, which is not very satisfactory and certainly does not help make up for the money loss.

It seems particularly fortunate for the railways that the Senate did not pass the House of Representatives bill. The bankers will be compelled, during the present cotton season, to get along without legislation, but this will give a chance for the trying out of any scheme which the railways or the bankers may decide is feasible, and it will depend largely on how carefully the railways prepare and follow out such a scheme as to whether or not the agitation for a law in regard to bills of lading is renewed at the next session of Congress. Shippers as a whole do not require any such law, so that politics for once may be eliminated; it is only the special interests engaged in a special kind of business that have definite requirements. The railways have therefore the very unusual opportunity of demonstrating their ability to solve their own problems without that federal "regulation" which is tending towards federal management.

Von Breitenbach, the Prussian minister of public works, said in the Prussian House of Lords recently that about 35 per cent. of the ties used are steel, and that there has been little change in this proportion for the last five years, and none is intended, as they are advantageous only where there is broken-stone ballast, which is not attainable on a large part of the Prussian lines.

TRAIN ACCIDENTS IN JUNE.¹

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of June, 1910. This record is intended to include merely such train accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. It is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation:

Date.	Road.	Place.	Cause of dermt.	Kind of train.	No. persons reported.	
					Kil'd.	Inj'd.
8.	N. Y., N. H. & H.	Gt. Barrington, re.		P. & F.	0	3
5.	Chic., Ind. & L.	Shelby, Ind.		P. & F.	0	30
10.	N. Y., O. & W.	Parker, Pa.		P. & F.	3	25
10.	Balt. & Ohio	Somerset, Pa.		P. & F.	1	3
22.	Balt. & Ohio	Pant (cars), Pa.		P. & F.	1	1
24.	Wabash	Percy, Iowa.		P. & P.	1	30
29.	Ga. & F., G. S. & F.	Vadosta, Ga.		P. & P.	0	14

Date.	Road.	Place.	Cause of dermt.	Kind of train.	No. persons reported.	
					Kil'd.	Inj'd.
1.	Ches. & Ohio	Pavette, d. track.		P.	3	0
5.	St. Louis & S. F.	Carbon Hill, Pa.		Pass.	0	36
16.	St. L., I. M. & So.	St. Louis, Mo.		P.	3	12
16.	Pennsylvania	Ebensburg, Pa.		Pass.	0	19
16.	Pennsylvania	Mt. Union, Pa.		Pass.	2	2
19.	N. O. Terminal	New Orleans, d. track.		P.	0	18
22.	Lehigh Valley	Freemansburg, d. track.		Pass.	0	17
23.	Chic. & Alton	Carlinville, Ill.		Pass.	0	10
23.	St. Louis & S. F.	Hatterhill, Pa.		P.	0	9
23.	Pennsylvania	Gettysburg, Pa.		P.	0	9
24.	Wabash	Percy, Iowa.		Pass.	0	3
25.	Cin., Ham. & Day	Hamilton, Ohio.		P.	0	3

The most fatal accident in the foregoing list was the derailment on the St. Louis & San Francisco on the 23rd. The persons killed and injured were trespassers riding on freight cars, said to be harvest hands.

The derailment on the Wabash on the 24th was followed almost immediately by the rear collision which is entered in the collision list as having occurred at the same place on the same day. According to the press despatches, the freight train came on and ran into the passenger train before the passengers had time to get out of the rear car. We have entered the casualties against the collision, though the accounts do not make it clear whether these were due to the collision or to the derailment.

The derailment at Mount Union, Pa., on the 16th appears from the accounts to have been a striking example of the safety of steel passenger cars, of which the train was principally made up. The train, which ran off the track, was running at high speed, and the cars were quickly thrown crosswise of the tracks and lodged afoul of the adjacent main track; yet no person was seriously injured. Moreover, a switching engine, drawing four freight cars, coming from the opposite direction, ran into the derailed cars, yet the worst result of this collision was to push the coaches aside a short distance.

In the derailment at Carlinville, Ill., on the 23rd, all of the cars in the train, except the rear car, were overturned. The tender was the first vehicle to jump the track.

The collision at Parker, N. Y., on the 19th is said to have been due to neglect or of misunderstanding concerning a despatcher's order by the engineman in charge of a pushing engine, which was running down hill light.

Of the five electric car accidents reported in the newspapers as occurring in June, only one appears to have been fatal. This was a butting collision in Steubenville, Ohio, on the 4th; two passengers killed, 14 injured.

A disastrous collision in France, killing 15 or more, and a derailment in Mexico, killing 20, have already been reported in the *Railway Age Gazette* (June 24, page 1,803, and July 1, page 46).

¹ Abbreviations and marks used in Accident List:
 re, Rear collision—bc, Butting collision—xc, other collisions—b, Broken—d, Defective—unt, Unforeseen obstruction—ms, Misplaced switch—acc, obstructed—derail, Open derailing switch—mal, Malicious obstruction of track, etc.—boiler, Explosion of locomotive on road—fire, Cars burned while running—P, or Pass, Passenger train—F, or Ft, Freight train (including empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly destroyed by fire—Dagger, One or more passengers killed.

ELECTRIFIED STEAM ROADS AND ELECTRIC TRUNK LINES.*

The accompanying tables give data of the important railways in which electricity is used in heavy service. Only such figures are included as were conveniently available, and such omissions or inaccuracies as may occur do not detract materially from the general presentation of the extent and character of the use which is now being made of electricity in railway service. The horsepower ratings of the various motor cars and locomotives are in general the nominal ratings for a short period, usually one hour, but as these ratings have been adapted in some cases to the particular service in which the motors are to operate, they cannot be taken as a basis for an accurate comparison between the capacities of different equipments.

Single Phase Electrification on Steam Railways and in Trunk Line Service.

Road.	Of line.	Single track.	Line voltage.	Motor cars.		Locomotives.	
				No.	H.p.	No.	H.p.
N. Y., N. H. & H.:							
Main line	21	190	11,000	4	600	41	1,400
New Canaan Branch	8	8	11,000	2	500	2	1,600
Grand Trunk	3.5	12	3,300	—	—	6	900
Grand Rapids & Southern	34	34	11,000	6	400	—	—
Denver & Interurban	16	46	11,000	8	500	—	—
Edmonton & Annapolis	—	—	—	—	—	—	—
Short Line	25	39	6,600	12	400	—	—
Swedish State Rys.	7	7	3,300	2	240	1	300
Midland Ry. of England	8.5	17	6,600	1	300	—	—
(2,900)	—	—	—	2	360	—	—
(20,000)	—	—	—	42	400	1	1,500
Prussian State	16.5	31	6,600	14	345	—	—
Lon., Brighton & S. Coast.	8.6	17.2	6,600	16	400	—	—
Rotterdam-Haag-Scheveningen	20.5	46.5	10,000	19	360	—	—
Spokane & Inland	129	129	6,600	28	400	6	500
(20,000)	—	—	—	30	500	2	1,600
Midl Ry. of France	75	—	12,000	30	500	2	1,600

Two-Phase Current Electrification on Steam Railways and in Trunk Line Service.

Road.	Of line.	Single track.	Line voltage.	Motor cars.		Locomotives.	
				No.	H.p.	No.	H.p.
New York Central	33	132	650	137	400	47	2,200
Pennsylvania	20	75	650	180	400	24	1,000
West Shore	44	106	650	20	350	—	—
Long Island	42	125	650	137	400	2	1,200
West Jersey & Seashore	75	150	650	68	400	—	—
Baltimore & Ohio	3.7	7.4	600	—	—	2.5	1,600
Northeastern Railway	37	—	600	—	—	300	2
Mexico Tunnel	4.5	—	600	24	400	—	—
Lancashire & Yorkshire	18	60	600	—	—	600	—
Great Western	5	—	600	—	—	600	—
Metropolitan Railway	—	67	600	56	600	10	800

Car equipment of Subway and Elevated Systems in American Cities. The Direct-Current Third-Rail System at Approximately 600 Volts is Used in All Cases.

Road.	Miles of single track.	Motor cars.	
		No.	Horse-power
Boston Elevated	2.9	219	320
Brooklyn Rapid Transit	71	558	101
Interborough Rapid Transit (New York)	190	969	764
Hudson & Manhattan (New York)	12	140	320
Chicago & Oak Park Elevated	19.4	65	326
Metropolitan West Side (Chicago)	51.1	15	210
Northwestern Elevated (Chicago)	25.5	20	128
Southside Elevated (Chicago)	35.5	150	70, 150, 180, 150, 110
Philadelphia Rapid Transit	11	100	250

Three-Phase Electrification on Steam Railways and in Trunk Line Service.

Road.	Of line.	Single track.	Line voltage.	Motor cars.		Locomotives.	
				No.	H.p.	No.	H.p.
Gt. Nor. (Cascade tunnel)	4	9	6,000	—	—	4	1,900
Italian State Railways:							
Varese Railway	66	—	3,000	10	400	2	800
Giov. Railway	12.4	37.3	3,000	—	—	20	2,000
Mt. Cenis Tunnel	4.4	—	3,000	—	—	10	2,000
Savona Ceva	—	—	3,000	—	—	10	2,000
Swiss Federal Railways:							
Simplon Tunnel	13.7	14.3	3,000	—	—	2	1,100
Garagel Santa Fe (Spain)	13.1	14.4	3,500	—	—	5	320

According to Washington, D. C., despatches, American bidders failed to get an order for locomotives for the Chinese railways apparently through the failure of manufacturers in this country to have trained technical representatives there who could give full specifications and explanations.

*An appendix to the paper on "Electrification of Railways," to be presented by George Westinghouse before the joint meeting of the American Society of Mechanical Engineers and the Institution of Mechanical Engineers.

CO-OPERATIVE ENGINEERING EDUCATION.*

BY HERMAN SCHNEIDER.

Dean of the College of Engineering, University of Cincinnati.

It is difficult to formulate a simple comprehensive statement of the principle underlying the co-operative system. Various attempts have been made to condense it into one sentence, as, for instance, "Hitching the school and shop abreast, rather than in tandem;" "Combining theory and practice." In former papers this statement has been used: "The practical side of engineering, that is, the technique, can be learned only in a shop working under commercial conditions, and the theory underlying the technique can be taught only in a school by skilled teachers." Perhaps the best statement of the fundamental idea is this: "The practice of engineering cannot be learned in a university; it can be learned only where engineering is practiced, namely, in the shop or field. The theory underlying the practice may be obtained outside of the university, but can be best obtained by an organized system of instruction under skilled teachers."

Many people think that the basic idea in the co-operative system is the alternate week arrangement. The plan by which theory and practice are combined and co-ordinated, is merely a detail, and the alternate week scheme which we use is the one which happens to fit our local conditions best. Even in our own school we are devising different systems of co-operation. For instance, after four years of experiment we have decided to operate the co-operative courses in electrical, mechanical and metallurgical engineering on the alternate week plan 11 months in the year, reducing the length of the courses from six years to five years. In civil engineering we have the alternate week scheme eight months in the year, and for the summer months we have made an arrangement with the Union Pacific, whereby our students obtain field work in railroading, together with instruction given by the railway company. In chemical engineering there will be a marked departure, according to our present plans, from both of these details of operation. It must be evident that, for different localities, different means of getting theory and practice together will be used, and also, in different courses, the ratio of theory to practice will vary. For example, the University of Wisconsin probably could not operate on the alternate week plan, because of its distance from the factories of the state. It could establish a faculty in Milwaukee and have an alternate week or fortnight scheme; but if the faculty remained in Madison, the plan would probably be to have eight months of instruction at Madison and four months of scheduled shop work, with co-ordination, in Milwaukee, using four rotating sections so that the shops would always have the same quota of student apprentices. Such a plan as this would be a co-operative scheme, of course, but would have a less amount of shop work, and, in the opinion of some of our critics, would be a more beneficial arrangement than the one which we believe to be the best for our conditions in Cincinnati. Further, in co-operative law, medical, commercial, agricultural, architectural, or mining courses, it is evident that the amount and character of practice would vary greatly. I believe, and sincerely hope, that there will be many forms of the co-operative system adopted by different institutions, and out of all of these we shall probably get, by experiment, the best forms.

Four years of experience in operating our co-operative courses, however, leads me to expect failure for any co-operative scheme which is not made commercially profitable for the shops, which does not start the student at the very bottom of the practice of engineering, which eliminates the hard work that the regular mechanics do, or the regular hours they maintain, or which modifies the shop discipline simply because the apprentices are university students. Any attempt to evade the disciplinary conditions which have through the ages made strong men, while it may be an advance on the old four-year system, will not meet the expectations of its sponsors. These thoughts are born of the questions so frequently asked us by college teachers not situated in industrial centers, and by others who are in factory communities, but who have a vague fear that somehow the

standard of their scholastic work, their dignity and their independence will be jeopardized by contact with the wicked world.

It is astonishing how much opposition there is to that part of our system which requires a student to do the hard physical work of laborers and mechanics. Engineering professors, particularly, seem to feel strongly that the high plane upon which the engineering profession is supposed to be, is in danger of being let down a peg, if embryo engineers begin their careers as apprentices. I have never been able to get a crystallized, logical statement of these objections. Personally, I believe that a goodly amount of physical work in contact with those whose lot it is to labor should be required of every young man in his formative years, no matter what his position in life is, or is to be. Especially should it be required of future engineers. Strong men have always grown stronger and better through this contact and competition, and the weaker ones find their levels more quickly than in any other way. Why an engineering college should not adopt nature's rigorous methods of finding leaders is not evident, and if engineering education should be for any particular purpose, it should certainly be for the training of leaders in production and construction. Surely a youth approaching manhood who does not feel within him the craving to measure his strength of body and mind with those who do the day's work lacks certain qualities necessary for leadership, and should not, therefore, get the training intended for leadership. If he does have the craving let him satisfy it; let him grow naturally, guide his growth and supplement it with proper intellectual instruction. In our opinion the man who has not the will and willingness to do physical labor in the practical engineering world is not a promising candidate for the engineering school; nor do we believe that imitation work in imitation shops should be offered to the students as an equally good, but easier and more dignified, substitute for the character-building, man-making, real work of real shops. Indeed, there is a sort of academic snobbishness, most unwholesome for the students, and most undemocratic in its essence, which looks askance at all knowledge that does not come by the book, and which feels that between the practical and the intellectual there is a great gulf fixed.

Now I assume that we are in the business of training men for the practice of engineering; and I further take it that the practice of engineering means the economical use of the forces and resources of nature for the benefit of mankind. The day has come when we must place honest emphasis on the word "economical;" we must also remember that mankind means all men, the majority of whom are those who produce and construct in using the resources of nature. We are, in fact, servants of each other, and in this mutual but complex interdependence of production we have for some time been leading surely to a crisis, which grows more acute as the nation becomes more industrial, and which will necessitate the solution of two problems: First, the elimination of waste in production, and second, the scientific use of labor to the end that it may be most efficient, best rewarded and properly conserved. These are matters not for the lawyer and politician, but for the engineer. That day is passing when the magnificent waste of men and materials can be an ignored consequence of achievement. The integration of a multitude of shop errors between the limits of January 1 and December 31 is now as much an engineering problem as the most delicate deduction in calculus. The training necessary to find all the factors which enter into this integral equation is just as much a part of engineering education as is mathematics. A working knowledge of the toxins of fatigue is as important, to say the least, as an ability to discover and eliminate the impurities in castings. To conserve the years of labor is as much a part of economical engineering as to find a good preservative coating for bridges. A knowledge of the limitations, the weaknesses and the group subtleties of men is as requisite as a similar knowledge of materials.

If we are to have a saving solution of this broad engineering problem of conservation in production, the men who tackle it must be initially aggressive in spirit and keen of mind; they must be deeply versed in science; they must have a thorough

*From a paper read before the annual meeting of the Society for the Promotion of Engineering Education, at Madison, Wis., June 26, 1910.

and intimate knowledge of men and materials that instruction in the humanities must give them breadth of vision with resultant breadth of tolerance. They must know the problem.

In joining with producing and controlling the course of these young men for this type of engineering, we felt we anticipated that there would be a reflex action on the engineering college. The reaction was not slow in coming. It was more in the nature of a flareback. My telephone was a year ago that in a letter "That cub you sent down here," the voice would say, "thinks this is a university. He won't work." It did not take us long to learn that it was necessary to paint the shop end of the course to aspiring Edisons in broad, black, greasy, sweaty strokes. One after another young men came to inquire about the work and one after another they would surrender to their mental aversion for early hours and much grime. But there was a fine residue from the sifting, a residue that meant business. Each year our list of applicants has grown and the selection has been more and more rigid; as a result our losses during the summer tryout decreased as the following table indicates:

Losses During Summer Trial Period			
Year.	Percent	Year	Percent
1906.....	40.0	1908.....	18.6
1907.....	28.4	1909.....	8.1

We also learned that first year, and have had it verified each year since, that the shop will spot a yellow streak in a man before the university even suspects it. An attempt to sneak spoiled work through is never a great success. It is not even a commendable failure and the rest of the workmen view it with tersely expressed disgust. It requires only a few days for a young man to realize that he must stand squarely on his own merits and that most of the men in overalls about him are a peculiarly keen lot of men worth cultivating. And this is when young Edison begins his combination course in tact and integrity.

We at the college end soon found our work under a scrutiny and criticism, with final judgment suspended, and this, too, from a source which does not hesitate to scrutinize and criticize. We are brought face to face with the failure of a university department as we never are in our four-year courses. A student, let us say, has finished successfully his work in physics; some day he does a fool thing in the shop which indicates that he knows very little about the subject. When confronted with it and with the fact that he should have known better because he had been taught the theory governing it, you find his grasp on the theory to be very feeble. It is not a part of his working organism.

Experiences of this sort caused a serious introspection on the part of our teachers, and a consequent re-adjustment of our courses and methods. We soon found that much of our trouble resulted from a lack of co-ordination between courses. After trying various plans to remedy this, we now have a system whereby each course is charted in a circle clockwise by weeks. At the periphery of the circle are the names of the teachers who tie to the particular work of any week. Every teacher gets a copy of every course chart. The instructor in charge of the course is chairman of a committee on that course, the other members being those whose work correlates with his. In this way a number of men may teach a subject which was formerly taught by one man. For example, the professor of metallurgy enters the bridge design and testing laboratory courses at appropriate times; the professor of industrial chemistry gives part of the course in cement.

Experience also taught us that it was necessary to have a separate set of men to co-ordinate the work of the shop with the work of the university. A department was started to do this and men were appointed of the grade of assistant professor and with the title of co-ordinator. The shop co-ordinator is a college graduate acquainted with shop practice. He spends every morning at the university and every afternoon in the shops. His function is to make a direct weekly co-ordination of the work of the shop with the theory of the university. One afternoon, for example, he may be at the shops of a local manufacturing company, where he will observe the student apprentices at work. He will know what they are turning out, their speeds, their feeds and cuts, the angle of the tool, how the batch of work is

ticketed, how the work is set up, the power drive, everything important in connection with the operation. The next week these young men will be grouped together with their classmates for two periods in class, when he will explain the functions of the particular parts, on which the students were working, in the machine which the local manufacturing company builds. He will take up all questions of speeds, feeds, cuts, accuracy, etc. Figuratively speaking, he will take from the student apprentices the blinders which would restrict their vision except for this explanatory work. The ticketing of the batch of work is gone into and the system of shop routing is explained. Ultimately all problems of shop organization, shop accounting, cost keeping, shop planning, power transmission, heating, lighting, etc., are discussed.

In conjunction with this, a card system is employed by means of which everything the student does in the shop that exemplifies a theory taught in the university is called in detail to the attention of the teacher of theory, so that when the student comes to that particular theory the exemplifications which he has had in his practical work in the shop are called to his attention. It will be seen, then, that out of the student's own experience is drawn much of his course in mechanism, thermodynamics, machine design, strength of materials, shop economics, etc.

This system has been in operation for one year and is one of the most valuable additions we have made to the scheme. The co-ordinators have made a careful study of each shop and are now completing organization charts showing the path which a student can most profitably follow through the shop. In addition to the shop chart, a chart is made for every individual student which indicates how closely this path has been followed and why there have been deviations, if any. These charts are the result of four years of closely observed experiment on the part of the university and the shops, and have been worked out by conferences between shop co-ordinators and shop superintendents.

Our critics have always felt that the amount of work given (six years) would tend to kill the scientific spirit and to instill a too practical one. A recent occurrence worth mentioning in this connection was a meeting of all the co-operative students with the faculty to discuss the 5-year, 11-month plan of operation. At this meeting the students who have been with us three or four years strongly expressed the hope that the course would be made six years long, 11 months of the year. None of the students wanted a six-year course, nine months of the year. When the vote was finally taken it was found that all the men who had had three or four years of the work wanted a six-year course, 11 months of the year, while the younger men were unanimously in favor of a five-year course, 11 months of the year. The reason given for their attitude by the older co-operative students was that they wanted to take up in the university advanced scientific work of a post graduate grade, together with certain academic subjects such as psychology and logic, and that they desired also to take a more comprehensive group of technical subjects than is usually given in any engineering course. That is to say, they have become so impressed in the shop with the broader aspects of engineering, that they desire to touch not only the technical subjects of their own courses, but also many of the technical subjects of other engineering courses. As a result, courses will be arranged so that men, graduating after five years, will be enabled to take one or two additional years if they so desire. This attitude was not surprising to those of the faculty who were watching the development of the co-operative students. A curious, and, I think, entirely unusual situation was developed in the meeting when nearly every speaker on the students' side solemnly warned the faculty that no measures should be taken which would in any way endanger the high standard of the co-operative course in the university.

Of course, our experience in four years of operation has enabled us to determine in advance that the usual work of the four-year theoretical courses could be carried on by co-operative students in five years of half-time work 11 months of the year, even though the standard maintained in the co-operative work is much higher than that of the four-year courses. A student's rating, by the way, is not determined by examination, but by a

record of daily efficiency. We have abolished examinations, but pay very close attention in the weekly faculty meetings to the weekly records of our co-operative students. Short written tests are given frequently and without advance notice. A certain pace is set and if the student cannot or will not maintain it he is dropped from the course.

We are more and more convinced that the best thing a university can teach an engineering student is how to tackle a problem, and to this end most of our summer work is devised. All of the summer work in the university is to be constructive following the analytical work of the previous year's theory. For example, the student's first problem will be something like this: "There is a barrel of rock salt; you are supposed to have a certain knowledge of theoretical chemistry after your year's work. Here is the laboratory; here, also, are the necessary industrial implements; over there is the library. Now go and make four pounds of table salt. At 5 o'clock each day let us have a written report on what you have accomplished." Following this and other simple problems, the work becomes more complex, leading into boiler compounds and metallurgy. The student will be compelled to rely almost entirely on his own resources, except for critical suggestions following errors, and by the time he has reached his third summer it is hoped that he will be able to use the laboratory, the library and his theoretical knowledge to make a logical and effective attack on a new piece of constructive work. In his last year he will have several problems which will involve theoretical considerations that he has never met, except, perhaps, in the fundamentals of physics.

Many additional changes in curriculum and method are in process of development, looking to a more rigorous mental and physical training of our young men for work in production and construction. And though a few of our students upon graduation will become teachers of future co-operative students, and a few more, temperamentally fitted for work in pure science, will join the freemasonry of those who explore beyond the ranges of the known, the majority will continue in the more prosaic business of helping to do the world's work. And these will bring to their tasks a working knowledge of the many-sided life of the shop and field, coupled with an ability to apply it to the rapidly increasing fund of material which the pure scientists uncover, to the end that the yield may be greater and the spirit of the labor brighter. And this, I take it, is engineering.

TESTS OF SELF-CLEANING FRONT ENDS, PENNSYLVANIA RAILROAD.

The front end arrangement now in use on the Atlantic type passenger locomotives of the Pennsylvania is shown in Fig. 1. The outside stack is 16 in. in diameter at the base and has a taper of 1 in. in diameter per foot of height. The inside stack is not tapered. The diaphragm plate is perforated, with a netting covering the perforation, and has an adjustable plate on the lower edge. A large number of tests of various kinds have been made on the testing plant at Altoona with class E2a locomotive 5,266 equipped with this front end, and while it has been found to be a very good arrangement, so far as the steaming of the locomotive is concerned, it is not self-cleaning. With low volatile friable coal the accumulation of cinders in the front end may be as much as 1,000 lbs. per hour, a quantity that would seriously interfere with the draft and necessitate cleaning the front end after an hour's run. With high volatile gas coal the accumulation of cinders is not so serious, but even with this coal 300 lbs. of cinders, or more, may be collected and the smokebox must be cleaned at the end of each trip, where the locomotive is working to its capacity; burned front ends result if there is any air leaking after the cinders have collected.

Master Mechanics' Front End.—A committee appointed by the American Railway Master Mechanics' Association reported upon a series of tests and tests made at Purdue University with a New York Central & Hudson River Atlantic type locomotive (Proceedings American Railway Master Mechanics' Association, Volume XXXIX, 1904), and as the conclusions from the results

of these tests, certain suggestions for a front end arrangement for best results are given as follows: "A suggestion as to a standard front end is presented [Fig. 2] which, with the following equations referring thereto, may be accepted as a summary of conclusions to be drawn from all experiments made."

For best results make H and h as great as practicable. Also make

$$\begin{aligned} d &= .21 D + .16 h. \\ b &= .24 \text{ or } .5 D \\ P &= .32 D \\ p &= .22 D \\ L \text{ (Not well established)} &= .6 D \text{ or } .9 D, \text{ but not intermediate values.} \end{aligned}$$

These rules were used as the basis of the design of front end arrangements to be tried. No attempt was made, however, to have the length of the smokebox conform to that recommended, which would make it either 63 in. or 42 in., instead of the present 83½ in.

The Locomotives Tested.—An "E2a" class locomotive, No. 5,266, was used for most of the front end trials, but later some

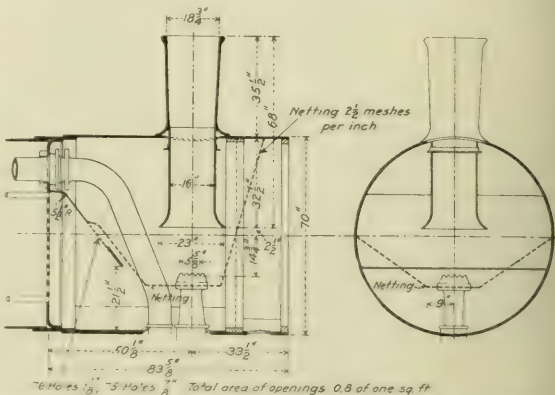


Fig. 1—Standard Front End; Pennsylvania Railroad Atlantic Locomotive.

of the devices were applied to "E3a" class locomotive, No. 2,984. The principal dimensions of these locomotives are as follows:

General Data.		E 2a.	E 3a.
Weight on truck, lbs.		37,167	33,700
" " front drivers, lbs.		53,384	66,700
" " rear drivers, lbs.		56,667	61,500
" " trailing truck, lbs.		37,000	31,200
Total weight, lbs.		184,167	193,100
Wheel base, driving, feet.		7.48	7.42
Wheel base, total, feet.		30.85	30.85
Cylinders		20.5 x 26	22 x 26
Valves		Double ported balanced shldr.	Richardson balanced.
Pistons		80	80
Driving, diameter, in.		80	80
Truck, diameter, in.		36	36
Trailing, diameter, in.		30	30
Boiler (Same on both locomotives).			
Type		Belpaire, wide firebox	
Boiler pressure		205 lbs.	
Diameter, test ring		67 in.	
Firebox, width and length		114 x 68	
Tubes, number and outside diameter		315, 2"	
Tubes, length between sheets		159.78	
Heating surface, tubes		2,471.04 sq. ft.	
" " firebox		136.86	
" " total		2,607.90	
Grate area		50.5	

Draft and Back Pressure.—In the tests made by the Master Mechanics' committee oil was used as fuel; by its use the admission of air to the firebox could be completely controlled and the effectiveness of any arrangement could be derived from the draft indications, the draft in the smokebox at any fixed back pressure being dependent only upon the smokebox arrangement. As the problem on the Pennsylvania was to devise an arrangement that would clear the smokebox of cinders, the use of oil as a fuel could not be considered and with coal as a fuel it was found impossible to duplicate draft readings under apparently similar conditions of running. By means of an indicator, connected to the exhaust pipe, a few inches below the nozzle, the back pressure was observed, and by running the locomotive under

gradually increasing loads a series of tests of the boiler pressure and the corresponding draft were run in the smoke box were obtained. Tests indicated very clearly that the draft is so closely dependent upon the conditions at the grate that it cannot be used as a basis of comparison for different firing and arrangements when firing coal.

In estimating the comparative merit of the different devices

with high volatile gas coal, as it is one of the regular passenger coals, while the other is not.

The *Tests*.—A large number of tests were made, including a series to show the effect of moving the front edge of the diaphragm plate in the standard iron end (Fig. 1). The changes did not produce any marked effect, possibly because of

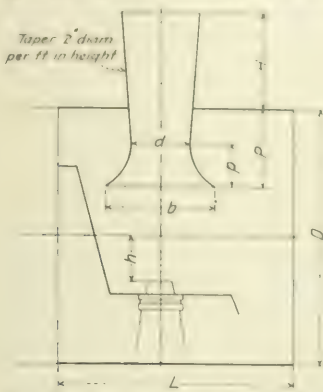


Fig. 2—M. M. Assoc. Front End.

tried it became necessary to take account of a number of factors, as:

The quantity of water that could be evaporated as compared with the standard front end.

The evaporation per pound of coal.

The general steaming of the locomotive as shown by the boiler pressure during a test.

From tests made with the standard front end it was known that the boiler could be expected to give an equivalent evaporation of about 16 lbs. of water per square foot of heating surface with low volatile friable coal and 18 lbs. with high volatile gas coal. To obtain the lower evaporation a speed of 160 revs. per minute and a cut-off of 27 per cent. was required with locomotive No. 5,266 with wide open throttle, and for the higher evaporation of 18 lbs., 160 revs. and 32 per cent. cut-off with full throttle. If the results with the standard front end could be equaled with a self-cleaning device the object of the tests would

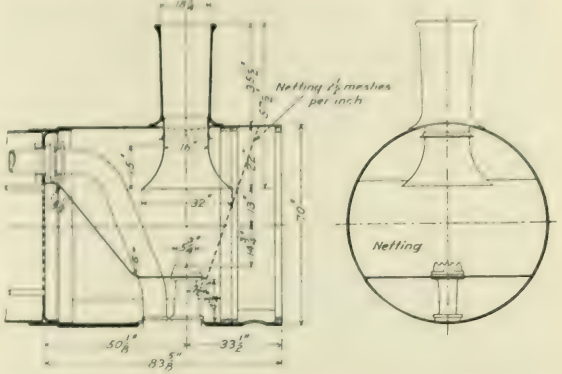


Fig. 4—Front End with Pennsylvania Railroad Outside and M. M. Assoc. Inside Stack.

the diaphragm being perforated. The tests of front ends made by the Master Mechanics' Association did not determine the arrangement of the diaphragm plate to make the smokebox self-cleaning and this was the object of the preliminary tests made by the Pennsylvania. First a diaphragm of the type recommended by the Master Mechanics' Association was tried without a netting. An inside stack, built according to the Master Mechanics' recommendation, was then substituted for the standard Pennsylvania stack and different diameters of nozzles were tried with the combination. Following this both the inside and outside stacks were made to conform to the recommended practice of the Master Mechanics' Association. The front of the diaphragm plate was then cut off until it extended only 7 1/2 in. in front of the center of the nozzle. A large number of other combinations were also tried, and the three which gave the best results, and were self-cleaning, were selected for the final tests.

Final Tests.—After the preliminary trials of the various de-

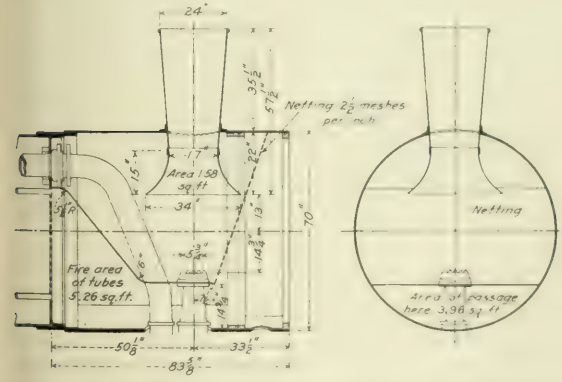


Fig. 3—M. M. Assoc. Front End as Applied to Pennsylvania Railroad Atlantic Locomotive.

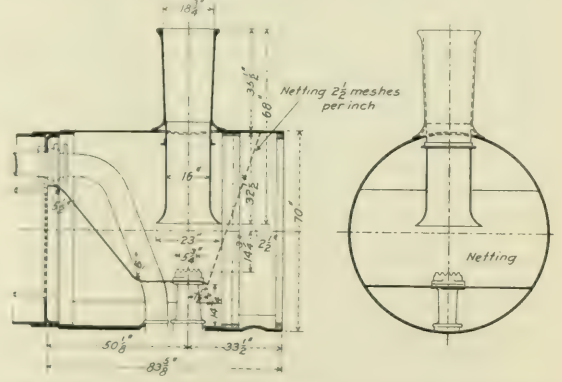


Fig. 5—Front End with Pennsylvania Railroad Outside and Inside Stacks.

be accomplished, as with the added advantage of a self-cleaning front, which would permit the use of a friable coal, the capacity of the locomotive would not be reduced.

Low volatile friable coal was used for the preliminary runs, as with it large quantities of cinders are drawn through the tubes and the self-cleaning feature could be better observed than with a coal making less cinders. The final series of tests were made

vinces three of those which were of greatest promise, Figs. 3, 4 and 5, were selected for further tests. Fig. 3 shows the front end recommended by the Master Mechanics' Association as applied to the "E2" or "E3" locomotive. It has a tapered stack with a wide mouthed inside stack. The diaphragm plate is without perforations and is carried down and forward to a point 7 1/2 in. in front of the exhaust nozzle center. The edge of the

plate ends at a point 14% in. above the bottom of the smokebox and the area of the passage for the gases at this restricted point is three-fourths of the area of the tube opening or fire area. The tests made with these three arrangements were each of two hours' duration at 160 revs. per minute, or about 38 miles per hour. Good results were obtained with each of these arrangements, all being perfectly self-cleaning except for a slight accumulation of cinders on the horizontal plate of the diaphragm.

Tests with the arrangement shown in Fig. 5 showed a better evaporation per pound of coal than any of the others and it was thought, all things considered, that this was the best arrangement. Another test was then run with it to develop the maximum boiler capacity at 160 revs. and 32 per cent. nominal cut-off, and this test was run without difficulty. This is as late a cut-off as can be run with the standard front end at this speed, and as the nozzle was $\frac{1}{8}$ in. larger in diameter than was used with the standard arrangement, it is to be presumed that the boiler capacity is as great with this self-cleaning front as with the standard, with the added advantage of slightly decreased back pressure in the cylinders due to the large nozzle.

After this maximum capacity test a trial was made at a very low rate of working under partial throttle to note the effect of such conditions on the quantity of cinders collected in the smokebox. This test, at a speed of 160 revs., 27 per cent.

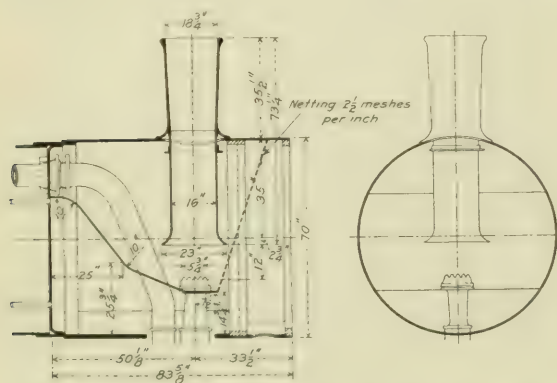


Fig 6—Front End Arrangement Which Gave Best Results on Atlantic Locomotive.

cut-off and the steam throttled to one-half the boiler pressure, showed practically no cinders collected in the smokebox.

Tests With Different Firemen.—To show that the results obtained were not due to good firing alone, tests with the arrangement shown in Fig. 4 were run under precisely the same conditions, with the exception that one test was fired by the regular testing plant fireman and the other by an inexperienced man who had been firing but two months and had never fired this class of locomotive. The results show that the good steaming of the locomotive with this self-cleaning front can be obtained by the average fireman, but they also show that the inexperienced man may use as much as 750 lbs. of coal per hour over the amount actually required.

Self-Cleaning Front on "E3a" Class.—At this point, after tests which indicated that for locomotive 5,266, "E2a" class, the self-cleaning front, Fig. 5, would give the best results, it was thought best to determine if this arrangement would give equally good results if applied to another boiler of the same class. Locomotive 5,266 was, therefore, removed from the plant and put into road service, and "E3a" locomotive 2,984, fitted with the same arrangement, was placed on the plant. Though the tests were not quite up to the maximum evaporation of the other locomotive, one of them was but five-tenths of a pound less per hour and it is clear that the boiler will give the same results as the other with the same front end. Modifications of the diaphragm were then taken up to make it of such a shape that it would clear itself of the small quantity of cinders which had been collect-

ing on it. The plate was made sloping, just back of the exhaust nozzle, where in the earlier form it had been flat. This modification of the form of the sheet did not have the desired effect.

The inside stack was then lengthened and the cinders were practically all cleared from the plate. The inside stack was then raised, as in Fig. 6, to a point 12 in. above the nozzle, to find the highest position for this inside stack that would clear the plate of cinders. Six shovelfuls of dry cinders were put on the plate and the locomotive run at a speed of about 120 revs. and a short cut-off for about 15 min., when the cinders were all removed; next, six shovelfuls of wet cinders were put in and these were also cleared from the plate.

Conclusions.—A front end arrangement has been developed for the "E" class which, while self-cleaning, maintains the boiler capacity or maximum evaporation fully equal to that with the standard front end arrangement. With friable coals, where large quantities of cinders are formed, the boiler capacity will be increased on long runs on account of the smokebox being kept clear of cinders, which obstruct the draft. The front end arrangement recommended for the "E" class of locomotives, Fig. 6, is to be used with an exhaust nozzle of 5% in. diameter. The outside and inside stacks as now used on this class of locomotive appear to give better results than can be obtained with the form recommended by the Master Mechanics' Association and it is thought advisable to retain them. The best results were obtained when the passage for the gases under the diaphragm was smooth and free from abrupt changes of form. The inclined adjustable diaphragm plate, often used, was found to cause an obstruction to the flow of gases and is undesirable. In the experiments made, the height of the whole horizontal plate of the diaphragm was varied and the final position recommended is suitable for any locomotive of this class and means for adjustment is not considered necessary.

ANNUAL MEETING OF THE FREIGHT CLAIM ASSOCIATION.

The nineteenth annual meeting of the Freight Claim Association was held at the Hotel Alexandria, Los Angeles, June 15 and 16, President J. S. Tustin (Missouri Pacific) in the chair, and about 130 representatives present.

The president in his opening address said, in part: We all recall the time when questions of liability, both as to a claimant and to interline relationship, were sifted through as many minds as there were separate carriers employed in the transportation of the property; but a few claim officers connected with closely related lines adopted what is called the single-audit plan, under which one mind determines the relationships on a claim involved in joint service; and where now is the carrier that may safely sit in splendid isolation—a law unto itself—on these joint claim problems? A patient tolerance of small irritations, while we strive for a perfect service, is a befitting attitude. It is true that each common carrier is itself responsible before the law for the validity of its own conduct and open to a separate challenge of government examiners, but this should not serve to beget a shrinking timidity resulting in the nullification of broad experience. The arbitration court of our association is doing important work. Nine years ago 35 claims were settled through arbitration in one year, and in the three years following 61, 57 and 71 claims. Within the last twenty-four months 1,037 claims were placed before this court—a voluntary tribunal of no mean importance. But it may be seriously questioned whether, without a systematic effort to minimize the burden, the association should continue indefinitely to call for this labor, a service little better than gratuitous. A recommendation will be made to codify the findings in these claims, to create an influence in the settlement of other claims without arbitration. Whether the solution is to be had by the selection of a permanent chairman, duly qualified to express a conclusion, influencing, also, it may be, the practice of arbitration, is a matter for the association to determine. * * * The valuable investigations con-

ducted by several claim groups, notably the Southern, New York and Chicago conferences, should be made available to the members of the association as a whole, probably by having their minutes printed at the expense of the association and distributed to our members.

Speaking of the work of the Conference Committee, which has had frequent conferences with representatives of the Interstate Commerce Commission, Chairman Tustin said: The first difficulty we met was the indefinite character of our work. "What are we here for? What are the functions of the Conference Committee?" If we had listened to all criticisms the whole movement would have been emasculated and we should have gone to Washington and adjourned home. But the committee formed certain convictions and we had the courage to put them into practice. Our work is summed up in this little pamphlet, which is the condensation of about five hundred pages. We did not think you would want to read the five hundred pages and, for economy of time, we did not print everything. Here on page five of the report, covering the marking of cotton, is an illustration of some of the things we took hold of. There are a great many carriers to which this subject does not appeal at all, because they do not haul any cotton. A lot of freight claim agents do not know what cotton is, and yet it is a living issue with us. We sweat blood on this cotton proposition. * * * The railroad commissioners of the United States are much concerned over this question of freight claims and they propose to hold around the United States a lot of public hearings on this question. When this movement started I began by writing letters to certain traffic associations—merchants' bureaus and merchants' leagues—to see what they thought of the progress of the claim business in the United States. That was followed by letters to individual shippers, importers, exporters, jobbers and wholesalers. The next fleet of letters was sent to the traffic people all over the United States. I sent out 800 letters to find out what the country merchant thought of the progress of the claim settlements of the United States; and I was astonished with the unanimity of opinion that progress has been made in the last three or four years that is almost revolutionary in its scope. First, I had the testimony of the shipper, or rather of the merchants' leagues; second, the testimony of the individual shipper; third, the testimony of the traffic men; and, fourth, the testimony of our agents, who were in touch with the small merchants at our little country towns. It is the small merchant at the little country town that makes or ruins our reputation as claim agents. With a big industry it is usually easy to deal. In all probability its claim agent is an ex-railway man and knows how to get at it; he is not the man who goes before the legislative bodies in behalf of incendiary legislation. At all events, he is not likely to. But here is a little fellow at a little country town who buys a stock of groceries and who has a vision in his mind of what he is going to do with his groceries when he gets them. He is going to open a box of oranges and put them here, and a pail of tobacco and a bucket of candy there, to make a display; but on the way the box of crackers becomes broken and somebody steals some of the oranges and the pail of candy is broken and the candy smeared on the car floor, and the man's dream is dissipated; there is a sense of outrage; and apparently back of that situation, in his mind, is the great corporation, and he reads in the papers about fifty million dollars of bonds and 100 million dollars of bonds and Wall street and all that colossal matter, and he thinks all this is arrayed against his little pail of candy and himself. So, in thinking over this question, I began to realize how the little country fellow feels; how he talks; what he says to his family; what he says to the man who is trying to make the laws in Topeka or Little Rock. He is the man who wants to go to the state capital and whose voice is heard in radical legislation.

I asked the agents if other roads paid their claims quicker. I said I hoped they did, because we needed that stimulus. Some said, "You are pretty quick, but the Rock Island is just as quick and the Santa Fe is just as good." And that is what we want

work for—not to be better than the worst, but to be just a little better than the best. It was a happy day when the Government issued that pamphlet on packing. It was the entering wedge. It has been declared that for all-around carelessness the American shipper takes the palm. For the year ending 1908 twenty-eight and a half millions of dollars were paid out for loss and damage to freight, exclusive of payments by switch and terminal carriers. That was two years ago. Meantime payments have increased and I venture to say that when the new compilation is out for this year it will exceed the startling figure of \$30,000,000, which is 4 per cent. on \$750,000,000. * * * Your conference committee has tried to keep open the highway of governmental co-operation. That has been the conception we have had of our job. * * * There have been two or three bills before Congress this session proposing to penalize carriers if a claim is not paid within sixty or ninety days. The speaker here told of the efforts of the committee to secure reasonable action by the Congressional committee.

Following Mr. Tustin's remarks the meeting took up and acted on a number of committee reports. Article VI of the Constitution was changed so as to provide for only four standing committees, viz., on Constitution and By-Laws, on Loss and Damage Rules, on Overcharge Rules and on Methods and Topics. The Committees on Car-Sealing Devices and on Uniform Blanks are abolished and their duties added to those of the Committees on Loss and Damage Rules and Overcharge Rules.

The membership of the Committee on Methods and Topics was increased from five to nine, thus making all of the standing committees composed of the same number of members.

Provision was also made for each member of the standing committees to be appointed for a term of years, varying from one to three years, which plan it was thought would result in increased efficiency in the work of those bodies, making them more permanent in character.

Article VII of the Constitution was amended to provide for three regular arbitration committees of three members each (there having previously been one regular and two special committees), all of which are on the same footing, with the same powers.

These changes in Articles VI and VII were made effective at once.

The second paragraph of Loss and Damage Rule No. 40 was amended to read as follows, effective July 15, 1910:

"All claims for damage or for loss of a package or loss from a package, not exceeding \$20, and not provided for in the first paragraph of this rule, shall be prorated from point of shipment to destination upon mileage basis unless the record of checking at destination, junction or break-bulk point locates the damage or loss; in which event claims shall be prorated from last point at which shipment checked in full and good order to point where damage or loss is discovered. No investigation further than the development of the above records of checking shall be permitted. Subject to Ruling W-2. Minimum distance for any carrier to be ten miles.

"This rule to apply on all unsettled claims."

This rule has caused the members a great deal of trouble during the past few years, being interpreted in many different ways, but it is hoped that the conclusion reached at this session will prove satisfactory to all.

In receiving the report of the committee on car-sealing devices, a resolution was adopted referring to the American Railway Association the whole question of improvements, from a standpoint of strength and security to lading, in seals, car doors, fastenings and equipment generally as at present used.

The following officers were elected for the ensuing year: President, J. S. Tustin (Missouri Pacific); first vice-president, W. L. Stanley (Seaboard Air Line); second vice-president, F. E. Shallenberger (Star Union Line); secretary and treasurer, W. P. Taylor (R. F. & P.), Richmond, Va. Mr. Tustin was also chairman of the Conference Committee during the past year and was likewise reelected to that position.

The Conference Committee of 22 members was continued for another year, to continue its work along the same lines as during the year just closed.

The following members were elected to constitute the three

arbitration committees, each group of three as shown being designated to work together as one committee, the chairmen having been designated by the president, viz:

G. C. Arnold (chairman), (Lehigh Valley); W. H. Hancock (Union Pacific); R. C. Hancock (St. Louis Southwestern of Texas).

R. K. Slaughter (chairman), (Chesapeake Steamship Co.); H. F. Bidwell (Boston & Maine); W. O. Bunger (Chicago, Rock Island & Pacific).

J. L. Eysmans (chairman), (Cumberland Valley); J. M. Eedson (Michigan Central); E. Arnold (Grand Trunk).

The following Appeal Committee was elected, the first named being designated chairman by the president, viz:

J. J. Hooper (chairman), (Southern); A. B. Thompson (D., L. & W.); G. W. Perry (Great Northern); A. R. McNitt (Oregon Short Line); J. M. Brewer (Southern Pacific).

St. Paul, Minn., and June 21, 1911, were selected as the place and time for the next annual meeting.

NEW CHICAGO STATION OF THE CHICAGO & NORTH WESTERN.

The new passenger station which the Chicago & North Western is building at Chicago will be one of the largest terminals in the United States. A general article about the plans for this station, illustrated with perspective elevations, was published in the *Railway Age Gazette*, August 14, 1908. In our issue of July 16, 1909, a description was given of the general structural features, together with views of the cross section of the train shed, and on February 11, 1910, some progress views of construction were shown. The Bush train shed was described March 17, 1910, and on March 18 we gave a full description of the revision of grade of the Chicago & Oak Park Elevated's line at the entrance to the terminal. The present article is intended to bring up to date the facts about the construction of the station.

The estimated cost of the terminal is \$20,000,000. It is expected to have it completed and ready for use at the end of the present year. Here will center all the passenger traffic of the North Western lines which now goes through the Wells street station. At the present terminal there are handled daily 310 passenger trains, of which 70 per cent. are suburban. The number of passengers using the station on a certain day in April of this year was as follows: Suburban, 35,305; through, 8,443; total, 43,748. This represents about the average.

The Wells street station is on the north side of the Chicago river and all the trains entering it are brought over one bridge spanning the north branch of the river. The new station is several blocks west and south of the Wells street station and no bridge crossing is necessary. As shown on the ground floor plan, Fig. 1, the station extends from the north side of Madison street to Milwaukee avenue, crossing Washington street, Randolph street and Lake street, and having a total length of practically 1,670 ft. This length is divided as follows: From street line on Madison street to face of building, 33 ft.; main building and concourse, 218 ft.; train shed, 893 ft. 9% in.; from end of train shed to south line of Lake street, 181 ft. 6% in. The tracks of the Oak Park Elevated cross the terminal tracks on an elevated structure in Lake street. The power plant of the new terminal is placed in the triangle between Lake street and Milwaukee avenue, the width of Lake street being 80 ft. and the length of the triangle on the west side being about 261 ft. The total over all width of the terminal is 329 ft.

The old style high roof is conspicuous by its absence in this terminal, the roof being masked by masonry walls 48 ft. high on Canal street and Union street. The Bush train shed, Fig. 2, is used, this style providing for curved roof over the platforms with narrow openings over the middle of each track so the smoke is carried on of the train shed. The roof is of steel frame construction, covered with concrete, the smoke

ducts being plastered on metal lath. Fig. 4 shows almost the entire length of the train shed in process of construction and the Oak Park Elevated at the north end. Fig. 5 is an interior view showing the floor construction of concrete, recessed for the tracks. The framework of the structure is steel, but concrete is used largely throughout to protect the steel and form all the floors. Fig. 6 is a view of the massive column construction under the train shed and Fig. 7 is a view from above, showing the framing and the beginning of the Clinton street wall. The bumpers are at the south end of the train shed next to the concourse in the main building.

Fig. 8 shows the waterproofing of the subway bridge over the tracks at Kinzie and Clinton streets, and is illustrative of the general method followed in such work in connection with the terminal. Streets were crossed at various angles. Many awkward intersections were met. So the work was decidedly complicated and many special plans were prepared.

The floors of the bridges and subway crossings in general consist of steel trough girders filled with concrete, which were put in rather wet. This was smoothed off and waterproofed with membrane and asphalt waterproofing. The contract ap-



Track Supports under Train Shed Floor.

proximated 500,000 sq. ft. of surface and was awarded to the Standard Asphalt & Rubber Company, Chicago. The concrete was a 1:2:4 mix and after it was dry and set the surface was cleaned thoroughly and covered with a coating of Sarco concrete primer, this being very thin and intended to sink into the surface voids and assist in binding the waterproofing. When the primer dried the surface was covered with a heavy coat of No. 6 Sarco waterproofing, heated to a temperature of 400 deg. Fah. and swabbed on with mops. Upon the hot waterproofing was laid a layer of 8-oz. open mesh burlap in strips 10 in. wide, a coat of the waterproofing being swabbed on this. Four coats of waterproofing and three layers of burlap were used, the joints overlapping so the membrane was solid over the whole floor.

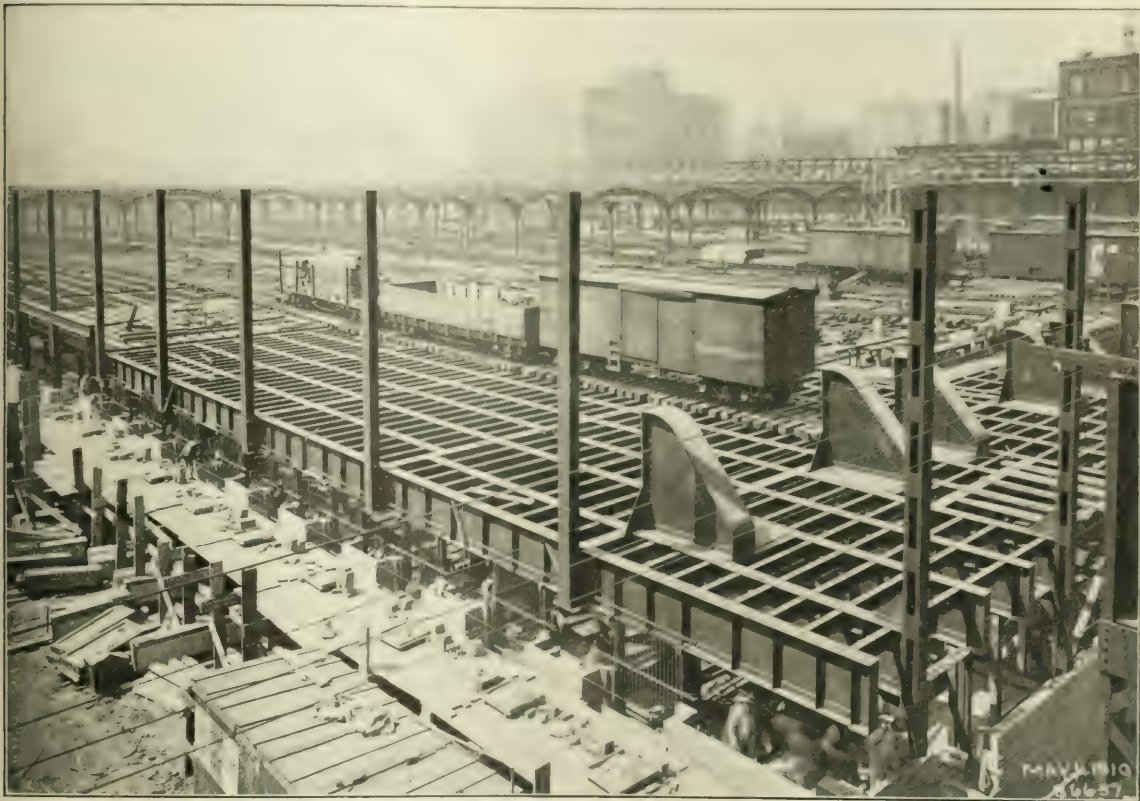
Upon the fourth coat of waterproofing was placed a layer of sand mastic 1½ in. thick, to protect the membrane from damage. In preparing this mastic the waterproofing was heated in open wood fired kettles to a temperature of 400 deg. Fah. and dry hot sand was added, the mixture being then heated to 150 deg. Fah. and constantly stirred to prevent stick-

ing to the sides of the kettle, which would have resulted in burning and running the material.

The mastic was composed of one part of Sarsco waterproofing and four parts of clean well graded sand. Two wheelbarrows were used to convey the hot mastic from the place of preparation to the slab on which it was placed. A layer of mastic was laid to a thickness of $\frac{3}{4}$ -in., screeds of this thickness preserving the depth. After compacting it enough to eliminate voids and holes a second course was laid, the joints overlapping the joints in the lower course 12 in. The top course was swabbed with hot Sarsco waterproofing which was then sanded before it cooled, to prevent damage by pedestrians. Temporary tracks were laid for the use of trains carrying materials into the terminal and these tracks were shifted as required, a 2 in. cushion of sand being placed over the mastic

in the concourse, are telegraph offices, behind which is a public space in front of the baggage room where is handled all the incoming baggage, elevator bringing the trunks and other baggage down from the train above. The baggage room opens on a driveway, leading in from Clinton street parallel with Washington street and connecting by means of a gate with a carriage entrance on the Canal street side, stairs leading from the carriage entrance to the concourse, and an entrance leading also to the baggage room. A parcel check room is conveniently located at the east end of the baggage room. At the west end are the offices of the baggage master and clerks.

The street car tunnel under the river on Washington street comes to the street surface within the walls of the terminal, with space on each side between the curbs for wagons to use



New Chicago Station; Chicago & North Western.

Looking northeast from Clinton street.

to prevent injury to it by ties when the waterproofing was carried to a point that required the shifting of the tracks over the completed work. Drainage was provided for and great pains were taken with all the details of the waterproofing.

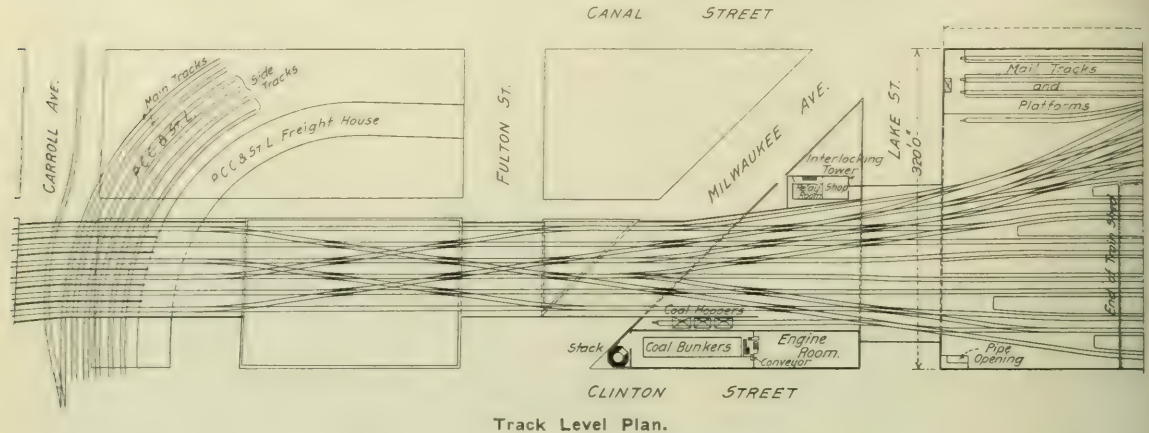
The entrance is on the north side of Madison street, the magnificent colonnaded entrance having a height of 140 ft., the clock dials facing the three streets being 12 ft. in diameter. On the ground floor at the left of the entrance, Fig. 17, is a news stand with a well equipped lunch room behind it, and a drug store adjoining. Beside the drug store is a vestibule with stairs to the concourse above and adjoining a carriage entrance which is intended to be used for private occasions, such as the reception or departure of distinguished visitors, or for funerals. To the right of the entrance is the ticket office and information bureau with a vestibuled entrance from Canal street. Directly facing the entrance, under the stairs

the street. On the north side of Washington street are located the United States Post Office sub-station and distributing tables for the mail brought in on the trains and carried by conveyors from the mail cars to chutes ending above these tables. The post office sub-station is connected with other parts of the station by pneumatic tubes, of which there is a number for the use of the baggage master as well as for the mail service. The suburban concourse is on the north side of the post office sub-station, eight stairways leading from the train floor from the 16 tracks. On the Clinton street end is a room for emigrants who have to remain over between trains, toilet accommodations being provided for men and women, the quarters for the women containing bath rooms. A lunch room with kitchen is provided for emigrant travelers. On the Canal street side is a large space for cabs and automobiles. On the north side of Randolph street is located the out-baggage room

and the rooms for the railway mail, conductors, swing room, mail room and express room. There is a trucking space next the street with elevators leading from it to the floor above to take outgoing baggage to the train floor. The power plant, as already mentioned, is on the north side of Lake street.

The main waiting room on the second floor, Fig. 3, is 202 ft. long and 117 ft. wide. On the Canal street end are the men's rooms, and on the Clinton street end is the rest room for women and a dining room 79 ft. x 59 ft. Above these rooms are club rooms for the convenience of passengers who are compelled to wait some hours for trains and who do not wish to

having 98 sq. ft. of active surface, with stokers, and are operated from engine-driven shaft in the basement. A complete system of coal and ash handling apparatus, Fig. 10, was installed by the Link Belt Co., Chicago. It consists of a pan conveyor, taking coal as delivered from the coal hoppers beneath the cars and passing it to the crusher, where it is dropped to a transverse conveyor which delivers it to a Peck continuous pivoted bucket conveyor. This latter elevates the coal to the storage bunkers above the boiler. The ashes are collected in pits below the boilers and raked into pivoted bucket conveyor in the basement; are there elevated to the



Track Level Plan.

leave the building. Every convenience found in the best equipped clubs will be provided here. The concourse is of steel and glass, as well built in as any part of the building, so that no discomfort will be experienced by travelers waiting for trains. The concourse is 60 ft. wide and 320 ft. long.

The elevators, ending in the baggage room on the ground floor, are at the ends of the tracks, just outside the concourse. The three tracks on the Clinton street side and the five tracks on the Canal street side will be used for through trains. Between these latter tracks are mail conveyors consisting of traveling belts flush with the floor and ending over the distributing tables on the floor below in the post office substation. When the trains come in the mail is thrown from the mail cars on to the conveyors and it requires no further attention. Baggage is taken from the opposite side of the trains and there is no interference by the baggage men with mail handling. Incoming baggage is handled by trucks to the elevators at the ends of the tracks near the concourse. Outgoing baggage is taken to the train floor on the north side of Randolph street by elevators and trucked to the baggage room; outgoing mail going up the same way.

The power plant is located at the intersection of Milwaukee Avenue and Lake street, and a general arrangement of the boilers, engines and generators, pumps, etc., is shown in the ground plan, Fig. 9.

The boiler plant consists of six Babcock & Wilcox water tube boilers of the vertical header type, all wrought steel construction and designed for a working pressure of 200 lbs. These boilers are set two in a battery, and an unusual method of setting is adopted. The boilers are fired from what is ordinarily termed the rear end, and a combination of horizontal and vertical passes for the gases is arranged so that the up-take is at the top and at the stoker end. Each boiler contains 5,980 sq. ft. of heating surface and is equipped with superheaters of the Foster type, each superheater containing sufficient surface to raise the temperature of 22,000 lbs. of steam per hour 70 deg. Fahr. above that due to a pressure of 155 lbs. by gage.

The boilers are provided with Green traveling grates, each

top of the boiler house, then dropped through a chute to an inclined pan conveyor, which delivers them to the ash storage bin located above the coal car track. Gates are provided in the bottom of this bin to deliver ashes to cars on the track. Sprague electric motors are used for all drives throughout.

It will be seen that the conveyors are arranged so that a coal car is emptied and the coal distributed to the boiler, while the ashes are elevated and delivered to the same car in the same position.

The large chimney rests on a concrete foundation which extends 20 ft. below the base and is supported on four concrete cylinder piers, and the smoke connection from the chimney back into the boiler room is constructed of reinforced concrete lined with fire brick. The breeching opening into the chimney is 6 ft. 6 in. wide x 15 ft. high. The inside diameter of the chimney at the base is 11 ft. and the top 10 ft. 6 in. It stands on an octagonal base, above which is a circular stack built of Custodis radial brick rising to a height of 245 ft. above the boiler room floor. It is surmounted with a cast iron cap, on which are bronze fasteners supporting the four lightning rods, which are 6 ft. high and furnished with 24 platinum points.

There are three vertical cross-compound non-condensing Corliss engines, built by the Allis-Chalmers Co., with cylinders 25 in. and 44 in. x 42 in., each rated at 1,150 h.p. at 100 revolutions per minute, steam pressure 150 lbs. The receiver on these engines is equipped with reheating coils. The dynamos are direct-connected 250 volt, continuous current, compound wound, machines of 750 k. w. capacity, manufactured by the General Electric Co. There are two motor generator sets, each comprising 250-volt d.c. motor, 720 rev. per min., driving a 500-k.w. 6000-volt a.c., 60-cycle, 3 phase alternating current generator. Each machine has its own direct-connected exciter unit. There is also a low pressure steam turbine and generator unit of 500 k.w. capacity, the generator end a 250-volt d.c. machine, operated in multiple with the engine-driven dynamos. This turbine is of the horizontal type, running at 1,500 revolutions per minute, with the dynamo mounted on the turbine shaft. Steam will be supplied directly from the main engine exhaust at a pressure

of 16 lbs. absolute, the turbine operator, under a vacuum of 27 in. In connection with the low pressure steam turbine there is installed a Worthington surface condenser, covering 4,000 sq. ft. of tube surface, together with the usual auxiliary equipment of dry vacuum air pump, hot and cold water pumps. The latter are motor-driven centrifugal pumps fitted with bronze runners and shafts.

A cooling tower is erected on the roof of the boiler house. This is of the four-fan type, with two fans on a shaft, each shaft driven by a Sprague motor. Above the fans the tower is encased in brick work. The complete equipment is designed to cool and circulate sufficient water to condense 22,500 lbs. of

steam will be installed a 100-gal. electric large pump. That portion of the power house below the sewers will be cared for by a floor operator.

In the engine room are also two Ingersoll-Rand air compressors. These are cross-compound, steam-driven, two-stage air compressors, each with a capacity of 500 cu. ft. The steam cylinders are 11 in. and 18 in. and the air cylinders 6 in. and 10 in., all 14-in. stroke. Each machine is equipped with inter-cooler and the system is provided with an after-cooler, through which all of the air will pass before being delivered to the transmission lines to insure its freedom from moisture.

At the station building there is an auxiliary boiler plant

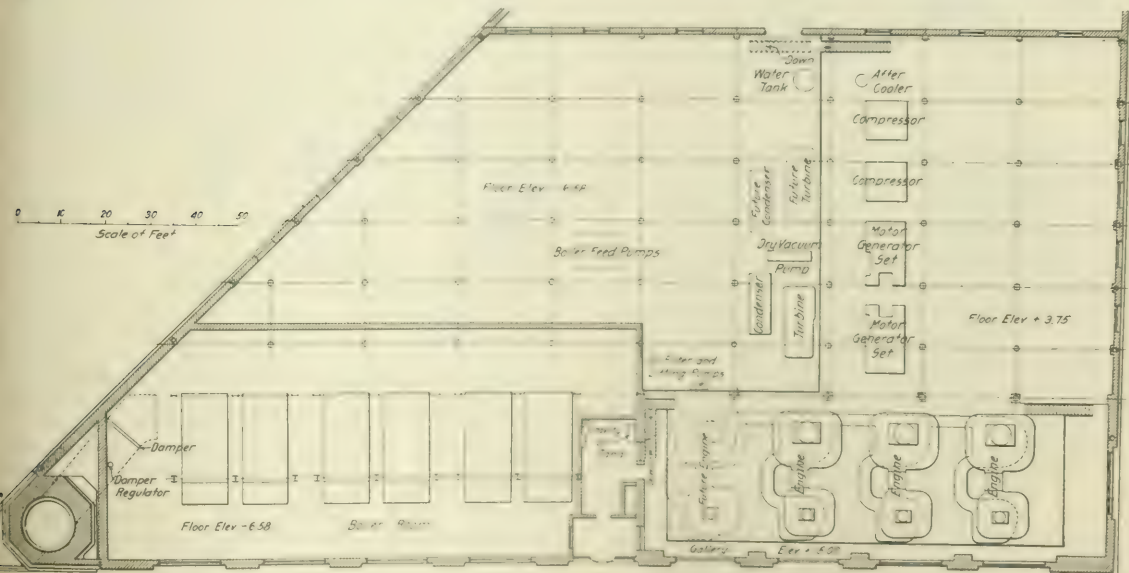


Track Level Plan (Continued).

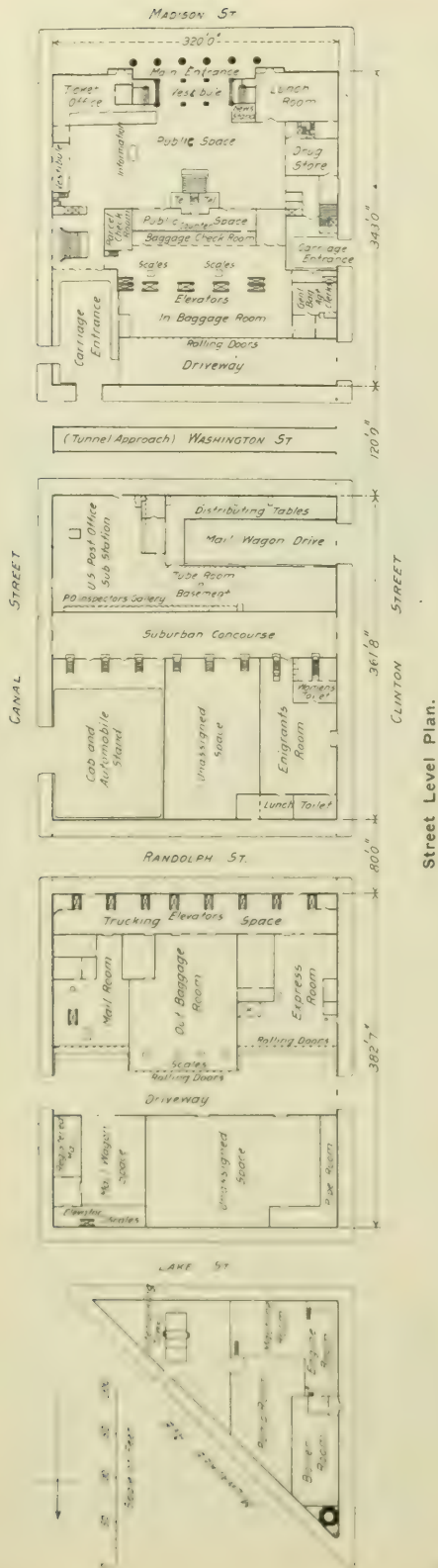
steam per minute and maintain at the turbine exhaust a vacuum of 27 in.

For boiler feed there is provided two Epping-Carpenter outside, center-packed plunger pumps, duplex and compound, with 8-in. and 12-in. by 7-in. by 12-in. cylinders. To care for the heating system provided for the power house and interlocking tower adjacent, there has been installed in duplicate 6-in. x 8-in. Marsh vacuum pumps, for removing all condensation and delivering it to the feed water heater. The feed water heater is of the Webster type, 3,000 h.p., with a capacity for heating 90,000 lbs. of water from 60 deg. Fahr. to 204 deg. Fahr. per hour. For draining the sub-basement below the boiler room

consisting of two B. & W. boilers of the same type as those at the power house, but containing only 1,500 sq. ft. of heating surface each. These boilers are set with twin-fire furnaces, as built by the Water Arch Furnace Co. There is also at the station building a machinery room, where there are various service pumps, a fire pump, water heater for domestic supply, garbage destructor for the refuse from the kitchen and restaurants, machinery for vacuum cleaning system of the main building, also air pumps and tanks, of the Johnson Service Co. temperature regulating system. This vacuum sweeping system will care for the entire terminal station building, while a second plant under the track structure will serve the emigrants'



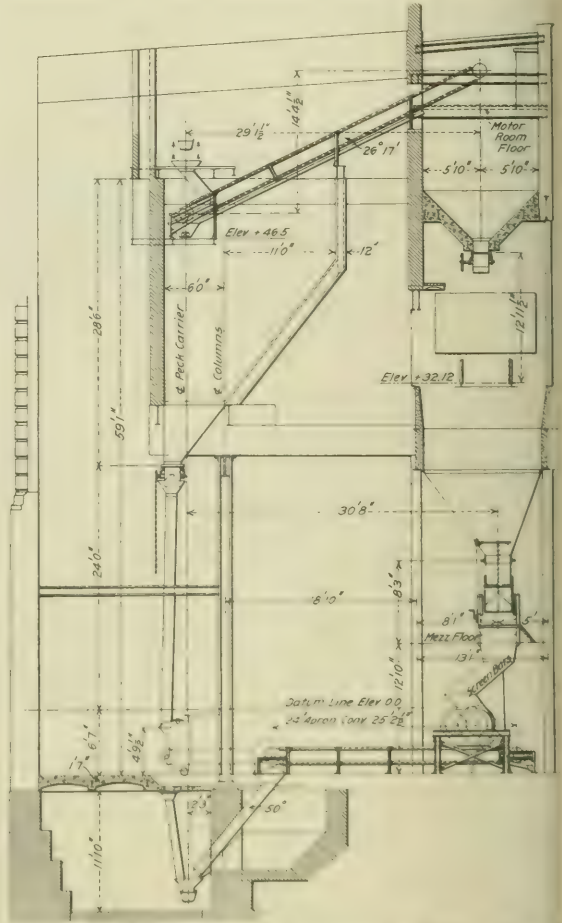
Power House: Chicago & North Western Station.



quarters, and the suburban concourse and the space devoted to the United States post office.

There is also installed at the main station building a Carbondale Machine Company's absorption system of refrigeration, with a capacity of 50 tons. This cools water for drinking purposes, the water being pumped through the building, also by a separate system to the power house, which is about 1,800 ft. north of the plant. The refrigerators and cooling boxes are of 6,000 cu. ft. capacity, for use in connection with the restaurant kitchens, which are also cared for by this refrigerating plant.

W. C. Armstrong, Terminal Engineer for the Chicago & North Western, has been in charge of the preparation of the plans and of all the construction work. The architects are



Coal and Ashes Handling Equipment in Boiler House.

Frost & Granger, of Chicago, and Pierce, Richardson & Neilor are the engineers for the power plant and equipment. The George A. Fuller Construction Company had the general contract for the building, exclusive of track structures and train shed. The steel work was fabricated by the American Bridge Company and erected by the Strobel Steel Construction Company. George W. Jackson, Inc., had the contract for foundations and concrete on the Terminal section. John J. O'Heron & Company had the contract for the west approach and the Bates & Rogers Construction Company the contract for the north approach, these involving several thousand feet of retaining walls of varying heights up to 26 ft. Gustavino arches are used in all ceilings in the main building and the interior finish was supplied by the American Marble Company.

General News Section.

The Chicago, Indianapolis & Eastern Ry. has increased the pay of trainmen and yardmen.

The Yazoo & Mississippi Valley has no trainmen to collect fares on its passenger trains.

In a derailment on the Trans-Caspian Railway, July 11, near Kizilawut, 19 persons were killed and 31 injured.

The Seaboard Air Line has made an increase of 1½ cents an hour in the pay of the men in its shops, who belong to the Federation of Trades.

A board of conciliation, which has been sitting at Toronto, Ont., has awarded a large increase in pay to the telegraphers of the Grand Trunk Pacific.

The locomotive engineers on 49 railways west of Chicago are formulating demands for increases in wages, which it is expected will be presented to the officers of the railways before August 1.

At Austin, Tex., it is said that Governor Campbell will recommend to the legislature at its special session in August that it authorize the sale of the Texas State Railroad, running between Rusk and Palestine, about 40 miles. The road has been operated at a loss ever since it was built.

On the line of the Delaware & Hudson, between Wilkesbarre and Carbondale, Pa., last week, disturbances perpetrated by the striking track laborers were so extensive and persistent that the company ordered the discontinuance of all night freight trains. Several freight trains had been derailed. Twenty-three freight-train crews were laid off.

Passenger train, No. 3, of the Missouri, Kansas & Texas, was stopped on the night of July 9 about 12 miles from St. Louis by three robbers, who intimidated the engineman and compelled him and the fireman to present their demands on the express messenger; but it appears that the robbers were frightened away before they had got anything of value.

According to the *Galveston News*, the Southern Pacific now employs "train auditors" on local freight trains. It seems that these men are not employed for the purpose of collecting fares of the passengers who ride on the local freights, but to keep close track of the package freight left at and taken from the way stations. It is said that much freight has been lost or stolen.

The Pennsylvania has laid off 400 shop men at Altoona and 26 freight crews on the middle division. The freight yard at Hollidaysburg and its shops have been closed, the falling off in freight being such that the whole of the business can be handled at the Altoona yards. The Philadelphia & Reading has reduced the time in its locomotive shops at Reading from 40 hours a week to 32 hours.

The Twentieth Century Limited express trains of the New York Central will soon all be composed entirely of steel cars; five complete trains of cars for this service being now under construction at the shops of the Pullman Company. In each of the new trains there will be a bath room with a shower bath attachment, and the smoking cars will be provided with exhaust fans.

President Taft has appointed as members of the Congressional Commission, which is to investigate the question of employers' liability and workmen's compensation, Messrs. W. C. Brown, president of the New York Central, and D. L. Cease, editor of the "Railroad Trainman." The other members of the commission are: Senators Hughes, of Colorado, and Warner, of Missouri; and Representatives Denby, of Michigan, and Brantley, of Georgia.

The Bureau of Statistics and Accounts of the Interstate Commerce Commission has issued a revised classification of expenditures for additions and betterments on steam railways, taking effect July 1. The original issue of this classification was issued June 21, 1909, and the present pamphlet, called "The First Revised Issue," has been prepared to meet such criticisms as have been presented and favorably acted on. The most prominent change is, a clause, giving railways the option of charging bet-

terments to operating expenses, where the total amount is less than \$500 for any one improvement. A new account has been added, A22, "Roadway Machinery and Tools," and the last primary account, No. A35, covering miscellaneous items, has been amplified. Under the head of "Equipment," (A33), it is provided that when equipment is practically rebuilt the reserve for accrued depreciation shall be adjusted and the basis for the depreciation on such equipment amended to meet the changed conditions. In making an estimate of a proper rate to be applied for depreciation on equipment, it will be necessary to consider only its probable life in service as prolonged by usual repairs.

The Southern Pacific lines east of El Paso, following protracted negotiations under the guidance of the government mediators, have made a small increase in the pay of telegraphers. The operators asked for an increase of about 7½ per cent, together with some modification of the hours of work; but, according to the newspapers, the increase granted is very small, while the hours of work, so far as Texas is concerned, will be regulated by the state law.

Riding in the London Tubes.

Oh, what an improvement on that awful steam underground of 10 years or less ago! Where the smoke was so choking that you lost consciousness between stations and where it was too black to read the names of the stations. The present system is centuries ahead of the other, and if you know just where you want to change and you don't mind walking half the way, there isn't a better or quicker way of getting about London except a taxi. The crowds at rush hours behave differently from New York crowds. The train comes quickly in, the guard steps out and in a courteous tone asks you to hurry, but there is little inclination to shove on the part of the passengers. They make way for each other while the precious moments pass. At last they are all on board and nothing remains but the exercise of the guard. Probably the motormen run the train slowly so that the guard may come to no injury in his attempt to board the train; but after he is on board there is just as much speed as on a subway express. You have the privilege in some cars on most trains of smoking among the ladies; and there are maps of the system in the car so that you may have some idea of the number of roads there are and how easy it will be for you to make a mistake and run miles out of your course. You cannot leave the underground until you have produced the right ticket; not unless you happen to have a penny about you.—*The Sun*, New York.

Rock Island Machinists' Strike.

About half the machinists on the Chicago, Rock Island & Pacific struck on Monday, July 11. The road had shut down its shops for a short time early in June. At that time the business agent representing the employees gave instructions that no machinists do any work in the shops while they were closed. The management of the road knew nothing of these instructions. A short time afterward, five men in the shops at Chickasha, Okla., were ordered to do certain work, and they refused. The management gave orders that when the shops re-opened, on July 5, these men should not be employed. On July 6 all the machinists at the Chickasha shops walked out, and the business agent notified the railway that if the five men in question were not re-employed he would call out all the 700 machinists on the road. W. S. Tinsman, general manager, was away from his office at that time. W. A. Nettleton, general superintendent of motive power, asked that action be postponed until he could confer with Mr. Tinsman. The business agent refused, and ordered the strike Monday morning.

Curiously enough, most of the men in the shops in the Southwest stayed at work, while those at Silvis, and other towns in Illinois, went out. This is probably due to the fact that the business agent lives at Davenport, Iowa. The strike has caused

no serious trouble, as the road's equipment is in good shape and it is receiving new engines. The men at Chickasha, where the trouble originated, went back to work on Wednesday, which makes it probable that the strike will soon fall through.

Aeroplane Records.

At Rheims, France, July 7, Mr. Olieslager flew in the air continuously for 2 hours, 39 minutes, 39 seconds, traversing in that time 158.35 miles. This is the longest time that a heavier-than-air flying machine has yet remained aloft. On July 10, Olieslager flew 244.44 miles in 5 hours, 3 minutes, 5 seconds; nothing said in the despatches about stops. On the same day, Leon Morane flew five kilometers (3.1 miles) in 2 minutes, 53 seconds, and 10 kilometers in 5 minutes, 42 seconds. Morane also took the prize for speed, flying 20 kilometers (12.44 miles) in 12 minutes, 45 seconds. In a later flight the same day, he made five kilometers in 2 minutes, 48 seconds; equal to 68.42 miles an hour. All of these records were made with monoplanes.

A Correction.

An officer of the Delaware & Hudson Company writes to say that in the map of Pennsylvania, published in our issue of June 24, page 1794, that part of the Delaware & Hudson line between Carbondale and Scranton, 16 miles, should be shown as a four-track road. On the map it was shown as two-track.

Opening of Long Island Railroad to Manhattan Island.

The Long Island Railroad announces that its trains will be run regularly through the East river tunnels to the new station at Seventh avenue, Manhattan, beginning on Thursday, September 8.

American Society for Testing Materials.

At the thirteenth annual meeting of the society held at Atlantic City, N. J., June 28 to July 2, a number of amendments to the by-laws, proposed by the executive committee, were referred to letter ballot of the society.

Article 1, referring to membership and dues, was altered to the following effect: The membership of the society shall consist of members and junior members. A member shall be a person not less than 30 years of age, corporation, firm, technical society, teaching faculty or library, proposed by two members and approved by the executive committee. A junior member shall be a person less than 30 years of age, proposed by two members and approved by the executive committee. A junior member shall have the same rights and privileges as a member, and his status shall be changed to that of member at the beginning of the fiscal year next succeeding the date on which he attains the age of 30 years.

Article 2, regarding the executive committee, was changed to include these officers and also the last past president and seven members, four being elected by letter ballot at each annual meeting in the odd years, and three at each annual meeting of the even years. Four members of the executive committee shall constitute a quorum.

The total membership on June 15, 1910, was 1,280. Sixty-one additional applications for membership have been approved since that date, making a total of 1,341, as against 1,160 as reported at the previous annual meeting.

International Railway Congress.

The International Railway Congress was opened at Berne, Switzerland, last week, according to the program. The number of delegates and visitors was larger than had been expected, and all of the sight-seeing excursions were crowded. At a dinner of the English speaking delegates, on the evening of July 11, Interstate Commerce Commissioner F. K. Lane made one of the principal speeches. Mr. Lane called attention to the fact that American laws, regulating railway charges, were not nearly so radical as those of Great Britain. He declared that all candid railway men acknowledge that the law which has just been passed by the United States Congress will tend to the stability of securities.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.
AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn.
AMERICAN ASSOC. OF LOCAL FREIGHT AGENTS' ASS'N.—G. W. Dennison, Penna. Co., Toledo, Ohio.
AMERICAN ASS'N. OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew Bldg., Cincinnati, Ohio.
AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York.
AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 18; Fort Worth, Tex.
AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASS'N.—E. H. Fritch, Monadnock Bldg., Chicago.
AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis.
AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago.
AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.
AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia.
AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and August; New York.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., N. Y.; 2d Tues.; New York.
AMERICAN STREET AND INTERURBAN RAILWAY ASS'N.—H. C. Donecker, 39 W. 39th St., New York; Oct. 10-14; Atlantic City.
ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago.
ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A., T. & S. F., Topeka, Kan.
ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston.
ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Pl., New York.
BUFFALO TRANSPORTATION CLUB.—J. N. Sells, Buffalo.
CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; Thursdays; Montreal.
CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month; Chicago.
CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.
ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton Building, Pittsburgh; 1st and 3d Tuesdays; Pittsburgh.
FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich. Fred. & Pot. R.R., Richmond, Va.
GENERAL SUPERINTENDENTS' ASS'N. OF CHICAGO.—H. D. Judson, 209 Adams St., Chicago; Wednesday preceding 3d Thurs.; Chicago.
INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.
INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & E. Ry., Two Harbors, Minn.
INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASS'N.—A. L. Woodworth, Lima, Ohio; Aug. 16-18; Detroit, Mich.
INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11, Brussels; July 4-16; Berne, Switzerland.
IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 3d Friday in month, except July and August; Des Moines.
MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago.
NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.
NEW YORK RAILROAD CLUB.—D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
NORTHERN RAILWAY CLUB.—C. L. Kennedy, C., M. & St. P., Duluth; 4th Saturday; Duluth, Minn.
OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Bldg.; 3d Wed. RAILWAY CLUB OF KANSAS CITY.—C. Manning, 1008 Walnut St., Kansas City; Third Friday in month; Kansas City.
RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; annual, Oct. 11; Richmond, Va.
RAILWAY SLEEPERS ASS'N.—J. P. Murphy, Box C., Collinwood, O.
RICHMOND RAILROAD CLUB.—F. O. Robinson; 2d Monday; Richmond.
ROADMASTERS AND MAINTENANCE OF WAY ASS'N.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; annual, Sept. 18-16; Chicago.
ST. LOUIS RAILWAY CLUB.—B. W. Frothingham, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
SOCIETY OF RY. FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago, Oct. 25 and 26. Hotel Chamberlayne, Old Point Comfort, Va.
SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—F. W. Sandwich, A & W. R. Ry., Montgomery, Ala.; annual, Oct. 20; Atlanta.
SOUTHERN & SOUTHWESTERN R.R. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., Mar., July, Sept. and Nov.; Atlanta.
TRAFFIC CLUB OF NEW YORK.—C. A. Swape, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.
TRAIN DISPATCHERS' ASS'N. OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago.
TRANSPORTATION CLUB OF TOLEDO.—L. G. Macomber, Woolson Spice Co., Toledo.
TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R. R., East Buffalo, annual meeting, Aug. 10-19, Niagara Falls, Ont.
WESTERN CANADA RAILWAY CLUB.—W. H. Rosecrance, P. O. Box 1707, Winnipeg; 2d Monday, except June, July and August; Winnipeg.
WESTERN SOCIETY OF ENGINEERS.—L. H. Warner, Monadnock Bldg., Chicago; Wednesdays, except July and August; Chicago.

Traffic News.

The railways of the southern states are preparing new freight tariffs, showing increases in rates, which will be ready for publication, it is said, in about six weeks.

The British steamer *Inverkip* has been chartered to bring to California a cargo of coal from Chinwangtao, China. The mines at this place have just been opened to foreign trade.

The shipments of anthracite coal in the month of June amounted to 5,398,123 tons, equal to about 10 per cent. more than the shipments in June, 1909. All of the roads show increases except the Erie, on which there was a decrease of 44 per cent.

A reduction of \$25 a car has been made in the freight rate on fruit from towns in Georgia to interior points of New York and Pennsylvania. It is said that this rate was made after an informal conference and agreement between the traffic officers of the roads interested and the fruit shippers.

During the last five days of June, the number of new tariffs filed with the Interstate Commerce Commission was over 11,000. Some of these tariffs named 500 carriers as participants in the rates, from which it would appear that if the commission decides to suspend the advanced rates proposed by these tariffs, it will have a considerable clerical task on hand.

The St. Louis lines, at the request of Commissioner Coyle, of the Traffic Bureau of the Business Men's League of St. Louis, have appointed a committee to confer with the board of managers of the Traffic Bureau from time to time on eastbound rate matters. The committee appointed by the roads is composed of W. C. Maxwell (Wabash), C. L. Hilleary (New York Central Lines) and G. W. Davis (Vandalia).

The state's attorney of Montgomery county, Illinois, has brought suit at Champaign against the Illinois Traction System, an electric line, for alleged violation of the state 2-cent fare law. He contends that this road in advancing its fare from Mt. Olive to Litchfield, eight miles, to 80 cents has fixed a rate that is illegal. The rate in question is 4 cents more than that charged by the Illinois Central and the Wabash.

San Diego, Cal., gets its supply of lumber largely from Puget Sound forests in the shape of giant rafts, towed by tugs. Half a dozen of these will traverse the 1,500 miles of ocean during the summer. On June 21st the first raft of the season, containing over 7,000,000 ft. of logs, bound with 31 tons of chain, arrived in San Diego bay in tow of the tug *Hercules*. The raft was cigar shaped and measured over 500 ft. in length. It drew 20 ft. of water.

W. M. Hopkins, transportation manager of the Chicago board of trade, has issued a circular warning members of the board against manipulation of the transit privilege resulting in violations of the integrity of the published rates. Members of the Interstate Commerce Commission have indicated to the board of trade that it is the commission's intention to stop manipulation of the rates on grain through abuse of the transit privilege, and that if this end cannot be attained otherwise the commission will abolish the transit privilege.

The Lehigh Valley announces that it will soon restore passenger rates in the state of Pennsylvania to the basis which was in effect prior to October 1, 1907, when rates within that state were reduced because of the passage of the 2-cent law. This law was decided unconstitutional, so far as the Pennsylvania Railroad is concerned, many months since, and now a suit of the Philadelphia & Reading has also been decided by the supreme court in favor of the road. Assuming that these two suits settle the main questions concerning the constitutionality of the law, the Lehigh Valley proposes to raise its fares at once. The supreme court, endorsing the lower court, bases its decision on the constitutional provision that the legislature can alter the charter of a railway only in such manner that no injustice shall be done to the incorporators.

L. W. Noyes, president of the Illinois Manufacturers' Association, has telegraphed to President Taft intimating that the agreement as to advances in freight rates made by the Presi-

dent with the presidents of certain railways is not being carried out in the spirit in which it was made. Mr. Noyes directs attention to reports from Washington that the burden of proving that advances are unreasonable is to be put on the shippers and says: "In speaking for the shippers we assure you we wish the carriers treated fairly, but we believe that the advances they are asking are unreasonable and we think that the plan suggested by you that they first show the equity of what they are asking before they put the rates into effect is nothing more than right. Fallacious arguments as to probable financial disaster unless rates are advanced are being put forth to scare the public. Please remember that the thousands and thousands of shippers interested in this matter are scattered, are poorly organized and cannot concentrate their effort quickly and must depend upon you for protection."

I. C. C. Hearing on New York Commutation Rates.

The first hearing under the revised interstate commerce act was held in Washington on Tuesday of this week, when the New Jersey commuters submitted their protest against the raising of season-ticket rates from stations in that state into New York by the Pennsylvania, the Delaware, Lackawanna & Western, the Central of New Jersey, the Erie, the New York Central (West Shore) and the Lehigh Valley. The roads were represented by a formidable array of counsel and traffic officers. The increased rates are advertised to go into effect July 20, and the commuters ask the commission to suspend them for 120 days while a full investigation into their reasonableness is being made. At the close of the hearing Chairman Knapp announced that a decision would be made in three or four days.

The railways denied the jurisdiction of the commission to suspend the proposed increases, on the ground that the new rates were filed before the enactment of the new law; and also maintained that the proposed increases are warranted because expenses have increased greatly. They discussed at length the provision of the new law authorizing the commission to suspend proposed increases, contending that this power should not be used except in extraordinary cases, when it appeared that irreparable injury would be done unless suspensions were ordered. The power to suspend is analogous to that exercised by courts of equity in issuing temporary injunctions. All the roads maintained that they were losing money on suburban passenger traffic from New Jersey points to New York.

George F. Brownell, of the Erie, said that his road had spent \$8,000,000 for improvements, including the open cut through Bergen Hill, which, he said, would greatly improve the passenger service. He also said that the increases in wages in 1910 will amount to \$1,560,000 a year. The commutation rates are less than one-half the regular rates. The actual cost of hauling a passenger is 1.5 cents a mile. The commutation business does not pay its fair share of conducting the company's business. The commutation rates are unduly low as compared with commutation rates in other parts of the country.

W. H. Truesdale, president of the Delaware, Lackawanna & Western, declared that for the last 10 years his company had operated the Morris & Essex division at a loss of about \$1,000,000 a year, while the Lackawanna had spent \$15,000,000 on that division in 10 years. The per capita cost of handling commutation traffic had materially increased since the rates were established years ago.

George A. Cullen, general passenger agent of the Lackawanna, said that in most instances the proposed rates were lower than commutation rates on other lines for similar distances. He figured that the general increase in commutation rates by his road would average 15 per cent. He asserted that it cost 47 per cent. more to-day to seat a passenger in a coach than it did 20 years ago.

J. B. Thayer, third vice-president of the Pennsylvania, gave testimony similar to the foregoing.

W. C. Hope, general passenger agent of the Central of New Jersey, testified that the commutation rates averaged his company 5.5 mills of a mile. He declared the service was not remunerative.

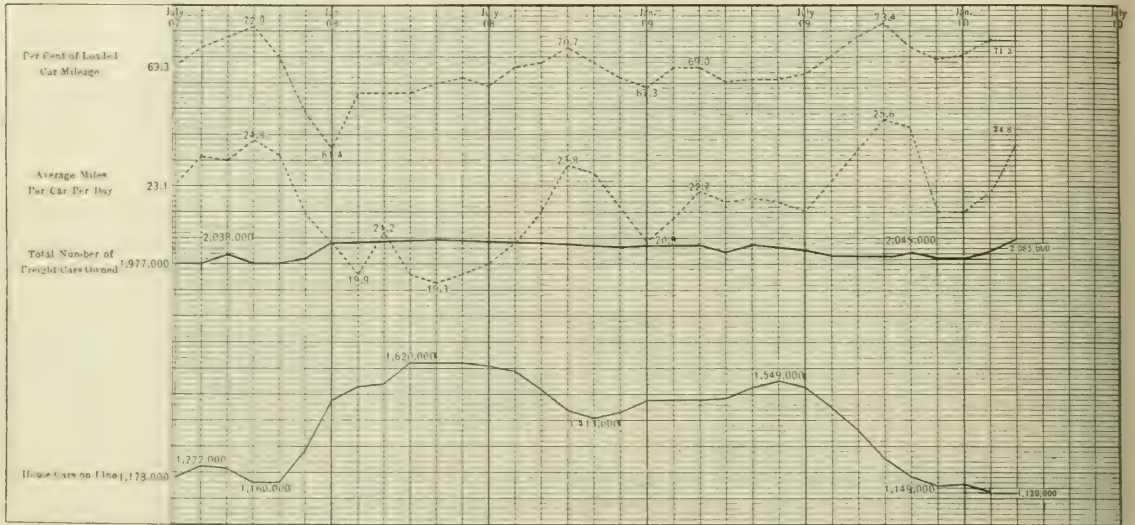
In presenting elaborate tables on the commutation traffic H. A. Taylor, of the Erie Railroad, said that the Erie's taxes in New Jersey had been increased 151 per cent. in the last 10 years.

Attorney-General Wilson, of New Jersey, urged the commission to suspend the rates in order that the complaining com-

muters might have an opportunity to study the exhibits made by the railways and reply to them. He pointed out that, in his opinion, the law placed the burden of proof on the railways. They must show that conditions justified the increase. They had put in a mass of figures. Whether these were correct and justified

statistical bulletin No. 76, covering car balance and performance for March, 1910, says:

"Conditions during March were quite favorable to a good car performance and the results attained are quite clearly reflected in the averages shown in this bulletin. The miles per car per



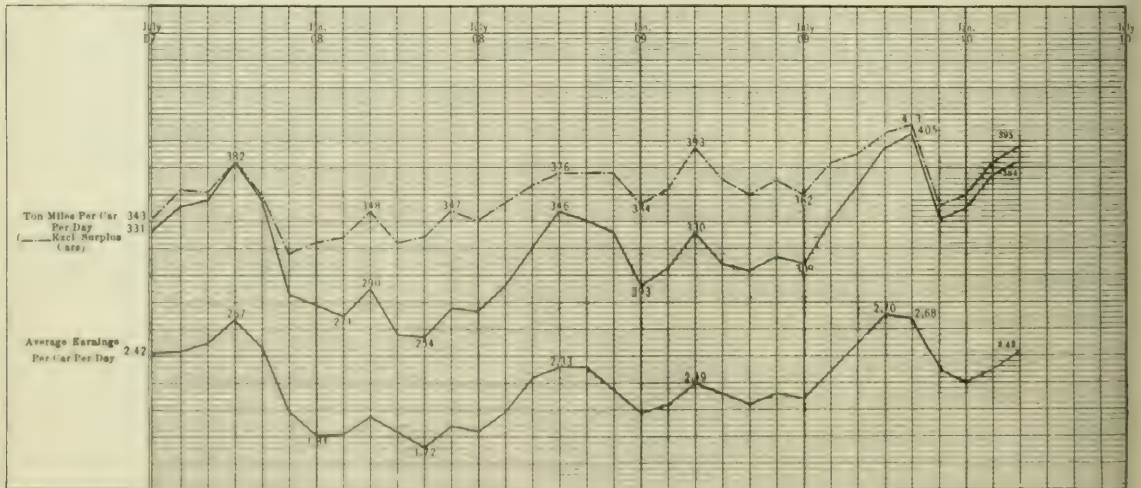
Car Balance and Performance.

the increases could only be determined after the data had been examined. "These increases," he said, "are a menace to the prosperity of many communities. It is an unwarranted hardship on tens of thousands of people who have built and are building homes on the strength of the existing rates."

"The opportunity to examine the railways' claims," suggested Chairman Knapp, "would not be lost through the refusal of this

day averaged 24.8, within .8 of the high figure reached in October, 1909. The ton-miles per car per day reached 384 for all cars, and 395 excluding surplus cars, these figures also being close to the October, 1909, average. The daily earnings per car averaged \$2.42

Notwithstanding the continuation of an outward interchange which resulted in the reduction of the number of cars at home



Car Loading and Earnings.

commission to suspend the rates. The commission subsequently could entertain complaints of these proposed rates."

Freight Car Balance and Performance.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting

to 51 per cent, the loaded mileage shows a slight recession, averaging 71.3 per cent, as against 71.4 per cent in February. The tons per loaded car decreased to 21.6, or 1.1 tons less than the high average for February. The cars in shop were at 5.29 per cent of the total a slight reduction made February.

The accompanying table gives car balance and performance for the period covered by the report. The charts show graphi-

CAR BALANCES AND PERFORMANCE IN MARCH, 1910									
	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Pa., W. Va., Md., S. C., Ga., Fla.	Ky., Tenn., Mo., Ark., La., Tex., Okla., Colo., Neb., Dakotas.	Ill., Wis., Minn.	Mont., Wyo., Idaho, Nev., Ariz., Utah, Cal., Nev., Mex.	Oregon, Wash., Pac. Ariz., Cal., Nev., Tex., Okla., Colo., Neb., Dakotas.	Idaho, Nev., Ariz., Utah, Cal., Nev., Tex., Okla., Colo., Neb., Dakotas.	Oregon, Wash., Pac. Ariz., Cal., Nev., Tex., Okla., Colo., Neb., Dakotas.	Total
Revenue freight cars owned	76,677	665,900	220,206	169,450	174,256	385,161	16,805	135,239	2,844,400
Average number of system cars on line	37,038	384,410	109,897	91,753	82,934	245,102	5,714	73,698	1,120,116
Railway-owned cars: Average freight on line	41,867	284,789	108,877	65,000	72,306	224,024	15,023	62,589	874,276
Total cars on line	79,805	610,205	213,774	156,753	155,296	473,033	20,737	136,238	2,001,472
Excess	3,128					37,872	3,932	899	88,800
Per cent. of cars on line to total owned:									
Home	49	50	50	54	48	65	34	55	54
Foreign	55	43	47	39	41	35	89	43	46
All railways	104	97	99	99	89	123	123	101	100
Private cars on line	3,251	39,363	10,334	4,164	6,856	17,183	1,370	7,444	69,000
Total, all cars on line	83,056	649,568	224,108	160,917	162,086	490,216	22,107	143,682	2,070,472
Per cent. of cars in shop	4.15	4.50	5.50	5.66	7.02	4.08	4.32	5.37	4.60
No. of freight engines owned	1,234	9,894	2,855	2,619	2,619	6,673	419	6,209	40,000
Average cars on line per freight engine owned	67	67	67	63	63	81	49	75	47
Total freight car mileage	47,137,948	532,798,096	165,677,610	126,587,430	128,960,298	315,125,430	21,092,717	101,217,840	1,000,000,000
Average miles per car per day	18.1	25.1	23.9	25.4	25.7	36.2	30.2	30.9	28.0
Per cent. freight mileage	4.8	6.8	7.1	6.7	7.3	10.3	7.3	10.3	7.3
Total freight mileage	51,955,896	568,665,616	175,755,220	132,253,830	136,577,918	331,250,840	28,185,434	112,228,150	1,000,000,000
Average miles, including Company freight	11.1	16.3	16.1	16.3	15.4	14.2	16.9	14.7	14.2
Per cent. freight	14.8	28.3	29.3	24.6	19.8	19.8	24.8	25.5	14.2
Per cent. freight	204	127	127	119	106	206	162	160	140
Per cent. freight	\$9,089.78	\$10,420.100	\$11,000.314	\$12,763.12	\$12,622.580	\$31,007.392	\$3,212.020	\$10,107.1	\$10,000.000
Gross freight earnings	\$7,32	\$2,40	\$2.13	\$2.43	\$2.40	\$2.60	\$6.17	\$2.42	\$2.40
Average daily earnings: Per car owned	3.12	3.58	3.20	3.63	3.62	3.34	3.00	3.41	3.40
Per freight car on line	2.43	2.43	2.10	2.56	2.41	2.64	2.66	2.58	2.40
All cars on line									

the performance and earnings of freight cars in 1907, 1908, 1909 and 1910.

Summary of July Crop Report.

The general average condition of crop growth in the United States on July 1, 1910, was about 5.5 per cent. lower than on July 1, 1909; 3.8 per cent. lower than July 1, 1908, and 3.4 per cent. lower than the 10-year average condition on July 1. In the New England states conditions are 3.5 per cent. better than a year ago and 4.1 per cent. above the average. In the Southern States conditions are about 3.5 per cent. better than on July 1 a year ago, and 2.4 above the 10-year average; in the North Central states, east of the Mississippi river, conditions are 8.7 per cent. below a year ago and 4 per cent. below the average; in the North Central states west of the Mississippi river, 15 per cent. lower than a year ago and 12.2 per cent. below the average; in the far Western states, 3.6 per cent. below a year ago and 4.3 per cent. below the average.

The following tabulation is a summary for the United States of crop conditions on July 1, with comparisons, as estimated by the United States department of agriculture.

Crops.	Condition July 1—			
	1910.	1909.	1908.	10-year av. 1910.
Corn	85.4	89.3	82.8	85.1
Winter wheat	81.5	82.4	80.6	81.3
Spring wheat	61.6	92.7	89.4	87.1
All wheat	73.5	86.5	83.9	84.0
Oats	82.2	88.8	85.7	86.6
Barley	73.7	90.2	86.2	85.1
Rye	87.5	91.4	91.2	90.4
Flaxseed	65.0	95.1	92.5	91.1
Rice	86.3	90.7	92.9	89.4
Tobacco	85.3	89.8	86.6	86.3
Hay (all)	80.2	87.8	92.6	86.1
" timothy	79.2	87.1	90.2	85.4
" clover	82.8	83.8	95.5	86.6
" alfalfa	84.5	91.4	86.1	89.4
" millet	75.2	93.0	87.8	89.0
Kafir corn	82.7	89.4	85.3	87.4
Pastures	81.6	93.1	94.6	91.9
Potatoes	86.3	93.0	89.6	90.9
Sweet potatoes	87.4	89.7	89.8	89.5
Apples	49.6	54.6	57.6	61.9
Peaches	62.1	50.0	69.7	61.4
Pears	61.0	57.5	69.7	63.2
Grapes	80.2	90.2	87.9	88.5
Blackberries	77.0	88.8	90.5	90.0
Raspberries	76.2	89.5	88.4	88.6
Watermelons	78.5	80.6	81.4	81.4
Cantaloupes	77.8	82.4	82.7	80.3
Oranges	86.6	86.1	91.4	88.6
Lemons	85.6	88.0	92.9	91.4
Tomatoes	86.1	91.6	89.4	88.0
Cabbages	88.6	90.7	88.3	89.4
Onions	89.8	91.7	90.3	90.6
Beans (dry)	88.4	89.1	90.0	89.6
Beans (lima)	87.7	89.1	90.6	86.3
Peas	87.1	86.7	88.2	86.9
Broom corn	83.9	86.8	79.8	84.7
Hemp	86.7	94.0	80.4	87.1
Hops	89.6	79.2	83.8	86.6
Sorghum	85.3	87.0	87.7	88.6
Sugar cane	87.0	92.5	91.7	90.0
Sugar beets	89.3	90.4	86.9	88.0
Cotton	80.7	74.6	81.2	79.5

* Four year averages.

The acreage of the cultivated crops, so far estimated by the Bureau of Statistics, is about 4.2 per cent. greater than last year.

The preliminary estimates of acreage in 1910 and the final estimates for 1909, for important crops, are as follows:

Crop.	1910.		1909.	
	114,083,000	108,771,000	114,083,000	108,771,000
Winter wheat	29,044,000	28,330,000	29,044,000	28,330,000
Spring wheat	19,742,000	18,393,000	19,742,000	18,393,000
Oats	34,380,000	33,204,000	34,380,000	33,204,000
Barley	7,057,000	7,011,000	7,057,000	7,011,000
Potatoes	3,521,000	3,525,000	3,521,000	3,525,000
Flax	3,103,000	2,742,000	3,103,000	2,742,000
Rice	1,170,000	720,000	1,170,000	720,000
Tobacco	1,216,000	1,180,000	1,216,000	1,180,000
Cotton (planted)	33,196,000	32,292,000	33,196,000	32,292,000

Reductions in Sleeping Car Rates Postponed.

The United States circuit court at Chicago issued an order on July 8 postponing the date on which the Interstate Commerce Commission's orders for reductions in sleeping car rates in the West are to go into effect, until the commission can rehear the case. The Chicago, Milwaukee & St. Paul, the Atchison, Topeka & Santa Fe, the Great Northern and the Northern Pacific were required to give bonds of \$50,000 each and the Pullman Company to give a bond of \$100,000 to refund to travelers after July 12 the difference between the present rates for berths and those finally fixed, in case a reduction is finally

upheld by the courts. Within 20 days after the expiration of each month the roads must also turn over to the clerk of the circuit court the difference between their earnings on the present rates and what their earnings would be on the rates prescribed by the commission. The roads must also give each passenger a coupon stating the amount which he can recover by applying to the clerk of the United States circuit court in case the commission's order finally is upheld.

The court's order was issued after it had heard arguments by counsel for the roads mentioned, and the Pullman Company on a rehearing of a petition previously filed with the court and rejected by it, for an injunction restraining the commission from enforcing its order reducing the rates. Gardiner Lathrop, general solicitor of the Santa Fe, presented figures to show that when the cost of operation is apportioned between all cars his company loses an average of \$85,000 annually on its California Limited. The Santa Fe has an arrangement with the Pullman Company by which they divide the earnings and expenses of operating sleeping cars. The St. Paul operates its own sleeping cars, and William Ellis, its commerce counsel, filed a statement indicating that it loses \$500,000 a year on its sleeping car business. G. S. Fernald, of the Pullman Company, told the court that application of the rates prescribed by the commission would reduce the profit on its business between the St. Paul and Fargo, S. Dak., to 1.77 per cent. on the investment. The opinion of the court was written by Judge Seaman. The reasons for the court's decision are summarized as follows:

"Many interstate rates would be lowered and become permanent rates by operation of state laws provided the commission's interstate rates were put into force.

"A new element was introduced into the case by evidence tending to show that it cost the railways much more to haul a Pullman sleeper than it did to haul a day coach, and therefore the new rates might be confiscatory and effect a discrimination in favor of passengers in day coaches.

"The commission sought wrongfully to punish the railways for their failure to appear before the commission and defend the attack made upon Pullman berth rates, but the punishment was too drastic inasmuch as the operation of the new rates eventually might prove to be confiscatory.

"The commission intimated in its decision that it had taken judicial notice of facts not introduced nor appearing on the records of the case and in so doing substantially had denied the defendants a 'full hearing' provided for by the law.

"No tenable view was presented to show that a trial of the new rates for the period prescribed by the commission would serve as a reliable test of the assumed ultimate benefits or losses thereunder."

Judge Grosscup gave an oral opinion, supplementing the written opinion of Judge Seaman. Both judges criticized both the commission and the railways. The railways were criticized for not having introduced their evidence at the original hearing before the commission. The commission was criticized on the ground that although it evidently thought the new evidence that the roads proposed to introduce essential to a proper adjudication of the case, it refused, as a vindication of its authority and a punishment to the railways for their indifference, to stay the rates prescribed pending a rehearing. Counsel for the railways explained that they had not thought it necessary to introduce all their evidence at the hearing before the commission because they did not believe that those seeking a reduction of sleeping car rates had made a case.

INTERSTATE COMMERCE COMMISSION.

Rates on Arizona Lumber Reduced.

Sagmore & Manistee Lumber Co. et al. v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Clements.

Present rates on lumber in carloads from Williams, Ariz., Flagstaff and Cliffs to Phoenix are unreasonable to the extent that they exceed 18 cents per 100 lbs. Present joint through rates on lumber from Williams, Flagstaff and Cliffs to points upon the Phoenix & Eastern are also unreasonable to the extent that they exceed the rates named in the report.

The complainants say that the defendants are guilty of undue discrimination in their lumber rates to Phoenix and points upon the Phoenix & Eastern because the rates from San Pedro are in many instances lower than those from Williams; but the

same railway does not transport lumber from both Williams and San Pedro. It has already been decided that rates from Williams to points on this line are unreasonable, and the commission cannot assume that the Southern Pacific will so reduce its rates from San Pedro as to willfully defeat what has been found just.

The common lumber produced at Williams must be sold in southern Arizona if complainants' lumbering operations are to be successfully continued, for it will not bear the cost of transportation by rail to distant markets, and the proportion of common lumber to the higher grades is so great that the manufacture cannot be successfully conducted unless the poorer grades can be disposed of in some market at a fair price.

Through rates for the transportation of lumber and timber from Williams, Flagstaff and Cliffs to certain points in Arizona over various of defendant lines established and joint through rates prescribed for the future. (19 I. C. C., 119.)

Running of Law of Limitations.

Homier P. Fisk & Sons v. Boston & Maine. Opinion by Commissioner Clements.

While an informal letter is sufficient to stop the statute of limitations on reparation claims, yet such letter must contain all the elements of a claim. The letter relied on herein is not such a definite and independent claim as to defeat the plea of limitation. A carrier may demand its legal charges before delivering freight, and demurrage accruing during a controversy as to such payment cannot be refunded on that ground alone, but it must be shown that the charges are unreasonable or unjustly discriminatory.

Disimilarity of conditions affecting the transportation of coal existing at Springfield, Mass., but not present at Holyoke, Mass., under the decisions of the United States supreme court negatives the presumption of unreasonableness of rates as to Holyoke shipments.

In the absence of satisfactory evidence the rate charged complainants on coal from the Lackawanna road not found unreasonable.

Refund of straight overcharge on certain shipments of coal ordered to be made. (19 I. C. C., 299.)

Method of Constructing Rates in the South Attacked.

Corporation Commission of the State of North Carolina et al. v. Norfolk & Western. Opinion by Commissioner Clements.

Because of conditions which exist at the Virginia cities and do not exist at Winston-Salem and Durham, N. C., complainant's charge of unjust discrimination is not sustained. But because defendants have constructed a system of rates on a zone or blanket system is not sufficient to justify the collection of unreasonable charges to any point. Every city is entitled to the advantage of its location and may not lawfully be subjected to high freight charges merely because railways, for reasons of convenience or otherwise, include it in a number of other points in surrounding territory, which latter points are not similarly situated.

It does not follow as a necessary consequence that the reduction of rates to Winston-Salem and Durham to a reasonable basis would necessarily entail a reduction of rates to other points in North Carolina. It might be true that certain reductions would necessarily be made, but it would be to a few points only and to a very limited extent. While it is true that transportation conditions are to some extent different on the lines extending south from Roanoke and Lynchburg than obtain on the main line from Roanoke to Norfolk, yet the difference by no means warrants rates to Winston-Salem and Durham on through traffic that are so much higher than are maintained to main-line points.

Present class rates of the Norfolk & Western on shipments from Roanoke and Lynchburg to Winston-Salem and Durham, respectively, are found unjust to the extent that they exceed the rates prescribed in the report. Present class rates of the Norfolk & Western on shipments from Cincinnati, Ohio, to Winston-Salem and Durham, respectively, are also found unreasonable to the extent that they exceed the rates prescribed in the report.

For the present no order will be made as to the traffic moving from the other western points of origin north of the Ohio named herein. (19 I. C. C., 303.)

Indirect Case of Through Rate Being Higher Than Combination of Locals.

Lull Carriage Co. v. Chicago, Kalamazoo & Saginaw Railway et al. Opinion by Commissioner Clements.

The mere fact that a minimum applicable to parts of a combination of rates may be higher or lower than the minimum applicable to the joint through rate does not overcome the presumption of unreasonableness in a joint rate and minimum in excess of the sum of the locals and resulting from the respective minima applicable thereto. Were the commission to hold otherwise railways, by simply making differing minima on local and through shipments, could carry all through traffic via gateways they might select on higher charges than would result from combinations of locals through the same gateways. Under the circumstances here shown to exist complainant was subjected to an unreasonable charge on its shipment of wooden buggy bodies in the white from Moline, Ill., to Kalamazoo, Mich., and is entitled to reparation. Complainant's shipment of cutters from Kalamazoo, Mich., via Chicago, to Fond du Lac, Wis., does not present a combination of locals lower than the through rate on which the presumption obtains that the through rate was unreasonable, and reparation as to this feature denied.

STATE COMMISSIONS.

The Washington Railway Commission has ordered general reductions in the switching rates of the Northern Pacific at Tacoma. The reductions amount to from 31 to 60 per cent.

The Public Service Commission of New York, Second district, has appointed James J. Gill assistant supervisor of equipment, at a salary of \$2,400 a year. Mr. Gill hitherto has been road foreman of engines on the New York Central & Hudson River.

The thousands of new rates filed by the railways of Indiana, to become effective August 1, have staggered the commissioners, and they are asking the roads to postpone until a later date the taking effect of the new rates. A casual examination of the tariffs shows that a month or more will be required to study them.

The convention of state commissioners, which met in Indianapolis last week, sent a petition to the Interstate Commerce Commission asking it to suspend all of the new and increased freight rates which have been filed by the railways in the Central Freight Association. The petition was signed by representatives of Indiana, Ohio and Michigan, one from each state. The secretary of the Illinois commission, who was present, said that he had no authority to sign the petition.

The Missouri railway commission on July 6 gave the railways of that state until October 15 to analyze a schedule of freight rates which the commission wants to put into effect. The proposed schedule would reduce present rates on most commodities about 8 per cent., but would increase the rates on corn, oats and wheat from 8 to 12 per cent. above what the railways are now charging. The state commission is at present under an injunction from the federal court restraining it from making reductions in rates until litigation involving rates previously made by it, which is now pending before the courts, is settled.

COURT NEWS.

The supreme court of West Virginia on July 11 refused to disturb the decision of the lower court, upholding the 2-cent fare law of that state as applied to the Chesapeake & Ohio.

Justice Mills, of the supreme court of New York, on the application of the New York Central, has issued injunctions against about 50 persons at places on the Hudson and Harlem divisions, forbidding them to speculate in commutation tickets. The defendants, keepers of drug stores, cigar stores and saloons bought non-transferable season and family tickets and allowed them to be used indiscriminately by persons who would pay them a profit on the cost of the rides.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

F. M. Dudley has been appointed a general attorney of the Chicago, Milwaukee & Puget Sound, with office at Seattle, Wash.

H. J. Holden, assistant auditor of the New York, Chicago & St. Louis at Cleveland, Ohio, has been appointed auditor, with office at Cleveland, succeeding H. V. Fountain, resigned on account of ill health.

W. K. Vanderbilt, Jr., has been appointed assistant to the president of the New York Central & Hudson River and to a similar position on the Cleveland, Cincinnati, Chicago & St. Louis. He will be appointed also to similar positions on the affiliated lines.

Operating Officers.

A. N. Lyon, superintendent of the Kanawha & Michigan at Charleston, W. Va., has been appointed general superintendent.

J. G. Code and C. W. Coe, superintendents of the Wheeling & Lake Erie, have had their headquarters changed from Canton, Ohio, to Brewster.

R. G. Carden, trainmaster of the Missouri Pacific at Atchison, Kan., has been transferred to Jefferson City, Mo. W. H. Broughton succeeds Mr. Carden.

R. L. Ruby has been appointed assistant superintendent of transportation of the Southern Pacific, in charge of claim bureau, with office at San Francisco, Cal.

N. A. Williams, assistant superintendent of the Green River division of the Denver & Rio Grande at Helper, Utah, has been appointed superintendent, with office at Helper, succeeding E. B. Mitchell, resigned.

C. H. Gaunt, assistant general manager and superintendent of telegraph of the Atchison, Topeka & Santa Fe at Topeka, Kan., has resigned to become connected with the Western Union Telegraph Company. L. M. Jones, assistant superintendent of telegraph at Topeka, succeeds Mr. Gaunt as superintendent of telegraph.

Thomas F. Rowlands, whose appointment as superintendent of the Southern Pacific Company, with office at Ogden, Utah, has been announced in these columns, was born August 31, 1861, in New York. He received a high school education at Mankato, Minn., and began railway work in 1878 as an operator with the Chicago, St. Paul, Minneapolis & Omaha. For seven years from 1881 he was with the Oregon Short Line as agent and operator. He then went to the Southern Pacific and has been consecutively, until his recent promotion, operator, clerk, dispatcher, chief dispatcher, trainmaster and assistant superintendent.

Traffic Officers.

T. J. Williamson has been appointed a contracting agent of the Erie Dispatch, with office at Indianapolis, Ind.

L. A. De Cou has been appointed agent of the Traders Dispatch, with office at Seattle, Wash., succeeding W. A. Adams, deceased.

W. B. Terhune, commercial agent of the Atlanta & West Point, at Cincinnati, Ohio, has been transferred to New Orleans, La.

W. M. Anderson has been appointed a traveling freight and passenger agent of the San Pedro, Los Angeles & Salt Lake, with office at Denver, Colo.

W. J. Nolan, commercial agent of the Atchison, Topeka & Santa Fe at New Orleans, La., has been appointed general agent, with office at New Orleans, succeeding J. C. Sartelle, transferred to St. Louis.

J. C. McDonald, general passenger agent of the National Railways of Mexico at the City of Mexico, has resigned to become assistant to the general manager of the Water People's Company for Mexico.

Norton England, commercial agent of the Mountain Pacific Iron Mountain system at Atlanta, Ga., has been appointed commercial freight agent, with office at Greenville, S. C., succeeding J. D. Dowling, resigned. S. B. Patterson succeeds Mr. England.

J. W. Gauder has been appointed a traveling freight agent of the St. Louis & San Francisco, with office at Wichita, Kan., and M. A. Fulwiler has been appointed a traveling freight agent, with office at New York. E. F. Hundley has been appointed general agent at the City of Mexico.

B. H. Stephens, general agent of the Trinity & Brazos Valley at Corsicana, Tex., has been appointed a commercial agent, with office at Dallas, Tex., succeeding E. E. Peacock, resigned. H. P. Bonner, commercial agent at Galveston, has resigned to manage with Mr. Peacock the Texas Merchants Freight Bureau.

L. L. Beck has been appointed a commercial agent of the Tennessee Central, and J. G. Larkin has been appointed a soliciting freight office, both with offices at St. Louis, Mo. M. E. Newell has been appointed a commercial agent and T. F. O'Donnell has been appointed a contracting freight agent, with office in Chicago.

G. F. Herr, general agent of the Denver & Rio Grande at Los Angeles, Cal., has been appointed assistant general passenger agent of the Western Pacific, with office at San Francisco, Cal. O. P. Applegate has been appointed a traveling freight agent of the Denver & Rio Grande, with office at Detroit, Mich.

C. Klinger, contracting freight agent of the Illinois Central at Louisville, Ky., has been appointed a commercial agent, with office at Louisville, succeeding T. B. McCabe, deceased. T. J. Horan succeeds Mr. Klinger. F. H. Webber has been appointed a contracting freight agent, with office at Atlanta, Ga., succeeding H. L. Collins.

E. L. Porter, traveling freight agent of the Cleveland, Cincinnati, Chicago & St. Louis at Jacksonville, Fla., has been appointed a commercial agent, with office at Jacksonville. C. B. Oakley has been appointed a traveling agent, with office at Tampa, Fla., reporting to Mr. Porter. J. H. Meglemry, traveling freight agent at Columbus, Ohio, has been transferred to Richmond, Va., and W. L. Dewey succeeds Mr. Meglemry.

J. H. Grace, whose appointment as assistant general freight agent of the Great Northern, with office at Chicago, has been announced in these columns, began railway work in 1883 in the Philadelphia office of the Lackawanna Line, where he remained for nine years, beginning as messenger boy and rising to traveling agent. He was then appointed agent of the Great Northern Railway and the Northern Steamship Company at Philadelphia. He was made general agent at Philadelphia in January, 1903, and two months later was transferred to Chicago, where he has been general agent until his recent appointment.

Eugene Hamilton Fell, who has been appointed assistant general passenger agent of the Atlanta, Birmingham & Atlantic, at Atlanta, Ga., was born March 19, 1877, at Newnan, Ga. Mr. Fell graduated from the high school of his native town in June, 1894, and the same year began railway work as a clerk on the Atlanta & West Point. From May, 1895, to February, 1897, he was agent of the Central of Georgia, and then for a short time was yardmaster on the Western of Alabama, since which he has been consecutively, December, 1897, to June, 1907, operator, yardmaster, clerk in the passenger department, traveling passenger agent and again clerk in the passenger department of the Central of Georgia. In June, 1907, he went to the Atlanta, Birmingham & Atlantic as chief clerk in the passenger department at Atlanta, which position he held at the time of his recent appointment as assistant general passenger agent.

Engineering and Rolling Stock Officers.

J. H. Cooper has been appointed a roadmaster of the St. Louis & San Francisco, with office at Birmingham, Ala., succeeding F. W. Farrow, resigned.

Kenneth H. Hanger has been appointed chief engineer of the Chicago, Rock Island & Gulf, with office at Fort Worth, Tex., succeeding A. B. Warner, assigned to other duties.

The office of master mechanic on the Chicago, Peoria & St. Louis has been abolished and C. S. Branch has been appointed superintendent of the mechanical department, with office at Jacksonville, Ill.

James J. Gill, road foreman of engines on the New York Central & Hudson River, has resigned to become assistant supervisor of equipment for the Public Service Commission of New York, Second district.

R. P. Black, division engineer of the Kanawha & Michigan at Charleston, W. Va., has been appointed engineer maintenance of way, with office at Charleston, W. Va., and the office of division engineer has been abolished.

Fred L. Thompson, whose appointment as engineer of bridges and buildings of the Illinois Central, with office at Chicago, has been announced in these columns, was born in February, 1872, at Grandview, Ill. He graduated with the B.S. degree in civil engineering from the University of Illinois in 1896, and began railway work with the Illinois Central in June of that year. He has since been consecutively rodman on construction work, assistant engineer in charge of grade reduction and double-track work on northern and southern lines and roadmaster on the Chicago and Louisville divisions. In January, 1907, he was made assistant engineer of bridges in charge of Grand Crossing track elevation work and all outside construction work in the bridge department, from which position he has now been promoted.

Special Officers.

E. A. Abbott, advertising agent of the Chicago, Burlington & Quincy, with office at Chicago, has resigned to become connected with Poole Brothers, railway printers in Chicago.

OBITUARY.

J. P. Burnett, until a few months ago general freight agent of the Missouri Pacific, with office at St. Louis, Mo., died in St. Louis on July 7. Mr. Burnett was born near Sparta, Ill., in 1870, and began railway work in the freight department of the St. Louis, Iron Mountain & Southern. He was transferred to the Missouri Pacific in 1898 and was successively promoted until in 1905 he was made assistant general freight agent. Later he was appointed general freight agent, which position he resigned on account of ill health.

C. L. Wellington, traffic manager of the Colorado & Southern, with office at Denver, Colo., died at Denver on July 8. Mr. Wellington was born in February, 1851, at Cambridge, Mass., and began railway work in 1873 with the Michigan Central at Detroit, Mich., as a clerk in the office of the assistant general freight agent. He was then consecutively clerk with the Chicago & Grand Trunk, now the Grand Trunk Western, at Chicago; clerk with the Wabash at Toledo, Ohio; assistant general freight agent of the Wabash, St. Louis & Pacific at Chicago; commissioner of the Interstate Traffic Association at Kansas City; general freight agent of the Milwaukee, Lake Shore & Western; assistant general freight agent of the Ashland division of the Chicago & North Western; general freight agent and later traffic manager of the Wisconsin Central lines. He was for three years from November, 1896, commissioner of the Western Freight Association at Chicago, and the next year was commissioner of the Colorado Railway Association at Denver. He was appointed traffic manager of the Colorado & Southern in October, 1900, which position he held until his death.

Complaint having been made in the Prussian Parliament that the management has been building too elegant houses for its employees, the minister replied that there was a time when they were rather over-doing it, but that all that had been stopped. Until a few years ago they could build a house for four families for \$4,000, or a little more; now, however, such a house costs an eighth and sometimes a quarter more. For men above the lower grades a house for one family may cost about \$2,100.

Railway Construction.

New Incorporations, Surveys, Etc.

ALASKA ROADS.—An officer of the Copper River & Northwestern is quoted as saying that the company will build an extension to the Bering river coal fields as soon as the government makes arrangements for the mining of coal. Harry White, of Los Angeles, Cal., and associates are quoted as saying that they have funds ready to build a line from Controller Bay to the coal fields in that district, and the Controller Bay & Bering Coal Railway is said to be clearing right-of-way for a line to Canyon Creek.

ALGOMA CENTRAL & HUDSON BAY.—Bids are wanted up to July 23 by R. S. McCormick, chief engineer, Sault Ste. Marie, Ont., for the construction to subgrade of a section of the Manitoulin & North Shore Railway from the north side of Goat Island Channel, Ont., near Little Currant northerly to the White Fish river, about 18 miles.

AMERICAN FALLS, ROCKLAND & SOUTHEASTERN.—Incorporated in Idaho to build from American Falls, Idaho, south to Rockland, 30 miles. D. W. Davies, American Falls, is the principal promoter.

ATCHISON, TOPEKA & SANTA FE.—According to press reports, extensive improvement work is now being carried out on the Eastern Railway of New Mexico in Eddy county, N. Mex. It is said that improvements are being made to the roadbed and track south to Pecos, Tex.

CANADIAN NORTHERN.—According to press reports, the Northern Construction Co. has started work on a 60-mile section of the Canadian Northern Pacific from Port Mann, British Columbia, opposite New Westminster, up the valley of the Fraser river. (June 10, p. 1436.)

CANADIAN NORTHERN ONTARIO.—An officer writes that grading has just been started on the line from Hawkesbury, Ont., east to Montreal, Que. J. P. Mullarkey, Montreal, is the contractor.

CANADIAN NORTHERN PACIFIC.—See Canadian Northern.

CENTRAL RAILROAD OF NEW JERSEY.—An officer writes regarding the reports that the tunnel at Glen Onoko, Pa., is to be removed by blasting away the rock through which it is built, at a cost of about \$1,000,000, that the company has this work under consideration. Arrangements have not yet been made to carry out the improvement.

CONTROLLER BAY & BERING COAL RAILWAY.—See Alaska Roads.

COPPER RIVER & NORTHWESTERN.—See Alaska Roads.

DAKOTA, KANSAS & GULF.—Surveys for this line have been finished, it is said, and right-of-way is to be secured at once. The plans call for a line from Beloit, Kan., northwest to Kearney, Neb., about 120 miles. The maximum grade will be 26 ft. to the mile and maximum curvature 3 degs. The work will be heavy south of the Republican river, and it will be necessary to construct 10 steel viaducts, one of which is to be 1,500 ft. long, and another 500 ft. In addition, there will be bridges crossing the Republican and Platte rivers. W. H. Mitchell, president, Beloit.

DEERING SOUTHEASTERN.—An officer is quoted as saying that the company is planning to build an extension from Deering, Mo., east to Caruthersville, 13 miles, also an extension from the southern terminus at Camp southwest to Hornersville, seven miles.

EASTERN RAILWAY OF NEW MEXICO.—See Atchison, Topeka & Santa Fe.

FORT SMITH, ST. LOUIS & CHICAGO.—This company, which was organized last year, proposes to build from Fort Smith, Ark., northeast to Bergman, about 100 miles. It has not yet been decided when bids will be asked for the work. L. S. Powers, president, and W. A. Richardson, chief engineer, Harrison.

GARDEN CITY, GULF & NORTHERN.—This company was organized to build from Plains, Kan., north via Garden City and Scott to St. Francis, in Cheyenne county, about 225 miles. Track has been laid on the 10 miles from Scott south to Garden City.

According to press reports, work was recently started on the section north of Scott, and it is understood that the company expects to have the 58 miles north to Oakley, which is on the Union Pacific, finished during 1910. B. M. McCue, president, and William H. Cost, chief engineer, Garden City. (April 1, p. 918.)

GOTEBE & SOUTHWESTERN.—Final surveys have been made, it is said, and plans are ready to begin work on a line from Gotebo, Okla., southeast to Lawton, 50 miles. The offices of the company are at 408 New York Life building, Kansas City, Mo.

GRAND TRUNK.—The Massachusetts Railroad Commission has granted a certificate of expediency to this company to build the section through Massachusetts of the proposed extension from Palmer southeast to Providence, R. I. Permission has already been granted in Rhode Island to build the section of the line in that state. (See N. Y., N. H. & H., June 17, p. 1568.)

HAMPDEN RAILROAD.—Organized in Massachusetts, with \$1,000,000 capital, to build from Springfield, Mass., northeast to Bondsville, on the Boston & Maine, with a branch north to Holyoke. The directors include R. D. Gillett, H. W. Ely and A. D. Robinson, Westfield; A. W. Eaton, Pittsfield; J. A. Skinner, Holyoke; H. H. Bowman and E. T. Ley, Springfield.

HANFORD & SUMMIT LAKE (ELECTRIC).—Incorporated in California, with \$500,000 capital, and office at Hanford, Cal. The company plans to build a loop line from Hanford via Grangeville and Hardwick, into the Summit lake region, thence returning through Lemoore and Armona. C. K. Hardwick, J. O. Hickman, G. C. Aydelott, Hanford; R. W. Heins, Santa Cruz, and C. McClellan, San Francisco, are directors.

HUNTINGDON, LEWISTOWN & JUNIATA VALLEY TRACTION.—This company has given a mortgage for \$4,500,000 to cover the cost of building about 50 miles of new line. Contracts were let in May to W. D. Cassone and to the Pennsylvania Excavation Co., both of Allentown, Pa., to build from Mount Union, Pa., north via Mill Creek to Cold Spring Park, 18 miles, with a line running northeast from Mill Creek to Reedsville, thence south to Lewistown, 30 miles. J. Murray Africa, chief engineer, Huntingdon. (May 20, p. 1281.)

KANSAS CITY, MEXICO & ORIENT.—Work is now under way by Roach & Stansell, Memphis, Tenn., on 160 miles of line between San Angelo, Tex., and Fort Stockton. The work consists of rock cuts and earth excavation. (May 13, p. 1237.)

MANITOULIN & NORTH SHORE.—See Algoma Central & Hudson Bay.

MASSILLON & BREWSTER AIR LINE.—Preliminary surveys are said to be made for a line from Massillon, Ohio, south to Brewster, 6.5 miles. J. G. Wise, Massillon, is interested.

MEMPHIS & ST. LOUIS.—This company, which held an option until July 1 on the grade between Pierre, S. Dak., and Aberdeen, has been granted an extension of 90 days in which to sign a contract to build the line.

MEMPHIS, DALLAS & GULF.—See Memphis, Paris & Gulf. (June 10, p. 1437.)

MEMPHIS, PARIS & GULF.—This company has been granted permission to build an extension from the present terminus at Murfreesboro, Pike county, Ark., northeast to Memphis, Tenn., 255 miles; also to build an extension from the western terminus at Ashdown, Ark., southwest to a point on the Red river opposite Shaws, Tex., 18 miles. The line is eventually to be extended in Texas under the name of the Memphis, Dallas & Gulf, to Dallas. (April 8, p. 970.)

MIDLAND-PENNSYLVANIA.—According to press reports this company, which was organized early this year, is planning to begin construction work on the line from Millerburg, Pa., northeast via Gratz to Ashland, about 43 miles. W. E. Harrington, president, Philadelphia, Pa.

MISSOURI PACIFIC.—An officer writes that a contract has been given to T. B. Jones & Co. for work on five miles of second-track between Jefferson City, Mo., and Coal Junction. The work includes the reconstruction of the terminal yard at Jefferson City.

MONTANA, IDAHO & PACIFIC.—Plans of the survey from

Lapwai Junction, Idaho, east to the boundary of Idaho and the Lolo pass have been filed. The line is eventually to be extended further east to Butte, Mont. J. H. Bennett, president, Boise, Idaho, and G. W. Boodin, vice-president, Portland, Ore.

MT. GILEAD (OHIO) TRACTION.—As soon as a report is made by the engineers, Roberts & Abbott Co., Cleveland, Ohio, financial arrangements are to be made and work started on a system of electric lines radiating from Mt. Gilead, Ohio, to connect with Mansfield, Mt. Vernon, Delaware, Marion and Galion, a total of 107 miles. The General Traction Development Co., 516 Hippodrome building, Cleveland, will have charge of the entire work of organization, financing, construction and subsequent operation of the line. E. F. Wheaton, vice-president and general manager, Cleveland. There is no truth in the newspaper reports that the company proposes to build extensions into the Indiana fields.

NEVADA-CALIFORNIA-OREGON.—An officer writes that a contract was let last month to the Hall Construction Co. for building an extension of 16 miles up Pitt river canyon to Goose lake, Cal. The line is eventually to be extended further north to Lake View, Ore. (April 1, p. 918.)

NEW ORLEANS GREAT NORTHERN.—Announcement is said to be made that this company will build about six miles of line to a point north of Jackson, Miss.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, expects to ask for bids in about two weeks to construct the triborough subways on the route proposed by the commission. (April 8, p. 974.)

NEW YORK, NEW HAVEN & HARTFORD.—The petition of this company for a certificate of public exigency to build an extension from the Southbridge branch near the terminus at Southbridge, Mass., northwest 19.3 miles to a connection with the Central Vermont at Palmer, has been refused. This route is a part of that over which the Grand Trunk proposes to build. (June 24, p. 1812.)

OREGON & WASHINGTON.—This company is said to have secured right-of-way for a line from Cosmopolis, Wash., south for seven miles to North river, thence northeast along that stream for five miles. An officer is quoted as saying that the line is not to be extended to the Willapa harbor, and that the plans only call for a belt line through timberlands in the North river country, to have a total length of about 24 miles.

SAN ANTONIO & ARANSAS PASS RAILWAY CO.—An officer writes confirming the report that new track is to be laid on sections of this road as follows: between Houston, Tex., and Yoakum; Kenedy and Skidmore, and between Yoakum and Moulton. The work is to be carried out at an early date. Orders have already been placed for rail to be used on the first 100 miles. (July 1, p. 54.)

SAN DIEGO & ARIZONA.—This company was organized to build from San Diego, Cal., east to Yuma, Ariz., on the Colorado river. A section of the line is to run through Lower California and Mexico. Work has been finished on 30 miles, and a grading contract was recently let for a section of the line in Mexico. E. J. Kallright, chief engineer, Union building, San Diego. (Dec. 24, p. 1262.)

VIDALIA & SOUTHEASTERN.—Application has been made for a charter in Georgia, it is said, to build from Vidalia, Ga., east via Reidsville to Fleming, about 60 miles. A. Y. Garbutt, Montgomery, and F. K. Durden, Vidalia, are incorporators.

WASHINGTON-VIRGINIA.—Incorporated in Virginia to build from Bluemont, Va., southeast to Vienna, 50 miles. M. E. Church, president and general manager; G. B. Fadeley, vice-president, and L. L. Northrup, treasurer, Falls Church.

WRIGHTSVILLE, ADRIAN & LYONS.—This company, which was recently organized in Georgia to build from Wrightsville, Ga., southeast to Lyons, is said to have amended its charter increasing the capital from \$100,000 to \$1,000,000 and providing for an additional line from Wrightsville northwest to Milledgeville through Johnson, Washington and Baldwin counties. The plans include an extension from Lyons to Brunswick. Grading work has been finished on six miles. T. J. James, president, Adrian. (April 29, p. 1115.)

Railway Financial News.

ALGOMA CENTRAL & HUDSON BAY.—The Bank of Montreal, London, recently offered at 90 £770,000 (about \$1,500,000) 5 per cent. first mortgage bonds of 1910-1960 of the Algoma Central & Hudson Bay. The total authorized issue of these bonds is \$2,500,000. The remaining \$8,000,000 is to be raised in France. The principal and interest are unconditionally guaranteed by the Lake Superior Corporation. The company has 80 miles of road in operation.

ANTOINE VALLEY.—See Memphis, Dallas & Gulf.

CHICAGO & ALTON.—The executive committee, at a meeting held on July 12, took no action looking toward the declaration of a dividend on the common stock. It is said that the question of dividends on the common stock did not come up at the meeting, but that it might be discussed at a meeting of the executive committee next week. The Alton paid 1 per cent. dividends on its common stock August 15, 1908, and in February and August, 1909, and February, 1910, semi-annual payments of 2 per cent. were made.

KANAWHA & MICHIGAN.—Colonel C. S. Reynolds, president of the First National Bank of Toledo, has been elected a member of the board of directors of the Kanawha & Michigan.

KANSAS CITY, MEXICO & ORIENT.—Parrs Bank, Ltd., and Boulton Brothers & Co., both of London, recently offered \$5,000,000 first mortgage 4 per cent. bonds of 1901-1951 at 84, the subscriber for each \$1,000 bond being entitled to a certificate representing an option to buy until June 1, 1913, three fully paid preferred shares, par value \$100, at \$40 per share, and three fully paid common shares, par value \$100, at \$25 per share.

LEHIGH VALLEY RAILROAD.—The New York Public Service Commission, Second district, has authorized the Lehigh Valley Railway to issue \$825,000 50-year 5 per cent. debenture bonds to the Lehigh Valley Railroad on account of advances made in 1908, 1909 and up to June 30, 1910, for improvements and betterments.

MEMPHIS, DALLAS & GULF.—A press despatch from Little Rock, Ark., says that this company has filed a certificate of increased capital stock from \$645,000 to \$7,875,000. The company has issued a circular which says that on July 1 the Memphis, Dallas & Gulf took over the Antoine Valley Railroad and the Ultima, Thule, Arkadelphia & Mississippi, and these two roads will hereafter be operated as divisions of the M. D. & G.

NEW LONDON NORTHERN.—The \$1,500,000 consolidated mortgage bonds, due July 1, 1910, were paid at maturity, and Kidder, Peabody & Co., Boston, and Strong, Sturgis & Co., New York, are offering a new issue of \$1,500,000 first mortgage 4 per cent. bonds of 1910-1940. The road runs from New London, Conn., to Brattleboro, Vt., 121 miles, and is leased to the Central Vermont for 99 years from December 1, 1891, at a yearly rental sufficient to provide the interest on the standing bonds and 9 per cent. dividends on the capital stock.

PITTSBURGH, SHAWMUT & NORTHERN.—The receiver has been granted permission by the New York Public Service Commission, Second district, to issue \$1,500,000 additional receiver's certificates. The proceeds of these certificates are to be used to reimburse the receiver for the purchase of equipment and for the payment for extensions and improvements.

ROME, WATERTOWN & OGDENSBURG.—The company has asked the New York Public Service Commission, Second district, for permission to issue \$419,000 consolidated mortgage bonds, of which \$417,800 are to be used to refund an equal amount of 6 per cent. bonds maturing September 1.

TEXAS CENTRAL.—A stockholders meeting has been called to vote on the question of authorizing a mortgage to secure bonds to the amount of \$20,000,000. The proceeds of the sale of these bonds are to be used for improvements and extensions.

ULTIMA, THULE, ARKADELPHIA & MISSISSIPPI.—See Memphis, Dallas & Gulf.

Supply Trade Section.

H. S. White has been appointed sales manager of the Detroit Seamless Steel Tubes Co., Detroit, Mich.

Fire damaged the plant of the American Insulated Wire & Cable Co., West Twenty-first and Morgan streets, Chicago, on July 6.

H. W. Marsh has been appointed general manager of the Milwaukee Car Mfg. Co., Milwaukee, Wis., succeeding T. F. Howe, whose resignation has been announced in these columns.

The Isthmian Canal Commission will receive bids until July 19 for manganese tumblers and rollers, bushings, lag and set screws, engine indicators, steam traps, hose couplings, flanges, rubber tires, rubber valves, gage-glass gaskets, asbestos packing, rubber boots, emery cloth, etc. (Circular No. 593); and until August 8 for fixed irons for rising-stem gage valves, cylindrical valves, and snubbing hooks and girders for the canal locks (Circular No. 594).

The Westinghouse Electric & Manufacturing Co., New York, is to pay on August 1 the \$6,000,000 three-year 6 per cent. collateral notes issued in 1907. Of the funds necessary to make this payment, \$2,000,000 are surplus treasury funds and \$4,000,000 the proceeds of the sale of a new issue of three-year 6 per cent. collateral notes due August 1, 1913. Kuhn, Loeb & Co., New York, are offering to exchange at par the new notes for the old notes due August 1, 1910.

The Lackawanna Steel Co., New York, and subsidiary companies, report earnings for the quarter ended June 30, 1910, and the six months ended June 30, which compare with those of the same period last year as follows:

	1910.	1909.	Changes—
†Income, mfg. & operat'n	\$1,662,002	\$586,863	Inc., \$1,075,138
Proportion of earnings on investment, ‡	340,000	80,460	" 259,539
Total	\$2,011,002	\$667,323	Inc., \$1,343,678
Deduct interest	43,500	406,875	" 30,625
Sinking funds	101,402	90,816	" 10,585
Dep. and renewals	364,063	282,537	" 81,526
Total deduction	\$902,965	\$780,229	Inc., \$122,736
Surplus	1,108,036	112,905	" 1,220,941
Jan. 1 to June 30:			
†Income, mfg. & operat'n	\$2,770,843	\$765,583	Inc., \$2,004,809
Proportion of earnings on investment, ‡	678,000	160,920	" 517,079
Total	\$3,448,843	\$926,454	Inc., \$2,521,889
Deduct interest	54,683	792,500	" 62,083
Sinking funds	191,944	141,233	" 50,391
Dep. and renewals	708,165	483,339	" 224,806
Total deduction	\$1,754,368	1,415,062	Inc., \$337,280
Surplus	1,693,979	490,688	" 2,134,608
Unfilled orders (gross tons) June 30 were 319,836, against 384,984 last year.			

*Deficit.
†After deducting all expenses incident thereto, including ordinary repairs and maintenance of plants and interest on bonds and fixed charges of subsidiary companies.
‡In not controlled companies.

TRADE PUBLICATIONS.

Pneumatic Hammer.—The Ingersoll-Rand Company, New York, in Form No. 8003, describes its "Imperial, Type E" pneumatic riveting hammers.

Rolled Steel Step Joint.—The Q. & C. Co., New York, has issued a pamphlet describing its Bonanza rolled steel step joint, for use in joining rails of different sections.

Electric Fans.—The Sprague Electric Company, New York, in leaflet 322-A, gives specifications and price lists of the alternating current electric fans which it manufactures.

Door Fastener and Check.—Irving S. Elliot, selling agent, Lakeport, N. H., has issued a folder describing the Laconia sliding door fastener and check for mail, baggage or express cars.

Motor Inspection Cars.—The Buda Company, Chicago, in

Bulletin No. 43, describes its No. 100 Buda gasoline motor inspection car. This company also makes other styles of motor cars for section use, including motor velocipedes.

Rail Laying Machine.—The Q. & C. Co., New York, has issued a pamphlet describing its rail-laying machine, and illustrating its use for renewing rails as compared with the method of employing a large number of men with tongs.

Induction Motors.—The Sprague Electric Company, New York, has just issued Bulletin No. 600, containing general detail descriptions of the single and polyphase induction motors which it manufactures. Complete specifications and dimensions of these motors are given.

Oregon Short Line.—"Where Gush the Geysers" is the title of a large booklet issued by the Oregon Short Line advertising the all-rail route to the Yellowstone. The booklet is full of attractively colored photographs, interesting descriptive matter, instructive relief maps of the country and data concerning cost of tours through the park.

Flexible Steel Armored Hose.—The Sprague Electric Company, New York, has just issued a pamphlet describing its flexible steel armored hose, including: special air drill hose, pneumatic tool hose, water hose and steam hose. This company also makes a number of couplings for hose, which latter are also shown in the catalogue.

Telephone Power Plant Equipments.—The Western Electric Company, New York, has published its Bulletin No. 100B, describing telephone power plant equipments for non-multiple switchboards. This bulletin presents some features of Western Electric power apparatus designed especially for telephone plants. The subject matter covers only such apparatus as is required for non-multiple switchboards having capacity up to 800 lines and which have been previously described in Bulletins 1003, 1004 and 1005.

RAILWAY STRUCTURES.

BELOIT, KAN.—See Dakota, Kansas & Gulf under Railway Construction.

CAMPBELLTON, N. B.—A fire which occurred on July 11 at Campbellton is said to have burned 1,000 buildings and caused a financial loss of nearly \$3,000,000. The buildings that were destroyed included the Intercolonial Railway station, roundhouse and machine shops.

CARLSBAD, N. MEX.—See Lakewood, N. Mex.

CARMI, ILL.—According to local press reports, the Louisville & Nashville has announced that it will build a new passenger station.

CONNELLSVILLE, PA.—The Western Maryland has given a contract to the McClintic-Marshall Construction Co. of New York and Pittsburgh, for about 40 steel bridges to be built on the line now under construction from Cumberland, Md., north to Connelleville, Pa.

DES MOINES, IOWA.—The contract for the West Seventh street viaduct has been let and work is to be begun as soon as possible. This structure was described in the *Railway Age Gazette* of January 15, 1909.

GARY, IND.—The union station at Gary, built jointly for the Lake Shore & Michigan Southern and the Baltimore & Ohio, has been formally opened. The station cost \$250,000.

HOUSTON, TEX.—Plans have been made for the new Southern Pacific office building at Franklin and Travis streets in Houston. It is understood that construction work will be started soon. (April 22, p. 1069.)

JOLIET, ILL.—The Elgin, Joliet & Eastern has let the contract

to Cook & Lund, Chicago, for building a brick and concrete roundhouse.

LAKEWOOD, N. MEX.—According to press reports, a new bridge is being built across the Pecos river by the Eastern Railway of New Mexico, a subsidiary line of the Atchafalaya, Fresno & Santa Fe, at a point south of Lakewood, and a steel bridge is being put in place over the Pecos river at a point north of Carlisbad. The bridges over Huckleberry draw and Dark canyon, south of Carlisbad, are also being rebuilt.

NEW YORK, N. Y.—Bids are in for building nine stations on the line of the New York, Westchester & Boston. Six of the stations are to be built in the borough of the Bronx, two in Mount Vernon and one in New Rochelle. Contracts are to be let for the work in the near future. (April 29, p. 1117.)

NORTH NORWICH, N. Y.—The New York Public Service Commission, Second district, has been petitioned by the State Highway Commission to order the elimination of a crossing in the town of North Norwich, Chenango county. This is to be accomplished by building an overhead structure for highway traffic over the tracks of the Delaware, Lackawanna & Western and the New York, Ontario & Western railways.

PALMYRA, PA.—The Philadelphia & Reading, it is said, will put up a new passenger station at Palmyra, Pa., to replace the present wooden structure.

PITTSBURGH, PA.—According to press reports, work is under way by C. A. Van Dusen, Pittsburgh, carrying out improvements to secure better connections between the tracks of the West Side Belt and the Pittsburgh & Lake Erie below the Point bridge. The work includes putting up a new steel and concrete bridge at Saw Mill run. The contract is said to be worth \$200,000.

QUANAH, TEX.—The Quanah, Acme & Pacific is to begin work at once on the five-stall roundhouse mentioned in the *Railway Age Gazette* of August 6, 1909.

QUEBEC, QUE.—Bids are wanted by L. K. Jones, secretary of the Department of Railways and Canals at Ottawa, Ont., up to September 1, for the superstructure of the Quebec bridge over the St. Lawrence river near Quebec. Plans and specifications may be secured from the Quebec Bridge Board of Engineers, Canadian Express buildings, Montreal, and at the Department of Railways and Canals. (April 29, p. 1118.)

ROUND ROCK, TEX.—According to press reports, plans have been filed by the International & Great Northern for a passenger station to be built at Round Rock.

ST. LOUIS, MO.—The Illinois Traction System has let the contract to Kremer & Voirol, St. Louis, for building the express station at Twelfth and Lucas streets mentioned in the *Railway Age Gazette* of August 20, 1909. It will be a two-story structure of brick and will cost about \$45,000.

WINNIPEG, MAN.—The Canadian Northern has lost a number of passenger stations, freight depots, water stations and yard materials in the bush fires of the past weeks.

FOREIGN RAILWAY NOTES.

The Norwegian minister of commerce, Arctander, has been retired because he was opposed to woman suffrage, and is succeeded by the late minister of public works, Bränne, who is himself succeeded by the engineer, Darre-Jenssen, who built the Gellivara Railway north of the Arctic circle, and also lines in Spain.

Professor Beletubsky, who has long held the chair of bridge engineering in the Russian School of Bridges and Highways (which, by the way, is a hundred years old this year), recently lectured in Berlin on Russian bridge-building, and during the lecture he said that there is a similar institution in Russia for women, in which some 600 girls are studying; and he showed a photograph of one of the graduates at her level, clothed in a natty uniform.

Late News.

The items in this column were received after the classified departments were closed.

The Railroad Commission of Texas has granted a postponement until August 1 to the railways entering Dallas to submit plans for the union passenger station. (April 29, p. 1117.)

Right-of-way has been secured and work is to be started at once, it is said, by the Oregon Short Line on the branch from Ashton, Idaho, southeast to Driggs, 40 miles. (April 15, p. 1016.)

H. B. Nichols, engineer of way of the Philadelphia Rapid Transit Co., has been appointed chief engineer, succeeding W. S. Twining, resigned. George B. Taylor, assistant engineer of way, succeeds Mr. Nichols, all with offices at Philadelphia, Pa.

The Mexican Railway, which operates a line from Mexico City, Mex., east to Vera Cruz, has adopted plans for improvements and extensions of branch lines, it is said, to cost \$2,000,000. This includes putting up a bridge over the Metlac baranca. The improvements will eliminate two tunnels, reduce the grade and shorten the distance about four miles.

The Utah & Salt Lake Electric has been organized in Utah with a capital of \$1,500,000 and headquarters at Provo. The company plans to build a line from Salt Lake City, Utah, south via Sandy, Lehi, American Fork, Provo and Springville to Payson, about 70 miles. S. Bamberger, S. L. Chipman, C. Hanks, W. L. Hayes, G. W. Craig and G. C. Whitmore are interested.

The Boston Chamber of Commerce has sent to Montréal James J. Storrow, former president of the chamber, and D. O. Ives, the chamber's transportation expert. Messrs. Storrow and Ives will see the principal officers of the Grand Trunk in an effort to induce them to make Boston a coast terminal as well as Providence, which, under plans already laid down, had been selected as a terminal point of the road.

It is given out informally in Washington that the Interstate Commerce Commission will not suspend the increased commutation fares between New Jersey points and New York City, as petitioned for by the attorney-general of New Jersey and a number of other parties, but will, in the near future, investigate these rates on its own motion. But it is said that in the matter of freight rates, extensive advances in which have been announced for August 1 throughout Trunk line and Central Traffic Association territory, the commission will issue a suspending order.

The Order of Railway Conductors and the Brotherhood of Railroad Trainmen have voted to strike on the Pennsylvania Railroad unless the company agrees to the 10-hour day; that is, to pay overtime on every trip that consumes more than 10 hours. This is what has been agreed to by the other roads which have recently settled with their trainmen, though on these other roads the mileage rates are not as high as on the Pennsylvania. The conductors voted 1,863 for and 448 against a strike in case the company did not accede to their demands; the trainmen voted 10,918 for and 965 against a strike. At the conference held Wednesday afternoon, at which the conductors were represented by A. B. Garretson and the trainmen by W. G. Lee, General Manager Meyers, of the Pennsylvania, stated definitely that the company could not afford to make any agreement with its men which would increase operating expenses. The company is willing to put the 10-hour day in effect on the Pennsylvania on the same basis that this day is in effect on the New York Central Lines. The employees acknowledge that the rates of pay on the Pennsylvania have been higher in the past than on other roads, and base their demand for an increase in the rate of pay on the argument that the Pennsylvania has educated its men to believe that they are worth more than employees of other roads. While General Manager Meyers was unwilling to meet any of the demands of the employees which would necessitate an increase in expenses, he took their demands under consideration, and there is to be another conference on Thursday afternoon. The vote to strike authorizes a strike only in case the committee representing the conductors and trainmen cannot come to an agreement with the company.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Pittsburgh, Shawmut & Northern is in the market for two locomotives.

The Spokane, Portland & Seattle is in the market for three 10-wheel locomotives.

The Texas Southeastern has ordered one ten-wheel locomotive from the Baldwin Locomotive Works.

The Chino Copper Co., 71 Broadway, New York, is in the market for two 16-in. x 24-in. cylinder, four-wheel switching locomotives.

CAR BUILDING.

The Baltimore & Ohio is in the market for 1,000 gondola cars.

The Chicago & Northwestern has ordered 200 milk cars from the American Car & Foundry Co.

The Chilean State Railways have ordered four sleeping and four parlor cars from the Pullman Company.

The Michigan United Railways, Jackson, Mich., are in the market for 30 city cars, one snow sweeper and one sprinkler car.

The Northern Pacific inquiry for 1,000 all-wood refrigerator cars, reported in the *Railway Age Gazette* of May 27, is said to be assuming definite form.

The National Railways of Mexico have ordered 1,600 box, 500 gondola, 100 tank, 150 flat and 150 stock cars from the American Car & Foundry Company.

The Mexican Railways, reported in the *Railway Age Gazette* of March 11 as in the market for 10 coaches, have ordered four first class and six second class coaches from the Harlan & Hollingsworth Corporation.

MACHINERY AND TOOLS.

The Canadian Pacific is in the market for one steam shovel.

The Grand Trunk Pacific is in the market for one rotary snow plow.

IRON AND STEEL.

The Wheeling & Lake Erie has ordered 1,200 tons of rails from the Carnegie Steel Co. and 1,100 tons from the Lackawanna Steel Co.

The San Antonio & Aransas Pass has ordered 11,000 tons of O. H. rails from the Tennessee Coal, Iron & R. R. Co. for use on work mentioned in the *Railway Age Gazette* under Railway Construction, July 1.

The Western Maryland has let the contract to the McClintic-Marshall Construction Co. for all bridge and viaduct work on the 83-mile branch line from Cumberland, Ma., to Connellsville, Pa. The contract includes about 12,000 tons of structural steel.

General Conditions in Steel.—It is estimated that the various steel companies are receiving orders at the rate of about 50,000 tons per day, about 20 or 30 per cent. below actual production. These figures cover all classes of steel, mostly industrial work, as the railways, since the first of the present month, have placed few contracts for rails, bridges or equipment. Some shading of prices for some classes of steel is reported, but this cutting is not of a radical nature.

Painting of Steel Cars.

Records obtained from even of the largest railways in the country, and a number of car builders show that the perfect method for painting steel cars is yet to be found. In two instances, cars painted by the present method have failed, showing rust and disintegration inside of six months; and two railways have come to the conclusion that they know so little about forming or drawing up specifications for painting that they have left the painting of steel cars to the car builder, with certain restrictions, as to colors and materials used.

One of the principal methods now in use is as follows: The

steel sheets and trim in most cases are pickled with the intention of removing such mill scale as may appear, and to make as smooth a surface as possible for the first or priming coat. When the car is ready for treatment it is usually primed with a mixture of leads or zinc, combined with a certain amount of dryer and some color. This is then rubbed to a surface, and then two to three coats of a roughing material are often applied. This is also rubbed to a smooth finish and the car is ready for the body color, which is applied in one or two coats. After this is set, the varnish is applied and the car is then striped and lettered, and the last coat of finishing varnish applied.

Regarding the above and present methods for painting steel cars, it has been found that failures are due not so much to the class or grade of material used, as to the inability of the film formed by those materials to present to the elements and conditions found in service, an absolutely non-porous film; also one that is not only waterproof, but acid proof, and one that holds sufficient life or flexibility after being in service to withstand the expansion and contraction of metal and the action of the weather.

It has been found that in pickling the sheets as above, enough of the pickle or acids used has been left or retained in the pores of the sheets to start the action under the film of paint after the cars have been finished to cause the premature opening of pores in the paint film, allowing dampness to enter and reach the metal, which naturally causes rust and disintegration, the drying and flaking of the paint film.

When the paint film is applied and the cars are run in service, there is a weather action which tends to dry and harden the paint film in addition to the dryers that are used with the paints. It is not long before the weather action begins to absorb such binders, or, in other words, the life of the paint film, and it begins to show cracks and check marks, the color begins to fade, and disintegration is started.

It is found from experience and practical test that to procure and make a perfect paint film a perfect binder must first be obtained, one that embodies all the features which the present paint does not include. This material is said to have been found in Flexible Compound. This compound is not a paint or a varnish, but is a material garnet in color and has about the same body as raw linseed oil. It is pure and free from all substances that would tend to disintegrate or deteriorate when used in connection with paints. Therefore, it makes a good binder. It is also free from benzine and dryers or cheap oils of any nature.

The peculiar features of this Flexible Compound are that it is waterproof, acid proof, flexible and retains these features permanently; does not dry down with age, but bodies in drying; is non-porous, and with the above features in itself or in connection with leads, oils and pigments, makes a paint that is both rust and waterproof.

The binder now used to hold pigments together is linseed oil, and this, due to its present method of manufacture (a process of steaming the flaxseed before pressing), causes the oil to retain a percentage of moisture. This moisture is present to a greater or less extent in all colors ground in oil. Therefore, when these colors are used this moisture contained in them is injurious, due to the fact that when the weather action takes place, particularly sun action, pores soon appear in the paint film and the binder is slowly absorbed.

When this action takes place, and is completed, the paint film has hardened down, the gloss is lost and there is nothing left but lead and pigments in a dead and cracked form. When this stage is reached it is very easily seen that rust and disintegration soon start in the metal underneath.

Flexible Compound used in connection with leads and dry colors according to formulae will make a paint that presents a film that is impervious to acid or weather actions or to any cause that would naturally cause failures of paints mixed under the old or present formulae.

In the use of compound it is necessary in most instances to use any form of pickle or previous treatment of sheets in steel car construction. Sand blasting is much better. Some companies have gone to the trouble and expense of sherardizing their sheets, but this fails to coat the sheets with a non-porous and impervious film that is left on the sheet by sherardizing. Therefore, sand blasting alone is all that is necessary where treating materials with this compound with leads, oils and pigments.

Flexible Compound is sold by Joseph M. Brown, dealer in railway equipment and specialties, 303 Great Northern building, Chicago.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY IN THE LATTER PART OF THE MONTH, BY
THE RAILROAD GAZETTE (INC.), 50 FULTON ST., NEW YORK.

CHICAGO: Plymouth Bldg. CLEVELAND: William Bldg.
LONDON: Queen Anne's Chambers, Whitehall.

W. H. BOARDMAN, President

E. A. SIMMONS, Vice Pres. & Treas. HENRY LEE, Secretary
The address of the company is the address of the editors.

EDITORS

W. H. BOARDMAN, Editor.
SAMUEL O. DUNN, Western Edit. Mgr.
BRADFORD BOARDMAN, Eastern Edit. Mgr.
ROY V. WRIGHT
ERNEST McCULLOUGH
G. L. FOWLER
WILLIAM FORSYTH
S. W. DUNNING
CLARENCE DENING
E. E. ADAMS
W. E. HOOPER
F. L. LAMER
F. W. KRAEGER
H. H. SIMMONS

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico\$6.00 a year.
Canada\$6.00 a year.
Foreign Edition (London).....£1 12s. (\$8.00) a year.
Single Copies15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$8.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49. FRIDAY, JULY 22, 1910. NUMBER 4.

CONTENTS

EDITORIAL:

Editorial Notes.....	147
Records of Automatic Block Signal Performance.....	148
Overlapping Protective Committees.....	148
Enlightening (?) the Public.....	149
Inconsistent Federal Regulation.....	150
New Books.....	150

ILLUSTRATED:

Steam Turbine Electric Locomotive.....	152
Locomotive and Car Shops of the National Trans-Continental.....	154
Burlington Chair Car.....	157
Multiple Track Railways in Ohio.....	162

MISCELLANEOUS:

Deadwood in Railway Service.....	151
Report on Pittsburgh Subway.....	159
Railway Statistics of the United States, Year Ended June 30, 1909.....	161
Proposed Standard Form of Railway-Telephone Agreement.....	163
Foreign Railway Notes.....	161, 165

GENERAL NEWS SECTION.....	164
SUPPLY TRADE SECTION.....	176

It is announced in Washington that the Secretary of State has appointed Hon. Martin A. Knapp, chairman of the Interstate Commerce Commission, to confer with Hon. J. P. Mabee, chairman of the Railway Commission of Canada, on the subject of joint control of international freight and passenger rates. This is the outcome of a suggestion made by the Canadian commission a year ago, based, it is said, on the fact that there has been some demand in Canada for suitable legislation by which a railway can be required, for instance, to make through rates from Montreal to Philadelphia, the same as though both cities were in Canada or both in the United States. It is claimed that there are cases where such through shipments have to pay the sum of two local rates, when equity would require that a lower through rate be made. As the Canadian Railway Commission has a reputation for making wise and just decisions in rate questions, there

can be no objection to the proposed conference—if Chairman Knapp can spare the necessary time from his numerous engagements at Washington in dispute about wages, but it is not clear that there is any pressing public need for joint control. The necessary machinery would be somewhat cumbersome. The present arrangement, by which international rates are controlled by each country separately, so far as its territorial jurisdiction will allow, seems to work pretty well. Rates are in most cases kept down by competition; and as for publicity (in case of abuses) the regulating bodies of the two countries can co-operate effectively without any change in the laws. When one reads the scores of decisions issued by the Interstate Commerce Commission on such questions as whether sawdust should be charged more or less than planing-mill shavings, the thought of making that kind of question the subject of a treaty between "high contracting parties" is rather wearying.

ONE of the anomalies of the railway accident record, as published quarterly by the Interstate Commerce Commission, is the very considerable number of men killed and injured in coupling and uncoupling cars. In the latest bulletin, that for the last three months of 1909, the total number killed in coupling or uncoupling was 66, and injured 837. And yet the law requiring the universal use of automatic couplers has been in full force for 10 years. The present record is in large degree explainable by the broad definition which is given to the term "coupling." It includes all of the preparatory processes as well as miscellaneous work connected with the handling of cars on which the coupling apparatus is out of order. Much of the work done under this head is, in a sense, unnecessary, in that the rules if strictly followed, authorize the men to postpone operations in which they have to risk their limbs until the work can be done with safety. Indeed, it is said, in the bulletin before us (Table 3), that four of the killed and 30 of the injured went between cars unnecessarily and contrary to rule. These facts of the accident record are brought to mind by a recent newspaper item, which says that on the Middle division of the Pennsylvania Railroad an order has been issued that—

"In the event of an employee finding it necessary to go between cars in a train, before doing so he must safeguard himself by seeing that some member of the crew is made aware of the fact, and the latter must take the necessary precautions to prevent the train being moved while there is a man between the cars."

While this order simply gives form to what already is (or should be) the best practice, it will be useful in calling the attention of trainmen formally to the fact that going between cars is risky and, moreover, that, when it has to do with coupling, the act is contrary to the spirit of the law. The habit of risking life and limb seems in railway work to be most insidious. This being so, every trainman ought to be glad of the adoption of any rule which will help eradicate the habit.

THE wreck which was caused by the collision at Middletown, Ohio, July 4, in which 23 persons were killed, was caught by the motion-picture photographers within an hour after the collision occurred, and it appears that the owners of the films have exhibited, or attempted to exhibit, the pictures in the towns in that region. To this exhibition the railway company objects, and the mayor of Hamilton has been asked to suppress the pictures as being morbid and distressing in character. Such a request is eminently proper. Motion pictures are so inexpensive that the shows draw large numbers of children and youths who are more likely to be harmed than benefited by sights of dead and dying victims of a smash-up. The city authorities should act on their own initiative in such a matter, as much as in the case of the prizefight pictures. Such shows take us back a hundred years, when children were taken to see public executions of criminals. At the same time it must be said that a railway which in this year of grace runs heavy passenger trains on single track at 70 miles an hour without a space interval system deserves all the punishment that may come to it by the exhibition of the

results of such a dangerous method of train management. Indeed, if motion pictures showing the distress caused by collisions could be displayed before some men who are responsible for the creation of public opinion, an appropriation from the public treasury for that purpose would be commendable.

RECORDS OF AUTOMATIC BLOCK SIGNAL PERFORMANCE.

WITH the rapid increase in mileage worked under automatic block signals, railways have come face to face with the serious question of being able to get from their employees reliable reports of false clear signal failures. Such failures are of themselves very difficult to detect in the ordinary course of events unless they happen to hold the signal continuously in the clear position. Occasional or intermittent clear failures are discovered, usually, only by accident. Of course, a man riding on the rear end of a train will, in daylight, be able to detect any such failure for his train; but to employ a sufficient number of inspectors to ride on the rear end of every train would be an unwarranted expense. It would not be impossible, perhaps, to require flagmen or rear brakemen to observe signals from the rear end and report false clear failures, but no one has yet tried this with sufficient care to show whether it could be done without annoying difficulties. To identify the signals accurately would be a somewhat strenuous job. It is almost out of the question to detect clear failures on a track on which the train is not running, as it is seldom possible to see whether or not the whole block is occupied. On a dark night there is nothing to show a man on the rear end whether or not a signal (on his own track) sticks clear except in some cases a back light; and back lights are so small or dim that they are easily confused with other lights. To make of them reliable indications would necessitate radical changes. In times of storm, even during the day, the difficulty is greatly increased.

It seems, then, that, unless we are going into costly experiments and radical changes, reliance must be placed for accurate reports on efficient inspection and the honesty of the signal repairmen. The section forces might be educated to a point where they could make reliable reports on signal failures and thus assist materially. This, however, would take time, and the present assumption presupposes a high order of discipline and a thorough understanding among the men of the true purpose of reports of clear as well as other failures, which purpose is a check on the efficiency of the organization and apparatus and not a system of espionage. Especially should it be understood that the maintainer will not be censured for failures not due to any fault of his. Many men will instinctively try to conceal failures for the sake of their records, or for fear of censure or through a mistaken sense of loyalty to some fellow-employee. For this reason failures should be classified, and those due to poor maintenance only should count against the maintainer's record.

Reasonably frequent staff meetings, at which the subject of reporting and the causes of failures can be freely discussed, are an efficient means of gaining the confidence of the men. The signal engineer or other responsible officer should hold meetings regularly with the supervisors, and they in turn with their men. All the maintainers could not, of course, be withdrawn from their sections at one time for this purpose, but they could be divided into groups, each of which could meet separately; and these groups could be made to overlap so that the personal experiences of each man would be available to all. Brief reports of such meetings could be distributed throughout the department, the names of those participating being omitted if found desirable. At such meetings the dangerous nature of false clear failures and the desirability of removing their causes at almost any cost should be impressed on all. In this connection, it is possible, with a little intelligence, to do much good work of an educational nature among the maintainers through the inspectors and supervisors.

This matter of reliable reports is one of the most serious problems connected with automatic block signal operation. Last

year the Railway Signal association appointed a committee to investigate the subject and report on methods in use and to make recommendations. This committee is competent to deal with the subject with thoroughness and intelligence, and its report should be of great value to all concerned.

OVERLAPPING PROTECTIVE COMMITTEES.

IT is not unusual during railway receiverships to have two rival committees, both representing the same class of securities and each asking for the deposit of these securities and issuing in exchange certificates of deposit, but it is quite unusual for a protective committee to be formed which asks not only for the deposit of securities but for the deposit of certificates of deposit representing securities deposited with another committee. In the case of the Wabash-Pittsburgh Terminal first mortgage bonds, a protective committee, of which J. N. Wallace, president of the Central Trust Co. of New York, is chairman, was formed soon after the receivership and received deposits of first mortgage bonds, issuing in exchange certificates of deposit. It is claimed that the agreement under which these first mortgage bonds were deposited provides that bondowners shall not have the right to withdraw their securities until the committee has formulated a plan for the reorganization of the company. A tentative plan for the reorganization of the Wheeling & Lake Erie and the Wabash-Pittsburgh Terminal was suggested, but had to be abandoned because of legal difficulties. The first mortgage bonds of the Terminal company are secured on the property of that company and by the deposit of a controlling interest of the stock of the Wheeling & Lake Erie and also by a traffic agreement made between the Terminal company, the Wabash Railroad and the Wheeling & Lake Erie, under which the Wabash and the Wheeling agreed to pay the Terminal company 25 per cent. of the gross profits on interchange traffic in case this amount is needed to meet a deficit in interest of the Terminal company. When the Wheeling was put in the hands of a receiver, this traffic agreement was suspended by the receiver under order of the court, and shortly afterward the Wabash also suspended its agreement with the Terminal company.

On August 1, 1908, \$8,000,000 5 per cent. notes of the Wheeling fell due. These notes were secured by a deposit of \$12,000,000 general mortgage 4 per cent. bonds of the Wheeling and were guaranteed, principal and interest, by the Wabash Railroad. The notes were bought by a syndicate representing Wabash interests, and this syndicate presumably now holds the \$12,000,000 Wheeling 4's that were the security for the notes. It is claimed that the trustee of these Wheeling 4's is the Central Trust Co. of New York, and the interests which have now formed a new protective committee to represent Wabash-Pittsburgh Terminal first mortgage bonds have pointed out that the same interests, namely, the Central Trust Co. interests, have been placed in the contradictory position of representing the Terminal company's bonds, one of the equities of which bonds lies in the traffic agreement between the Wheeling, the Wabash and the Terminal company, and at the same time representing the general mortgage bonds of the Wheeling, which bonds would be directly benefited by a final suspension of the tri-party traffic agreement. The new protective committee, of which James G. Chaplin is chairman, will ask the deposit of both Terminal first mortgage bonds and certificates of deposit of the Wallace committee of these bonds. Apparently, the Chaplin committee thinks that the interests of Terminal mortgage bondowners will not be served by a suit brought against the Wallace committee to compel them to return bonds deposited with them, because, it is said, such a suit, if successful, would relieve the Wallace committee of any responsibility that it may already have incurred through delay in forming a plan for the reorganization of the Terminal company. On the other hand, the Chaplin committee must have in some substantial form the assurance of at least a considerable part of the Terminal company bondowners before it can take any definite steps toward the protection of these

bondowners. Apparently, therefore, the plan is to leave the plan for a reorganization of the Terminal company and the protection of the bondowners in the hands of the shippers, what can be done in the best way. The plan is to leave the shippers to show what could have been done by the Wallace committee. In this way it would seem that the Wallace committee hopes to be able to force the Wallace committee either to adopt the Chaplin plan or to make a plan of its own which will give the bondowners the chance to withdraw their bonds from the Wallace committee. It is a curious illustration of the intricacies of system building that the interests representing the Wabash Railroad and the Wheeling & Lake Erie appear to be almost as convinced now that they must free themselves of any connection and responsibility for the Wabash-Pittsburgh Terminal as the Gould interests were originally anxious to gain an entrance into Pittsburgh. In the meantime the quotation for Terminal first mortgage 4's was as low as 35% last week, and the quotation for Central Trust company certificates representing these 4's was 32. The second mortgage bonds of the Terminal company were quoted last week as low as 4%.

ENLIGHTENING (?) THE PUBLIC.

THE hearing which was given by the Interstate Commerce Commission at Washington last week on the application of the New Jersey commuters for an order postponing the advertised increase in the prices of their tickets afforded a fine example of a waste of energy which is often observable in the presentation of railway affairs to the public. Following the prayer-book as though it were the very gospel, the railways left undone the things that they ought to have done and did the things that they ought not to have done. Their main purpose seemed to be to take still another line from the prayer-book and, in the most impressive manner possible, declare that, as a result of the hardships endured during the past few years, "There is no health in us." But, with a fatuity that is inexplicable, they proved too much; proved not only that they lacked health but that they were dead and buried—almost.

The statistics which were presented were either fragmentary or one-sided; so much so that they could have little, if any, useful effect, while the thing that obviously was most needed, a succinct statement clearly showing the strength of the railways' case, was conspicuous by its absence. The reporters, ready to publish such a statement, were left to put it together as best they could. Each railway officer who attended the hearing had for his main object, no doubt, the presentation to the commission of conclusive evidence that the commutation rates which he had advertised were reasonable; and we must conclude that he carried out his purpose; carried it out by laying before the commission statistics of which the reporters did not get hold. But there was also another object: the laying of his case before the public. It is the failure to do this effectively, or even in a passable fashion, of which we are here complaining. If the railway man says that he did not expect or intend to enlighten the public on this subject at this particular time, we reply that that is a duty which he could not fairly omit; for the newspapers, looking upon this hearing, the first under the revised law, as of unusual importance, were sure to do their best to publish an illuminating report of it. Doing their very best, however, they could not make a satisfactory report, and therefore it was the duty of the railways to have prepared one. If those people who are interested in a subject of this kind could be induced to repress their curiosity until the Interstate Commerce Commission should find time to issue a report, the case might be different; but that is not possible. The people want a report at once, and the Associated Press tries to give it to them. A number of railway press bureaus are now engaged constantly in an endeavor to enlighten the public as to the useful activities, the virtues and misfortunes of the railways. Here was an opportunity which they missed.

There is no evading the demand for all reasonable fulness and frankness in giving information to the public. Partial or mis-

leading information, either false or true, is as much a hindrance to somebody to still further before the issue by publishing misleading information on the other side. Any deliverance which signifies a lack of frankness leads shippers, and all of the voluble fellows who pose as advocates of the shippers, to issue something from their standpoint which is equally futile, and that portion of the public which is disposed to be impartial is delayed and confused in reaching any satisfactory conclusion. The Chicago spokesmen of the shippers' organizations even complain that the Railway Business Association is made up largely of railway men in disguise; and when a beef shipper agrees to an advance in freight rates he is accused of being an owner of railway stock rather than a shipper of beef. And when it comes to making exaggerated and one-sided statements, we think that the "shippers" are less blameworthy than the railway men, for, in their bigger mountain of ignorance, they have a more plausible excuse for their errors.

President Truesdale of the Lackawanna said at Washington that in 10 years his company had lost about a million dollars a year on the operation of the Morris & Essex, which is leased to the Lackawanna, or ten millions during the whole period of 10 years; while, during the same time, the Lackawanna had spent on the M. & E. fifteen millions. The uninformed reader gives no credence to such a statement as that. He feels sure that there is something wrong about it. The reader who has some little information about the relations of these two companies to each other concludes that somewhere in the accounts a big profit would be shown, and that this big profit has been concealed. The fact that this loss of a million a year is calculated after interest at 7 per cent. has been paid on nearly thirty-two millions of the stock and bonds of the Morris & Essex is soon discovered by any one who finds it worth while to look up the record. This interest, amounting to \$2,217,390 a year, is \$950,290 larger than the sum that would have to be paid if the interest rate were 4 per cent. instead of 7 per cent.; and this difference is just about equal to the annual deficit as given by Mr. Truesdale. As a large majority of newspaper readers and other citizens believe that 4 per cent. is a reasonable rate of interest on railway investments, this is a state of facts which ought to be explained. If it is not explained by the railway officers most interested, it will be explained, with suitable coloring, by someone else.

The public, in considering the cost of operating a railway, looks, and rightfully looks, on the total payments of interest on all of the capital invested. If a road is doing business at a loss, even for a short time, it has some reason for doing so, and in a case like this the public is entitled to know the reason. No honorable merchant offers to sell goods at less than cost without setting forth what he believes will be accepted by the public as a reasonable explanation of his attitude.

Some of the other roads presented figures at the hearing as confusing as those here referred to, though not on such a large scale. Statements of profit or loss per passenger mile, per train mile, per passenger journey or per passenger year (or month) are mostly wasted at a public hearing, because the hearers are led to try to swallow more than they can assimilate; while the reader of the doings in the newspapers the next morning suffers from the hasty preparation of the report by the newspapers. As before observed, the thing needed is a full and sufficient statement by the railways. A general argument, based on the increase in the cost of living, such as would be put into a stump speech, does not meet the situation. The only satisfactory treatment is by means of a statistical comparison. It may be said that so ponderous a production is not called for; but to this the obvious answers are: (1) The railways began by giving out a lot of figures voluntarily and (2) the Associated Press tried to give these railway statements to the public. Once begun, the process should be carried out.

Again, any statement of a case like this should be of reasonable length. If the attorneys who go to Washington furnish material for a four-column article, and the matter seems to the editorial agent of the Associated Press too thin to be worth more

than one column, he is going to try to abridge or condense what is given to him. He is likely to do that job imperfectly, and therefore it behooves the railways not only to prepare an article beforehand but to make it of reasonable length and solidity.

Omission of important features, concerning which newspaper readers are well enough informed to raise mental queries as they read, is also a serious mistake. There is no longer any use in getting up railway "news" in the style of the idle-hour paragraphs of the afternoon papers. The business in hand is an element in a serious controversy, and if it is not to be taken up with a view to real illumination of its obscure features it is a question whether it should be taken up at all. But, as already intimated, the Associated Press will take it up even if those most interested neglect it.

INCONSISTENT FEDERAL REGULATION.

THE inconsistency between the Sherman act and the Interstate Commerce Act would have been much reduced if the administration railway bill introduced at the last session of Congress had been passed as originally presented. It would have legalized reasonable agreements regarding rates and also some existing combinations of parallel railways. Instead of being mitigated, this inconsistency has been increased by the enactment of the Mann-Elkins act; and it is now more glaring than ever before. This emphasizes the need for amendment of the Sherman act as it applies to railways.

When the original Interstate Commerce Act was passed, the Interstate Commerce Commission assumed that it was empowered to reduce rates, and acted accordingly. When the Sherman law was passed, it was the general understanding that it did not apply to railways. So long as this condition lasted there was no seeming inconsistency between the two laws. The railways, it was understood, had the right to make reasonable agreements regarding rates; and the commission, it was assumed, had power, by reducing any unreasonable rates that they might make, to prevent them from abusing this right. The Supreme Court of the United States, by its decisions in the maximum freight rate cases and in the Trans-Missouri Freight Association case, completely reversed the situation. In the latter case it held that the railways could make no agreements in restraint of trade, reasonable or unreasonable. In the former cases it held that the commission had no power to fix rates. This interpretation of the two acts developed the inconsistency between them. The Interstate Commerce Act prohibited unfair discrimination. In order to avoid unfair discrimination it was necessary for the railways to make and carry out agreements for that purpose. But the Sherman act, as it was interpreted, prohibited the necessary agreements and concerted action.

The inconsistency was increased by the passage of the Hepburn act. It rendered the prohibition of the Sherman act against agreements regarding competitive rates entirely superfluous, as it gave the commission power to reduce an unreasonable rate whether fixed by an individual road or by a combination of roads. The Mann-Elkins act goes much farther. It gives the commission also authority to prevent any road or number of roads from making any change in rates that may be discriminatory or unreasonable. Since the commission can now render innocuous and futile any and every rate agreement between competing railways, what rational ground can there be for retaining the prohibition of the Sherman law not only against unreasonable, but also against reasonable, agreements?

The two laws are not only inconsistent in principle, but directly contradict each other. The theory of the Sherman act as interpreted by the Supreme Court is that each carrier must take individual action regarding all its rates. The Interstate Commerce Act, on the other hand, plainly contemplates concerted action, and the commission in passing on rates which are complained of and in fixing new rates does not deal with the rates of each carrier individually, but with the rates of groups of carriers. When all the railways between Chicago and New York agree to fix the same rates, they violate the Sherman law. When the commission itself fixes the same rates for all these carriers, what happens? If it is wrong for competing

carriers to make the same rates, is it right for the commission to make the same rates for them? And if it is not wrong for competing railways to charge the same rates, but, on the other hand, is right and desirable, can it be wrong for them to agree to make the same rates?

If the railways should try to comply literally with both the Sherman act and the Interstate Commerce Act, the business of the country and the work of the commission would immediately be completely demoralized. For if the roads made their rates by absolutely individual action, they would necessarily make different rates. The shipper, then, in order to be sure that he got the lowest rate between any two points, would have to examine not merely a single tariff issued by a group of roads, but the tariffs of each road by which it was possible for him to ship. The commission, instead of investigating the rates of a group of roads, would have to attempt the interminable task of investigating the rates of each individual road in the group. It would be absolutely impossible for the railways, the shippers or the commission to do business in literal compliance with the Sherman act.

It may be replied that nobody would be a big enough fool to try literally either to enforce or obey the Sherman act. But the injunction suit started by the department of justice at Hamilton, Mo., shows that as it applies to railways it is not dead but merely sleeping. It is a constant menace to present methods of doing business. Nobody can tell when some United States district attorney desiring to get a reputation as a tribune of the people may run amuck and start prosecutions against some group of railways that will compel them, temporarily at least, to abandon present methods of rate-making. President Taft, by causing the starting of the proceeding at Hamilton, Mo., and then promptly stopping it, showed that he recognizes the fact that the Sherman act as it applies to railways is fit to exist only as a threat. Any law which is fit to exist only as a threat is not fit to exist at all. The country ought to choose whether it will repeal it or enforce it. If public sentiment cannot otherwise be educated to the point where it will force Congress to repeal it, it is perhaps to be hoped that the government soon will run amuck and try literally to enforce it. The immediate results will be evil. Some persons, who have been guilty of no offense but that of violating a law which cannot be obeyed without violating other more important laws and demoralizing business, would be punished. But the ultimate result would be to cause the law's repeal as it applies to railways; and that would be worth all that securing it would cost.

NEW BOOKS.

A Congressional History of Railways. Vol. II. The railways in Congress, 1850-1887. By Lewis H. Hancy, Ph.D. 385 pages; 5½ in. x 8½ in. Madison, Wis.: The Democrat Printing Co.

The first volume of this work was noticed in the *Railway Age Gazette* of February 26, 1909, page 395. The author was then a professor in the State University of Iowa, but the title page of Volume II. shows him as now associate professor and acting head of the Department of Economics of the University of Texas. The first volume brought the history down to 1850. The two together constitute a careful compilation of notes concerning every feature of federal regulation of railways down to the enactment of the Interstate Commerce law in 1887. The author has studied his material with great care and in very numerous footnotes gives his authority for every quotation made. The second volume, like Volume I., has a good deal of matter which the historian will find so nearly worthless that he will wish it had been buried; but the useful matter is all there. Some of the principal headings in the present volume are: land grants; import duties on railway iron; the development and passage of the Pacific railway bill; the southern route to the Pacific; Isthmian railway developments; railway affairs in the civil war; the mail service; Congress and the Granger movement, and the Interstate Commerce act. In the preface the author says that he has been aided by the Carnegie institution. The whole work was issued originally in a Bulletin of the University of Wisconsin, Economics and Political Science Series.

DEADWOOD IN RAILWAY SERVICE.

By N. F. GREGORY,
Yardmaster, Pennsylvania Railroad, Verona, Pa.

Deadwood defined means "useless material." But as applied to employees of railways and commercial concerns it signifies *useful material* if properly handled and trained. Railways carry more of this material than commercial concerns because of their much larger departments and the impossibility of personal supervision of employees by the higher officers. Commercial organizations have always followed the practice of *worth-selection* and have paid for it. Financially unable to carry "deadwood" their organizations are necessarily compact; and they have selected, retained and rewarded the man who showed that he could "carry the message to Garcia," turning adrift those who fall short of the mark. There is a familiar saying among those in the ranks of a railway "once a railway man, always a railway man." Railway employees feel that it is a matter of mutual promises "for better or for worse, until death do us part," and the railways, through a mistaken idea that a paternal spirit properly imbued in the minds of the men generates loyalty and interested service, have kept their promise faithfully.

This paper will be confined to railway employees below the position of superintendent. The ability of the higher officers being conceded, it is with the idea of bringing the line into conformity with the staff, with the ultimate object of a reduction in operating cost by the practice of *worth-selection* of employees instead of chance selection, that this paper is written.

The term "deadwood" does not apply to the man who has served faithfully throughout his lifetime and become incapacitated, but it applies most emphatically to the men who can, but do not, work interestedly and faithfully, because they reason that they feel the avenues of progress are closed by the restriction of promotion to certain lines and departments.

While this feeling affects the employees in all the departments of railways, my remarks are confined to those in the operating department, because that department must always exercise a great influence on the net earnings; and, again, because it is that department to which the patrons of the railway look for service.

The fundamental operations of a railway are controlled by
Yardmasters,
Train despatchers,
Road conductors,
Yard conductors.

The yardmaster originates and places cars, starts and receives trains; the train despatcher controls their movements between terminals; and the road and yard conductors execute their orders.

Now, what is the status of these men to whom are intrusted the fundamental operations of railway transportation? Yardmasters are selected from a body of employees embracing clerks, operators and conductors, often because either of the recommendation of a friendly superior or length of service, the practice of selection according to worth not always being followed. These men have usually reached middle age before they are appointed yardmasters; they lack a thorough educational basis, want originality, and have passed the age of development. They meet each day's requirements with the minimum effort and with no idea of permanent improvement for themselves or betterment of operating conditions.

Train despatchers are promoted from operators, and yard and road conductors from brakemen, the question of advancement to these positions turning generally on length of service. These men also have reached middle age before they are appointed to these positions; they have only had training in one line, and, having little or no hope of further advancement, they soon lose interest in their work. They have had only one kind of experience, and it naturally follows that they have but one set of ideas and associates; and as these allow no opportunity for broadening or developing, in a few years their interest wanes,

and the result is deadwood in place of what was perhaps promising material.

The present plan of promotion becomes most serious as applied to the next higher positions, the highest positions in the subordinate ranks, viz., those of trainmaster, division operator and chief clerk. With few exceptions the training of the men appointed to these positions has been similar to that of those appointed yardmasters and despatchers. The aim should be to fill these positions with men who have had such experience as would make them familiar with the actual working conditions and the human element involved. While the men appointed under the present method have had some of this experience, they lack general experience, having associated with men and work in only one line. There is education and development in association with men in different lines and of different ideas. In a few years, as in the cases of yardmaster and train despatcher, they lose interest, their primary thought becoming their own ease and comfort. They stay close to their offices, and shift the responsibility of handling the work to the shoulders of subordinates. When this stage is reached we have more deadwood, but in a more serious and vital place, as these men have direct charge of operation, of the trial of men, of employing and weeding out, disciplining and discharging them.

Another weakness of the present plan of promotion is that these men have had no office experience. They depend largely on their clerical force for handling correspondence and records; in fact, the burden of that part of the work falls almost entirely on the clerks. This affords an opportunity for intelligent clerks. They readily see that by relieving their superiors of these burdens their services become almost indispensable, and they come to be largely relied upon, exerting an influence far beyond their position and experience. Since they have the direction of car distribution and tracing, the handling of all correspondence with minor officials and employees, and, in a lesser degree, the settlement of questions of discipline, movement, classification, etc., their influence on the actual operation of the railway is obvious. We will admit that these are intelligent men, good clerks, and that they thoroughly understand the system of office routine. But they are not practical men, and cannot conceive the unnecessary labor, lost motion and confusion that some of their instructions cause. They do not understand the character of men in the operating service, and furnish cause for grievances through their lack of this knowledge.

While the trainmaster should be relieved of the burden of this detail, it should be by assistants—say assistant trainmasters—who should be practical men, and such positions as assistant trainmasters of districts should be abolished, as they cause additional and unnecessary delay and duplication of work. Let the trainmaster's office deal directly with the yardmasters' offices, and have the trainmaster get in closer touch with his yards and yardmasters. Except for a signature, and an occasional view from the rear of a private car, the trainmaster has come to be almost unknown on his division. It must be understood that there are subordinate officials of exceptional character and intelligence—many of them men qualified for almost any position.

Right here it might be remarked that the gap between trainmaster and yardmaster should be lessened, and that the one between yardmaster and conductor should be increased. While in the regular organization the yardmaster is classed as a petty officer, and gets certain consideration and privileges, in practical operation he has come to be classed about on a plane with a conductor, and any clerk, and even messenger in a superintendent's, or trainmaster's office can give him instructions, or oral reprimand, from which there does not seem to be any appeal. There is too much criticism and responsibility given yardmasters as compared to the assistance and consideration they receive.

Everyone below the subordinate officials has to do too much explaining, too much corresponding, and has to keep too many records. It must not be forgotten that yardmasters and trainmen

are operating men, and, therefore, the abolition of this endless detail of correspondence, and in its stead the establishment of personal supervision on the part of the trainmaster, division operator, and chief clerks are the remedies for this situation.

Two things go hand in hand in the handling of employees, *overwork* and *underwork* being opposed to *enthusiasm* and *industry*.

Efficient work can only be secured by enthusiasm, and enthusiasm is generated by recognition of merit, industry and individual responsibility. Under the present system of *en masse* operation, these are lost sight of, and we face a condition of too much work to be performed by some (notably freight agents and yardmen) and not enough by others. We often have too many giving instructions, and not enough to execute them.

The crying want to-day is enthusiasm among employees. This is to be obtained by—

(1.) *Regulation of Promotion on a Graduated Salary Basis.*—The four fundamental operating positions which have been referred to being active and not advisory, it is essential that they should be filled by young men. Men should come into these positions of responsibility before time has seared their enthusiasm. The absence of an outlet for railway trainmen has confined them to a lifetime of braking on some of the railways, and the lack of inducement in the way of promotion on a graduated salary basis on others has deferred their promotion to the position of conductor until they have lost not only activity and interest, but also a respect for the position, and have a disinclination to shoulder the responsibility. If accepted at all, it is reluctantly. Examine the records of passenger or freight brakemen and it will be seen that they are serving the most active years of their life in such positions. Flat increases in wages will never bring results, as experience has shown that the recognition of the whole has only resulted in less interested labor on the part of individuals.

(2.) *Education.*—In order to develop a higher grade of subordinate officials some form of education should be fostered. The substitution of railway clubs for the present Y. M. C. A. and rest houses will solve the problem. Education can never be made attractive with a religious feature attached, as the religious feature, no matter how liberal, is bound to predominate to the exclusion of the educational feature. Two courses should be established, a primary course including English, stenography and primary railroading, and a higher course including railway finance, engineering and operation. With this plan as a basis, and premising that the solution of the problem of a higher class of subordinate officials is a graded and systematic line of advancement, we submit this plan as one that should be conducive to developing a higher grade of officials for these subordinate positions: Since yardmasters receive, classify and start all trains the position of yardmaster should be made the center to which all promotions gravitate and from which all radiate, in the actual operation of a railway. This can be accomplished by selecting young men from the engineering, telegraph, clerical and train services, and placing them in the less important yardmaster positions, of which there are many, in which knowledge of operation can be gained without the entire responsibility of directing movements being carried. One year's service in this line should qualify a man to handle a yard. He should put in another year in charge of a yard where he will be entirely responsible for movements.

There is a special qualification to make a successful yardmaster which all men do not possess. It is not essential in the working out of this plan that all men should be successful yardmasters, but it is essential that all men interested in the operation of a railway should have a knowledge of yard operation and train movements, and also know the qualifications of a man who can handle them successfully. From this point, then, the men that do not show qualifications as operating men should be turned back to the lines from which they came, not with the idea of closing their avenue of promotion, but with the idea of promoting them through the engineering, telegraph and clerical forces just as far as they are qualified to go, even to the

position of superintendent, and beyond, as many of them might prove better executives than some of the more successful operating men. Let the men who show efficiency in operation go up through the regular operating line, that is, through the positions of assistant trainmaster and trainmaster.

The merit in this plan would be that college, office and practical men would meet on common ground; the benefits would be mutual; education and originality on the one hand, practical knowledge on the other. They would discover that they all belong to the same human family, and class prejudice would gradually disappear.

It is not the best practice to make train despatchers direct from operators; they should first have the experience of yardmaster. There is enough flexibility in the matter of salary to promote from operator to yardmaster and yardmaster to train despatcher, and train despatcher back to yardmaster, or up to assistant trainmaster.

We only include four branches of the service in this outline, but more with the idea of a working hypothesis than to exclude men from other branches of the service. Agents and enginemen can easily come under a plan of this kind.

All the foregoing suggestions are embodied in the following chart, showing the order of promotion through the office of yardmaster from and to the various subordinate and superior positions.

		Superintendent.			
		Trainmaster.			
Division Freight Agent.		Chief Clerk.		Division Operator.	
Agent.		Road Foreman Eng'm.		Higher Engineers.	
		Yardmaster.		Train Despatcher.	
Agent.		Conductor.		Clerk.	
Clerk.		Brakeman.		Engineer.	
		Fireman.			

In conclusion, investigation will prove that the lack of a progressive organization—the absence of a system of promotion on a graduated salary basis—has resulted in a system which runs the expense of operation into millions annually above what it should be. This is as much due to lack of interest and intelligent handling as to an unwieldy organization. The lack of individual interest, effort and responsibility, the existence of so much petty and so little real responsibility, must be made good by increased force and augmented cost, which would be avoided by a system such as is here recommended.

STEAM TURBINE ELECTRIC LOCOMOTIVE.

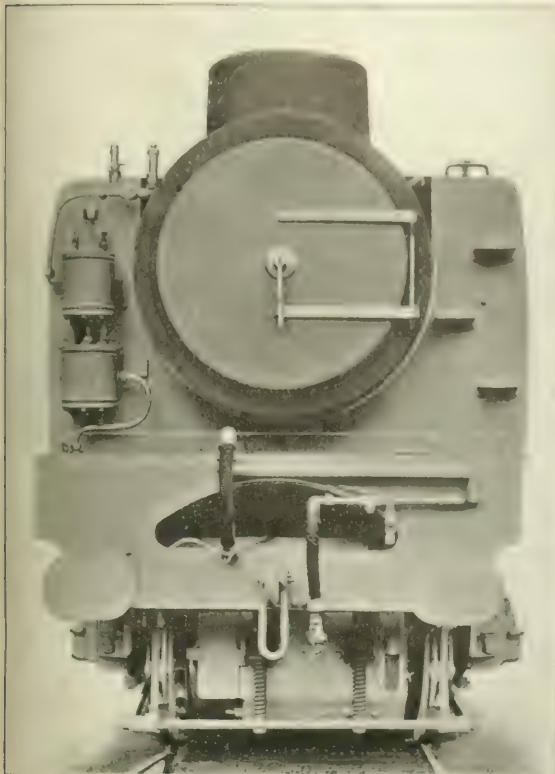
Last October Hugh Reid, in his presidential address to the Glasgow University Engineering Society, briefly described the Reid-Ramsay turbine electric locomotive, which was then being built by the North British Locomotive Co., Ltd., Glasgow.

This engine has been completed, and has made its preliminary trial on the main lines of the Caledonian and the North British railways, with a saloon carriage attached.

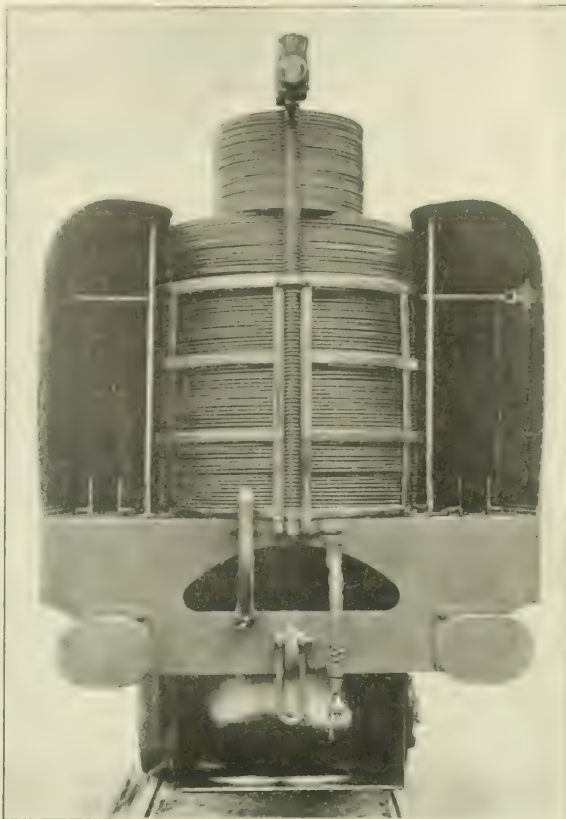
Steam is generated in a boiler of the ordinary locomotive type, which is fitted with a superheater, and the coal and water supplies are carried in the side bunkers and side water tanks at both sides of the boiler. The steam from the boiler passes into a turbine of the impulse type running at a speed of 3,000 revolutions per minute, to which is directly coupled a continuous-current, variable-voltage dynamo. The dynamo supplies current up to 600 volts to four series-wound traction motors, the armatures of which are built on the four driving axles of the locomotive. The exhaust steam from the turbine passes into an ejector condenser, and is, together with the circulating condensing water, delivered eventually to the hot well. As the steam turbine, unlike the reciprocating steam engine, requires no internal lubrication, the condensation water is free from oil, and consequently is returned from the hot well direct to the boiler by a feed pump. The water evaporated by the boiler is therefore returned to the boiler again and again, and the supply of water carried in the tanks is actually circulating water for condensation purposes. This condensing water is circulated within a closed cycle by small centrifugal pumps driven by auxiliary steam turbines placed alongside the main turbine and dynamo. The cycle of condensing

water is from the tanks through the first pump; then through the condenser, where it becomes heated in condensing the exhaust steam, and then to the hot walls. From the hot walls it passes through the second pump to the cooler, situated in front of the locomotive, where the full benefit of the blast of air created by the movement of the locomotive, aided by a fan, is utilized for cooling the hot circulating water. After passing through the

fan it passes within the cooler so that it will deliver hot air to the boiler fire and at the same time assist the current of air through the cooler. The small switchboard and the instruments required, the controller for coupling the four motors in various series parallel and parallel according to the demands will be



Rear End of Locomotive.



Front End of Locomotive.

cooler, the water is returned to the supply tanks ready for further condensation duties.

It is obvious that the condensation of the exhaust steam deprives the locomotive boiler of the usual exhaust blast which induces the draft through the fire-box and boiler tubes. In the experimental locomotive, the induced draft is replaced by forced draft provided by a small turbine-driven fan. The

exerted—and the regulator for controlling the voltage in the electrical circuit, and consequently the speed of the train, are all within easy reach of the engineman.

The foregoing comprises the main and auxiliary machinery of this experimental locomotive. The whole is mounted on a strong underframe, which is carried on two eight-wheel articulated trucks, that will easily negotiate curves. Each truck carries two



Steam Turbine Electric Locomotive.

of the four driving motors already referred to. As the engine is intended for express passenger main line work, it is hoped to obtain comparisons from its actual working with the performances of the reciprocating steam locomotives, especially as regards the relative consumption of fuel and water, the efficiency of transforming the energy of steam into drawbar pull, and the relative rapidity of acceleration.

Most of the component parts of this locomotive have already proved themselves effective and efficient in other applications; the novelty lies in the combination of the different elements.

LOCOMOTIVE AND CAR SHOPS OF THE NATIONAL TRANS-CONTINENTAL, WINNIPEG, CANADA.

The locomotive and car shops now under construction on the line of the National Trans-Continental Railway, about six miles east of Winnipeg, Can., are designed to care for the general repairs for 18,000 miles of line, and will have a total floor space of 17 acres. The various buildings are arranged about a midway, which runs north and south across the property, and are served by a series of standard gage service tracks, branching off from the yard tracks at the south. Communication between the buildings is obtained by narrow gage tracks and an over-head traveling crane, which runs the full length of the midway.

The buildings for locomotive work are located on both sides of the midway, and south of the through track, while those for car work are north of this track. The plant is arranged with provision for 100 per cent. extension of each building. With the exception of the storehouse, oilhouse and stores platform, the buildings are of steel construction, with self-supporting steel frames, concrete foundations and concrete walls up to the windows. The superstructure masonry is of brick and is carried up into the parapet walls around the buildings, and capped with concrete coping. The roofing of all the large buildings is composed of felt and asphalt, covered with gravel. The skylights are carried on steel ribs with rolled copper sheathing to carry the glass. Copper is used for all flashing, gutters and ventilators.

Interior illumination will be provided by Cooper-Hewett lamps, and the buildings will be heated by direct and indirect radiation. High and low pressure steam, water, compressed air and drinking water are distributed throughout the various buildings, with numerous outlets. Oil is distributed under pressure from the storage tanks to the furnaces in the boiler shop, while an accumulator provides pressure for operating the various hydraulic machines. The electric traveling cranes throughout the plant are equipped with alternating current motors and are operated directly from the three-phase circuits. A three-inch wooden floor, spiked to sleepers bedded in bituminous concrete, is used in most of the shops.

LOCOMOTIVE DEPARTMENT.

Machine and Erecting Shop.—This shop has three bays, 40 ft., 60 ft. and 70 ft. wide, respectively, and 613 ft. long. The 70-ft. bay is 50 ft. high and is laid out with 25 cross pits. There are two entrance tracks for locomotives. A 120-ton crane serves the entire bay, handling all of the locomotives to and from the pits. A 10-ton crane for general work also serves this bay. The 60-ft. bay is used for heavy individual motor driven machines and is spanned by two 10-ton cranes for handling material. The lye vat is in this bay, and also the flue shop. The 40-ft. bay is devoted to light machine work, the machines being group motor driven. The riveting tower is located at the east end of the bay and is equipped with a 20-ton crane for handling boilers. The indirect heating plants, locker rooms, lavatories, tin shop and light repair and brass department are located on a balcony running the full length of the shop and over the 40-ft. bay. Compressed air for the shop is furnished by two motor driven compressors, thus making this shop independent of the air compressor in the power house, to which, however, it may be connected.

The Boiler and Tank Shop.—This shop has four bays, 30 ft.,

50 ft., 60 ft. and 65 ft. wide, respectively, 180 ft. long and 36 ft. high. The 65-ft. bay has a 20-ton crane and is laid out with tracks and has a capacity for nine tanks. The 60-ft. bay is for general boiler work and is served by a 30-ton traveling crane. An inspection pit at the north end of the bay provides for testing. The 50-ft. bay, devoted to heavy machinery, both individual and group motor driven, is spanned by a 10-ton crane. The 30-ft. bay is used for light motor driven machinery in groups, and above 100 ft. of it extends a balcony on which is carried the indirect heating apparatus and the locker rooms, etc. The remainder of the bay is served by a five-ton electric traveling crane. An air compressor is installed in this shop for supplying the compressed air used in it. The motor driven hydraulic pumps and accumulator for supplying hydraulic pressure for the plant are located in the north end of the shop.

Forge Shop.—This shop is 260 ft. x 100 ft., spanned by a single truss. Mast cranes, with jibs swinging from the furnaces to the hammer, handle the heavier material. Along the south side of the building is a long line of double forges for handling the lighter work. The spring department is located in the north-west end of the shop and handles the spring work for both locomotive and car departments. The machinery, etc., is driven from line shaft by three 40-h.p. motors, carried on wall brackets. A motor driven blower furnishes the necessary blast for the furnaces through underground and over-head piping.

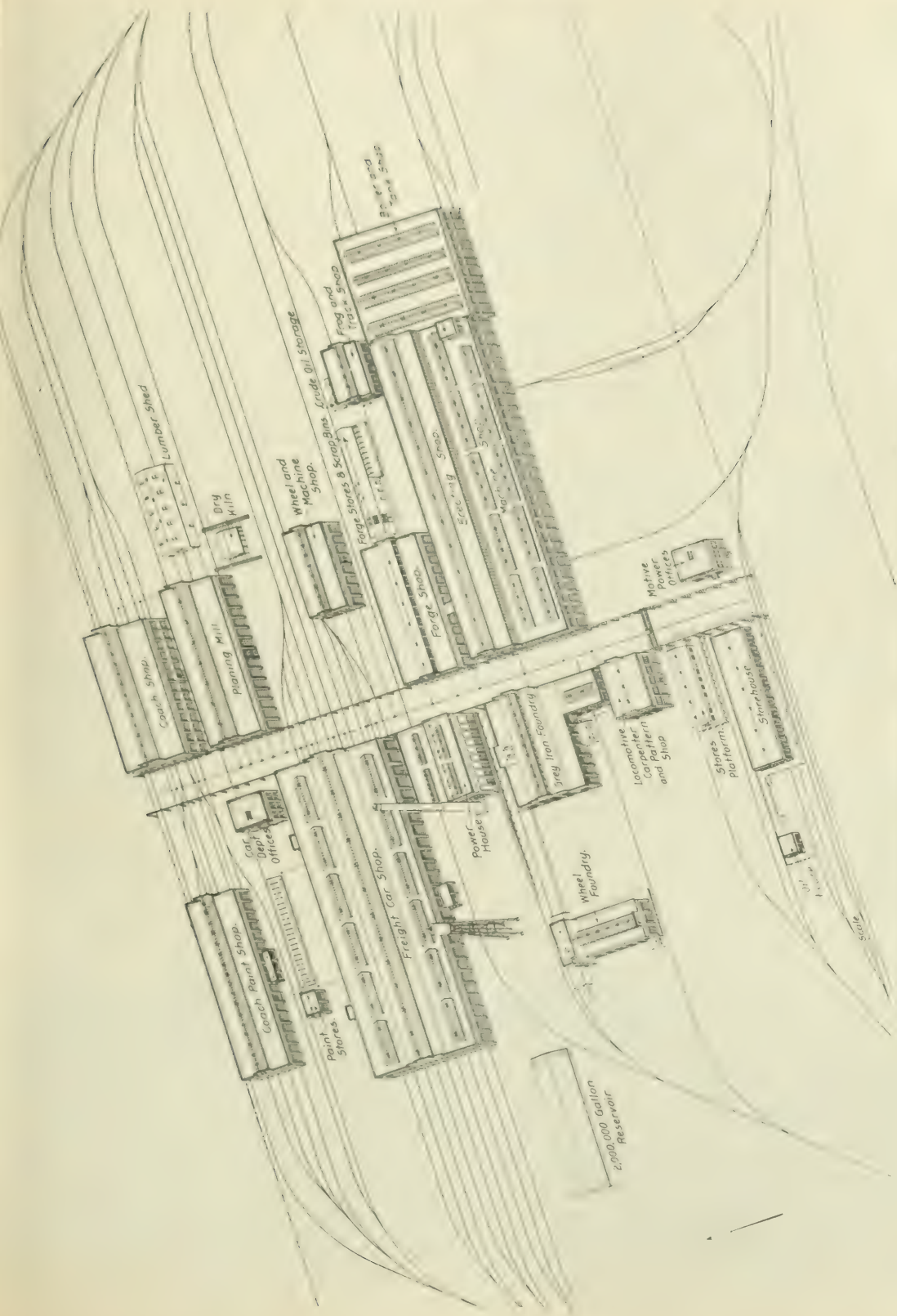
Forge Stores and Scrap Bins.—This building is a frame structure, 30 ft. x 220 ft., built on a light concrete foundation. The east 100 ft. is built as a roofed platform, with the floor four ft. above grade for conveniently handling material to the cars. This platform is divided into bins for sorting and storage of scrap. The western portion is enclosed with plank lining inside and drop siding outside, forming storage for coke, coal and iron stock. The iron stock room is arranged with an extensive rack system for storing the different stock sizes. The coal and coke storage bins are arranged with roof hatches, so that cars may be unloaded by a clam shell bucket and crane.

Frog and Track Shop.—This shop, 60 ft. x 100 ft. x 24 ft. high, is designed to handle repairs to frogs, switches, interlocking plants, etc. It is spanned by a 10-ton electric traveling crane and is equipped with saws, light hammers, drills, planers, etc.; also two groups of small machines driven from line shafts for the lighter rod and bolt work.

Crude Oil Storage.—This is a fireproof concrete building 25 x 60 ft., the floor of which is 8 ft. below grade, the side walls projecting 2 ft. 6 in. above grade. Four iron storage tanks, with a capacity of 8,000 gals. of crude oil each, rest on a concrete foundation. Compressed air connections are made to these tanks by which the oil is forced out and distributed to the various buildings. The tanks are filled by gravity from the tank cars.

Storehouse.—This building is placed on a reinforced concrete platform 4 ft. high. The platform is 85 ft. wide, 300 ft. long and projects 15 ft. into the midway, thus providing a large space which can be served by the midway crane in handling supplies from the storehouse to the various buildings. The storehouse building is of brick, 60 ft. x 260 ft., with a reinforced concrete roof carried on concrete posts. Side doors along both sides of the building give ready access from the loading platform. The building is lighted with incandescent lamps. The office has maple flooring, while the rest of the building has a cement-finished top on the reinforced concrete flooring. An extension of the storehouse platform, 100 ft. long, connects with that of the oil house.

Oilhouse.—This is a brick building, 30 ft. x 40 ft., with a concrete roof and divided into two rooms, one for the oil pumps and the other for storing oil cans, waste, etc. The platform is 50 ft. wide, 70 ft. long and 4 ft. high, and similar to that at the storehouse. A 10-ft. basement contains nine storage tanks for holding the various kinds of oil. A gasoline tank is buried outside the building and is connected to a pump in the building. The storage tanks are filled either by gravity from tank cars or from barrels emptied into fill boxes set in the platform floor and piped to the tanks. The oil is handled in the pump room by



General Plan of Locomotive and Car Shops, National Trans-Continental, Winn peg, Man.

blower measuring pump, one pump being connected to each tank.

Storage Platform.—This is a large platform of reinforced concrete construction, 56 ft. x 180 ft. and 4 ft. high, carried on concrete posts. The platform projects 15 ft. into the midway, so that the midway crane may handle material from the platform to the other buildings. On this platform is erected a light steel framework, enclosed on the sides and ends with corrugated iron and roofed over. A five-ton hand-operated crane serves the building, a wide crane door at the front permitting it to run out over the platform.

Carpenter and Pattern Shop.—A two-story building, 70 ft. x 100 ft., with a self-supporting steel frame on concrete foundations, is used as a carpenter and pattern shop. The second floor and the roof are of reinforced concrete, making the upper part of the building practically fireproof; fire doors are also used. The ground floor has 3-in. wood flooring and is used as a carpenter and pattern shop, being equipped with light woodworking machinery driven from line shafting. An enclosed stairway leads to the pattern storage above. An elevator, operating in a concrete shaft equipped with fire doors, is installed for handling patterns to and from the storage room. The windows are glazed with wire glass and the room is made as nearly fireproof as possible.

Gray Iron Foundry.—The gray iron foundry, which will supply both the locomotive and car departments, is 130 ft. x 200 ft., with a cleaning room annex 60 ft. x 80 ft. The main foundry has a central bay 70 ft. wide and two side bays each 30 ft. wide. The central bay is the general molding floor and is spanned by a 15-ton electric traveling crane, equipped with a five-ton auxiliary hoist for handling light material. Small jib cranes are attached to the columns for handling flasks, etc. The 30-ft. bay on the north side has a molding floor at the west end and the core room and core ovens at the east end, each served by a one-ton hand-operated traveling crane. There are three core ovens, two with shelves and rack cars for general small cores and one large oven with a platform car for cylinder cores and other large work. The latter oven is served by a five-ton bracket crane.

Between these two departments on the north side is the cupola room with two cupolas, 84 in. and 72 in. in diameter. The scale room for weighing charges and the blower room on an elevated steel platform are also in the cupola room. The core ovens are fired from this room, thus keeping all the ash, etc., in one place. Loaded cars, after weighing, are taken by a pneumatic elevator to the charging room, where they are handled by pneumatic charging machines. The charging floor is of steel plate, with a transfer table and storage tracks for placing loaded cars for charging. The cupola room and charging floor cover a space 30 ft. x 40 ft.

The 30 ft. bay on the south side of the building has the brass foundry at the west end enclosed with expanded metal screens 10 ft. high. This foundry is equipped with brass furnaces and complete equipment, and is served by a one-ton hand-operated traveling crane. The lavatory and locker rooms are also in this bay, as is the heating apparatus for the indirect radiation heating system. The cleaning room is at right angles to the main building and is spanned by a five-ton electric traveling crane. A service track runs through the room, so that clean castings may be carried direct to cars for shipment. The molding sand is stored in bins on the south side and is delivered by cars over the service track and distributed over the industrial tracks inside the building.

Along the north side of the building, between the service track and the foundry, is a long galvanized iron shed roofed in and divided into several compartments. The coke and pig and scrap iron are loaded from the cars under cover and taken into the foundry over the industrial tracks, which are also under cover between the shed and the building. It is important to have both the material and handling tracks under cover on account of the severe winter weather. In addition to the foundry equipment mentioned above, a power molding machine and a brake shop

molding machine have been installed on the molding floor.

Office Buildings.—The locomotive and car departments have separate but similar office buildings. They are two-story structures, 60 ft. x 68 ft., with steel interior framing and maple floors. The offices are on the first floor and the drafting files and blueprinting rooms are on the second floor. Vaults are carried up from the basements to the roofs, providing separate vaults for each floor. The basements are used as testing laboratories, storage rooms, etc.

CAR DEPARTMENT.

Coach Shop.—The coach repair shop is 115 ft. x 260 ft. It has four longitudinal tracks, providing for 12 standard coaches. An industrial track for handling material runs between each pair of standard tracks. A 16-ft. balcony extends along each side of the building, with a light wall enclosing it. There are windows in this wall, or partition, as well as in the outside wall. Material is delivered to the balconies by hoists located at the ends of the balconies. The north balcony is devoted to cabinet work, being equipped with light tools, such as scroll and band saws, lathes, drills, surfacers, etc., which are driven from a line shaft. On the main floor directly below the north balcony are a number of heavy wood-working tools, most of which are individual motor driven. The south balcony is divided into several compartments for upholstering, tinsmithing, varnishing, etc. A small brass shop with lathes, a small planer, drill, two buffing machines and a lacquer oven are located in the west end. On the main floor below the balcony are located the nickel plating department, with its buffing wheels, sash washing sink and the lavatories, locker rooms and indirect heating apparatus. The building has a wooden floor and the balconies have concrete floors.

Coach Paint Shop.—This building is 67 ft. x 340 ft., with four through tracks to accommodate 16 standard coaches, and two narrow gage service tracks.

Freight Car Shop.—This building is 200 ft. x 600 ft., with nine through tracks to accommodate 108 freight cars. It is divided into three equal bays, 65 ft. wide, each of which has three car repair tracks, with two industrial narrow gage tracks. The two side bays have a clear height of 20 ft., while the center bay has a clear height of 30 ft. and is spanned by a 20-ton electric traveling crane with a 5-ton auxiliary. The center bay is designed for handling future steel equipment. On each side of the freight car shop are platform racks and bins for storing prepared rods, bolts, etc. These are served by industrial tracks which run through the shop.

Paint Stores Building.—A small building, 30 ft. x 40 ft., is used for storing, mixing and delivering paint, etc., for the two paint shops. It is fitted with tanks for the various oils and varnishes, bins for dry colors, glass racks, stencil racks and washers, and a color grinder and a putty mixer. Barrels of oil, etc., are handled from the platform, which surrounds the building, by a small telpher hoist which runs along the interior of the shop.

Dry Kiln.—The dry kiln is a concrete and brick building, 40 ft. x 50 ft., divided lengthwise into two kilns. There are two large entrance doors at each end, with tracks running in. The doors are double, with an air space, as are the walls. The coils for heating are placed on the concrete floor. The kilns are controlled from a small cabinet in which are the steam and return control valves, lighting switches, recording thermometers, etc.

Planing Mill.—The planing mill is 100 ft. x 300 ft., and so arranged that standard cars of material can be run in and unloaded at the machines. The north side of the shop is devoted to sill work and the machines are arranged so that the material goes through without doubling back. The south portion of the shop handles the flat work for flooring, sheathing, etc. At the west end of the shop is the department for door and sash work. On the south side, at the center, is located the lavatory and locker room, and on a steel platform above the indirect heating apparatus. On the same platform are the exhausters fans for dust, shavings, etc.

Wheel Foundry.—The wheel foundry is 70 ft. x 150 ft., laid

out on the straight line floor principle, with four floors of 25 wheels each, giving a capacity of 100 wheels per day. There are 17 unloading pits and two putting cranes. Wheels are cleaned and loaded on the cars from a platform at the level of the pits. The cupola room, care room and charging floor are at the north end of the building and are equipped with a pneumatic elevator, scale room, storage trucks, etc. There is a wheel breaker between the wheel and the provision boundaries.

Wheel and Axle Shop.—This is a building 60 ft. x 100 ft., powered by a 10-ton electric traveling crane and equipped with wheel-boring mills, axle lathes, wheel press, wheel lathes, tire furnaces, etc., for wheel work, and with arch bar drills, lathes, planers, drills, nut tappers, grinders, etc., for general car shop machine work.

POWER PLANT

The power house is 110 ft. x 150 ft., divided lengthwise by a brick fire wall into two rooms, 45 ft. and 60 ft. wide, respectively. The boiler room, 45 ft. x 150 ft., is arranged to receive ten water tube boilers in units of about 400 h.p. each. Two of these boilers have Dutch ovens for burning refuse from the planing mill; the others are equipped with chain grate stokers. The ash pits are furnished with chutes for carrying ashes, by a conveyor, to cars outside of the building. The boiler room and basement floors are concrete; the shafting, etc., for driving the stokers is carried along the ceiling of the basement. The engine room, 60 ft. x 150 ft., has a pump pit 16 ft. wide and 8 ft. deep, running along the entire length of the fire wall. In this pit are located the air receiver for the compressor; the vacuum pump, the fire, boiler, service and well pumps, and the feed water heater.

There are three 500-k.w., a.c. generators, driven at 150 r.p.m. by direct-connected cross-compound Corliss engines; one 250-k.w., a.c. generator, driven by a simple engine, and two 150-k.w., d.c. generators, one driven by a simple engine and the other by a motor. There are two exciter units driven by a simple engine, and a 1,500 cu.-ft. capacity Corliss engine driven air compressor. The engine room is spanned by a 10-ton hand-operated traveling crane. The floor is polished maple, laid on a false floor, carried on sleepers, bedded in bituminous concrete. The chimney is 11 ft. in diam. and 200 ft. high. A 100,000-gal. tank, 125 ft. above grade gives pressure for the general water service distribution. A smaller tank of 10,000 gal. capacity is hung just below the large tank, providing storage and distributing pressure for drinking water.

WATER SUPPLY.

The soft water supply is obtained from a pumping station on the bank of the Red river, just above the city of Winnipeg. The pump house has suction pipes running out into the river, connected to vertical triplex high-speed pumps, with a capacity of 1,000,000 imperial gals. in 24 hrs. These pumps are direct connected to gas engines. A duplicate gas producer plant is

intended to render a shut-down practically impossible. From the pump house the water is conveyed by pipes to the shop, through a 12-in. diam. wire-wound wooden stave main. The pipe line empties into a storage settling reservoir with a storage capacity of 2,000,000 imperial gals. This reservoir is built of concrete, 60 ft. x 270 ft. and 25 ft. deep, with a dividing wall running lengthwise, so that half of the reservoir may be emptied for cleaning. The surrounding wall and floor are of mass concrete, and the center dividing wall is of reinforced concrete. Close to the roof are hung a number of pipe coils for heating in winter to prevent the ice forming too thick on the top of the water and thus interfering with the outlet pipes, etc. Water is drawn from this reservoir for the high level tank, and connections are also made to the fire pumps in the boiler house.

WATER SYSTEM

As there is no municipal sewer into which to drain the shops it was necessary to install a sewer system. A gravity system of tile collecting pipes runs through the shop site connecting with roof downspouts, sanitary sewers and all drains. This sewer line is arranged with manholes, surface drains, vents, etc., and discharges into a concrete sump forming the basement of the pump house. The next floor carries the centrifugal pumps of 16,000 gal. capacity per minute, with suction pipes running down into the sumps and shafts running to the floor above, where the vertical shaft motors for driving are located. These motors are controlled by an automatic starter, which is operated by a float in the sump below. Under heavy rain conditions the flow from the shops and the grounds is estimated at approximately 16,000 gal. per minute. The pump house is a small reinforced concrete building located about 1,400 ft. from the midway. The two pump discharges run into a single 36-in. diameter banded wood stave pipe, which runs from the pump house to the Seine river, into which it discharges close to its junction with the Red river.

The details of the shop plant were developed and the actual construction carried out under the supervision of Frank W. Walker, M.B., superintendent of the terminal shops, National Trans-Continental Railway.

BURLINGTON CHAIR CAR.

The new Burlington passenger equipment has heavy fish-belly girder underframes and the upper structure of wood. An example of this is seen in the new chair cars for that system, built by the American Car & Foundry Co. The cars are 70 ft. long out to end of sills and 9 ft. 8 in. wide out to side sills. The six-wheel trucks have 41½-in. steel wheels and plated wood wheel pieces. The two trucks weigh 40,500 lbs. and the car body 78,800 lbs; total, 119,300 lbs. The principal members of the steel underframe are the two fish-belly plate girders, which are ¾ in. thick, 28 in. deep at the center and 14¼ in. at bol-

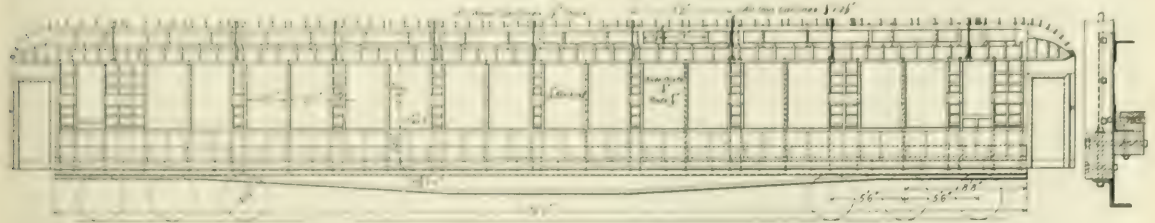


Burlington Chair Car.

stern with a top cover plate $1\frac{1}{2}$ x 10 ft. in. throughout the whole length. The lower edge of the under is reinforced by 3 x 1 ft. in. angles on the outside and 3 x 3 x $\frac{1}{2}$ in. angles on the inside, and at the top there is an angle 3 x 3 x $\frac{1}{2}$ in. There are three wooden floorboards with 4 x 6 in. in. on each side of the center sill. The side sill consist of plate angles 11 in. deep and 20 in. thick, reinforced near the top with a 3 x 3 x $\frac{1}{2}$ in. angle on the inside and at the bottom by 3 x 3 x $\frac{1}{2}$ in. Z bars, and at the floor line by means of 3 x 4 x $\frac{1}{2}$ in. angles.

The body bolsters are built up of plates and shapes with web

The roofing of the upper and lower deck is covered with No. 8 heavy duck, laid lengthwise and lapped over on the sides of the crown molding. The outside of this duck is painted with two coats of special roof paint, but no paint is used on the underside of the canvas or on the wood before the application of the canvas. The outside finish consists of $3\frac{1}{4}$ x $2\frac{1}{4}$ -in. oval section white wood, tongued and grooved. The interior finish is of selected mahogany of superior grade and neat design, without inlay. The ceiling is painted light green. The seats are the Hale & Kilburn walk-over chairs. The covering for the smoking



Side Elevation of Framing.

plates 11 in. deep. Each bolster consists of two members spaced 1-ft. centers and built into the underframe construction with $1\frac{1}{4}$ -in. cover plate 4 ft. 8 in. x 8 ft. 10 in. The center plates are secured to a substantial steel casting riveted to the main sill, extending the full length between bolster diaphragms. The two needle beams built of shapes and plates spaced 12 ft. apart are 28 in. deep and $\frac{7}{8}$ -in. wide, built into the underframe construction. The location and size of the cross bearers are shown on the drawing. All sills and underframes are coated before riveted with a mixture of 25 per cent. pure lampblack and 75 per cent. pure raw linseed oil.

The framing of the wood super-structure, with dimensions, is

room seats is dark machine buffed leather. The heating is of the vapor system, with separate control in the smoking room, and furnished by the Chicago Car Heating Co. The cars are lighted by electricity, using the head-end system with 54-cell batteries and Gibbs train connectors. The cars are equipped with the Westinghouse LN high-speed brakes, with pressure retaining valves and other late improvements.

REPORT ON PITTSBURGH SUBWAY.*

BY BION J. ARNOLD,
Consulting Engineer.

I. *The Improvements Available* at the present time to provide better rapid transit facilities for the Pittsburgh district are (a) Elevated roads, (b) Subways and (c) Electrification of suburban terminals of steam railroads.

II. *Elevated Roads.* The only available location for an elevated system in the downtown business district would be upon the outlying streets along the rivers, as the structure would not be tolerated in the narrow streets of the more congested central areas. This out-of-the-way location would place an elevated road at a disadvantage.

III. *Subways.* A subway between the downtown business district and certain centers in the outlying districts appears to be a natural development. It is probable that one section of the city will be ready for a subway before the other sections, but eventually all parts of the city should be connected by some unified system of sub-surface transportation.

TECHNICAL ELEMENTS OF SUBWAY SYSTEM.

(a) *First Cost.* The first cost of a double-track subway, fully equipped, may be estimated as between \$1,000,000 and \$2,000,000 per mile of single track. A subway system for Pittsburgh should hardly be undertaken unless an expenditure of at least \$30,000,000 is contemplated, half of this amount, at least, to be spent for the sections first built.

(b) *Operating Expense.* Experience has shown that the ratio between operating expenses and gross earnings, under subway conditions, varies between 40 and 60 per cent., with a fair average of 50 per cent. The average operating expense of a surface system is from 60 per cent. to 70 per cent. of passenger earnings, and subways can be operated at a relatively lower percentage that justifies the larger investment in situations where the density of traffic is great.

(c) *Earnings.* The annual earnings from operation should amount to not less than 10 per cent. of the first cost, and seldom will amount to more than 15 per cent., for before reaching this latter figure there no doubt would arise demands for extensions.

* Abstracted from a preliminary report on the possibilities for rapid transit, presented to the mayor of Pittsburgh.



Seats in Burlington Chair Car.

shown on the accompanying drawing. There is a deafening floor between floor beams, with space above filled with mineral wool. The floor proper consists of two courses of boards. The lower course of pine, matched and grooved and laid crosswise of the car, and the upper course of maple, $\frac{3}{4}$ x $3\frac{1}{4}$ in., laid lengthwise, and between them there is one thickness of hard finish building paper. The entire main body of the car is covered with imported linoleum.

These figures indicate on what narrow margins enterprises of this character must be financed. Under Pittsburgh conditions, I believe that average annual earnings from passengers equal to at least 12 per cent. of the first cost of the system will be necessary to make a subway practicable.

(d) *Earnings per capita.* If the first section of the subway must earn an amount equal to 12 per cent. on \$15,000,000 or \$1,800,000 per year, the question is: when will it be possible to build it?

The earnings per capita of the surface system are now about \$10 as an average, but certain residence sections of the city run as high as \$28 per unit of "sleeping population" of the district. A conservative estimate would be that if a subway can be designed to serve 150,000 people contributing \$12 each year to the subway in addition to their use of the surface system, then an initial investment of \$15,000,000 would be justified, or at the rate of \$100 per person served.

(e) *Density of Population.* At present the maximum density of population in Pittsburgh over any considerable area is about 100 persons per acre, although one ward, the old Seventh, had a density of nearly 200 per acre; but in many residence districts, such as the East Liberty section, the density is as low as 30 per acre. In New York the density per acre for the lower East Side is about 700 per acre, and in Harlem, which is the best contributing district for the New York subway, the density is 150 per acre, which is the same as the average for the entire island of Manhattan. No doubt there will be considerable development in the line of apartment dwellings, which will raise the present average density of population in many sections, although it will not be safe to count on large contiguous residence areas where the average density will reach as high as 100 per acre. This would indicate that the first section of the subway should be designed to serve an area of about four square miles.

(f) *Combined Surface and Subway Systems.*—It will be wise to count on a combined system using the subway as a main trunk line and the surface railway as a means of collecting and distributing the passengers over a wide area. The tubes should be located and designed so as to accommodate suburban trains coming into the city over the various lines of the present railways, which may be electrified eventually. It will be necessary to design a subway for real rapid transit by eliminating the stops in the short haul territory just outside the business center of the city and to operate trains instead of single car units.

(g) *Location.*—In general, the first section of the subway should connect the downtown district with East Liberty, with two stations in the business center and about three stations in the East Liberty district. The second section of the subway should be built under the river to Allegheny, and the next two sections should consist of loops in the business center and an extension to the South Side.

FINANCIAL CONSIDERATION.

Any subsurface transportation system, to be permanently successful, should be able to carry the following financial burdens:

1. Operating expenses including taxes, damages, insurance and maintenance, which will vary from 40 per cent. to 60 per cent. of the passenger income, depending upon the volume of traffic.

2. An annual depreciation fund which will vary from 3 per cent. to 5 per cent. of the cost of equipment only.

3. An amortization fund which, at 4 per cent. per year on cost of construction compounded at 2.5 per cent., will retire the investment in structure in 50 years, or at $\frac{1}{2}$ per cent. per year, would amount to the first cost of construction in 75 years.

4. A contingent reserve fund to take care of extraordinary accidents and other unforeseen contingencies, which should accumulate and be kept invested until it reaches about 5 per cent. of the total cost.

5. Interest on cost, which at present may vary from a maximum of about 8 per cent. with private capital down to about 4 per cent. with municipal credit.

6. Discount fund, which should offset the discount on bonds

or other similar indebtedness in about twenty years.

7. Surplus profits, which in case of private ownership, should be divided with the city on some equitable and agreed basis or used for building extensions.

METHODS OF FINANCING SUBWAYS.

Four subway systems have been built in this country: those in Boston, New York and Philadelphia.

The first Boston subway was constructed by the city, and was rented to the local railway company on a basis of not less than 4½ per cent. annual rental upon its total first cost. Arrangements recently have been made, however, for the Boston Elevated Railway to finance the Cambridge extension from Boston, with its own capital.

The original subway of the Interborough company, of New York, was built with money raised upon bonds guaranteed by the city's credit. This money was used in the construction of the subway itself, but the equipment was furnished by a private company which was given the privilege of operating the subway for a period of 50 years with a possible extension of 25 years. The subway of the Hudson & Manhattan was built entirely with private capital, but the company pays an agreed varying annual rental for the use of such streets as it occupies on Manhattan island.

The Philadelphia subway was built entirely by private capital and is used as a downtown terminal for both elevated and surface cars of the Philadelphia Rapid Transit.

The various methods which have been recognized or suggested for financing the cost of subways may be briefly recapitulated as follows:

- (a) *Private Capital for Building, Equipment and Operation.* Length of franchise may be for (a) short term, (b) long term or for (c) indeterminate term. Right to purchase should be retained by the city.

- (b) *City Credit for Construction, Private Capital for Equipment.* To be operated by contractor for a term of years. Sinking fund should be provided to retire city bonds used in construction. City should have the right to purchase equipment at a fair valuation at the end of the contractor's lease.

- (c) *City Credit for both Construction and Equipment, Private Operation.* To be operated by contractor on bonus principle. Sinking funds to be provided for retiring cost, for depreciation and for operating reserve.

- (d) *City Credit for both Construction and Equipment, Municipal Operation.* Municipal construction and operation without the use of any private enterprise whatsoever.

- (e) *Assessment.* Part or all of the cost to be raised by long term assessment on the property benefited, preferably without accumulation of interest. In case of very poor territory the loss from operation during the first years, while business is being developed, should also be financed by assessment.

RETURN ON INVESTMENT IN SUBWAY.

The earnings and net returns will depend on the following:

1. Density of population served, and rides per capita.
2. Equitable arrangement for exchange of transfers between the subway and the collecting and distributing surface system.
3. Use of subway as a downtown terminal by electrified branches of present steam lines.

In my opinion a subway in Pittsburgh will pay eventually, but there will be a loss during the first years of operation, and particularly so if it be built too soon or upon too large a scale. The subway should not be constructed until definite arrangements have been made with existing transportation systems for the joint use of the subway to the mutual advantage of the companies and the traveling public.

PROBLEMS REQUIRING INVESTIGATION

In order to determine, more definitely, the prospects of building a subway in advance of actual needs, so that it may become an important factor in influencing the extent and character of the growth of the city and district, it will be desirable to proceed along the following lines of inquiry:

1. Ascertain the best terms which private capital will offer or

accept for building, equipping and operating the subway and for giving the city the right to purchase.

2. Secure by legislation the right for the city to raise bonds of a type self supporting and independent of the debt limit, so that money for purchasing or constructing a subway and possibly for equipping it also, may be secured by means of the city's credit, and thus reduce to a minimum the fixed charge for interest.

3. Determine what the present street surface railway company will do in regard to interchanging transfers with the subway.

4. Determine what the steam railway companies will do in regard to electrification of their suburban tracks and renting the use of the subway as a downtown terminal or for a through passenger connection for suburban trains.

5. Determine, by comparing the present census with others, the rate of growth of the sections which may be effected by rapid transit development.

6. Ascertain the probable increase in value of real estate in the districts to be served in order to determine whether or not this increase in value of land will justify the building of apartment houses in sufficient numbers to result in a density favorable to subway operation.

7. Investigate the possibilities of raising all or part of the first cost of a subway by assessment on the land benefited by the improvement.

RAILWAY STATISTICS OF THE UNITED STATES FOR THE YEAR ENDED JUNE 30, 1909.

The Interstate Commerce Commission, in the abstract of its annual statistical report for the year ended June 30, 1909, gives statistics for that year from which the principal items are shown in the table below. The report for the year ended June 30, 1908, appeared in our issue of January 14, 1910. The report for 1909 was compiled on substantially the same basis as that for 1908 and differs considerably from previous reports. For instance, in 1908 and 1909 the statements do not include data from reports of companies classed as switching and terminal companies. The comparisons, therefore, between 1908 and 1909 are comparatively accurate, but are not accurate between these two years and the earlier years.

STATISTICS OF RAILWAY IN 1909 AND PREVIOUS YEARS.

	1909.	1908.	1907.	1906.
Miles of road completed.....	2,136,869	233,678	229,951	224,365
Increase, 12 months.....	8,215	5,930	5,588	6,262
*In hands of receivers.....	57,212	57,698	3,926	3,971
Locomotives, number.....	57,212	57,698	55,388	51,672
Cars owned, passenger.....	45,384	45,292	43,973	42,262
Cars owned, freight.....	2,073,606	2,100,784	1,991,557	1,837,912
Cars owned, total.....	2,218,280	2,244,357	2,126,594	1,958,912
Employees.....	1,502,823	1,458,244	1,672,074	1,521,355
Per 100 miles of road.....	638	623	735	689
Total stock and funded debt.....	13,711.9	\$12,840.1	.....	\$14,570.4
Stock and debt per mile road.....	59,259	57,230.0	.....	67,936.0
Gross earnings, millions.....	2,418.7	2,393.8	2,589.1	2,325.8
Average per mile.....	10,361	10,533.0	11,383.0	10,460.0
Passengers carried, millions.....	891.5	890.0	873.9	800.0
Carried 1 mile, millions.....	29,109.3	29,082.8	27,718.6	25,175.0
Tons freight carried, millions.....	1,556.8	1,533.0	1,796.3	1,631.4
Carried 1 mile, millions.....	218,803.0	218,381.5	236,601.4	215,877.6
Average rate per ton-mile, mills.....	7.6	7.5	7.6	7.5
Average passenger fare per mile, cents.....	1.9	2.0	2.0	2.0

*Not reported in the present abstract.

†In millions. This represents only securities outstanding in the hands of the public.

There is given herewith a condensed income account and profit and loss account of operating roads. This includes both operating and financial transactions of these companies, but does not give any statistics for leased companies. The statistics for leased roads include only money received and paid under contracts and agreements, so that the operating revenues and expenses in the table given below covers all companies. For such items as dividends, taxes, etc., the figures for all companies, including leased companies, will be somewhat different from the figures given in the income account. For instance, the aggregate of dividends declared during the year amounted to \$320,890,830.

The report gives the usual totals of accidents. The most important part of the accident records for the year under review, that given in the quarterly bulletins, has already been published

OPERATING ROADS.

INCOME ACCOUNT.		
Rail operations.....		
Operating revenues.....	\$2,418,677,538	
Operating expenses.....	1,999,443,410	
Net operating revenue.....		\$419,234,128
Outside operations.....		
Revenues.....	54,527,793	
Expenses.....	50,590,794	
Net revenue from outside operations.....		3,936,999
Total net revenue.....		823,171,097
Taxes accrued.....		85,199,554
Operating income.....		738,031,543
Other income.....		199,041,118
Gross corporate income.....		937,072,661
Deductions from gross corporate income.....		548,908,546
Net corporate income.....		388,164,115
Disposition of net corporate income:		
Dividends declared from current income.....	233,069,739	
Additions and betterments charged to income.....	23,675,622	
Appropriations to reserves and miscellaneous items.....	20,632,313	
Total.....		277,377,674
Balance to credit of profit and loss.....		110,786,441
PROFIT AND LOSS ACCOUNT.		
Credit balance on June 30, 1908.....		720,423,740
Credit balance for year 1909 from income account.....		110,786,441
Total.....		831,210,181
Dividends declared out of surplus.....		38,972,760
Difference.....		792,236,421
Other profit and loss items—debit balance.....		23,708,013
Balance credit, June 30, 1909, carried to balance sheet.....		768,528,408

in the *Railway Age Gazette* (November 19, 1909, page 968); the totals here given are from the annual reports of the roads and include wayfarers at crossings and trespassers on the tracks of the railways. The following are the principal totals:

	Killed.	Injured.
All classes of persons.....	8,722	104,348
Passengers.....	253	10,311
Ratio to number carried, 1 in.....	3,523,602	86,458
Ratio to number carried one mile, 1 in.....	115,056,611	2,833,133
Other persons.....	5,859	10,309
Trespassers (included in "other persons").....	4,944	5,759
At highway crossings (included in "other persons").....	733	1,830
Ratio of casualties to number employed—		
Employees, all classes, 1 in.....	576	20
Trainmen, 1 in.....	205	9

The abstract indicates that terminal and switching companies are not included in the foregoing totals. These switching companies report 102 persons killed and 975 injured. Whether or not the larger totals include accidents on electric railways does not appear. In the quarterly bulletins electric interurban lines (which in some cases probably include also city street car lines), were included in the accident statistics until within the last six months, but now they are excluded and appear in separate statements. With these changes the value of the statistics for comparison, both the annual and the quarterly, is much lessened if not destroyed.

FOREIGN RAILWAY NOTES.

In Chile this spring the line connecting the capital, Santiago, and the chief port, Valparaiso, 155 miles, with its branches, was to be electrified.

The tunnel for the second track of the Simplon tunnel was by contract to be enlarged and made ready by the original contractors. They have protested against building it; but the Swiss authorities have insisted, and if the old contractors did not take up the work, new bids were to be received for it July 15.

MULTIPLE TRACK RAILWAYS IN OHIO.

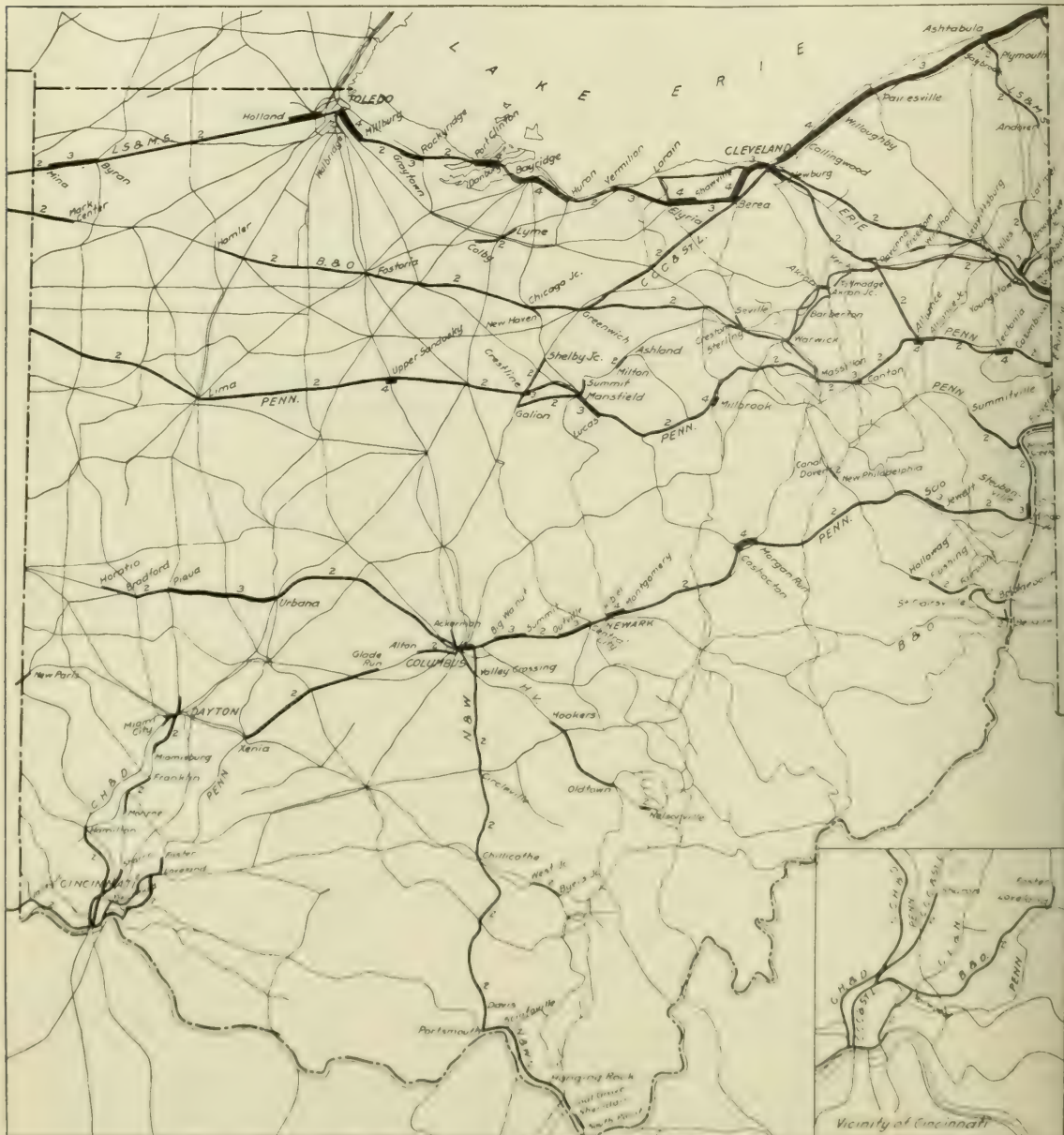
The map of Ohio, given herewith, is designed to show all railways in that state on which there are two or more main tracks. The lines in the vicinity of Cincinnati are shown separately in the lower right hand corner because of the small scale of the large map.

The termini of the sections shown on the map are as follows:

Ohio.
Baltimore & Ohio.

	No. tracks.	Approx. miles.
Newcastle Junction, Pa., to Hamler.....	2	220
Mark Centre to Indiana state line.....	2	9
Hazleton to Girard.....	2	7
Cleveland to C., L. & W. Junction.....	2	3
Sterling to Seville.....	2	5
Lorain to Benton.....	2	3
Chicago Junction to New Haven.....	2	1
Kiblers to Newark.....	2	

	No. tracks.	Approx. miles.
Warwick to Massillon.....	2	12
Canal Dover to New Philadelphia.....	2	3
Holloway to east end of yard.....	2	8
Flushing to Fairpoint.....	2	10
St. Clairsville Junction to Bridgeport.....	2	9
Bellaire to C. & P. crossing.....	2	2
Bellaire to Shicks Mines.....	2	2
Cincinnati to Loveland.....	2	25
West Junction to Byers Junction.....	2	8
Conneaut Harbor to Pennsylvania state line.....	2	5
Cincinnati, Lebanon & Northern.....	2	5
Cincinnati to Norwood.....	2	5
Cincinnati, Hamilton & Dayton.....	2	25
Cincinnati to Hamilton.....	2	25
Greenzastle to Cleveland, Akron & Columbus.....	2	12
N. & W. Junction to Columbus.....	2	12
Cleveland, Cincinnati, Columbus & St. Louis.....	2	55
Cleveland to Greenwich.....	2	18
Shelby Junction to Galion.....	2	18



Multiple-Track Railways In Ohio.

	No. of Miles	Approx. Cost
Galion to Marion Court with Euro Cincinnati to Valley Junction	2	10
Cincinnati to Sharon	2	11
Monroe to Franklin	2	11
Maumslburg to Dayton	2	10
<i>Erie.</i>		
Holland to Cleveland	2	4
Leavittsburg to Berea	2	4
Wadsworth to Treadwell	2	5
Ravenna to B. A. tower	2	2
Kent to Edinburg	2	3
Alton to Barberton	2	3
Stirling to Creston	2	3
Ashtabula to Milton	2	3
Summit to Galton	2	19
Galion to Marion Court with Big Four	2	21
<i>Hocking Valley</i>		
Rockwell to Wallbridge	2	2
Arcadia to Valley Crossing	2	11
Hodges to Matamoras Junction	2	23
East Dayton to Nelsonville	2	2
<i>Lake Shore & Michigan Southern</i>		
Saxmook to Painesville	3	20
Painesville to Walling Ave. (Cleveland)	4	25
Wilson Avenue to West Cleveland	2	5
At West Cleveland	3	1
West Cleveland to Berea	4	9
Berea to Shawville	3	9
Shawville to Elyria	4	3
At Elyria	2	2
Elyria to Vermilion	3	14
Vermilion to Huron	2	12
Huron to Bay Bridge	4	14
Bay Bridge to Danbury	2	2
Danbury to Port Clinton	1	5
Port Clinton to Rocky Ridge	2	16
Rocky Ridge to Graytown	3	2
Graytown to Millbury	2	15
Millbury to Toledo	4	5
Toledo to Nasby	2	5
Nasby to Holland	2	4
Holland to Bryan	3	44
Bryan to Edgerton	4	10
Ashtabula to Andover (inc. 2 miles 3d track)	2	25
Summer to Daughen Junction	2	14
Doughton Junction to Youngstown	3	6
Air Line Junction to Wagon Works	2	2
<i>New York, Chicago & St. Louis.</i>		
At Euclid	2	2
Cleveland to Lorain	2	26
Lyme to Colby	2	9
<i>Norfolk & Western.</i>		
Columbus to Valley Crossing	2	10
Valley Crossing to Hanging Rock (includes some sections not finished)	2	14
Hanging Rock to Coal Grove	2	2
Sheridan to South Point	2	3
<i>Pennsylvania Lines.</i>		
Pennsylvania state line to East Palestine	4	2
East Palestine to Columbiana	2	20
Columbiana to Leetonia	4	3
Leetonia to Alliance Junction	2	16
Alliance Junction to Alliance	2	4
Through Alliance	4	1
Alliance to Canton	2	17
Through Canton	3	1
Canton to Millbrook	2	38
At Millbrook	4	1
Millbrook to Lucas	2	28
Lucas to Mansfield	3	6
Mansfield to Crestline	2	14
In Crestline	3	1
Crestline to Upper Sandusky	2	28
At Upper Sandusky	4	1
Upper Sandusky to Indiana state line	2	85
Union Station, Cleveland to St. Clair Street	2	2
St. Clair Street to Woodland Avenue	3	2
Woodland Avenue to Newburgh	4	2
Newburgh to Alliance	2	48
Summitville to East Liverpool	2	21
East Liverpool to Rochester, Pa.	2	18
Yellow Creek to Mingo Junction	2	20
Niles to Kenwood, Pa.	2	2
West of Detour Junction	2	1
Walbridge to Toledo	2	2
Pennsylvania state line to Steubenville	2	2
Steubenville to Mingo Junction	3	3
Mingo Junction to Jewett	2	23
Jewett to Seio	3	5
Seio to Morgan Run	2	43
Morgan Run to Coshocton	2	4
Coshocton to Montgomery	4	32
Montgomery to Newark	2	4
Newark to Central City	2	4
Central City to Outville	3	8
Outville to Summit	2	8
Summit to Big Walnut	3	6
Big Walnut to Columbus	2	2
Columbus to Urbana	2	47
Urbana to Piqua	3	24
At Piqua	2	2
West of Piqua to Bradford	2	10
Bradford to Horatio	2	4
Columbus to Xenia	2	9
Glade Run to Xenia	2	38
Foster to Cincinnati	2	27
Dayton to Miami City	2	1
New Paris to Richmond, Ind.	2	5
<i>Pittsburgh & Lake Erie.</i>		
Lowellville to Haseltown	4	8
Haseltown to Youngstown	2	8
<i>Toledo & Ohio Central.</i>		
At Columbus	2	4

PROPOSED STANDARD FORM OF RAILWAY TELEPHONE AGREEMENT.

At the recent meeting of the Railway Telegraph Separationists' Association at Los Angeles (*Railway Age Gazette* July 7), a special committee presented the following report:

At the quarterly meeting of the Eastern Division of the association, held in Washington last November, the "standard telephone operating agreement" for railways was taken up for discussion, and the committee of five then appointed reported its conclusions. The proposed agreement is well designed to meet existing laws or any contemplated legislation with respect to discrimination and at the same time provide amply for railway telephone service. Particular care is taken in every clause to state that the rates to be applied shall be the regular charges of the telephone company to its business subscribers and lessees in similar service, under substantially similar conditions. It takes away nothing that the railways now enjoy, except possibly a few comparatively low rentals for apparatus, which would be more than offset by the substitution of the flat rate for measured service at a few points where the railways, under the present standard telephone agreement, are placed on a measured basis and other subscribers or lessees in similar service under substantially the same conditions, have a flat rate. It permits the use of any apparatus the railway company may elect for use on private lines, not connecting with any public or private branch exchange, or mileage line furnished by the telephone company. It requires the railways to use only apparatus approved by the telephone company when such apparatus is for use on lines likely to be connected with their system. There is no objection to such restriction, if it can be termed a restriction. The standard railway contract, under which most of the railways are now operating, was introduced nine years ago. The new agreement is presented now as originally prepared by the telephone company. Within the current year a new and important feature has appeared. The telegraph company controlling the lines on a majority of the railways is working in harmony with the American Telephone & Telegraph Company; and within the past few months we have noticed that the development of the telegraph and telephone, under such harmonious workings, has been a great benefit to the public generally. It is, therefore, the conclusion of the committee that this association should postpone action on the acceptance of the standard telephone operating agreement until the telegraph and telephone companies have further developed their traffic arrangement, in order that it may be more practicable to judge as to what form of agreement will be best adapted to the service.

This committee consisted of E. P. Griffith (Erie), chairman, L. B. Foley (D. L. & W.), F. G. Sherman, A. B. Taylor (N. Y. C.), J. C. Johnson (Penn.), and N. E. Smith (N. Y., N. H. & H.).

The report was accepted, and the committee was continued, but with the proviso that, in the opinion of the meeting, if any railway company requires an agreement with a telephone company at the present time, it should endeavor to adopt the new agreement for a term of one year experimentally.

The British consul at Salina Cruz, the Pacific terminus of the Tehuantepec Railway, states that the freight carried over the Mexican-Isthmus route in 1909 reached nearly 1,000,000 tons. At Salina Cruz port, the temporary entrance to the inside dock has been filled in, and the whole proposed length of wharfage, built of stone and cement, is now completed and fully equipped with electric cranes, etc., for the rapid loading and discharging of vessels. Another large steel and masonry warehouse has been completed, making six in all, each over 300 ft. long. The Pan-American Railway, connecting with the Tehuantepec line, handled of the 1909-10 Chiapas coffee crop, 8,500,000 lbs., fully 75 per cent. of which went to London and Hamburg. Next season it is estimated there will be a 45 per cent. increase in the crop and a 15 per cent. increase in acreage.

General News Section.

The Texas Midland has increased the pay of brakemen and firemen.

The Louisville & Nashville has made an increase of 6 per cent. in the pay of 4,000 shopmen.

The Baltimore, Ohio & Southwestern has increased the pay of locomotive engineers, to take effect August 1.

The Delaware, Lackawanna & Western, after protracted negotiations, has increased the pay of engineers about 13 per cent.

The dispute between the Virginian Railway and its locomotive engineers concerning wages and conditions of labor has been referred to the government mediators, Messrs. Knapp and Neill.

The striking shopmen of the Rock Island road, referred to in our last issue, returned to work on Saturday last without further conference with or any solicitation from the officers of the company.

In the Federal Court at Pittsburgh, Pa., July 16, suits for violation of the 28-hour law regulating the transportation of live stock were filed against the Pennsylvania lines west of Pittsburgh, 140 violations being charged.

A bridge of the West Side Belt Line on West Carson street, Pittsburgh, Pa., was partly wrecked by dynamite July 15. The McClintic-Marshall Construction Co., the contractor on the work, had employed a few non-union men.

The Public Service Commission of Maryland, which was established this year, is investigating an accident on the Baltimore & Ohio, which occurred in Baltimore last week, where six carpenters at work on a bridge were struck by a train and killed.

The Delaware & Hudson, whose track repairmen have been on a strike for about three weeks, has made to the strikers a second offer. It will pay the foremen the rates that they have demanded, and will pay the laborers \$1.65 a day. The demand of the laborers was for \$1.75. According to the reports, about 1,200 men are on strike.

The Chicago Great Western has bought the Missouri river bridge at Leavenworth, Kan., and adjacent yards from the Leavenworth Bridge & Terminal Co., and beginning August 1 will run its trains to and from Kansas City by way of Leavenworth. The bridge is now used by the Chicago, Burlington & Quincy and the Chicago, Rock Island & Pacific.

Sheet metal workers and coppersmiths employed in the shops of the Missouri, Kansas & Texas, who have been on strike several weeks, have returned to work. They have been granted an increase in wages and improved conditions. Painters employed in the shops at Parsons, Kan., who have been on strike several weeks, have also returned to work, an increase in wages of 2½ cents an hour having been granted.

Henry K. McHarg, until recently president of the Texas Central, who, it is said, has sold his interest in that company, has announced that to every conductor, agent, brakeman and porter on the line he will make a present of a month's salary, and to every employee who has been in the service of the road for 20 years he will give a year's salary. The Texas Central is 267 miles long, extending from Waco northwest to Rotan, and has 30 locomotives.

The newly created Federal Bureau of Mines will include the mine accident and fuel investigations formerly in charge of the Technologic Branch of the United States Geological Survey. For the first year of its existence the work of this bureau will be a continuation and expansion of the work as it was carried on under the direction of the Geological Survey. The law creating the new bureau also provides for a variety of other problems, most of which will be deferred until Congress gives adequate appropriations.

A. R. Mosher, president of the Canadian Brotherhood of Railway Employees, announces that the pay of the men on the Intercolonial has been increased, and that numerous favorable changes have been made in the regulations under which employees work. Some of the men will have their pay increased as much as \$30 a month. These changes are the result of pro-

tracted negotiations with the officers of the road and will take effect as from December 1, 1909. Clerks, checkers, dining car conductors and numerous other classes of employees will have two weeks' vacation annually with pay.

Threatened Strike on the Pennsylvania.

Following the conference last week between General Manager Myers and the representatives of the conductors and trainmen, led by Messrs. Garretson and Lee, as reported in our issue of the 14th, page 145, the leaders of the employees gave out positive statements that the demand which they had made was so serious and important that any suggestion to refer the matter to arbitration would be rejected. Reports were current that a strike would be ordered on the night of July 15, the committee of the employees having held long conferences on that day from which no news was given out; but no strike was ordered. The directors of the road met on that day and adopted a resolution approving the position which had been taken by the executive officers. Following this President McCrea issued a statement in which he said:

"It should be clearly understood that it is not less hours of labor demanded by the conductors and trainmen, but, on the contrary, what they do demand is more money for every hour they work than is paid by other roads in this territory."

Calling attention to the awards made on other railroads in the east, Mr. McCrea says: "These awards have been accepted by all other lines in the eastern territory, and the trainmen state that the rates are considered by them as standard, and while the company has expressed a willingness to go to the 10-hour basis, and at the same rate as other lines have in effect under these arbitration awards, it cannot concede the demand which is now made upon it that it shall pay for 10 hours of work the same amount of wages that it now pays for 11 or 12 hours of work."

"In other words, reduced to a mileage basis, the contention of the men is that 100 miles, or less, should constitute a day, figuring 10 miles to the hour, and that we should pay, for instance, 4.04 cents per mile to conductors in through freight service. On the other hand, the trainmen and conductors, on the award made to them by Messrs. Morrissey and Clark (New York Central case) accepted a mileage basis and 10-hour day, at the rate of 3.63 cents per mile for similar runs. The company feels that the demand of the employees is unfair, inasmuch as it cannot be considered other than a penalty for former liberal treatment. . . ."

Mr. Garretson issued a statement in which he said:

"All the men insist upon is that the code of rules that obtains upon every other road in the country shall be applied on the Pennsylvania without a reduction in the present rate of wages. For years it has been the pride of the Pennsylvania to boast to other roads that they could dictate the wages of their employees and the conditions under which they served, and they were able for years to maintain a semblance of this position by the regular issuance of so-called voluntary increases, and no greater misnomer was ever employed to describe such increases than the word voluntary."

"The student of conditions would invariably notice that such voluntary increases were always granted when the rumble of the feet of an approaching grievance committee was heard. Such increases, invariably given on the percentage basis, widened the difference in rates which existed all over the line between similar classes of service or on different runs on the same portions of the territory, but they served the purpose for which they were devised, namely, to distract the attention of the employees from the fact that the conditions under which they served the company were less remunerative even with a comparatively higher rate of pay than those which obtained on surrounding lines."

On Saturday it was announced that there had been some misunderstanding; that on the lines west of Pittsburgh the company had given the employees substantially what they asked for, and that another conference would be held on Monday at 11 o'clock, though the representatives of the company said that there would be nothing new to offer at that conference. The

company in the meantime was making extensive preparations for a possible strike, temporary lodging quarters were made up at the principal terminals and the local authorities were called on at many places to swear in additional policemen. The thousand police in the employ of the company were mobilized, and the men in the large shops of the company were notified that they might be wanted as guards and were asked to say what place they would like to take in case it became necessary to protect the company's property. An officer on the lines west of Pittsburgh told a reporter that it was surprisingly easy to find new trainmen.

On Monday evening the company issued a statement to the effect that the men had accepted the general manager's proposition, which in effect was that "the company would put into effect working conditions, including a minimum day as detailed in the New York Central award, leaving the company's high rates stand, but not increasing them by making the 10-hour day apply to the rates which were made to fit an 11 and 12-hour day." This rather incomplete statement was not much illuminated by the statements given out by the representatives of the employees, but according to the *Philadelphia Press* the result of the conference was as follows:

The terms of settlement have the New York Central award as a basis. The company is to make a change in the working conditions, changing from the "trip" system of pay to the "mileage" system. Men now holding high-pay runs are to be protected. A minimum of 10 hours as a day's work is to be established and the short trip minimum of six hours is to be abolished. Men are guaranteed 26 days' work a month.

The men assert the settlement was due to the clearing up of misunderstandings.

The company asserts it has made no concessions other than those offered six weeks ago; that what the men wanted was \$4.04 for a minimum day of 10 hours (for freight conductors), and what they got was \$3.63. The men point to President McCrea's statement issued on Friday as proving that the company misunderstood the demands. They declare the only concession granted by them was on the amount of pay for overtime, in which they accepted 37 cents an hour, instead of 40 cents.

Mr. Garretson went home on Monday and Mr. Lee on Tuesday, leaving the local committees to continue negotiations about details, which, it was said, might take from three days to a week. This seems to indicate that the essential differences are settled, but on what basis cannot be said with certainty until a fuller statement shall be issued by the parties interested.

On the lines west of Pittsburgh the tension seems to have been relieved, but no definite results are given out.

Strike of Trainmen on the Grand Trunk.

The long pending negotiations between the officers of the Grand Trunk and the representatives of the conductors and trainmen of the road were brought suddenly to an end on the evening of Monday, July 18, by a strike which at once stopped freight traffic almost completely throughout the company's lines. On Tuesday through passenger trains were run with very few exceptions, though in many cases behind time, but many local passenger trains were omitted and only a very few freight trains were run. The strike included the Central Vermont through to New London, Conn., and also the trainmen of the Wabash who run over the Grand Trunk tracks between Detroit and St. Thomas. The only place from which a complete cessation of passenger traffic was reported was on the Central Vermont south of Brattleboro. It appears that the company had engaged considerable numbers of new men and an order was at once issued closing the principal shops. President Hays on Tuesday issued a statement in which he said:

"Messrs. Berry and Murdock, with a committee, met the officers of the company and advised that they had received the authority of a large majority of our trainmen to order a strike in the event a settlement was not reached with the company. A general discussion of the situation took place, during which we advised them that we were not in a position to do more than had been offered in our former proposition, giving the men an increase of approximately 18 per cent. with the further promise that they should be given the same standard rate of pay as the Canadian Pacific as soon as the Grand Trunk, through its relation with the Grand Trunk Pacific, is in a position to participate in the higher rates obtaining on traffic in the Northwest. * * * It was explained that if there was any question of indefiniteness as to the date when the standardization was to take effect we would agree that it should be not later than January 1, 1913, or earlier if the Board of Railway Commissioners, upon hearing the facts in the case, should so determine.

This was not considered satisfactory, and the conference was adjourned until the afternoon, when we were handed the schedule of rates of pay and rules, which are practically the eastern standard. To this reply was made that we could do no better than what had already been offered, and we had no further propositions to make.

"Should a strike be ordered we feel confident that it will be found that many of the employees of the company in the train service will disregard such strike and will continue service with the company. We have a large number of applications from other parties desirous of obtaining employment, and shall also recruit largely from our own forces in other departments.

"In the meantime we shall make effective the rules and rates of pay offered the employees. Pending settlement of matters all shops on the system will be closed.

"We have done the best we can, having regard to the interests of the shareholders and of the men themselves. We have offered substantial increases in wages. For instance, we give conductors between Montreal and Portland an increase from \$110 to \$135; between Montreal and Brockville from \$90 to \$140 a month; between Montreal and Toronto from \$110 to \$140, and brakemen from \$70 to \$85, and brakemen from \$55 to \$60 to \$80. * * * When I put this to the men I said, further, that this was a large increase, but that if they did not think it satisfactory there was still another alternative. I said I was willing, in such case, to go to the arbitration of a board of expert railway men as to whether or not the proposition was fair, and would be willing to abide by their decision.

"Further, I said to the representatives of the men: Suppose a strike is brought on, with all its disturbance of conditions and business; what shall we do eventually but settle it as I have proposed? You will have displaced a great many men, created great losses all over, and got no further ahead. But they refused to listen to this."

Vice-President Murdock, of the Brotherhood of Trainmen, replying to the statement issued by Mr. Hays, said: "This putting up a poor face to the public is about played out. During the last 10 years the company has taken over \$36,000,000 out of revenue and used it on improvements which should have come out of capital account. No other road in the country has done this so far as I know, and we feel that some of those millions should have been directed toward the pockets of the men."

Mr. Murdock went on to name many instances in which the rate offered by the road was lower than that which had been recommended by the Board of Conciliation which had considered the controversy between the road and the men and had made a report a week or two since. He also said that the brotherhoods had proposed a temporary adjustment to last until next January 1, which had not been accepted. When asked as to the power of the brotherhoods, he said that they had \$1,000,000 to keep the strike going, and that striking conductors would receive from the Order of Railway Conductors \$50 a month, and brakemen from the Brotherhood of Railway Trainmen \$35 a month.

The Central Vermont sent an appeal to the federal mediators at Washington, and they—Messrs. Knapp and Neill—sent a telegram to Mr. Murdock, but he replied that there was small hope for settlement and that the men would stop work that evening.

Strike on the Northeastern of England.

Press despatches of July 19 report a strike of employees on the Northeastern Railway of England. No notice had been given. The men say that the strike is a "protest against the generally tyrannical methods of the officers." The strike began at Newcastle, where 3,000 employees left work at 10 o'clock on Monday night.

The Other Side of the Picture.

[Letter in New York Evening Post.]

Let us praise the bridge which carried us safely over. For more than 20 years I held an annual commutation ticket between New York and New Brunswick, N. J. [on the Pennsylvania Railroad, 31 miles], which cost me \$85 for a ride of 60 miles to and fro, at about 25 cents a day, and I have been a passenger on that road for more than 60 years and have never once met with an accident or seen a passenger injured. I will venture to say the

cars are at least as fine as those of any other road out of New York. For more than half a century this annual commutation of \$85 has been maintained and the towns along the road have been built up by it. At last, through the increasing price of material and of labor, and the wages of employees, in order to maintain its reputation for safety and its high state of efficiency, it has been thought necessary for the first time in over 60 years to raise its commutation rates.

New York City Freight Terminals.

A plan for a joint freight terminal in New York City was submitted to Mayor Gaynor last week by Calvin Tomkins, commissioner of docks. The plan provides for a system of yards, docks and storehouses on the west side of Manhattan Island.

The New York Central now has yards near Sixtieth street and Thirtieth street, connected by surface tracks on Eleventh avenue. The new plan is to build a four-track elevated railway along the water front between these yards, and perhaps extending further south. This railway, which will not carry passengers, will have track connection with double-deck piers, provided with freight handling machinery and switching tracks, each pier for the use of one railway company or a group of them. It will also connect with buildings extending from the water front back to Eleventh avenue. The lower floors of these buildings will be provided with tracks, and the upper floors will be used for storage, etc. This scheme would require a classification and L. C. L. yard, which would be at Fortieth street, and would connect with docks for car floats.

Mr. Tomkins proposes a terminal company in which the roads terminating in New York City and on the New Jersey shore of the Hudson river would be stockholders. Each company would pay to the terminal company a proportionate rental. The roads would receive the use of the docks, tracks, etc., and the two lower floors of the terminal buildings, and would themselves arrange for the sub-letting of the upper floors of the buildings, at uniform rates, to industrials. The city would acquire the necessary property and build the elevated railway, docks and buildings, the railway companies guaranteeing that the rental they paid the terminal company would be enough to cover interest and an amortization fund for the bonds by the sale of which the city would get money to pay for the improvements. The cost is estimated at \$100,000,000.

Monorail Accident.

The monorail line which has been under construction in the Borough of the Bronx, New York City, for several months past was last week so far completed that, on Saturday afternoon, the company started out to carry a carload of passengers from Bartow station (on the Harlem River branch of the New York, New Haven & Hartford) to City Island—which is the length of the road—but the car had reached a speed of only 20 miles an hour before it was overturned at a curve, because, apparently, of a new and insecure roadbed or else of insufficient strength in the structure which steadies the cars at the top. The overhead structure did not entirely give way and the car was therefore prevented from falling completely over, but about 20 of the 100 passengers were injured. One of the injured was H. H. Tunis, designer of the road, who was acting as motorman. The proprietors of the road say that they soon have it running in good order.

International Association for the Prevention of Smoke.

At the recent convention at Minneapolis, Minn., R. S. Riley, president of the American Ship Windlass Co., Providence, R. I., read an instructive paper on "Taylor Stokers and Steam Boiler Efficiency," in which he showed by numerous illustrations the principles of construction and operation in their relation to increased efficiency.

American Street and Interurban Railway Association.

Convention Bulletin, No. 2, just issued by the secretary-treasurer, H. C. Donecker, gives information regarding hotel rates, localities, restaurants, etc., for the convention, to be held at Atlantic City, N. J., October 10-14, 1910.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
 AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.
 AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn.
 AMERICAN ASSOC. OF LOCAL FREIGHT AGENTS' ASS'N.—G. W. Dennison, Penna. Co., Toledo, Ohio.
 AMERICAN ASS'N. OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew Bldg., Cincinnati, Ohio.
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York.
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 18; Fort Worth, Tex.
 AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASS'N.—E. H. Fritch, Monadnock Bldg., Chicago.
 AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis.
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago.
 AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.
 AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia.
 AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 290 W. 57th St., N. Y.; 1st and 3d Tues., except July and August, New York.
 AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., N. Y.; 2d Tues.; New York.
 AMERICAN STREET AND INTERURBAN RAILWAY ASS'N.—H. C. Donecker, 29 W. 39th St., New York; Oct. 10-14; Atlantic City.
 ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago.
 ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A. T. & S. F., Topeka, Kan.
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston.
 ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Place, New York.
 BUFFALO TRANSPORTATION CLUB.—J. N. Sells, Buffalo.
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
 CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; Thursdays; Montreal.
 CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Street, Chicago; 2d Monday in month; Chicago.
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
 ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.
 ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton Building, Pittsburgh; 1st and 3d Tuesday; Pittsburgh.
 FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R.R., Richmond, Va.
 GENERAL SUPERINTENDENTS' ASS'N OF CHICAGO.—H. D. Judson, 209 Adams St., Chicago; Wednesday preceding 3d Thursday; Chicago.
 INTERNATIONAL MASTER ROILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
 INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.
 INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.
 INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASS'N.—A. L. Woodworth, Lima, Ohio; Aug. 16-18; Detroit, Mich.
 INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels.
 IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
 MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago.
 NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept.; Boston.
 NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
 NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d Mon. in June, July, August; St. Paul and Minn.
 NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. M. & St. P., Duluth; 4th Saturday; Duluth, Minn.
 OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Bldg.; 2d Wed.
 RAILWAY CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City; 3d Friday in month; Kansas City.
 RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 19 North Linden St., Bethlehem, Pa.; annual, Oct. 11; Richmond, Va.
 RAILWAY SLEEPERS' ASS'N.—J. P. Murphy, Box C, Collinwood, O.
 RAILROAD ENGINEERS' CLUB.—F. O. Robinson, 2d Broadway, Richmond.
 ROADMASTERS AND MAINTENANCE OF WAY ASS'N.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; annual, Sept. 13-16; Chicago.
 ST. LOUIS RAILWAY CLUB.—B. W. Fraughton, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
 SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nequist, La Salle St. Station, Chicago; Oct. 25 and 26, Hotel Chamberlain, Old Point Comfort, Va.
 SECTION ASSOCIATION OF CAR SERVICE OFFICERS.—F. W. Sandwich, A. & W. R. Ry., Montgomery, Ala.; annual, Oct. 20; Atlanta.
 SOUTHERN & SEABOARD RY. R. C. Club.—J. McGill, Prudential Bldg., Atlanta; 2d Thurs., Jan., Mar., July, Sept. and Nov.; Atlanta.
 TRAILER CLUB OF NEW YORK.—C. A. Scripps, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.
 TRAIN DISPATCHERS' ASS'N OF AMERICA.—J. F. Macleod, 7042 Stewart Ave., Chicago.
 TRANSPORTATION CLUB OF TOLEDO.—E. G. Macomber, Woolson Spree Co., Toledo.
 TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, annual meeting, Aug. 16-19, Niagara Falls, Ohio.
 WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg; 2d Monday, except June, July and August, Winnipeg.
 WESTERN CLUB OF U. S. ENGINEERS.—H. H. Warden, Monadnock Bldg., Chicago; Wednesdays, except July and August, Chicago.

Traffic News.

Traveling lecturers who will instruct farmers and ranchmen are now going over the lines of the St. Louis, Memphis and Texas.

The Legislature of Texas has just convened in a special session and the governor of the state proposes to lay before it a proposal to reduce passenger fares generally from three cents a mile to two cents.

The Attorney-General of Indiana has filed with the Interstate Commerce Commission a petition to be allowed to intervene in the suit of the State of Oklahoma to compel a reduction in the rates for upper berths in sleeping cars. The Indiana petition presents a long list of routes on which the sum of \$1 for upper berths is declared to be a reasonable rate.

Shippers in the North River territory are preparing to present claims aggregating \$300,000 for over charges on shipments made during the past two months on the tariffs which have lately been declared by the Interstate Commerce Commission to be excessive. The rates referred to are those which were adjudicated in the Burnham-Hanna-Munger act in which the decision of the commission was sustained by the supreme court.

The National Industrial Traffic League met in Chicago on July 12, and, on the suggestion of H. C. Barlow, traffic director of the Chicago Association of Commerce, decided to make an investigation of the effect on freight rates of the ownership by railroads of water transportation lines on the Great Lakes and elsewhere. Mr. Barlow expressed the belief that the ownership of the boat lines by the railroads is eliminating water competition and that to this is due the fact that the margins between the all-rail and the lake-and-rail rates between Chicago and the East are being reduced.

Representatives of commuters residing on the line of the West Shore Railroad in New Jersey have complained to the Interstate Commerce Commission that the principal defense made by the New Jersey railroads, when questioned last week at Washington as to the increases which have been made in commutation rates, does not apply on the West Shore. This defense was that very large sums of money have been expended in improving the railroads in order to enable them to accommodate the suburban traffic. On the West Shore very few improvements have been made. Moreover, the suburban territory on the West Shore is "peculiarly dedicated to the homes of people of fixed and small incomes."

The New York, New Haven & Hartford announces that after July 23 passengers riding on mileage tickets to or from New York will be required to surrender two extra coupons, this addition of four cents being made to provide for a terminal charge. This terminal charge, presumably added because of the increased expense of maintaining and operating the Grand Central terminal, appears to have been the reason for an increase of five cents in single trip tickets which was made a few weeks since. The changes in the column of distances in the time-tables which were made about that time and which were quickly corrected, appear to have been due to this same cause, or, rather, due to the blunder of someone in assuming that constructive miles, introduced for the purpose of computing rates, were the same as actual miles.

The Interstate Commerce Commission has issued the following as a result of conferences with traffic managers of all roads east of Chicago and north of the Potomac: "It being understood that the commission would exercise its authority under the new law and suspend all general and important rate advances made for the purpose of increasing revenue, the principal carriers in official classifications territory through a committee appointed for that purpose proposed to-day to voluntarily postpone the effective date of such advanced rates until November 1, and arrangement to that effect was made after a conference with the commission. This will not delay investigation and decision as to the reasonableness of the proposed advances, but will obviate the necessity at this time for numerous suspension orders which otherwise would be made."

This week's bulletin of rate changes issued by the New York State Public Service Commission, Second district, shows an unusually large number of advances in freight rates to take effect August 10th to 15th. An advance in carload rates of one cent per 100 lbs. is generally made on grain and grain

products between points in New York by the roads in the New York Central and Erie systems, also by the Delagh Valley, the Lackawanna, the Buffalo, Rochester & Pittsburgh, and many others. Rates on numerous low-grade commodities are advanced in amounts ranging from a quarter of a cent to two cents per 100 lbs. The taking effect of some of these rates, as well as rates published to take effect August first, may be suspended [by the roads] on account of the relation which they bear to rates applying to interstate commerce and published to take effect at the same time, which rates have been indefinitely suspended by the Interstate Commerce Commission pending investigation. The Public Service Commission is not empowered, as is the Interstate Commission, to suspend rate advances.

A conference was held in Chicago last week by representatives of the Interstate Commerce Commission and officers of the transcontinental railroads to consider what method shall be used in checking the accounts of these roads so as to determine what will be the effect on their revenues of the reductions in rates which the commission outlined in its recent opinions in the transcontinental freight rate cases. The commission was represented by John H. Marble, one of its attorneys; J. M. Jones, chief of the bureau of tariffs, and Charles A. Lutz, chief examiner of accounts. The commission in its opinion suggested that the estimate of how much the railroads' earnings should be reduced should be based on a comparison of their actual earnings from traffic in the months of July, August and September, with what their earnings would have been under the rates which it suggested. Representatives of the railroads pointed out that this method would be unsatisfactory because, as shippers expect reductions in rates to be made October 1, they naturally will ship as little freight as possible until the lower rates go into effect. It was suggested that it would be better to compute the probable reduction in earnings on the basis of freight already carried in past months. It was finally decided to leave to the commission the selection of the months whose business shall be used as the basis of computation.

The Shippers and Receivers' Association of Cincinnati has applied to the federal court for a mandatory injunction to compel the Interstate Commerce Commission to annul its recent order in the case of rates from Cincinnati south, reopen the hearing and give another decision. The rates to which objection is made were to take effect July 15. One of the questions which plaintiffs desire to settle is that of the right of the commission to consider the earnings of a group of roads when deciding whether or not the rates on a single road in the group are excessive. Rates from the Middle West to the Southeast as compared with the rates from the seaboard to the same territory have been a bone of contention for 25 years, Chicago and St. Louis shippers claiming to lose great volumes of business annually on account of the discrimination. The bulk of the business between Cincinnati and Chattanooga is done by the Cincinnati, New Orleans & Texas Pacific, which, it was shown, earns \$26,000 per mile of road. This fact was cited by the shippers to show that the rates could be reduced materially without endangering a fair return to the road. The commission, in its decision, admitted that the road in question would not suffer from the reduction in rates asked for by the complainants, but it insisted that if such reduction were to be made it would be unfair to the other roads which were not enjoying such large earnings and which were roundabout routes between the same points. It is insisted by the shippers that the commission did not have the power to take this into consideration.

H. P. Hood & Sons, of Boston, who, with other firms, have protested to the Interstate Commerce Commission against a large increase in the rates on milk from northern New England to Boston, over the Boston & Maine, present a statement to the effect that they have enjoyed the same rates constantly since 1856. These are based on a price of \$100 a car a mile a year. In the beginning, the firm supplied the cars itself in order to develop the business, spending about \$15,000 for each carload developed; and it continues to furnish the cars. On the Boston & Maine the firm now has 21 car lines. Besides furnishing the cars, the Messrs. Hood have built the terminal depots, icing houses and creameries. The other roads have adopted a system like that of the Boston & Maine, and it is claimed that the farmers receive for their milk higher prices than are paid elsewhere in the country, except at a few points in California and

in the southern states; while at the same time the retail price of milk has been lower in Boston than in other large cities. It is declared that the system has been profitable to the railway companies. The proposed new rates average about 50 per cent. higher than the old. The Hood company declares that in the year ending Feb. 1, 1910, the average profit on milk sold at retail was 2.5 mills per quart, and the total profit of the company was less than 1.1 per cent. of the aggregate value of

authority to take leases of certain lines in New Hampshire agreed that rates on the leased lines should not be raised above those in existence on August 1, 1883.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting

CAR SURPLUSES AND SHORTAGES.

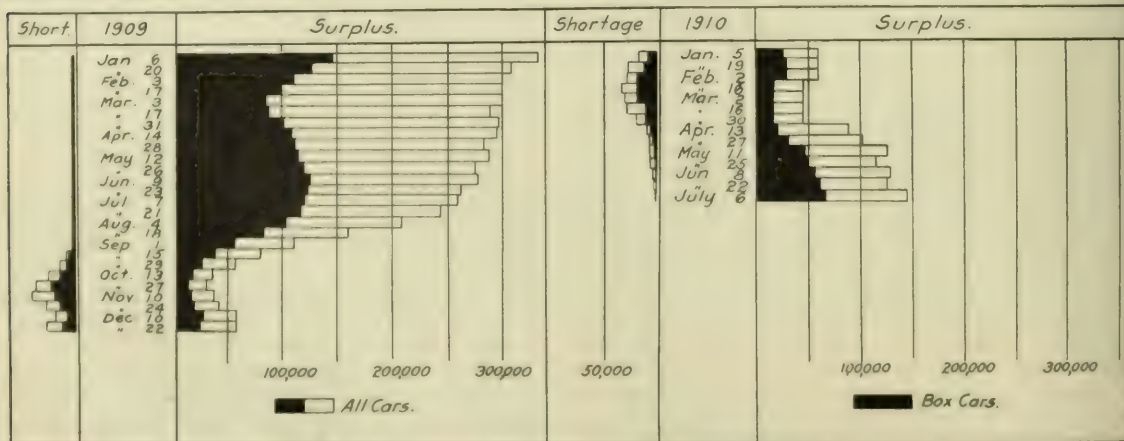
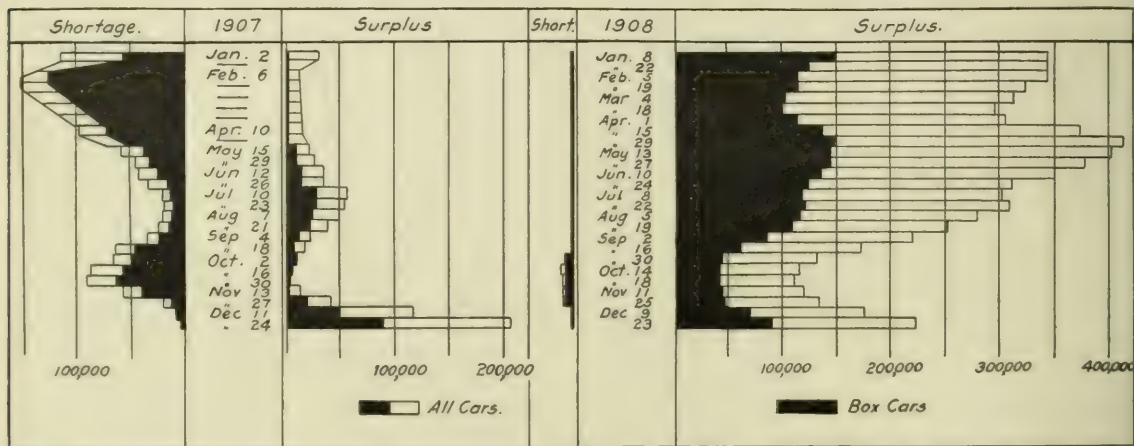
Group	Date	No. of roads.	- Surpluses -				Shortages				Total.
			Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.	
Group *1.	July 6, 1910.	8	126	7	917	93	58	154	0	0	212
" 2.	July 6, 1910.	23	11,891	140	15,205	13,466	7	1	3	3	14
" 3.	July 6, 1910.	24	20,911	598	8,519	3,304	0	115	0	193	308
" 4.	July 6, 1910.	10	2,956	3	415	1,877	27	160	0	0	187
" 5.	July 6, 1910.	20	2,977	216	1,670	1,265	0	25	6	0	31
" 6.	July 6, 1910.	20	7,294	676	2,273	6,029	16	2	1	100	119
" 7.	July 6, 1910.	3	1,079	128	106	627	0	0	0	0	0
" 8.	July 6, 1910.	12	7,338	343	4,659	3,127	0	1	8	2	11
" 9.	July 6, 1910.	12	1,880	347	186	931	0	0	2	0	2
" 10.	July 6, 1910.	18	5,647	1,038	2,810	6,433	10	0	0	0	10
" 11.	July 6, 1910.	6	2,979	345	15	978	0	55	0	10	65
Grand total		156	65,078	3,841	86,775	38,130	118	513	20	308	959

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan, and Western Pennsylvania lines; Group 4—West Virginia, Virginia, and North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota, and North and South Dakota lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.

the milk (two figures which to be consistent need to be explained). In the computation here presented, the cost of transportation averages 4 cents on each can of 8½ quarts. The petition further states that the Boston & Maine, in securing

statistical bulletin No. 75, giving a summary of car shortages and surpluses by groups from February 17, 1909, to July 6, 1910, says:

"There was a reaction in the car situation since the last bul-



Car Surpluses and Shortages in 1907, 1908, 1909 and 1910.

lin, and the surplus shows an increase of \$4,000,000, bringing the total to \$13,824, the largest figure since August, 1900. Of this increase, 5,467 are box cars, \$943 coal and gondolas and 4,096 miscellaneous. In box cars the increase is quite well distributed between groups 3 (Central), 4 (North Atlantic), 10 (Pacific) and 11 (Canadian). The increase in coal is almost entirely on the soft coal roads lying in group 3 (Eastern).

"The slight shortages that have been reported for several periods are reduced to a total of 959, which are so countered as to be of no importance."

The table gives surpluses and shortages by groups for the latest period covered by the report, and the charts show total surpluses and shortages in 1907, 1908, 1909 and 1910.

Drummers' Deceitful Devices.

Gov. Judson Harmon's veto of the "baggage bill," which was recently passed by the Ohio legislature, a measure designed to allow the transportation of freight as personal baggage on passenger trains, has called attention to the attempts to enact similar bills in other legislatures and in Congress. The fact that such laws would greatly delay passenger trains through forcing them to do freight train business is chiefly responsible for the opposition. The support for the measure comes from commercial travelers, who would have the privilege of shipping unlimited quantities of goods, to be delivered on sale, at express speed at extremely low rates. In addition to the "baggage bills" presented in state legislatures no less than four were introduced in Congress at the last session. They are now hibernating until efforts for their passage can be renewed when Congress meets again. There are many ingenious schemes resorted to to ship merchandise free as baggage. It is no rare thing, for instance, to hear someone asking in a crowded waiting room if there is anyone going to a given point without baggage. When such a person is found the inquirer seeks to borrow his ticket to check 150 lbs. of freight. *Pittsburgh Times.*

St. Louis Railway Club.

The St. Louis Railway Club will hold its annual outing and basket picnic at Union, Mo., on Saturday, July 23. The Rock Island has tendered a complimentary train for the use of the members and their families. The entertainment features are to include music, dancing, games, bathing and fishing, and the citizens of Union have invited the members to participate in the grand barbecue and band festival which is to be held on that day.

INTERSTATE COMMERCE COMMISSION.

Coal Rate Reduced.

League of Southern Idaho Commercial Clubs v. Oregon Short Line et al. Opinion by Commissioner Cockrell.

Carload rates on coal from Rock Springs, Wyo., etc., to certain Idaho points found unreasonable and lower rates prescribed. (18 I. C. C., 562.)

Rates on Petroleum Reduced.

National Petroleum Association et al. v. Missouri Pacific et al. National Refining Co. v. Missouri Pacific. Opinion by Commissioner Lane.

The rates on petroleum and its products from Coffeyville, Kan., to Memphis, Tenn., found unreasonable and lower rates prescribed. (18 I. C. C., 593.)

Rates on Phosphate Rock.

Bash Fertilizer Co. v. Wabash et al. Opinion by Commissioner Cockrell.

The complainant, manufacturing commercial fertilizers at Prairie Switch, Ind., asks lower rates on acid phosphate from Baltimore, Md., Buffalo, N. Y., Washington Court House, Ohio, and the Tennessee fields, it is held that lower rates should be established from Buffalo and Washington Court House.

Complainant asks for the same rates on phosphate rock and acid phosphate, for transit privileges, and for reparation, but it is held that acid phosphate is of higher grade than the crude rock, and while the carriers may rate them together the commis-

sioner will preserve an order such rating and complainant is not entitled either to transit privileges or to reparation. (18 I. C. C., 522.)

Substitution of Tonnage at Transit Points.

Henderson & Harland v. St. Louis Iron Mountain & Southern Ry. Opinion by Commissioner Cockrell.

Complainant's shipments of cotton, uncompressed, were destroyed by fire after arrival at the compress; and petition seeks either reparation of the amount paid on the inbound expense bills or an order requiring defendant to honor said expense bills for a reasonable time on new cotton for outbound movement. Complaint dismissed. (18 I. C. C., 514.)

Rates on Iron and Steel.

Highland Iron & Steel Co. v. Vandalia Railroad et al. Opinion by Commissioner Lane.

Rates on various classes of iron and steel from Terre Haute, Ind., to Louisville, Ky., Cincinnati, Ohio, and Dayton not found unreasonable. (18 I. C. C., 601.)

National Rolling Mill Co. v. Baltimore & Ohio Southwestern. Opinion by the commission.

Rates on bar iron from Vincennes, Ind., to Louisville, Ky., not unreasonable. (18 I. C. C., 601.)

Delay Due to Steamship Connection.

George Bonfield & Company v. Southern Pacific Company et al. Opinion by Chairman Knapp.

Shipments forwarded from Hamburg on through bills of lading prepaid to California terminals. The ship in which the consignments were loaded sailed from Hamburg July 4, 1908. When the goods arrived in New Orleans the through rate had been canceled, leaving in effect a rate from New Orleans to San Francisco higher than the proportion of the through rate formerly assessed by the defendants. Defendants collected from complainant the additional charges, although the delay in the ocean transportation was due to a breakdown of the machinery of their own ocean connection. It is held that under rule No. 111 of conference rulings bulletin No. 4 the complaint must be dismissed. (18 I. C. C., 552.)

Reparation Denied.

Wilburine Oil Works, Limited, v. Pennsylvania Railroad et al. Opinion by Chairman Knapp.

Reparation for misrouting where shipper gives instructions to forward the goods via the route taken denied. (18 I. C. C., 518.)

Pankey & Holmes v. Central New England et al. Opinion by Commissioner Clements.

Rates on apples from Mount Ross, N. Y., to Birmingham, Ala., via the Seaboard Despatch, are not found unreasonable. (18 I. C. C., 578.)

Quammen & Austad Lumber Co. v. Chicago Great Western et al. Opinion by Commissioner Lane.

Again the commission holds that the mere fact that a lower rate is now charged does not warrant finding the former higher rate unreasonable. (18 I. C. C., 599.)

Rates from Concentrating Points.

St. Paul Board of Trade et al. v. Minneapolis, St. Paul & Sault Ste. Marie. Opinion by Commissioner Harlan.

The defendant maintains two proportional rates out of Minnesota concentrating markets to Manistique, Mich., on butter and eggs destined to eastern points, one of 20 cents and one of 40 cents per 100 lbs., the former being limited in its application to butter and eggs that have reached the concentrating points over defendant's line and the 40-cent rate being an open rate applicable on butter and eggs reaching those markets over other lines. The defendant may make a distinction in its rates between shipments originating at the concentrating point so far as its line is concerned and traffic on which it has had a haul into the concentrating points; but it may do this only under proper tariff provisions connecting the inbound with the outbound movements, and then only when the inbound movement to the concentrating point proceeds under rates on file with this commission. (19 I. C. C., 285.)

Question of to Whom Reparation is Due.

Stannyside Coal Mining Co. et al. v. Denver & Rio Grande, et al. Opinion by Commissioner Clements.

Reparation is due to the person who has been required to pay the excessive charge as the price of transportation, and who is the true owner of the property transported during the period of transportation. In this case it is admitted that none of the complainants paid the freight charges on which they seek reparation. The claim for reparation is therefore denied. (19 I. C. C., 20.)

Yellow Pine Lumber Case.

Louisiana Central Lumber Co. et al. v. Chicago, Burlington & Quincy et al.

The commission decides that the rates on yellow pine lumber and products from points in Louisiana, Texas, Arkansas and Missouri to points reached by the Chicago, Burlington & Quincy and the Union Pacific in western Nebraska are unreasonable. Reparation will be awarded on all shipments to points reached by the lines of the defendants in Kansas, Colorado and Wyoming during the period while the higher rates were in effect. Reparation will also be awarded on all shipments to western Nebraska points the rates which are herein found to have been unreasonable.

Wheat and Flour Rates from Detroit.

David Stott v. Michigan Central et al. Opinion by Commissioner Prouty.

Complainant, a miller at Detroit, Mich., brings in wheat by water from Duluth, grinds it at Detroit, and ships the product by all rail to various eastern destinations. In the complaint he asks defendants to apply from Detroit to these eastern destinations a rate on wheat which has come to Detroit by water which is less than the rate which they apply on the flour which the complainant has ground from similar wheat, and also that defendants grant to millers located on their lines in case of this wheat the milling-in-transit privilege.

There is very great force in the contention of the complainant, and unless that contention is sustained it is evident that mills located at the end of the water and the beginning of rail transportation cannot grind in competition with those upon either side. In *Hecker, Jones, Jewell Milling Co. v. B. & O. R. R. Co.*, 14 I. C. C., 356, the commission held that if carriers leading to the seaboard granted a milling-in-transit rate to flour for export they should accord the same rate upon wheat brought to the port of export and there ground for export. This order was sustained by the circuit court of the United States upon proceedings brought by the carriers to enjoin its enforcement.

We have here the reverse of that proposition. The Hecker-Jones mill was situated at the end of the rail haul and at the beginning of the water haul. The mill of the complainant is located at the end of the water and the beginning of the rail haul, but in each case the discrimination is the same, and the reason which calls for the allowance of a milling-in-transit rate in that case applies with equal force to the one before us.

While, however, the two cases cannot be distinguished in principle, there are very important practical differences. In the *Hecker-Jones* case it was possible to keep the wheat for export entirely separate from that ground for domestic use. At the present time under that order the Hecker-Jones Company in fact keeps the grain for export milling and the product of that grain entirely distinct from that which is used for home consumption. In the present case the wheat which the complainant brings in by water is mingled with that which he brings in by rail, the two being ground together and therefore inextricably blended in the barrel of flour. The method of the complainant's business is such that it is impossible to distinguish the flour produced from water-borne wheat and that produced from rail wheat, and it is therefore impossible to deal with this case in the same manner in which we did the *Hecker-Jones* case. Complaint dismissed. (18 I. C. C., 582.)

Reparation Awarded.

Texas Grain & Elevator Co. v. Chicago, Rock Island & Pacific et al. Opinion by Chairman Knapp.

Rate on corn in the shuck found unreasonable. (18 I. C. C., 580.)

Chicago, Rock Island & Pacific et al. Opinion by Commissioner Prouty.

Carload of lumber was misrouted by the Texas & Pacific; the original carrier. (18 I. C. C., 589.)

Winters Metallic Paint Co. v. Chicago, Milwaukee & St. Paul et al. Opinion by Commissioner Lane.

Rate on ground iron ore from Iron Ridge Junction, Minn., to Spokane, Wash., and Denver, Colo., are found unreasonable. (18 I. C. C., 586.)

John J. Shyne v. Southern Pacific et al. Opinion by Chairman Knapp.

Overcharge on a carload of lumber shipped from Oregon City, Ore., to Cripple Creek, Colo., due to unreasonable joint rate. (18 I. C. C., 584.)

Lebanon Paper Co. v. Elgin, Joliet & Eastern et al. Opinion by Commissioner Lane.

Unreasonable charges were collected because of misrouting of a carload shipment from Chicago Heights, Ill., to Lebanon, Ore. (18 I. C. C., 591.)

Sunderland Brothers Co. v. St. Louis & San Francisco et al. Opinion by Chairman Knapp.

Minimum weight assessed on complainant's shipments of lime from Ash Grove, Mo., to Pine Bluffs, Wyo., and Laramie found excessive, and lower minimum weight prescribed for the future. (18 I. C. C., 585.)

Wilson Produce Co. v. Pennsylvania Railroad. Opinion by Commissioner Prouty.

One carload of watermelons from Lowell, Fla., was consigned to Pittsburgh, Pa., and diverted en route at Altoona. The diversion should have been made without additional charge. (19 I. C. C., 1.)

Stacy Mercantile Co. v. Minneapolis, St. Paul & Sault Ste. Marie et al. Opinion by Chairman Knapp.

There was discrimination in rates against complainant's shipment of apples from points in Washington to points in North Dakota, as at the time of shipment a lower rate was in effect from other points similarly situated in Washington. (18 I. C. C., 590.)

Henderson Elevator Co. v. Louisville & Nashville. Opinion by Chairman Knapp.

The defendant's failure to establish a proportional rate from Enfield, Ill., to Henderson, Ky., upon grain originating at points beyond Enfield and reshipped from Henderson to southeastern destinations, while maintaining such proportional rates, less than its local rates, from all junction points on its St. Louis division other than Enfield, unduly discriminated against traffic which moved via Enfield. (18 I. C. C., 538.)

STATE COMMISSIONS.

The Railroad Commission of Louisiana has under consideration a rule requiring all railways to carry passengers on freight trains, and a hearing will be held July 26.

The State Railroad Commission of Louisiana proposes to require the railways of the state to keep at all stations, where there is an agent, a full assortment of through tickets to all points, and a hearing will be held July 26.

The Railroad Commission of Indiana has requested the roads in the State to suspend, until November 1, the extensive increases in freight rates which they have lately announced. The commission proposes to investigate the new rates, and for this purpose has revived a general inquiry which was begun in 1907.

The commissioners of Minnesota, Iowa, North Dakota and South Dakota, at a conference held in St. Paul last week decided to call the principal railway traffic officers together for a general conference on July 26 with the hope of heading off the general increase in grain rates which has been announced by the railways to go into effect August 15.

The Michigan Railway Commission has issued an order requiring all the railways in that state, whether charging a passenger fare of 2 or 3 cents per mile, to fix the following maximum rates for excess baggage: From one to 10 miles, per 100 lbs., 8 cents; 391 to 400 miles, \$1.30 per 100 lbs., and other distances in proportion. No charge for excess baggage shall be less than 25 cents.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

A. B. Kearsey, trainmaster of the Atlanta & St. Andrews Bay, has been appointed auditor, with office at Dothan, Ala., succeeding L. D. P'Pool.

H. B. Chamberlain, formerly vice-president in charge of traffic of the Erie Railroad, has been elected vice-president, in charge of traffic, of the Tennessee Central, with office at Nashville, Tenn.

J. E. Franklin has been elected president of the Crystal City & Uvalde, and A. R. Ponder, formerly president and general manager, is now vice-president and general manager, both with offices at Crystal City, Tex.

Operating Officers.

A. D. Shelton, trainmaster of the Southern Railway at Greensboro, N. C., has been appointed superintendent of the Danville division, with office at Greensboro, succeeding H. L. Hungerford, transferred.

J. H. Galivan has been appointed trainmaster of the Saratoga division of the Delaware & Hudson, with office at Albany, N. Y., succeeding W. W. Conaughty, appointed engine despatcher, with office at Green Island.

W. H. Henderson, assistant trainmaster of the Pennsylvania Lines West of Pittsburgh, at Toledo, Ohio, has been appointed trainmaster, with office at Toledo, succeeding L. F. Corcoran, resigned. C. W. Blount, chief clerk to the trainmaster, succeeds Mr. Henderson.

P. G. Flaherty, acting master of transportation of the Grand Trunk at Montreal, Que., has been appointed trainmaster of the Third district, with office at Richmond, and Ernest Walton has been appointed master of transportation, Eastern division, with office at Montreal.

Sullivan S. Morris, superintendent of the Colorado & Southern at Denver, Colo., has been appointed general superintendent of the Yazoo & Mississippi Valley, with office at Memphis, Tenn., succeeding William S. King, resigned. H. E. Renick, assistant superintendent of the Colorado & Southern at Denver, Colo., succeeds Mr. Morris, with office at Denver. J. S. Evans, chief train despatcher, succeeds Mr. Renick.

Traffic Officers.

J. W. Hendley has been appointed a general agent of the Chicago & North Western, with office at Peoria, Ill.

E. H. Bell, commercial agent of the New York Central Lines, at Philadelphia, Pa., has resigned, effective August 1.

E. J. Buckingham has been appointed general passenger agent of the Crystal City & Uvalde, with office at Crystal City, Tex.

C. P. Ensign has been appointed general agent of the Denver & Rio Grande, with office at Los Angeles, Cal., succeeding G. F. Herr, promoted.

Frank M. Adams has been appointed general claim agent of the Puget Sound division of the Chicago, Milwaukee & St. Paul, with office at Seattle, Wash.

John P. Rogerman, traveling passenger agent of the Baltimore & Ohio Southwestern at Dallas, Tex., has been appointed western passenger agent, with office at Kansas City, Mo.

A. W. McElree has been appointed a general agent of the Gulf, Colorado & Santa Fe, with office at Dallas, Tex., succeeding C. L. McManus, resigned to accept service elsewhere.

J. H. Drake, assistant general freight agent of the National Railways of Mexico, has been appointed general freight agent, with office at the City of Mexico, Mex., succeeding C. W. Fish, promoted.

W. L. McWhirter, soliciting freight agent of the Gulf, Colorado & Santa Fe at Galveston, Tex., has been appointed commercial agent, with office at Galveston, succeeding W. J. Nolan, transferred.

W. R. Miller, traveling freight agent of the Chicago, Cincinnati & Louisville at Cincinnati, Ohio, has been transferred to Charleston, W. Va., where he will represent the Chesapeake & Ohio, the Chesapeake & Ohio of Indiana and the Hocking Valley.

W. J. Shotwell, assistant to the vice-president of the Western Pacific at San Francisco, Cal., has been appointed assistant general freight agent, with office at San Francisco. B. F. Nevins has been appointed general live stock agent and W. H. Davenport general agent, both with office at San Francisco.

Edward Mahoney, traveling passenger agent of the Chicago, Milwaukee & St. Paul at Omaha, Neb., has been appointed district passenger agent, with office at Denver, Colo., succeeding S. C. Rhodes, resigned. H. H. Hunkins, traveling passenger agent at Denver, has been transferred to Salt Lake City, Utah.

C. L. McManus, joint freight agent of the Chicago, Rock Island & Gulf and the Gulf, Colorado & Santa Fe at Dallas, Tex., has been appointed general agent of the St. Louis, Brownsville & Mexico and the Brownsville & Matamoros Bridge Company, and general agent in charge of operation of the Rio Grande Railroad, with office at Brownsville, Tex.

Nat H. Hall, soliciting freight agent of the Trinity & Brazos Valley at Galveston, Tex., will succeed to the duties of H. P. Bonner, commercial agent, whose resignation has been announced in these columns, under the title of soliciting freight agent. B. H. Stephens, general agent at Corsicana, Tex., whose appointment as general agent at Dallas, succeeding E. E. Peacock, has been announced, will continue to have charge of the Corsicana territory.

W. A. Beckler, whose appointment as general passenger agent of the Queen & Crescent, with office at Cincinnati, Ohio, has been announced in these columns, began railway work with the Columbus, Hocking Valley & Toledo as a ticket seller at Middleport, Ohio. He was afterward made ticket agent and for four years from June, 1889, he was a traveling passenger agent for the Chicago, St. Paul & Kansas City, with headquarters at Chicago. He then went with the Great Northern as passenger and ticket agent at Spokane, Wash. From March, 1894, to August, 1908, he was northern passenger agent of the Queen & Crescent Route at Chicago, when he was made assistant general passenger agent of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern at Cincinnati, from which position he has recently been promoted.

Charles W. Fish, who has been appointed traffic manager of the National Railways of Mexico, with office at City of Mexico, Mex., was born August 25, 1863, near Natchez, Miss. Mr. Fish was educated in the public schools of Girard, Ill., and began railway work in 1882 as a telegraph operator on the Missouri Pacific. He was later a clerk and traveling accountant for this company. From January, 1888, to September, 1894, he was traveling accountant and local freight agent of the International & Great Northern, and since September, 1894, he has been in the service of various companies, all of which are now a part of the National Railways of Mexico. From September, 1894, to March, 1901, he was general freight and passenger agent, also auditor, of the Texas Mexican Railway, and commercial agent of the National Railroad of Mexico at Laredo, Tex. For a short time in 1901 he was assistant auditor and then for three years was auditor of the National Railroad of Mexico. In May, 1904, he was appointed general freight agent of the same road, the Mexican International and the Inter-oceanic Railway of Mexico, remaining in that position until March 1, 1909, when he was made general freight agent of the National Railways of Mexico and the Inter-oceanic Railway of Mexico, which position he held at the time of his recent appointment.

Engineering and Rolling Stock Officers.

Charles F. Roberts has been appointed assistant locomotive superintendent of the United Railways of Havana, with office at Havana, Cuba.

W. V. O'Neill has been appointed master mechanic at the Crystal City & Uvalde, with office at Crystal City, Texas, succeeding J. S. Hardwick.

D. P. Kellogg, master mechanic of the Southern Pacific at Los Angeles, Cal., has been appointed shop superintendent of the Los Angeles general shops.

F. Martin, assistant division engineer of the Canadian Pacific at Calgary, Alberta, has been appointed a division engineer of the new Saskatchewan division, with office at Moose Jaw, Sask. H. B. Sims, resident engineer at Moose Jaw, has been appointed an assistant division engineer.

OBITUARY.

Lester O. Goddard, for 27 years connected with the law department of the Chicago, Burlington & Quincy, at Chicago, died at Riverside, a suburb of Chicago, on July 13.

I. G. Rawn, president of the Chicago, Indianapolis & Louisville, was shot and killed by a burglar at his summer home at Winnetka, Ill., on July 20. Mr. Rawn was born August 29, 1855, at Delaware, Ohio. He received a common school education, and began railway work in 1870 as a telegraph operator on the Cleveland, Columbus, Cincinnati & Indianapolis, now a part of the Cleveland, Cincinnati, Chicago & St. Louis. He was later a train despatcher and then trainmaster on the same road. From October, 1887, to January, 1889, he was master of transportation on the Kentucky Central, now a part of the Louisville & Nashville, and from January, 1889, until the following January he was division superintendent and superintendent of transportation on the Chesapeake & Ohio. In 1890 he became general superintendent of the Baltimore & Ohio Southwestern, and held this position about 12 years. Following this he was for about four months general superintendent of the Baltimore & Ohio, but in March, 1903, he went to the Illinois Central. From March, 1903, for three months he was assistant to the second vice-president of the I. C., and then was consecutively general superintendent of transportation, assistant general manager, general manager and vice-president. Mr. Rawn left the Illinois Central to become president of the Chicago, Indianapolis & Louisville on November 1, 1909.



I. G. Rawn

The Russian authorities have approved plans for building a railway nearly parallel with and some 175 miles south of the Siberian Railway, from Uralsk, on the Ural river, eastward through Orenburg, Orsk and Akmolinsk to Semipalatinsk, which is a town on the navigable Irtysh river, and connected by steamboats with the Siberian Railway. The country on the route is semi-arid, but at the eastern end, near the foot of a mountain chain, is more fertile. From Uralsk to Semipalatinsk the distance is some 500 miles, but only 300 miles will be undertaken at present. The authorities also contemplate a line from Semipalatinsk northeastward by Barnaul, on the Ob, to a point where this river is navigable. The route is in or near the foothills of the Altai range, a productive country which has already attracted many Russian settlers and has valuable mines. Besides these a coal road 125 miles long to bring coal to the Ob river and two lines in Central Asia, one 350 and one 540 miles long, are recommended.

Railway Construction.

New Incorporations, Surveys, Etc.

ALABAMA, TEXAS & NORTHERN.—This road has been extended from Panola, Ala., to Geiger, five miles. (March 11, p. 546.)

ALABAMA & NICHOLS RIVER.—An officer writes that work has been completed on an extension north to Naclina, Tex. The company is planning to build a further extension but is not yet ready to let contracts for the work. (Oct. 20, p. 827.)

ARIZONA & CALIFORNIA.—See Atchison, Topeka & Santa Fe.

ARIZONA EASTERN.—See Southern Pacific.

ARIZONA, MEXICO & GULF OF CALIFORNIA.—This company, which was organized last March to build from some point on the Arizona Southern, in Nevada, to Port Lobos, on the Gulf of California, about 225 miles for the main line with possible branches to Tucson and Phoenix, has let contracts to C. J. Lantry, of Kansas City, and E. J. Scott, of St. Louis, Mo. The Arizona Southern (owned by The Imperial Copper Company, which in turn is controlled by The Development Company of America), runs from Redrock, on the main line of the Southern Pacific, to Silverbell, Arizona, where the mines of The Imperial Copper Company are located. The contracts recently let call for the construction of 225 miles of main line from Port Lobos northeast to the Arizona Southern. It is expected to have the line built by the end of 1911. The plans also call for a 2,900-ft. pier at Port Lobos. B. P. Cheney, president, 81 Ames building, Boston, Mass.; V. L. Mason, vice-president, New York. The Arizona-Mexico Construction Company, 11 Pine street, New York, was organized to construct the line. F. M. Murphy, president. (April 22, p. 1064.)

ATCHISON, TOPEKA & SANTA FE.—The Arizona & California has been finished from Parker, Ariz., westward to Cadiz, Cal., 84.4 miles, and on July 1 the new Los Angeles-Phoenix line was opened for business. (May 20, p. 1286.)

ATLANTIC NORTHERN & SOUTHERN.—An officer writes that a grading contract was given July 1 to Shuggart & Barnes Brothers, Des Moines, Iowa, for work on an extension of 38 miles from Atlantic, Iowa, south via Grant to Villisca. The company now operates a 17-mile line from Atlantic north to Kimballton. Maximum grades will be 1.75 per cent. and maximum curvature 5 degs. (Nov. 26, p. 1036.)

ATLANTIC, QUEBEC & WESTERN.—This road has been extended from Fort Daniel, Que., northeasterly to Newport, 15 miles. (May 13, p. 1236.)

BANGOR & AROOSTOOK.—The Washburn extension has been opened for business. This consists of a line from Squa Pan, Me., northeasterly via Mapleton to Stockholm, 48 miles, with a branch from Mapleton eastward to Presque Isle, 7.5 miles. (Sept. 10, p. 477.)

BIG BEND TRANSIT.—An officer writes that the Secretary of the Interior has granted this company the only available terminals on the Spokane-Indian reservation, at the junction of the Spokane and Columbia rivers in Washington. The company has grading finished on its right-of-way through the Spokane-Indian and military reserves, and expects to begin construction work this year on the line, which is to be about 65 miles long. The projected route is from Spokane, Wash., west along the south bank of the Spokane river, to the mouth of that river, thence north, crossing the Spokane river and following the east bank of the Columbia river. Maximum grades will be 1 per cent., and there will be two bridges and several trestles. William A. Nicholls, president, 105 Howard street, Spokane. (Dec. 10, p. 1166.)

BRITISH COLUMBIA ELECTRIC.—A contract is said to have been given to McAlpine, Roberts & Co., Vancouver, B. C., for grading work on extensions of the North Vancouver lines in the Capilano district. (Nov. 12, p. 942.)

CANADIAN NORTHERN.—An officer writes that a contract has been given to the Northern Construction Co., Ltd., Winnipeg, Man., to build under the name of the Canadian Northern Pacific

a section of 60 miles of the proposed line from Vancouver, B. C., east along Fraser and North Thompson rivers via Lytton and Kamloops to Yellow Head Pass. The work will be heavy. Detailed plans of the line through the mainland of British Columbia from the lower Fraser terminals at Port Mann to a point on Moose lake, eastward of Tete Jaune Cache, are said to have been filed with the chief commissioner of lands and formally accepted. The first section includes the 37 miles from Yale, south along the Fraser river to Chilliwack. The second section extends from Chilliwack to New Westminster bridge. From Kamloops the line follows the North Thompson river 156 miles to its headwaters. Plans for the section from the North Thompson to McLennan river have not yet been filed. The eastern line is to connect with this section, and will extend from the headwaters of Canoe river northerly to about 10 miles south of Tete Jaune Cache, at the junction of the McLennan with the Fraser river, thence continue easterly a total of 33.6 miles. The plans filed cover upwards of 400 miles of construction, but do not include a section of about 30 miles on the mainland. On Vancouver Island two reconnaissance parties are now in the field, one on the northern shore of Cowichan lake, and the other more southerly. It is expected that the reports will be made and the route decided upon in July so that contracts can be let at once. (July 15, p. 142.)

An officer writes that contracts have been let to Foley, Welch & Stewart, St. Paul, Minn., to build the Duluth, Winnipeg & Pacific from Duluth, Minn., north to Virginia, about 75 miles, where connection is to be made with the Duluth, Rainy Lake & Winnipeg. The contract already let is for all of the work except the station buildings, water tanks and superstructures of steel bridges. The contracts for this work will be let at an early date. (July 8, p. 107.)

CANADIAN NORTHERN PACIFIC.—See Canadian Northern.

CANADIAN NORTHERN QUEBEC.—An extension has been opened for business from Rawdon Junction, Que., to Rawdon, 5.7 miles. (March 11, p. 546.)

CROSBYTON-SOUTH PLAINS.—An officer writes that contracts are let to M. H. Denison, Lubbock, Tex., for the grading, trestles, track-laying and surfacing work on this line. The projected route is from Lubbock, Tex., where connection is to be made with the Atchison, Topeka & Santa Fe northeasterly, thence easterly to Crosbyton, about 40 miles. There will be two trestles, one of 500 ft. and another 1,000 ft. long and 40 ft. high. (July 8, p. 103.)

DEERING SOUTHWESTERN.—An officer writes that this line is to be extended at once from Deering, Mo., east to Caruthersville, on the Mississippi river, about 13 miles. An extension will also be built soon from Camp, the present southern terminus, south-west to Hornersville, about eight miles. (July 15, p. 142.)

DULUTH, WINNIPEG & PACIFIC.—See Canadian Northern.

GRAND TRUNK.—Plans are being made for depressing the tracks of the Grand Trunk in Toronto, Ont., it is said, from Bathurst street to Sunnyside crossing. The work is to be started at once and will cost about \$500,000. When the improvements are finished there will be four tracks between Bathurst street and the freight yard at New Toronto.

GREAT LAKES CONNECTING.—Surveys are being made and right-of-way is being secured for a line through Lawrence county, Pa. The company was organized to build from Elwood City, Pa., northeast to Raymilton, 42 miles. (Feb. 11, p. 329.)

KENTUCKY ROADS.—Plans are being made to build a line from Corbin, Ky., west through coal and timber lands via Somerset to Hopkinsville, about 200 miles. The first section to be built will be from Corbin west to Somerset, 30 miles. C. Williams, Somerset, is secretary of the railway committee.

KETTLE RIVER VALLEY.—This company, which eventually will have a line to connect Vancouver, B. C., with the Kootenays, is said to have given a contract to Macdonnel, Gzowski & Co., Vancouver, for work on 80 miles of the section between Merritt and the headwaters of Coldwater river. The company will receive a subsidy of \$5,000 a mile from the province of British Columbia for 150 miles. From Coldwater the line is to be built eastward in the direction of Penticon, and either the main line or a branch will be built to Princeton. From Penticon the line is to be extended to Midway. From a point 10 miles northeast

of Midway the grade which was built by the Midway & Vernon between Rock Creek and Midway, will be used.

KNOXVILLE, SEVIERVILLE & EASTERN.—An extension of 15 miles is to be built, it is said, from the present eastern terminus at Sevierville, Tenn. (Nov. 5, p. 895.)

LOUISVILLE, LINCOLN FARM & MAMMOTH CAVE TRACTION.—An officer writes that contracts are to be let about September 1 for building this line from Mammoth Cave, Ky., southeast to Glasgow; also to Lincoln Farm and Hodgenville. Maximum grades will not be over 3 per cent. There will be two steel bridges and a hydraulic power house at Green river. J. M. Richardson, president, and C. Van-den-Burgh, general manager, Glasgow; H. H. Snyder, chief engineer. (May 20, p. 1282.)

MEMPHIS, DALLAS & GULF.—See this company in Financial News.

MISSOURI, OKLAHOMA & GULF.—The extension from Durant, Okla., south has been finished to Achille, 11 miles, and is now open for business. About 15 miles remains to be built to complete the extension to Denison, Tex. (May 13, p. 1237.)

NEVADA COPPER BELT.—This company, which now operates a line from Wabuska, Nev., east via Yerington to Mason, 14 miles, has construction work under way on 20 miles from Mason to the Nevada-Douglas Copper mine. P. J. Conway, Sweetwater, Nev., has a contract for some of the work. An officer writes that it is undecided when contracts will be let for a section of eight miles to complete the line to the Douglas mine. (Dec. 24, p. 1261.)

NORTHERN PACIFIC.—Passenger service is now in operation on the Red Mountain branch of the Rocky Mountain division from Helena, Mont., westward to Rimini, 18 miles.

The Roslyn branch of the Seattle division has been extended from Roslyn, Wash., to Beekman, three miles.

OREGON SHORT LINE.—An officer writes regarding the reports that a cut-off is to be built from Logan, Utah, northwest to Cache Junction, that plans for this work have not yet been adopted. (July 8, p. 104.)

An officer is quoted as saying that work is to be started at once on a branch from Montpelier, Idaho, southwest to Paris, in the Bear river country, 11 miles.

PHOENIX & BUCKEYE.—See Southern Pacific.

ST. LOUIS, FORT SMITH & DALLAS.—Incorporated in Oklahoma, with \$50,000 capital, to build from the Arkansas state line at Fort Smith, thence across the Poteau river southwest to Wilburton, in Latimer county, Okla., 60 miles. The estimated cost of the work is \$10,000 a mile. The incorporators include: John Vaughan, M. C. Burke, Fort Smith, Ark.; R. S. Willie, R. C. Alexander, Rogers; J. E. Reynolds and W. M. Murray, Arkoma, Okla.

SOUTHERN PACIFIC.—An officer writes that the Phoenix & Buckeye, which has been taken over by the Arizona Eastern, is building from Phoenix, Ariz., westward via Liberty and Buckeye to Arlington, towards Yuma, 50 miles. Track has been laid on 40 miles. Shattuck & Erdlinger Co., Los Angeles, Cal., are the contractors. Important trestles will be built across the Agua Fria and Hassayampa rivers. (March 18, p. 749.)

An officer writes that a survey has been made for a branch line from a point on the road between Woodland, Cal., and Tehama at Arbuckle, north via Colusa, Princeton and Glenn to Hamilton, which is the eastern terminus of a branch extending from Wyo east. The new line will have a total length of about 50 miles.

UNION PACIFIC.—The Pleasant Valley branch of the Colorado division has been opened for business from Cloverly, Colo., to Hungerford, 13 miles. (Oct. 29, p. 829.)

UNITED RAILWAYS CO. (ELECTRIC), PORTLAND, ORE.—This company is said to have let a contract to build a section of 11 miles from Burlington, Ore., west to Glencoe. Bids were asked for recently to build from Glencoe west to Bay City, about 56 miles (June 3, p. 1391.)

UTAH ROADS.—According to press reports, residents of Beaver, Utah, are back of a project to build a line from Milford south to Minersville, thence east via Adamsville to Greenville, about 35 miles.

Railway Financial News.

BOSTON & ALBANY.—President Brown, of the New York Central, says that the Boston & Albany division of the latter company has been called on to make good under its lease of the B. & A., as follows:

1900	\$100,000
1901	100,000
1902	100,000
1903	100,000
1904	100,000
1905	100,000
1906	100,000
1907	100,000
1908	100,000
1909	100,000
1910	100,000

BOSTON RAILROAD HOLDING CO.—The directors have voted to ask the Massachusetts Railroad Commission for permission to issue new preferred stock, to be guaranteed by the New York, New Haven & Hartford. No statement of the amount of the stock has been made public, but it is understood that if the desired permission is given, the New Haven company will probably return to the Boston Railroad Holding Co. the \$20,012,000 4 per cent. bonds of the Holding company which the New Haven now has in its treasury, and will receive in exchange an equal amount of preferred stock. The Holding company owns a controlling interest in the stock of the Boston & Maine.

BUFFALO & SUSQUEHANNA RAILWAY.—The federal court has authorized the receiver to issue \$383,000 receiver's certificates.

CANADIAN NORTHERN.—The company has issued \$3,000,000 series "V" 4½ per cent. first mortgage equipment bonds, maturing 10 per cent. annually from November 1, 1911, to 1920. The mortgage is secured on 3,250 freight cars, 43 passenger cars and three locomotives. The amount of the bond issue represents 75 per cent. of the cost of this equipment.

CENTRAL NEW ENGLAND.—Joseph Moore, Jr., has sent a letter to the minority stockholders asking them to accept the offer of the New York, New Haven & Hartford to buy their stock at \$45 a share for the preferred and \$22.50 for the common, providing sufficient of the outstanding stock is delivered. The New York, New Haven & Hartford owns \$3,420,285 of the \$3,750,000 preferred stock and \$4,432,776 of the \$1,800,000 common stock of the Central New England.

CHESAPEAKE & OHIO.—The Chesapeake & Ohio Equipment Corporation has been chartered in Virginia with \$1,000,000 authorized stock. The charter of this company is in connection, it is said, with the preparations for a new issue of equipment bonds. George W. Stevens, president of the C. & O., is president of the new company.

CHESAPEAKE & OHIO OF INDIANA.—This company, which has been formed to take over the Chicago, Cincinnati & Louisville, is to issue \$8,200,000 bonds dated July 1, 1910. The total authorized capital stock is \$3,000,000.

CHICAGO, CINCINNATI & LOUISVILLE.—See Chesapeake & Ohio of Indiana.

HOCKING VALLEY.—Colonel S. C. Reynolds, who was recently elected a director of the Kanawha & Michigan, has been elected also a director of the Hocking Valley. The special meeting to authorize an increase of the common stock to \$26,000,000 has been again adjourned to July 21. It is understood that the only suit now pending in the federal courts against the Hocking Valley is the one affecting the right of the Chesapeake & Ohio to the ownership of the majority of the stock of the Hocking Valley.

KANSAS CITY, FORT SCOTT & MEMPHIS.—The New York Stock Exchange has listed \$1,069,000 additional 4 per cent. guaranteed refunding mortgage bonds. Of these bonds \$592,000 were issued to retire an equal amount of underlying bonds, \$167,000 were issued for refunding purposes and \$310,000 were issued for additional lines and terminals.

MEMPHIS, DALLAS & GULF.—The company has filed a certificate of increase of capital stock from \$645,000 to \$7,875,000. The proceeds of the sale of the additional capital stock is to be used, it is said, to extend the line from Murfreesboro, Tenn., to Memphis.

MISSOURI PACIFIC.—See St. Louis, Iron Mountain & Southern.

NEW YORK, CINCINNATI & ST. LOUIS.—A semi-annual dividend of 4½ per cent. on the \$5,000,000 first preferred, and 2½ per cent. on the \$11,000,000 second non-cumulative preferred stock has been declared payable September 1. Dividends have heretofore been paid annually in March. In 1907 5 per cent. was paid on the first preferred and 4 per cent. on the second preferred and nothing on the common; in 1908 and 1909 5 per cent. each was paid on the first preferred and second preferred and nothing on the common; in March, 1910, 5 per cent. was paid on each of the first preferred and second preferred and 3 per cent. was paid on the common.

NEW YORK, NEW HAVEN & HARTFORD.—T. De Witt Cuyler has been elected a director, succeeding J. H. Whittemore, deceased. Mr. Cuyler is an additional representative of the Pennsylvania interests on the New Haven board. He is a director of the New Haven, of the Atchison, Topeka & Santa Fe, and was recently elected a director of the New York, Ontario & Western, a subsidiary of the New Haven.

See also Central New England.

See Boston Railroad Holding Co.

See also an item in regard to this company in General News.

NEW YORK, SUSQUEHANNA & WESTERN.—The second mortgage bondholders of the Middletown, Unionville & Water Gap have refused to accept the extension of their bonds, of which there are \$250,000 outstanding, for one year from June 1. The interest on the first mortgage bonds is guaranteed to November 1, 1911, by the New York, Susquehanna & Western, which operates the Water Gap and owns a majority of the \$150,000 stock. The interest on the second mortgage bonds was guaranteed by the Susquehanna up to June 1, when the principal became due, and the Susquehanna offered, if the bondholders would consent to the extension of the principal, to guarantee interest for a year, but 60 per cent. of the bondholders refused this offer and no interest is now being paid.

NORTHERN CENTRAL.—The committee representing the minority stockholders and the committee representing the majority stock have agreed with the Pennsylvania Railroad to a 999-year lease by the Pennsylvania of the Northern Central. The holders of the stock, \$19,342,550, are to receive a stock dividend of 40 per cent. and 10 per cent. in cash paid from treasury assets. The Pennsylvania Railroad is to guarantee 8 per cent. dividends on both the old and the new stock. After the Pennsylvania Railroad directors have passed on the report of their committee, the stockholders of the Northern Central will vote on the question of approving the lease.

PENNSYLVANIA RAILROAD.—The Philadelphia Stock Exchange has listed \$12,750,000 additional Allegheny Valley general mortgage 4 per cent. bonds. These bonds were issued to retire \$10,000,000 Allegheny Valley first 7 per cent. bonds due April 1, 1910, and for general purposes.

See also Northern Central.

The New York Public Service Commission, New York City has approved an agreement between the Pennsylvania Tunnel & Terminal, which owns the Pennsylvania tunnels, and the Pennsylvania Railroad, whereby the Pennsylvania Railroad is to operate the tunnels and to pay the Tunnel company the net profits from this operation for the 10 months beginning August 1.

ST. LOUIS, IRON MOUNTAIN & SOUTHERN.—This company has declared an annual dividend of 6 per cent. This contrasts with 4 per cent. paid in 1908-1909, 5 per cent. in 1907-1908, 14 per cent. in 1906-1907. Of the \$44,396,573 stock of the Iron Mountain, the Missouri Pacific owns \$44,336,600.

WHEELING & LAKE ERIE.—The United States Circuit Court has authorized the receiver to issue \$180,000 receiver's certificates, the proceeds of the sale of which will be used for the completion of the Sugar Creek & Northern branch. The court has also authorized the extension of \$750,000 receiver's certificates, due July 1, August 7 and September 1. Arrangements for the extension of these certificates have been made through Kuhn, Loeb & Co. and Blair & Co., both of New York. The court has refused the receiver's request for authority to issue an additional \$240,000 certificates for the purchase of tools, construction stations, etc.

Supply Trade Section.

The Railway Supply Manufacturers' Association has moved its offices from 313 Sixth avenue, Pittsburgh, Pa., to room 2135, Oliver building.

John F. Schurch, chief clerk to the president of the Minneapolis, St. Paul & Sault Ste. Marie, has been elected treasurer of the Railway Materials Co., with office in the Old Colony building, Chicago.

The Isthmian Canal Commission will receive bids until August 5 for lumber, centrifugal pumps and fittings for same, steel castings, locomotive and truck springs, steel links for cross conveyor, non-liquid oil, cable grease, etc. (Circular No. 595.)

The Atchison, Topeka & Santa Fe has ordered from the Western Electric Co. 600 of the Western Electric new telephone selectors—the largest order for selectors ever given. The New York Central and the Pennsylvania have given repeat orders for these selectors.

The motive power department of the Chilian Transandine Railway, Ltd., wants catalogues of all kinds of locomotive equipment and supplies, and machinery and supplies for railway shops. These catalogues should be addressed as follows: Locomotive Superintendent, Transandine Railway Company, Ltd., Los Andes, Chile, S. A.

Virgil G. Bogue, consulting engineer, 15 William street, New York, has returned to his headquarters at the New York office. It will be recalled that Mr. Bogue has for the past four years spent much of his time in the west as vice-president and chief engineer of the Western Pacific, which road he built and turned over to its owners last January.

The freight car shop of the Pullman Co., Pullman, Ill., was struck by lightning July 17, and the south end of the building was partly destroyed by fire. The damage was confined to the engine and boiler rooms and the dry kilns; the loss was entirely covered by insurance. The erecting shop, which contained 90 refrigerator cars at the time, was not damaged. It is expected that the plant will be running normally in a few days.

George E. Hannah, who went into the general machinery business after resigning his position with the American Locomotive Co., has concluded that he will again join the ranks of the railway supply fraternity. His address is Paterson, N. J. Mr. Hannah was identified with the Rogers Locomotive Co. before it was taken over by the American Locomotive Co. and served as a salesman, purchasing agent, secretary, treasurer and assistant to the president.

Dexter L. Phipps, general manager of the Chicago Refrigerator Car Co., has resigned to become president and director of the Chicago Car & Equipment Co., Clearing, Ill. Mr. Phipps has been engaged in the car building business for the past 20 years and is thoroughly experienced in this line. The Chicago Car & Equipment Co. has been in business during the past year, its work being largely in the line of car and locomotive repairs. The company expects to open offices and headquarters in Chicago in a short time.

The Southern Railway Equipment Co., St. Louis, Mo., entered its new building, 113 North Second street, on July 1. This company has secured the direct agency for that territory for the Anchor Packing Co., and D. J. Murray, the local representative of that company has taken charge of the packing department of the Southern Railway Supply Co. M. E. Townner, whose resignation as purchasing agent of the St. Louis & San Francisco has been announced in these columns, has been elected president of the company, Mr. Bartman becoming secretary.

At a meeting of the board of directors of The Petroleum Iron Works Co., Sharon, Pa., on July 11, 1910, C. H. Todd, of Washington, Pa., was elected president to succeed E. G. Wright, resigned. Mr. Todd, who was one of the founders of the Petroleum Iron Works Co., and who will be in active charge of the company's affairs, is well and favorably known, especially in the eastern and southwestern oil fields. The directors reported the plant as running at full capacity, with sufficient orders booked to insure a steady run for several months, and the financial position of the company as unusually strong.

TRADE PUBLICATIONS.

Locomotive Coaling Stations.—The Roberts & Schaefer Co., Chicago, has issued its Bulletin No. 21, containing illustrations and detail information of 25 coaling stations which it has designed and built for railways.

Unions.—The Jefferson Union Co., Lexington, Mass., has recently issued a catalogue of its style F male and female union. This company is preparing a catalogue on its new swing union, which will be distributed in the near future.

Sash Operator.—The G. Drouvé Co., Bridgeport, Conn., has just issued a folder setting forth the important features of its "Straight-Push" sash operator for shop buildings, etc. Three photographs are reproduced; two of which show, in half-tone, an installation, the third being a line drawing made from a photograph of a test made on a 150-ft. installation. Seven men are seen standing at equal distances along the sash which is being raised with them, under the control of one man.

RAILWAY STRUCTURES.

LOS ANGELES, CAL.—The Pacific Electric has let the contract to the Weber-Duller Co., Los Angeles, for building a reinforced concrete bridge 396 ft. long and 32 ft. wide over the tracks of the Los Angeles Railway Co. at Cornwell street.

MAMMOTH CAVE, KY.—See Louisville, Lincoln Farm & Mammoth Cave Traction, under Railway Construction.

OTTAWA, ONT.—Bids are wanted up to July 25 by L. K. Jones, secretary of the Department of Railways and Canals, at Ottawa, for the substructure of the Le Pas bridge on the Hudson Bay Railway. (July 8, p. 107.)

PORTLAND, ORE.—An officer of the Oregon Railroad & Navigation Co. writes that bids are in and work is to be started at once on a brick and steel freight station at Portland. The structure will be one-story high, 70 ft. wide, 1,000 ft. long, and cost about \$142,000. Contract for the work has not yet been let.

The double-deck steel bridge to carry two tracks for the Oregon Railroad & Navigation Co. to be built over the Willamette river at Portland, is to have concrete foundations. The bridge will consist of two 286-ft. spans, one 212-ft. span, two 60-ft. girders, 318-ft. highway viaduct. The towers for the lift span will be 265 ft. high, and the improvements will require 6,500 tons of steel. The total estimated cost is \$1,500,000. A contract for the sub-structure has been given to the Union Bridge & Construction Co., Kansas City, Mo. Contract for the steel and erection has not yet been let. (June 17, p. 1572.)

QUEBEC, QUE.—The Quebec bridge, for which bids for the superstructure are being asked for by L. K. Jones, secretary of the Department of Railways and Canals at Ottawa, Ont., up to September 1, is to be of steel construction, requiring about 70,000 tons. It will be a cantilever bridge with a 1,758-ft. span between the river piers. The greatest height of the trusses will be 290 ft. Contract for the foundation work has been let to M. P. & J. T. Davis. (July 15, p. 145.)

ST. LOUIS, MO.—The city council has passed a bill authorizing the abolishment of the grade crossing at Compton avenue. The Missouri Pacific, the St. Louis & San Francisco, the Wabash, and the Terminal Railroad of St. Louis will unite in the construction of the steel viaduct, the companies agreeing to pay for the structure and pay all property damages. The cost is estimated at \$370,000, and the time for its completion is set for July 1, 1911.

The Chicago, Rock Island & Pacific has let the contract to T. S. Leake & Co., Chicago, for building a roundhouse, oil house and machine shop. These buildings were mentioned in the *Railway Age Gazette* of March 18.

WEATHERFORD, TEX.—The Gulf, Colorado & Santa Fe has let the contract to H. D. McCoy, Cleburne, Tex., for building a combined passenger and freight depot. The building is estimated to cost \$20,000. (June 3, p. 1393.)

WICHITA FALLS, TEX.—The six roads entering Wichita Falls have agreed on plans for a union station and the contract for the building has been let to the Texas Construction Co., Fort Worth, Tex. The contract price is \$97,000, and the date for completion is fixed as January 1, 1911. The building will be 281 ft. long, two stories high and of fireproof construction. (May 13, p. 1229.)

Late News.

The items in this column were received after the classified departments were closed.

The Southern Indiana is considering ordering 100 condensation locomotives.

William Daves, special signal engineer at the Chicago Great Western, with office at Chicago, was thrown from a train and killed on July 19 near Oelwein, Iowa.

The attempt to have the Grand Trunk strike of conductors and trainmen settled by arbitration had up to Thursday failed. Vice-President Murdock, of the Brotherhood of Railroad Trainmen, said that the trainmen would not consent to arbitration. See page 165

A press despatch from Mexico City says that the National Railways of Mexico have placed an order for new equipment amounting to \$4,000,000 gold. It calls for 20 Mallett articulated compound locomotives, mail, baggage and express cars and 3,200 freight cars.

The supreme court of Alabama has ordered the sale, on August 1, of the entire stock of the Chattanooga Southern, of which there is \$2,250,000 common and \$750,000 preferred. The road runs from the Tennessee state line to Gadsden, Ala., 87 miles, and has trackage rights into Chattanooga.

The fourth annual meeting of the American Peat Society will be held at Ottawa, Can., on July 25, 26 and 27. The place of meeting is especially appropriate, as the Canadian government maintains a fuel-testing plant for peat only at Ottawa. The program, which consists of a number of individual papers on the use of peat, includes a visit to the government plant. Julius Bordo, of Kingsbridge, New York city, is the secretary.

The Central City & Pactolus has been incorporated in Colorado, with \$1,250,000 capital, to build from Pactolus, Colo., on the Denver, Northwestern & Pacific, near the mouth of the South Beaver creek, in Gilpin county, south to Central City, thence via Nevada to Russell gulch about 12 miles. A branch may also be built from Central City, east to Black Hawk. The incorporators include T. E. Watters, J. McDonough, F. H. Gray, D. J. Davies and P. L. Morris.

All the railways in official classification territory, which include the roads operating in the Western Trunk Line Committee territory, in the central territory and east of Chicago, have voluntarily postponed the effective date of their increased freight rates until November 1. This action on the part of the railways follows the announcement by the Interstate Commerce Commission that it had decided to suspend all important increases pending an investigation into their reasonableness. This makes it unnecessary for the I. C. C. to suspend the rates piecemeal.

Announcement is made that the railways are working on the details of a plan for collecting and diffusing correct information regarding rates, the relation which these rates bear to the value of commodities and other pertinent matters. It is hoped that the wide dissemination of this information will result in the better understanding between the general public, the shippers and the railways. In various sections, specific studies will be made of the causes of any dissatisfaction that may be found, so as to explain the conditions that determine the attitude of railways or to remove the causes of just complaint if it be found that the railways are at fault. This undertaking is in pursuance of the belief that if both the public and the railways have a clear and fuller knowledge and better understanding many differences which now arouse irritation will not only be lessened but removed. A bureau of railway economics, with a central office at Washington, will be charged with the collection, computation and verification of necessary statistics and with the consideration of events of general interest in the transportation field. This bureau will co-operate with the railways in the endeavor to bring about improvements in the relations between them and the public. The committee which is formulating this plan consists of W. C. Brown, of the New York Central Lines; E. P. Ripley, of the Santa Fe; W. W. Finley, of the Southern Railway; Darius Miller, of the Burlington; Daniel Willard, of the Baltimore & Ohio, and B. L. Winchell, of the St. Louis & San Francisco.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Atlantic Northern & Southern expect to be in the market for locomotives within from 30 to 60 days.

The Atlantic Coast Line, as reported in the *Railroad Age Gazette* of July 8, has ordered six simple consolidation locomotives from the Baldwin Locomotive Works.

General Information:		150,000 lbs.
Weight of driver		168,000 lbs.
Total weight		213,000 lbs.
Capacity		300,000 lbs.
Dimensions of storage		185 ft. x 14 ft.
Weight of storage		185 lbs.
Weight of storage		185 lbs.
Height of storage		100 ft.
Weight of storage		2,495 lbs.
Weight of storage		320 lbs.
Weight of storage		2 ft.
Weight of storage		14 ft.
Weight of storage		Wide
Weight of storage		19 ft. x 14 ft.
Weight of storage		16 ft. x 14 ft.
Weight of storage		Steel, 14 ft. x 14 ft.
Weight of storage		49 ft. x 14 ft.
Weight of storage		6,000 gals.
Weight of storage		1,150 tons

Special Equipment.

Boiler lagging	Hammered steel
Brakes	Franklin
Brake shoes	American Brake Co.
Brick arch	American Brake Shoe Co.
Couplers	American Arch Co.
Crane boxes	N.M.C. Co.'s Tower
Headlight	Cast steel
Lagging	Dressel oil
Journal bearings	Hancock 10A
Piston and valve rod packings	Damascus bronze
Safety valve	U. S. Metallic
Sanding devices	Consolidated 3-274
Sight-feed lubricators	Leach "B"—American Loco. Saner Co.
Suction gages	Detroit
Tires	Star Brass Co.
Tubes	Milvale
Valve gear	Spellerized steel
Wheel centers	Walschaerts
	Cast steel

CAR BUILDING.

The Atlantic Northern & Southern expects to be in the market for rolling stock within from 30 to 60 days.

The *Baltimore & Ohio* has ordered the 1,000 composite gondola cars for which it has been in the market for some time. These cars complete the 5,000 car inquiry previously noted and reported in the *Railway Age Gazette* of July 15.

The Texas Company, Houston, Tex., has ordered 200 tank cars from the American Car & Foundry Co. The cars are divided into the following classes: 85, 8,000-gal., single-compartment; 10, 8,000-gal., two-compartment; 15, 8,000-gal., three-compartment; 65, 6,000-gal., single-compartment; 25, 6,000-gal., two-compartment.

MACHINERY AND TOOLS.

The Chicago, Milwaukee & St. Paul has ordered the tools mentioned in the *Railway Age Gazette* of July 8, the 36-in. upright drill being placed with E. Harrington & Son, and the remainder of the tools with Manning, Maxwell & Moore.

IRON AND STEEL.

The Western Maryland has ordered 12,000 tons of bridge steel from the McClintic-Marshall Construction Co.

The Erie has ordered 1,000 tons of bridge steel from the Pennsylvania Steel Co. for a lift bridge at Cleveland, Ohio.

The Baltimore & Ohio has ordered 1,000 tons of rails from the Carnegie Steel Company and 500 tons from the Illinois Steel Company.

The Oregon Railway & Navigation Co. will use 6,500 tons of structural steel for the double-track bridge to be built over the Willamette river at Portland, Ore.

The National Brake & Electric Co., Milwaukee, Wis., has let the contract to the American Bridge Co. for the structural steel for its new machine shop and warehouse.

The *Quebec Bridge*, for which bids are now being asked by L. K. Jones, secretary, Department of Railways and Canals, Ottawa, Ont., will require 70,000 tons of steel.

The *Lima Locomotive & Machine Co.*, Lima, Ohio, has let the contract to the Massillon Bridge & Steel Co. for 600 tons of structural steel for an addition to its plant.

The *Memphis Union Station Co.*, Memphis, Tenn., has ordered 708 tons of structural steel from the Richards-Noelke Iron Works, Indianapolis, Ind., for the new union passenger station.

The *Denver & Rio Grande and the Colorado & Southern* will require 13,600 tons of rails, 34,000 rail joints, 652,000 tie plates, 6,000 kegs of spikes, 800 kegs of track bolts, 300 tons of cast iron pipe and 376 tons of bridge steel for building the double track line from Pueblo, Colo., to Walsenburg.

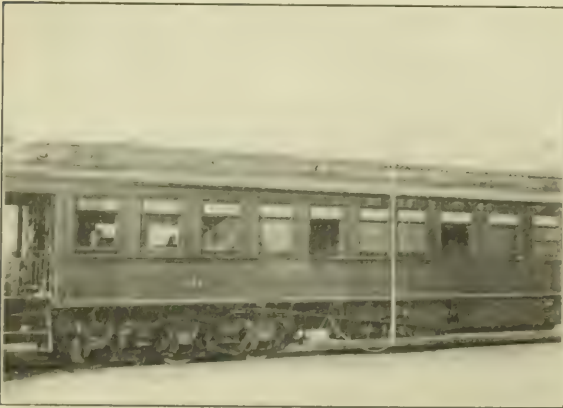
General Conditions in Steel.—The steel situation remains about the same as reported last week. Shipments are heavy and greatly exceed the amount of new orders received. The Republic Iron & Steel Company has reached an agreement with its men and its mills will be started up immediately. Five Canadian steel companies have united to form the Steel Company of Canada, with a capital of \$35,000,000.

Private Car Telephones.

Private cars on the Lehigh Valley have recently been equipped with portable telephones, through the medium of which connections may be secured with telephone train wires, or private telephone lines, at any point along the line. The connection is established by the use of line poles attached to the wires above.

It is thought that the Lehigh Valley is the first road to equip its private cars in this way. At present, two cars, those of the vice-president and of the general manager, have been equipped with telephones. In the former car there are three telephone stations, one in the rear observation room, one in the vice-president's stateroom and one at the stenographer's desk. The general manager's car is equipped with but two phones.

Recent transmission tests of this service, made between the cars



Lehigh Valley Private Car with Telephone Equipment.

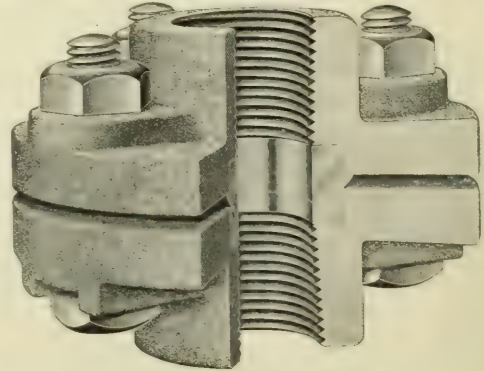
stationed at Sayre, Pa., and the railway offices in New York, are said to have proved satisfactory. The accompanying illustration shows in full with the line pole attached to the wires above. Beneath the car, in a watertight box, a flush type receptacle and a standard telephone sub-station protector are mounted. The line pole used to establish connections with telephone line along the right of way has one end of its connecting cord fitted with a plug which registers with the receptacle. At some stations, jack boxes, mounted on poles, are provided and the connections are made by a cord fitted with two plugs.

A special 16-cycle battery-operated interrupter is used for signaling. The battery is supplied from 20 dry cells carried in a holder beneath the car. This telephone equipment, furnished by the Western Electric Company, New York, was made of special design and finish to conform with the luxurious appointments of the private cars.

Dart Unions and Flanges.

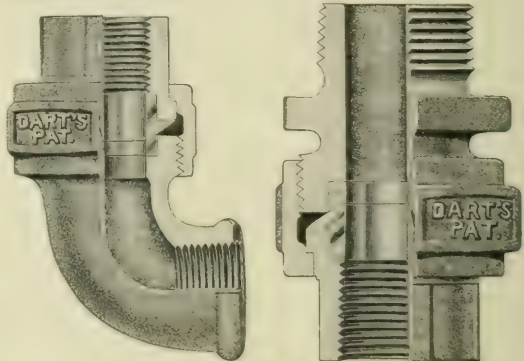
In the illustrations are shown a pipe flange, an air pump union, and a pipe elbow, made by the E. M. Dart Manufacturing Co., Providence, R. I., all of which have the Dart bronze seats.

This style of joint, used in connection with piping joints of various descriptions, has two seats of bronze, so made to prevent



Dart Flange Union.

corrosion. The iron portions of these flanges and unions are made of malleable iron, of heavy pattern. The shoulders in the nut and on the swivel end are very substantially built to withstand heavy strains.



Dart Elbow and Air Pump Union.

The Dart flange union, shown herewith, is adapted for high or low pressure service, and tight joints may be obtained, regardless of the unions being in or out of alinement.

Improved Castor or Portable Turntable.

The accompanying cut shows the Norwood vehicle castor, or portable turntable, for handling automobiles during loading or unloading at railway depots. It is said that lifting an automobile

in order to get it out of the car, and afterward lifting and dragging it around the platform, not only strains and bends the fenders, lamp forks, etc., but often snags the tires by dragging them over



Norwood Vehicle Castor.

nails, splinters, etc., causing damages and considerable loss to the railway company. With this device, fewer men are required for handling automobiles, and the device may also be used in handling large crates, etc.

The body portion of the Norwood castor is made of malleable iron, having four large ball bearing castor rollers on the corners, forming a small truck. The castor is built to conform to the shape of the wheel, and the ends of it droop within $\frac{1}{2}$ in. of the floor, so that the wheel of the automobile will easily roll into it.

This castor should be very useful at railway depots as well as in shops and storerooms. It is manufactured by the Automobile & Accessories Mfg. Co., Baltimore, Md.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY EXCEPT TIMES IN JUNE, BY
THE RAILROAD GAZETTE (INC.), 88 FULTON ST., NEW YORK.

CHICAGO: Plymouth Bldg. CLEVELAND: Williamson Bldg.
LONDON: Queen Anne's Chambers, Westminster.

W. H. BOARDMAN, President.

E. A. SIMMONS, Vice-Pres. & Treas. HENRY LEE, Secretary
The address of the company is the address of the officers.

EDITORS:

W. H. BOARDMAN, Editor.	ROY V. WRIGHT	B. B. ADAMS
SAMUEL O. DUNN,	ERNEST MCCULLOUGH	W. E. HOOPER
Western Edit. Mgr.	G. L. FOWLER	F. E. LINTNER
BRADFORD BOARDMAN,	WILLIAM FORSYTH	F. W. KRAEGER
Eastern Edit. Mgr.	S. W. DUNNING	H. H. SIMMONS
	CLARENCE DEMING	

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico	\$5.00 a year.
Canada	\$6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49.

FRIDAY, JULY 29, 1919

NUMBER 5.

CONTENTS

EDITORIAL:

Editorial Notes	179
The Canadian Railway Situation	180
New Books	180

LETTERS TO THE EDITOR

181

ILLUSTRATED:

Fifty-ton Gondola Car	185
A Simple Method of Re-running Curve Track Centers	194

MISCELLANEOUS:

The Value of American Railway Statistics.....	181
Pooling Locomotives	183
International Railway Congress	186
Transportation and Traffic in Holland	190
The Right to Strike	192
Concrete Construction Plant on a Short-Time Job	192
Foreign Railway Notes	190, 191, 193, 194

GENERAL NEWS SECTION

195

SUPPLY TRADE SECTION.....

207

A COMMITTEE representing New York banking interests is now planning to hold a conference with European bankers to discuss the arrangements which have been made between bankers, cotton shippers and railway representatives in regard to foreign order bills of lading covering cotton shipments. The general situation in regard to these bills of lading was described in the *Railway Age Gazette* of July 15. Since then the traffic representatives of the railways met at White Sulphur Springs, and an agreement probably covering the shipment of this season's cotton crop was reached. The railways agreed to establish offices for the certification of the signatures of their agents on foreign order cotton bills of lading. The question of liability for shipments of cotton on which railway agents had issued bills of lading and which had not been received by the railways was not discussed and no action was taken. The concessions that were made by the railways only in part meet the requirements of the bankers and of the situation in general. The certification of agents' signatures would probably prevent, or at least tend to

prevent, any further delay in the certification of the bills of lading. After all, the present arrangement is only a partial solution of the question and it is one of the railway men interested in the knowledge that it would be to everyone's interest in the long run to be governed. The certification of the signatures of the agents' signature would seem to mean nothing more than the notary public, except on a deed, and a man who was signing such a deed hardly feel that he was getting a guaranteed clear title if he simply knew that the one to sign the deed was, in fact, John Smith. The courts, of course, may not interpret this validation certificate in this way and may conceivably hold that it fixes some further liability in the railway. The bankers, it is understood, may now have to make some arrangements with surety companies for the guarantee of the value of goods behind the bills of lading, and this could, it seems, have been avoided by a more open-handed concession on the part of the railways.

THE success of the city of Philadelphia in marketing a "popular" loan suggests the application of the same principle to loans of our high class railway companies and adapting to this country the usage of France where the "popular" loan in small denominations is familiar if not normal. The present juncture in the railway bond market, when the gilt-edged railway underlying security is depressed and the market restricted, give special emphasis to an idea both for and against which there are good reasons. On the negative side are the mechanical details of the small popular bond, its unfamiliarity to the common people as a form of investment, probably some opposition by old underwriting interests, greater opposition by the savings banks which would fear some reduction of their deposits and, more remote but more serious, the danger that the "gilt-edged" popular bond would ultimately prove the forerunner of railway bonds of a more inferior type, tempting investment of the poor earner, by a high rate of interest. On the positive side are the economies in underwriting, the higher return to the poor investor, the elimination of the "periodical" feature of the savings bank interest accrued—for the price "and interest" in the case of the bond would bring the interest down to date—and finally the benefit to the railways if the clerk, the mechanic, and even the day laborer became small railway investors and their mental attitude toward the railway as an institution changed. There is, of course, a sense in which the poorer classes, in a great host, are, as savings bank depositors, railway investors now. Their deposits are to a great degree secured by the immense holdings of senior railway holdings by the savings banks; but it is a secondary relation and different in moral and sentimental results from the direct investment which shifts the small investor into a genuine bondholder, though far from being a "bloated" one. On the positive side is also that generally benign theory of the wide distribution of railway security holdings in non-speculative hands—though the theory has its limits and is restricted rigidly to a class of railway securities which do not default and wreak woe on a large body of unorganized holders like that following the calamity of a savings bank failure. Taking the negative and affirmative arguments side by side, the latter are at least so far dominant as to raise the question as to whether in times to come the "popular" loan may not be an expedient of our biggest and strongest railway corporations, with their steady dividend earnings as a solid equity to secure their borrowings.

IN the report of the American Society for Testing Materials on the protective qualities of various pigments as applied to steel plates, some tests were cited where such plates were freed from scale and submerged in water containing the pigments to be tested. According to these tests, certain pigments seemed to prevent corrosion and others to stimulate it. That is, where certain pigments were used corrosion did not occur, while it did occur with others. Hence the former were classed as inhibitors and the latter as stimulators. Among these, zinc oxide is put as an inhibitor and graphite as a stimulator. This classification has been criticised on the ground that it does not agree

with the results of tests of paint put on the plates of a test fence, in which the zinc oxide paint has failed at the end of a year, while the graphite paint is still in good condition. In fact it did sound a little strange to have graphite set forth as a stimulator of rust, when its record as a preventive and protective coating is so good. Data has been published from time to time in the *Railway Age Gazette* showing complete immunity from corrosion, under very trying conditions, of steel protected with graphite paints, and unless the work of the committee in making these tests was very carefully done, the submerged tests might easily give results that are quite contrary to the facts. For instance, one investigator asserts that he can produce a greater difference in the apparent corrosion of two plates than that found between zinc oxide and graphite, in the test referred to, by a change in the method of supporting the two plates in their bath. When these things are taken into consideration, then, it is not at all strange that exception is taken to the finding of the committee by certain makers of graphite paints who feel that unwarranted conclusions have been drawn, and that service in the field should be the proof to which this particular pudding should be subjected. Again, if these conclusions are checked with the results obtained from current exposure tests extending over a period of two years, it will be found that there is but little difference between the zinc oxides and graphite, both coming in behind the red leads, being about the same as the iron oxides, and leading the other pigments by a wide margin. So a test of the corrosive or non-corrosive qualities of a pigment by watching the effects produced on a steel plate submerged in water with which a pigment has been mixed and attributing those effects to the influence of the pigment does not seem to be a good one. It must not be inferred that the American Society for Testing Materials will base its final findings on such submergence tests, but it seems curious that these should have been given the importance that they have.

THE CANADIAN RAILWAY SITUATION.

CANADA, just at present, is a rich field for the student of railway events. The situation there has no real analogy in railway history. There was a situation somewhat like it in the United States when, several decades ago, the first lines to the Pacific were pushed through, when Congress was free with subsidies and land grants, when the scandals of the Credit Mobilier smirched more than one reputation, and when, later, new lines were put through in rivalry with the pioneer Union and Central Pacific. But on this side of the border the competition for the Pacific and far West business has extended through many degrees of latitude and long periods of time. In Canada the centralities of territory, relatively speaking, and quicker time conditions have made the conflict more acute and dramatic. The battlefield has been smaller—though absolutely, in its transcontinental dimensions, large—but the contest, prospectively at least, more intense.

The railway map of Canada shows two great systems which divide the land. The older, but now the smaller, the Grand Trunk, with its big child, the Grand Trunk Pacific, counts probably in its present trackage not less than 7,000 miles, probably more. It is well entrenched in Ontario, the old Canadian West, at the commercial centers of the country and in that region which lies between the Niagara frontier and Chicago. Its record has been a checkered one and, financially, not cheering for its stockholders. First on the ground, by securing government aid and with prevision of the great development of the wheat lands of the Canadian Northwest, it might have become the railway monopoly of the Dominion and taken the harvest that a younger and more energetic rival has reaped. That it failed to do so must be one of the marvels, unless, perhaps, account is taken of the old temperamental slowness of our kin above the St. Lawrence. We say old, for no one will accuse them of sluggishness now. But the Grand Trunk's awakening came at last, and now, backed by land grant and subsidy, it is making for the Pacific coast and invading the prairie territory of the Canadian Pacific.

Very different has been that rival's history. Pushed ahead swiftly by the energy and enterprise of men of go and prescience, its record has been one of singular, almost amazing success. It has been favored, undoubtedly, by the unlooked for development of the Canadian Northwest, and the rich results of the lavish yet, at the time, not unwise subsidies of the government in money and land were probably not fully foreseen. But all things come to the railway promoters who intelligently dare. As a sequel, the Canadian Pacific reveals itself as a mighty transcontinental system, like its competitor tapping Canada at important centers, with some 14,000 miles of track owned and controlled, and steadily acquiring more, with a great *nexus* of lines in the northwestern wheat region, with a back entrance to Chicago recently secured, seeking and acquiring closer traffic relations with President Mellen's system in New England, a high dividend payer already and with credit as high as its dividends—yet, withal, looking with anxious eye on the fresh vigor of its rival, backed by the same governmental co-operation on which its own prosperity was built up. And it dreads also the results of the physical invasion of the traffic kingdoms where its rulership, heretofore complete, may hereafter be divided.

That into such conditions of warm railway rivalry, already existing and sure to grow hotter in the future, Canadian politics enters goes without saying. We reviewed some two months ago a debate in the Canadian House of Commons, in which the opposition attacked sharply the financing and the construction accounts of the Grand Trunk Pacific, as well as the Grand Trunk's extension to Providence, R. I., and incursion on the New Haven's domain. There was palpable ground for the opposition assault, and its nature and fierceness forecast the railway question as the coming issue of Canadian parties, possibly resulting in the overthrow of the government. But whether the Canadian government shifts or not, it has obviously been tied up too closely with the Grand Trunk extension to recede. It may modify some of the plans, particularly in regard to the Grand Trunk Pacific line of 1,400 miles through the barrens between Quebec and Winnipeg. It may compel the abandonment of the Providence extension, as diverting traffic from Canadian ports. But whether Liberal or Conservative, the government seems bound to see through, at whatever cost, the extension to the Pacific coast and a new line to the northwestern wheat region. The precedent of the state aid given to the Canadian Pacific stands as an obstacle to retreat, whether the fiscal results are the same or otherwise.

The Canadian situation, quite apart from any political contingencies, raises some interesting questions for the future to answer. How far will the Canadian government venture into subsidies for a secondary transcontinental line be justified after promoting successfully a primary line entering the same general territory? Will future rivalries of the two great Canadian railway systems reach the usual ultimate of consolidation? And, whether competitive or merged, what are to be their future traffic relations with our own territory south of the border line reaching across the continent and, as affecting transportation routes, broken only by the great lakes, the Rockies and the Cascade range? These are interrogations of moment, to which the successors of President Hill in the West and Presidents Brown and Mellen in the East—or, maybe, the Federal Government as railway proprietor—will have to reply.

NEW BOOKS.

The Railway Special Agent and Police. Published quarterly. W. C. Fennell, Editor and Manager, Baltimore, Md. Thirty-five cents a copy, \$1.00 a year.

As was announced at the annual meeting of the International Association of Railway Special Agents and Police, at Los Angeles, last May, the proceedings of this association now take the form of a quarterly periodical, and the first number of this has just appeared. It is a good looking pamphlet of 64 pages, including two pages, with a full-page picture, devoted to the Ladies' Auxiliary. Among the subjects discussed at this year's meeting were Registration of Trade Marks; Disposition of Journal Bearings, and Criminal Law.

Letters to the Editor.

COURTESY ON TRAINS.

The Cuba Railway Co., Camaguey, Cuba, July 11, 1910.

TO THE EDITOR OF THE RAILWAY AGE-GAZETTE:

I have noted with interest and much well-wishing the article on politeness which have appeared in your columns, particularly that one in your issue of the 1st inst. Whatever it may be best to do, certain it is that *something* ought to be done.

On the evening of the 29th ult., on one of the trains serving the city of Tampa, the writer, who had the day arrived from Cuba, boarded a northbound train for a short local ride, being accompanied by two ladies who had ridden south to Tampa to meet him. He had failed to purchase tickets, for the very good reason that he did not know whether the ladies possessed ticket transportation returning, and for his own reasons did not wish to raise that question previous to boarding the train.

So the party boarded the train and found that it would add to the convenience and comfort of the journey to have a seat turned. (Turning seats is a much-mooted question, but conductors are expected to exercise a reasonable discretion.)

In due course the conductor presented himself. He was tendered an amount understood to be sufficient to pay the cash fares of two persons with the usual excess, and was handed also a ticket for the third member of the party. At the same time he was asked, since it was noted that there weren't more than twenty passengers in the coach, to turn a seat. (Presumably the request was made politely, the writer being a mere passenger traveling with ladies.) The fares were accepted without exception and the request was churlishly refused, and the conductor passed on.

Then, on the principle that so strict obedience of the one rule called for equally faithful adherence to the other rule, the writer decided to demand the issue of the usual cash fare receipts (having failed to receive them on this occasion and on two others previously when traveling over that road in that locality). Accordingly, after perhaps a quarter of an hour, the conductor, on passing through, was hailed. He halted, after passing our seats, and returned, and then this demand was made, to which the genial puncher replied, "Sure! give you two if you want 'em," and to which the passenger answered, "Thank you very much, as you prefer." The worthy servant disappeared and in a few minutes returned with two slips which he presented with various admonitions, punctuated by sundry jabs of his fingers on the passenger's shoulder, about not getting on his train again without tickets, and with the further information that he had issued the receipts at reduced rates, since he was not collecting the excess, as he had the right to do. The passenger then hastened to thank the conductor again, and assured him that he did not want anything less than the rules prescribed, whereupon those slips were taken up, 20 cents additional fare was demanded and paid, and other slips issued. These slips are still in my possession, and if this letter is published and an officer of the road in question sees it and wishes the facts direct, he can get them.

This transaction speaks for itself, and I never should have complained of the matter to the traffic department of the road interested, simply because of the fact that complaints, like the poor, the railways have always with them; but on reading your last article it occurred to me that this was such a representative case of flagrant incivility and attempted dishonesty, that it might be useful to air it.

The writer has been a railroader for many years and appreciates the annoyances to which conductors constantly are subjected. He was himself, for a time, a train ticket taker on the Panama Railroad. So much for any lurking suspicion that the passenger was not polite to the conductor. There was no element of grouch in connection with having to pay fare, as he undoubtedly could have secured passes over the rail line in Florida, as he did over the steamer line between Havana and Tampa, had the same been requested.

G. G. DEDGE.

THE VALUE OF AMERICAN RAILWAY STATISTICS.*

BY A. J. CUNNEY,

Assistant General Vice-President, Pennsylvania Railroad.

It is asserted that the statistics of costs of operation of railways are kept in possession of a departmental operating officer should not be those over which he has control, that they may apply proper remedies for unsatisfactory performances brought to light by equitable comparisons, but such officers should not be allowed to forget that other charges, such as taxes and interest, exist, which are not chargeable to expenses, and that dividends should be earned and paid. Statements of the unit costs of handling tonnage, passengers and baggage at the larger stations are also prepared and sent for criticism to the various officers, and to ascertain why costs are higher or lower at one station than another. On some railways the chief features of expenditures are also exhibited by chart and diagrams so that vivid pictures as well as figures may drive home the facts. There are now on several of the operating staffs, officers who are charged with the duty of supervising operating costs of all kinds including shop results, and to ascertain by personal examination and conference why better results cannot be obtained, and create a wholesome spirit of emulation among the various officers and divisions to bring about these results. I do not wish to convey the impression that all the railways in the country compile and use all of the foregoing facts, or that the American railway officer spends the most of his time sitting at a desk, wearing a pair of spectacles, digesting railway statistics, or has any greater love for them than officers in other countries, but in so far as they are of assistance to him he must, and does, study railway statistics. Constant and personal familiarity with his operating, division, or departmental work, with the assistance of a trained staff, enables him to discern promptly any danger signal of loss of business or excessive cost. As the result of an evolution in a chain of progress of which he is a part, he must and does, profit by statistics, and improves the situation by direct and immediate action taken on the ground as the result of his consideration, or if he cannot do so, is in a position to report to his superior officer reasons for such inability, and receives the results of the more extended experience of the latter, who will also probably warn other officers.

CONCLUSIONS.

I need not advocate the necessity or advantages of a uniform system of accounts or statistics, for that is behind the railways of North America which are devoting their energies to settling the few remaining points in connection with the prescribed accounts in such a way as to make the system finally effective and adapted to the varying interests of the weak as well as the strong roads, and to those companies which must observe special charter requirements of the states or provinces in which they are incorporated. That such advancement has been made is not due to any inherent virtue in American railway management, but rather to the necessities of development and management already alluded to, which were stronger than any inherent inclinations.

The experience of American railways removes all doubt as to the results achieved by vital statistics, in the hands of those directing and operating the various lines. Rates have fallen, operating expenses, taxes and other charges increased, but the growth of traffic has been handled with greater economy because the operating and traffic officers had full statistics for their constant reference and warning, and these statistics were available for use in various forms very soon after the traffic was moved or the expense incurred. The remedies have been applied in the shape of larger cars, larger train loads, and cars constructed of more durable materials, larger and more scientifically designed freight classification yards and facilities, and the use of a large part of the surplus income for improvements

* Abstracted from parts of a comprehensive report of the International Railway Congress, 1910, on the principles of statistics of railways in operation and uniform classification of working expenses.

of the grades, alinements and facilities, thereby restricting capital charges and making dividends a permanent feature by deferring them until the condition of the railway and its equipment justified their payment.

In stating these facts, I do not lay claim to any superiority for American methods, nor am I oblivious to the progress in accounting and statistics made by the railways of other countries, from which we may learn a great deal.

The railways in North America have by consolidation and affiliations developed into large systems, each embracing from a few thousand to several thousand miles of main running tracks, so that it is impossible to manage them efficiently without the assistance of vital and comprehensive accounts and statistics of the service performed, the volume and character of the business done, the revenues, costs, and net revenues therefrom, and comparisons with other periods compiled in such a way as to aid the efficient direction and management of the property, by quickening responsibility from the highest to the lowest, and from the lowest to the highest officer. In America there is less time and no more money to be wasted on statistics, unless useful, than in any other part of the world.

(a) I take the broad ground, and from the list herein stated it will be conclusive that no special statistic is believed to tell the whole story without others to supplement and correct it. All statistics kept should demonstrate their utility, and if not demonstrated should be abandoned. Scarcely any two officers derive a like value from a similar statistical statement because of their personal characteristics and service in which they received their training, or because the traffic or problems of their respective divisions differ radically; (b) No matter what statistics are prepared, it will always require (1) personal knowledge of the road, its traffic, working conditions and standards to properly interpret them, so that they will act as a guide to, and quicken that responsibility which results in efficient operating results, and (2) men of ability, experience and loyalty to produce such results. These results cannot nowadays be achieved until the sense of responsibility and some sort of comparative costs and results are given to foremen, section men, station masters, yard masters, agents and train masters, as well as officers, so as to give them facts covering the cost of labor and supplies involved in their own work, and gradually interest them toward greater efficiency by eliminating waste of materials, time and effort. This field is still a large and fruitful one, and the costs involved are too large to take chances on results; (c) Unless statistics reach operating, traffic and administrative officers within a relatively short time after the operations have taken place their value is largely lost and they then serve purposes of record only. This can only be done without duplicating working forces by the close working of the operating and auditing officers; (d) Each operating and traffic officer should have one or two recognized daily statistics summarized by weeks and for the month, agreed upon with the auditing officers, depending upon the character of the division (i. e., whether it is one fed by traffic from other divisions, or is a division located in strictly competitive territory where traffic originates, or has other special features) to keep him in touch with actual operating conditions upon his division affecting operating efficiency and costs. The poorer the railway, the greater the necessity for knowledge of this character, and the greater the necessity for co-operation between operating traffic and accounting officers. When weekly or monthly statistics for a division are furnished, a separation should be made between the statistics subject to the control of the operating officer from those over which he has no control, or only partial control, and a clear comparison of both sets of statistics given with a similar month and period in the previous year. Divisional operating officers through the medium of monthly departmental income and expense accounts should be given the facts regarding the proportion of the fixed and other obligatory charges of the company which the earnings of their division are expected to meet, over and above the operating and maintenance charges. The latter quickens a re-

sponsibility for earning a good margin over operating expenses, and broadens the view of the officer; (e) a definite classification must be uniformly observed so that the statistics will at all times convey the same meaning and insure proper comparison with the same items for similar previous periods of the same road or division with itself, but not necessarily, however, with those of any other railway; (f) that railway revenues and expenses be absolutely separated from all other operations which the company conducts or in which it is interested; (g) that in no system of uniform accounting should the desire for special information by railway or government officials lead them to make arbitrary decisions which strip the operating expenses of everything except bare maintenance charges, and force all above that into the capital accounts. In the interest of the public and the railways the capital accounts should be limited as much as possible, and every encouragement given to make adequate charges to expenses, since all transportation officers naturally try to keep their expenses down rather than up, and so prove their superior operating methods. Charges in excess of ordinary maintenance can be so shown in the accounts that uniformity will not be outraged. In the desire to standardize accounts the efforts should be confined to principles and not to details of management, for it must be remembered that each railway is a problem, and any attempt to mold all railways to one pattern will eventually be found ill-advised on the part of the regulator, hurtful to the regulated, and an incubus on individual and corporate efficiency; (h) while the American accounting and statistical system is not absolutely perfect, I do not know that it is excelled anywhere. It has proven its benefit to the railways, and enables investments in railway securities to be made on a clear knowledge of the physical and financial condition of the companies.

The railways and their transportation services are deemed to be of a public nature because the state confers upon them the power to condemn and appropriate land for their purposes subject to the payment of the proper value therefor, and because of the dependence of the community upon the transportation service. So far as the right of eminent domain is concerned, the railways avail themselves of it only as a last resort, after exhausting private negotiations, because of the excessive prices awarded by court juries or commissioners compared with the actual value of the land, but although the railways are privately owned, they are nevertheless granted this right because the use of the land is for the public benefit. The real reasons why the railways are a public benefit are because (1) they enrich the land owner from whom the right of way must be purchased; (2) they create wealth for the state, municipalities and country through which the lines are constructed by furnishing the means for the development of natural resources, manufactures and other commodities, quickly and cheaply bring them to the proper market; (3) they increase the revenues of the community by liberal payments of taxes; (4) they constantly enlarge and improve their facilities; (5) they preceed instead of follow the settler, thereby stimulating population and greatly extending and serving the wants of the community as well as adding to the ability by which such wants or luxuries are supplied and satisfied; (6) they furnish a reliable avenue for investments of home and foreign moneys, and steady employment for large bodies of all grades of laborers, artisans, clerks and professional men; and (7) they open a large and constant market for all kinds of materials and supplies consumed over an extensive area.

Their permanence insures prosperity to the community and while other industries may come and go with only a temporary or partial effect, all suffer when the transportation service ceases or becomes insufficient.

It would be idle to deny that we are living in a new era of progress in which the standards of living and practice have been materially improved and railways and other transportation agencies have played no small part in disseminating these higher standards of living and intelligence throughout the world. They

minister to the supply and demand of the railroads, and break down the barriers of racial prejudice and political animosity, especially the railways in a country of extensive natural resources and population like North America, and nothing can more prominently affect the existence of the railway as a service, the render, or the charges for such service, than a not unimportant, to those countries who look to it as the sources for agricultural, mineral, forestry and manufacturing products and to their citizens who have invested their capital therein.

These factors have created a demand in all countries for the standardization of railways as well as inquiries regarding their operating and financial results, and for the use of standard units by which these results may be conveyed in unmistakable form and substance. Uniformity of accounting and statistics will never admit of an actual and final comparison of one railway with another without a full knowledge of all the facts and conditions, nor will average statistics ever form a reliable rate-making basis, although in the days of keen competition these figures were a guide to that end and when uniformly kept for a series of years are a great advantage. It would nevertheless be a distinct gain to the railway profession, to those whose moneys are invested therein, and to the governments from which railway powers are derived, if this responsibility were so appreciated that a uniform system of railway reports, and particularly a uniform system of operating statistics, so far as the same can be made uniform, were to be adopted by the International Railway Congress.

POOLING LOCOMOTIVES.

At the joint meeting of the American Society of Mechanical Engineers and the Institution of Mechanical Engineers, at Birmingham, Eng., and London, July 25 to 30, William Forsyth, associate editor, *Railway Age Gazette*, presented a paper on American Locomotive Terminals, in which he described the engine house practice on the Pennsylvania Railroad at East Altoona, Pa., and discussed the pooling of locomotives. H. H. Vaughan, assistant to the vice-president of the Canadian Pacific, presented a paper on Handling Locomotives, which dealt entirely with pooling. Mr. Forsyth's remarks on pooling and Mr. Vaughan's paper follow.

MR. FORSYTH'S REMARKS ON POOLING.

"Improved engine house facilities, more system and better organization are favorable to the pooling of locomotives, and this practice has become more general for freight engines in the United States. As recently as 1905 the reports on pooling presented at the International Railway Congress indicated that it was not used on the majority of railways in the United States under normal conditions of traffic. The large increase in traffic in proportion to the number of locomotives in 1906 and subsequent years has compelled most of the roads to resort to the pooling of freight engines and the double-crewing of passenger engines, and these methods are now well established on the majority of American railways. By improved methods, the operations of cooling down, washing and filling with hot water may be performed in less than two hours without injury to firebox and tubes, and this alone has contributed in a large measure to the success of pooling. The reduction in boiler pressure from 225 lbs. to 160 and 180 lbs. has also reduced the number of boiler failures and permitted the more continuous use of locomotives which results from the pooling system.

"The amount of work which the engineers and firemen do at the engine houses is now so small that it is almost confined to lubrication of machinery and inspection of tools and supplies on engines, and no dependence is placed on them for repair work. The engineer is required to report any defects or needed repairs which he observes while running the locomotive or by casual inspection on the outside. The machinery underneath is inspected by men regularly employed for that purpose, and inspection pits in the tracks approaching the engine house are now regarded as an essential of a modern locomotive terminal. With the changes in practice above indicated, the pooling of freight

engines is rendered more essential and satisfactory and it is evident from the best of locomotive reports that no pronounced benefit is derived.

On some railways where shop facilities are limited, locomotives are required to make a large mileage before they go in for general repairs. The principal items which send engines frequently to the shop are worn tires, defective tubes, and, perhaps, worn driving boxes. At some engine houses all these repairs are made, the worn tires being replaced by new ones, or by others which have been turned at the shop. In this way such machinery as rods, crossheads, guides and link motion is kept in service, so that passenger locomotives make as high as 127,000 miles, and freight locomotives, 100,000 miles between general repairs; one passenger locomotive has made as high as 256,000 miles between shoppings. Passenger locomotives average 120,000 miles and freight locomotives 95,000 miles.

"On the Chicago, Burlington & Quincy for the last six months of 1909, pooled freight engines made on one division as high as 4,167 miles per month, and 110 engines on three divisions averaged 3,777 miles per month. On other roads passenger engines double-crewed make an average of 6,500 to 7,500 miles per month, one road reporting for engines in express service 118 miles per day and 12,780 miles per month."

MR. VAUGHAN'S PAPER.

The desirability of pooling engines in place of operating them by regularly assigned crews depends, in the writer's opinion, on whether the engines are engaged in passenger or freight service, and in the latter case, on the conditions which exist.

Passenger Service.

Where traffic conditions admit of the engine making greater mileage than can properly be run by one crew, two crews assigned to one engine, or three crews to two engines, will enable the engine to make as great a mileage as is desirable. On account of the comparatively short time occupied from terminal to terminal, the crews can usually make a round trip without holding the engine longer than is required to handle it and prepare it for the return trip, or to await its train. By using more than one crew to the engine, it is theoretically available for its return just as soon as though it were pooled. In practice, unless pooling is carried to the extent of sending out any engine on any train, certain engines are regularly used on certain trains or groups of trains, and it is comparatively easy to arrange the crews and engines so that a reasonable time may be allowed for repairs and yet ample service be obtained from the engine. When working with assigned crews it is of course usual to employ some extra passenger men to take the place of the regular men, who are also available in case an extra trip is required from an engine on account of specials or extra sections of regular trains. Where regular scheduled trains have to be provided for, this system is as flexible and convenient as pooling and has the additional advantage in passenger service that the men run certain trains regularly, and will consequently give better service than when handling a number of trains indiscriminately.

Pooling in passenger service is not in extensive use and will presumably have few advocates. The writer would, however, state as a result of his experience with both pooled and assigned engines in passenger service, that he is most strongly opposed to pooling in this service and considers that far better results can be obtained from assigned crews.

Freight Service.

Here conditions are very different. The time is slow and a long time is occupied from terminal to terminal, so that crews may require a full allowance of rest on arrival, or may even have to be relieved on the road. Few, if any, of the trains run at regular hours, and in place of following a defined schedule, the demand for engines varies with the traffic. When business is heavy, engines are wanted as soon as they are repaired and ready for service, making it difficult, if not impossible, to select the engines in any particular order. By pooling, such difficulties may be more easily met, especially

at large terminals. When engines are assigned the practice usually required by the agreement with the men is that engines shall be prepared and despatched in the order in which they arrive, but if the engine is ready its use may be retarded by the time required by the crew for rest. In pooling, both these objectionable conditions vanish. An engine may be turned at once if fit for service and thus rendered immediately available, and the movement of the men being entirely independent of that of the engines, the detention of engines at a terminal can be regulated by simply increasing or decreasing the number in the pool.

Under such conditions, if pooling is not carried on in name, it will be in fact, simply because business can not be handled unless engines are used without reference to the order of their arrival. Granted, therefore, that pooling is advantageous under these conditions, it should be done properly. All the features necessary to a successful pooling system must be employed, such as thorough terminal inspection independent of the engine crews, and arrangements for handling tools and engine supplies, and caring for headlights, oil cups, etc. If pooling is resorted to when business is especially heavy, or when traffic is disturbed by storms or by other causes, without proper arrangements being made, the results are most objectionable. Under these circumstances, the condition of the power will depreciate rapidly and the service rendered will be exceedingly inefficient. The maxim is frequently stated, "If you pool, pool," and its wisdom has been demonstrated by experience. The real question about pooling is, therefore, whether there are conditions under which it is preferable to adopt the alternative practice, that of running engines with assigned crews. This depends on the results obtained from the two systems, which are in the writer's experience as follows:

Mileage.—It is possible to obtain somewhat greater average mileage per engine under the pooling system, but the increase does not exceed 10 per cent. when traffic is being handled smoothly and without excessive congestion and delays.

Repairs.—When running successfully under the assigned engine system, repairs are less than when similar conditions exist with pooled engines. A man running an engine regularly keeps up the smaller details and knows what work is required at once, and what must be looked after in due time. His inspection reports are more reliable than those of a man who has had an engine for one trip only. As he has to run the engine next trip as well, he will handle it with greater care and avoid any action that will cause him trouble in the future. Men who have been accustomed to running pooled engines will not do all this at once, but they most certainly will if assigned to an engine for any length of time, and the difference is noticeable in engine houses where some engines are assigned and some are pooled.

Engines are sometimes taken care of by the headquarter station system, the work required to maintain the engine in proper condition being done at the terminal designated as the home station, while at the other terminal the only work done is that necessary for the return trip. With this arrangement, even with pooled engines, the same crew will, if possible, make the round trip; but when they are changed, practically as much work is required at the away station as at the home station. The result is a considerable increase in the cost of repairs, for there is not as a rule very much difference in the cost at the home station.

When the assigned engine system proves inadequate for traffic demands, the results change. Men will endeavor to book enough work against the engine to hold it until they have rested, and, on the other hand, engines are liable to be wanted before repairs that are actually required are completed. Under these conditions engines may be better and more cheaply maintained when pooled; but under normal conditions the writer's experience would show that with assigned crews the cost of running repairs may be reduced 5 to 10 per cent. and better mileage obtained from the engines between shoppings.

Fuel.—It is almost impossible to determine the fuel consumed by an engine on an individual trip, and consequently difficult when pooling to keep any record of the amount of coal used by different men. A record may be kept by engines, but it is then impossible to locate the responsibility for any excessive consumption. The practical result is that on pooled engines, individual fuel records are of comparatively little use. With assigned engines, while trip records may not be individually accurate, the average of several consecutive trips soon becomes so, as the variation of the amount of coal left on the tender, while important on one, is of comparatively small importance on a number of trips. There is no doubt in the writer's mind that individual coal records, whether by trip or by period, are an important factor in obtaining economical results in fuel consumption, both from men and from engines, and he ascribes the good results that have been obtained on the Canadian Pacific largely to the careful way in which the records have been watched.

Apart from the records, the familiarity of the men with the engines has an important bearing on fuel consumption. Most engines vary slightly in the way they burn the coal, in the nature and intensity of the draft, and in the best position for the throttle and reversing lever. Crews knowing an engine thoroughly learn about these peculiarities, while they do not when running a different engine each trip. One crew will obtain from an engine results that are impossible for another crew, and thus the result with assigned crews is a tendency to higher efficiency than when every engine has to be drafted and adapted to do the work with the poorest crew on the division. It is only necessary to watch the difference in the way an engine is handled by a regular crew and by a pooled crew to realize the advantage of the former, and important results have been clearly shown with the same men and engines, on divisions where the two systems have been in effect.

Service.—The remarks that have been made in connection with repairs and fuel apply with almost equal force to the class of service obtained from the engines, with reference to failures, breakdowns and ability to make the time required. A crew that knows the engine will get more out of it than one that does not. They will notice any difference in its working and will take more interest in getting any defect rectified. They will keep their equipment in better condition and will pay more attention to bearings which show signs of heating, etc. All these conditions lead to better and more efficient service.

Engine House Expenses.—Inspection, the care of tools, the filling of lubricators, headlights and cab lamps, are commonly looked after on assigned engines by the crews. When engines are pooled this work has to be done by the engine house force. At a large terminal this expense is not large, but when the number of engines handled is small it is difficult to arrange the duties of the men doing this work to prevent its becoming a serious item. Conditions vary on different roads in this respect, but the fact remains that this work is not in any way burdensome to men having a regular engine, while it is burdensome if they are required to prepare a different engine each trip, and consequently they object to it very strongly. In the majority of cases this work constitutes an additional charge on engines that are pooled.

Conclusions.

In passenger service pooling is objectionable under any conditions and should be avoided if possible.

In freight service pooling is advisable if conditions are such that engines cannot be run with assigned crews, and probably on divisions where business is so heavy that 60 engines per day or over are despatched from the terminal; but the writer's experience is that where assigned crews can be used on engines, the cost of repairs, the amount of fuel consumed and the class of service obtained, will all be more satisfactory.

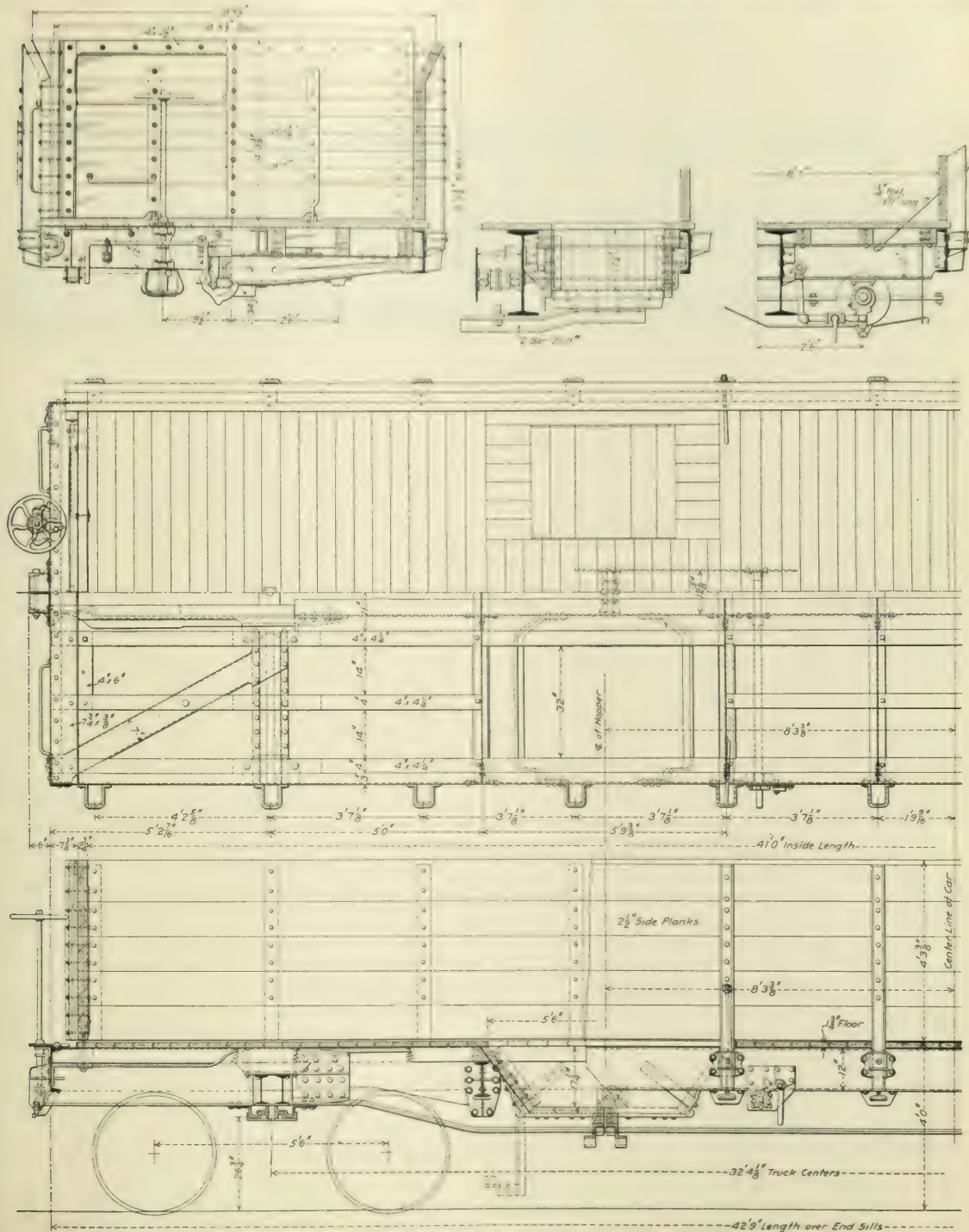
He therefore regards pooling as a practice that may be necessary under certain conditions, but that is certainly not desirable if the alternative system can be satisfactorily carried out.

FIFTY-TON GONDOLA CAR.

The Chicago, Milwaukee & St. Paul has been a customer of 50 ton gondola cars with Bettendorf steel underframes at the Milwaukee shops. The car is 42 ft 9 in long over the end sills and 41 ft. inside. The width inside is 8 ft. 7 in. and the

height of the sides above the floor is 4 ft 3 3/4 in. The top side board, 11 3/4 in wide, is flared out 5/4 in, making the width at the top of the car 9 ft 3 1/2 in, to permit of a larger pile of lading.

There are four narrow hoppers with drop bottom doors, operated by a simple mechanism, shown on the drawing, and sup-

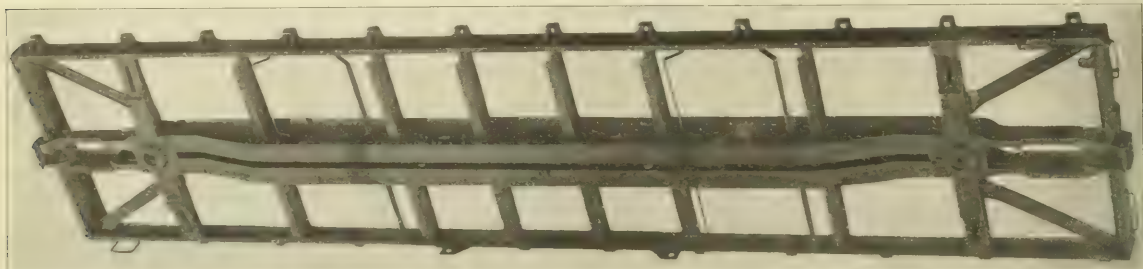


Fifty-Ton Gondola Car with Steel Underframe. Chicago, Milwaukee & St. Paul.

plied by the Enterprise Car Company, Chicago. The hoppers are between the center and side sills, and the chain sheaves for operating the doors are between the center sills, with a shaft extending out to a ratchet wheel at the side sill.

The Bettendorf steel underframe is built complete and shipped to the company's shops ready for the addition of the wood upperframe. The center sills are two 24-in. I beams, which are split in the web at the ends and reduced to 16 in. depth at the bolsters, where they are riveted to the cast-steel draft sills. The side sills are 12-in. channels; the stake pockets are riveted directly to them. The body bolster is built up of two

no indication for the proper rate for rails. He said the statement that there were no principles in railway accounting was preposterous, and called attention to the reports published in the Blue Books. Mr. Fay said that the English objection to ton-mile statistics was that they did not tell the truth. Figures for the average charges per ton per mile on a wide variety of miscellaneous freight would not represent the charge per ton per mile as paid by the public or indicate the cost per ton per mile when more than one company handled the same ton of freight. He illustrated the complexity of the problem with examples in which several railways participated in carrying the same ship-



Bottom View of Bettendorf Steel Underframe for 50-Ton Gondola Car, Chicago, Milwaukee & St. Paul.

8-in. I beams with cover plates; the six cross bearers on each side are made of the same size beams. The corners of the car are braced by 7-in. flanged channels extending from the center plate to the end sill. The car is mounted on Bettendorf boltless trucks. The total weight is 41,500 lbs.

INTERNATIONAL RAILWAY CONGRESS.

The proceedings of the International Railway Congress held at Berne, Switzerland, July 4 to July 16, are not entirely available as yet. The subject which aroused the most discussion was Railway Statistics, particularly ton-mile statistics. Of the reports on statistics and accounting, the one principally discussed was that of W. M. Acworth, who was sent as a delegate by the Board of Trade.

TON-MILE STATISTICS.

In presenting his report, Mr. Acworth said he wanted to make it perfectly clear that what he said represented his own attitude and nothing else. He said he believed that there were no principles of statistics and no uniform classification of expenses by English railways. He had never been able to understand the objection in England to ton-mile statistics. He did not agree with the statement that the cost of keeping such statistics was excessive, nor that traffic conditions made it extremely difficult to get at the figures. He understood that, in the case of one company, the cost of compiling such statistics was \$5,000 for \$55,000,000 of revenue.

C. W. Appleyard, of the South African Railway Administration, presented the report of Sir Thomas Price, based on the practise of the Central South African Railways. After the Washington meeting in 1905, these roads decided to adopt American methods, with such modification as local conditions required, and the ton-mile statistics had proved valuable. Other reports were presented by A. J. County, of the Pennsylvania Railroad [a part of this report is printed elsewhere in this issue], and by Mr. Barriol, of the Paris, Lyons and Mediterranean.

Sir Charles Gwynne, of the London & Southwestern, and Sam Fay, of the Great Central, criticized Mr. Acworth strongly. Sir Charles Gwynne said that his report was not representative of British railway methods. As to the matter of ton-mile statistics, they had been tried in England and found unsuccessful. As a kind of average rates they meant nothing, because, for example, the average rate per ton on millinery and coal would give

ment, the cost to each being complicated by different terms of trackage agreements, etc. He said further:

"A 12-ton truck will convey 12 tons of one particular class of merchandise, while other common merchandise of great bulk requires 12 trucks to convey the same tonnage. Thus 12 tons in the one case is on a vehicle with four wheels wearing out the permanent way; in the other, 48 wheels are wearing out the same permanent way. Further, the non-paying weight handled in one case would be about 6 tons, and in the other 72 tons, although the revenue tonnage in both cases is identical and ton-mileage statistics treat them as of the same value. Out of this hotch-potch of receipts and expenses divisible between companies without regard to rate charged or work performed, and of units that refuse to unify, English companies are asked to compile ton-mileage statistics. Is it to be wondered at that we object and assert that the cost of such a compilation would be sheer waste of hard-earned money?"

"Turning now to the question of ton-mileage as an aid to day-to-day management and the manipulation of traffic, I believe that there is little, if any, difference, except in name, between the methods employed on the English railways and those of the United States. In the latter country, I believe I am correct in saying that for the purposes of movement of traffic, cars are averaged at 'per ton,' and the gross tonnage of such cars is given as the measure of the engine load for each particular section of line. In England the method usually adopted is to deal with the wagon according to its class—i. e., weight and bulk capacity—either full or empty, as the measure of the engine load. While loading is dealt with in America under the name of 'tons' in England it is dealt with under the name of 'wagons,' the average gross tonnage of which is known. The methods, as I have said, are almost identical, the names alone varying. The mass of information which is at the disposal of English railway managers in the shape of statistics—weekly, monthly, or half-yearly—is much on the lines of the information, although in a different form, enumerated by Sir Thomas Price as common in the English colonies. The English railway managers shy at averages as much as possible, and endeavor to get correct facts in the smallest possible compass. They consider that by their methods they get to know more of the actual conditions than by worshipping the god of averages alone."

W. H. Hyde, of the Great Eastern Railway, agreed with the previous speakers, and also said that what was essential was that executive officers should be in possession of detailed statistics as regarded the movement of the traffic, and that such statistics

should be in their hands as soon as the train passed. This was the practice which prevailed on British railways at the present time, and no quantity of mechanical devices could effectively replace them.

Alfred Aslett, of the London Railway, said that passenger statistics were utterly useless for British railways, even in the case of bulk traffic. However, in Germany, said Mr. Aslett, dealing with the carriage of live stock, which was not suitable for weight

H. C. Allen, of the Buenos Ayres Great Southern, said that although his company had kept ton-mileage and passenger ton-mileage statistics for 20 years, they had found them of practically little or no use, and would discontinue them but for the fact that the information had to be prepared for the Argentine Government annual statistical returns. Some years ago his company kept statistics of the percentage of freight to capacity hauled, but had to put an end to that as it was found the staff were devoting all their energy to securing effective statistical results rather than to the earning of dividends or satisfying public requirements. Statistics might be overdone, and at one time they certainly were overdone on the Buenos Ayres Great Southern. He was satisfied that had the Argentine railways never gone in for ton-mileage they would not do so to-day. Their traffic varied from month to month with the seasons. One month the line was carrying wool, occupying 20 per cent. of the wagon capacity, but earning \$13.50 per ton, while the following month the line would be carrying grain, occupying the full capacity of the wagons, but only earning \$1.50 per ton. With such varying classifications, what possible use could be made of ton-mileage averages? Again, taking the so-called gross ton-mileage which the Argentine Government insisted on, that was merely the total net weight of the cars divided by the axles, and a unit of two axles per car was adopted for all statistical progress, and this, multiplied by the total vehicle-miles run plus total ton-mileage, gave the so-called gross ton-mileage. As, however, the railways had in service all classes of cars, from an 8-ton car weighing 10 tons to a 45-ton car weighing 15 tons, what reliability could be placed on the average gross ton-mile? Efficiency in operation could only be obtained by every traffic employee intelligently watching and recording every train coming under his notice and reporting promptly where there was any evidence of careless loading or extravagance in hauling power. It was hoped that by carefully recording gross ton-mile statistics that it would have been possible to appropriate the cost as between passengers and goods, but after many experiments it was agreed that, although statistics showed it cost $2\frac{1}{2}$ times as much to carry a passenger ton one mile as a ton of freight, this was disproved by subsequent experience.

Arthur Hale, of the American Railway Association, said that he had had the handling of fast freight traffic on the Pennsylvania Railroad and the Chesapeake & Ohio, and he had found ton-mile statistics of very great value; when the cost of handling traffic in the yards and a few other details of the kind were added, the ton-mile statistics had proved most useful in their work and had given good results generally. On the Baltimore & Ohio, conditions existed which were very similar to the cases quoted by Mr. Fay, but they were able to make up their ton-mile figures without trouble.

Theodore Voorhees, of the Philadelphia & Reading, said that in the matter of statistics a comparison as between different roads was of little value unless all the attendant circumstances were taken into account. For example, the Pennsylvania Railroad had a traffic amounting to ten times that of the Philadelphia & Reading. The characteristics of the two lines were entirely different. The Reading was practically a terminal road, while the Pennsylvania carried a great volume of through traffic, and it was necessary in any comparisons between the statistics of the two systems to take into account the proportion of terminal work to the total. Unless that were done a comparison between the two roads would be quite misleading. It was extremely difficult to arrive at any real costs in railway

work, because of so many circumstances in the gross earnings. The gross earnings figures and the net earnings which resulted, for instance, were very different. These were faulty and attempted to make use of the gross earnings figures, and it was not possible to make any comparison.

On the other hand, the gross earnings and the passenger mile the human element entered into the problem. What proportion, for instance, of maintenance of track was to be charged to passenger service, and what proportion to freight service? It was the personal equation that entered into decisions of that kind. In this connection he might refer to the litigation in which the Reading had been engaged in connection with the 2-cent rate. In the course of that litigation the books of the company were submitted to the examination of experts on behalf of the state, and every facility was given in order, if possible, to ascertain what it really did cost to carry a passenger. The result was a total failure, the figures produced by the experts based on the same books resulting in diametrically opposite results.

R. M. Patterson, of the Pennsylvania Railroad, pointed out that the value of statistics was not in their compilation, but in their proper use. He made a comparison between ton-mileage figures on the New York and the Pennsylvania divisions of the Pennsylvania Railroad. He showed that the Pennsylvania division had a predominance of mineral traffic, with long haul, and the New York division had a predominance of merchandise traffic, with short haul. Ton-mileage statistics showed that the cost per ton per mile on the Philadelphia division was about 3 mills, and on the New York division about 8 mills. Facts like that developed the tendency to jump at conclusions, but ton-mile statistics were got out in greater detail, and it was shown that the difference was largely due to the difference in station costs of the two divisions. That showed that ton-mileage figures properly handled gave valuable information. Broadly speaking, while in a number of instances ton-mile statistics may have been wrongly used—and they had been used wrongly in America—still, it could be claimed that they had been used in many cases rightly and to great advantage. The discovery that station costs were responsible for the difference referred to, led him to consider the whole subject of operating large stations, and he had been led to the conclusion that the English railways were ahead of the American railways in that respect.

Mr. Appleyard said it seemed clear that any attempt to secure uniformity in regard to details must be fore-doomed to failure, and would probably prevent that advance that everybody was anxious to see. At the same time, and he had Sir Thomas Price's authority for saying that it might perhaps be possible to secure unanimity as to the principles on which statistics should be based. In that case comparisons might be made between results in different countries which were not possible at the present time. There could be no doubt as to the value of being able to make comparisons of that kind, and by being able to compare their own figures in South Africa with those of American roads they had secured substantial economies.

Col. Bonham-Carter, of the Madras & Southern Mahratta, said that he had been for $3\frac{1}{2}$ years under-secretary for railway traffic and statistics to the government of India, and for seven years manager of a system of 1,600 miles. It seemed to him that many of the speeches which had been made did not make sufficient distinction between the reports which were compiled for the information of shareholders, and as to which there was some advantage in uniformity, and those other statistics, the temporary statistics, which were got out by every railway in the world at short intervals to keep the operating officers in touch with the conditions. The difficulty was as to deciding what portion of those operating statistics should be put into a more permanent shape. He had not in his experience found the government statistics, based on passenger and ton-miles, of any practical use. Any information which those figures gave could be obtained from operating statistics at a much earlier date, and in many cases passenger and ton-mile statistics could

be obtained from these operating statistics. He quoted an instance of the misleading results which statistics on the ton-mile basis gave.

William Mahl, of the Harriman Lines, said that Mr. County in his report had set out fully the practices of American railways. *It would be noted that the railways in America were now governed in these matters by the orders of the Interstate Commerce Commission, and that they could not, if they wished, participate in any movement which had for its object a general classification, except with the proviso that its conclusions would be approved by the Interstate Commerce Commission. The adoption by the American railways of the passenger-mile and the ton-mile had been for purposes which had not been clearly defined in the course of the discussion. It was well that it should be made clear that the ton and passenger-mile had not been adopted for the purpose of making rates or as a unit of cost, but had been adopted as units of service performed primarily for the information of the management in the intelligent operation of their properties, and as an indication of the service given to the public and of the efficiency of the management. That fact was brought out in the results shown by American railways in the development of traffic, and in the increased service to the public. Every railway manager desired to increase the sale of his product, and the passenger-mile and the ton-mile figures of one year only stimulated him to break that record during the following 12 months. The aggregate ton or passenger-miles only were not sufficient for him; a knowledge of the direction of the passenger ton-miles was also wanted to the end that steps might be taken to equalize the traffic as far as conditions would permit. The rivalry between different American railways in hauling the largest average train loads was a matter of common knowledge. From it had resulted the exceptional improvement during the last 10 years. He could only quote in this connection from the reports of the company with which he was associated. On the Union Pacific Railroad the tons per train had increased from 279 in 1898 to 549 tons in 1909, or, to put it in another way, with an increase in 11 years of only 11 per cent. in locomotive-miles the company had increased its freight service to the public by 141 per cent. On the Southern Pacific the tons per train had increased from 155 in 1885 to 474 tons in 1909, or in the 25 years covered by that period, with an increase in train-mileage of about 232 per cent., the company had increased its service to the public by 598 per cent. The information concerning the ton and train-mileage had enabled the American railway manager to direct his abilities into the proper groove and these statistics had contributed largely to the achievements of American railways in the transportation of the immense tonnage hauled and to the low cost at which the service was performed. It should be borne in mind that American railways dealt with the public as sellers of transportation, and their sales were measured and adjusted by the miles the passengers or the freight was carried. It was but natural that they should want to know as much as possible about the product they were selling, both with a view to increasing the sale of the product and reducing its cost.

Mr. Acworth, in replying to the discussion, said that some of his English critics appeared to be under the impression that he had said that there were no statistics of English railways, but the criticism he had made was that there were no principles of statistics. He had not yet heard any statement as to the principles employed. It was a great pity that the English railway companies did not get out ton and passenger-mile statistics; the figures would show that some of the criticisms levelled against English railway companies had no foundation in fact. Again and again he had heard it said that English railway passenger fares were the highest in the world, a charge based on the passenger per mile or the passenger ton-mile. If passenger-mile statistics were got out the correct would be to show that the English fares were not the highest but were exactly the lowest in the world.

It was true that freight rates in England were high but

there were excellent reasons for that. The American roads took ton-mile statistics for granted, and it came to this: that the civilized world was on one side and Great Britain was on the other. He had never expected to convert English railwaymen to a belief in ton-mile statistics, and that this meeting was certainly not the place to make so unprofitable an experiment. The fact that such statistics had been tried on the Great Western Railway and given up as useless was quoted as an argument against ton-mile statistics. As a matter of fact they had not been used on the Great Western for about 40 years. Sir Charles Owens, while referring to the Great Western, had not told delegates that there was in England at this moment a railway at least three times as large as the Great Western was when it experimented with ton-mile statistics, and that this English railway had kept ton-mile statistics for 10 years with results so entirely satisfactory that it was in contemplation to extend the principle to passenger-mileage. To ask what economies had been effected by the use of ton-mile statistics was really not to the point, because if anyone regarded ton-mile statistics in that way he would be disappointed. Ton-mile statistics were merely a diagnosis of the position of a road, not a cure for troubles.

Mr. Fay had quoted examples of complicated working, but if Mr. Fay would study the schedule in the report which applied to the production of ton-mile statistics he would find that his cases had been dealt with, and that the only receipts which it was suggested should be entered in such an account were the receipts from the company's own trucks carried on the company's own lines. Mr. Fay complained that he had not asked railway companies for the necessary statistics. He had deliberately refrained from doing that because he felt that his report should have nothing to do with internal statistics, but merely with the statistics which were produced for publication. He had no doubt at all that a mass of statistics was got out by English railway companies for purposes of daily control, but he was dealing in his report with the returns made to shareholders or to Parliament.

RAIL JOINTS.

In the group of reports dealing with rail joints, the points selected for elucidation were the reduction in the number of joints by increasing the length of the rails, the maximum length to be adopted for ordinary track rails, the welding of rail joints, and the strengthening of rail joints.

The reporter for Great Britain and English-speaking countries was Alexander Ross, of the Great Northern Railway (England). In Great Britain and Ireland all companies had been gradually increasing the length of the rails, and it would appear that from the near future a length of 45 ft. might be taken as the standard. While recognizing the advantages of a continuous rail, expansion and contraction prevented the use of welded joints. In the United States the standard length of rail was now 33 ft. In other English-speaking countries the length of rail employed varied from 30 to 40 ft.

Practice on the Continent and in Egypt was the subject matter of two reports, one by Mr. Chateau, of the French State Railways, and the other by Friedrich Kramer, of the Hungarian State Railways. In France, Belgium, Italy, Spain and Portugal much attention, said Mr. Chateau, had been paid to rail lengthening, the average length now adopted being 59 ft., while rails up to 72 ft 2 in. were employed in current practice. The welding of rail joints found few advocates.

He believed that there would be a further increase in the length of the rail, and that such increase would involve a radical change in the type of joint employed. The initial step towards a further increase in the length of the rail was the evolution of a joint without bolts and of the troubleless type. It would also be necessary to adopt means of preventing the fracture of very long rails. A type of rail joint which had given great satisfaction was that made by the French Eastern Railway, and a very similar joint was employed by the French Northern company. The twist joint was used rather extensively in Italy, but more recently

an ordinary suspended joint had been attempted, and the bolts were now being tried on the Paris Metropolitan, and so far had given satisfaction. A general tendency was evident to stiffen the joint by bringing the rails closer together. It was well known that rails in service assumed a north-south curvature, and this curvature was one of the causes of the cracks produced at the joints. The process of straightening the rails could therefore be adopted in order to reduce the strain in joints, and the properties they possessed when new, and in order to improve joints which had become weakened. If this were combined with recutting the ends of the rails, the drilling of new holes, and the supply of new fishplates, then a complete solution would have been obtained of the problem of the improvement of worn joints. This subject would assume greater importance when the present long lengths of rails in service began to show signs of wear and tear.

Mr. Kramer, whose report referred to practice in Austria-Hungary, Roumania, Bulgaria, Servia, Turkey and Egypt, noted a similar increase in the length of rail following the practice in other countries. The replies he had received suggested that it would be possible to increase the length of rail to 78 ft. 8 in., if suitable provision were made to replace broken rails quickly without interference with traffic. The final determination of the greatest length suitable for ordinary track rails could only be settled by experience. A few administrations had experimented with welded joints, but there was little prospect of their introduction on main lines. He noted a tendency to improve the rail joint without altering the general principle of design.

STEEL FOR FREIGHT AND PASSENGER CARS.

The report for America by D. F. Crawford, of the Pennsylvania Lines West, was published in our issue of April 1, 1910. R. L. Ettenger, of the Southern Railway, also reported for the United States, his subject being the use of special steel of high resistance for locomotive and rolling stock construction. With regard to axles for locomotives, the replies received indicated that the experiments made with alloy steel for locomotive axles had not resulted in a betterment of the service or freedom from failures. The use of special steels properly heat treated after being rolled into locomotive tires was now being made the subject of tests in different parts of the country. Tests were also being carried out with heat treated alloy steels for springs, piston rods and crank pins, but it was yet too early to draw definite conclusions.

Otto Honigsberg reported for countries belonging to the Verein Deutscher Eisenbahn-Verwaltungen, representing 59,502 miles of line. The replies received showed that crucible steel, having an ultimate tensile strength of 85,336 lbs. per square inch, was used by several administrations for piston rods, cranks, eccentric rods, crank pins, coupling pins, cross head pins, etc. Nickel steel was used by several railways for coupling rods, and pins, crank pins and about pinion wheels. The favorable results obtained by the Prussian State Railways with pins made of compound steel or of special mild steel for case hardening purposes used on their superheated steam locomotives which do heavy work, were worth noting.

Mr. Le Blant, of the French Eastern Railway, reported for those administrations not included within the scope of other reports. He said that a fair number of railways were making trials of crank axles of locomotives made of special steel of high resistance, but only one company, the Northern of France, had definitely decided to extend the application of such material.

STRENGTHENING OF TRACK.

The reports dealing with the strengthening of track were divided into two parts; those dealing with the methods employed to attain increased strength of road, and the second part with the strengthening of bridges.

The reporter for Great Britain on both subjects was J. W. Jacomb-Hood, of the London & South-Western. He said that the strengthening of the track apart from structures to carry the track could not be the only condition and might not even be one of the conditions upon which the increased weight and

speed of trains depended. At the present day solid structure, such as masonry viaducts, were quite common, and up to the last war, masonry was still something of a novelty, while the good old type of the jointed track with fishplates had given way to the welded joint. During the past three years there had been a considerable increase in the weight of traffic, and it was likely that this would be still further increased in the coming years. Between 1880 and 1910 the improvement had taken place had been rather one of condition than of improvement by radical alteration in design. It was probably true that the average weight of rail on the principal lines of Great Britain was still somewhere between 80 and 90 lbs., and represented no considerable increase from the conditions that ruled 30 years ago. There had been no drastic change in the jointing of the rails, nor had the chairs, fastenings or ties varied in any marked degree. It was clear, therefore, that a conservative tendency in trackwork had not interfered with or retarded developments in loads and speeds. The important question now to be considered was whether the point had been reached when the general conditions of track were operating to prevent further progress. The construction gage of railways in Great Britain, giving the loading or running gage, might be taken as permanently fixed. Locomotive design was already being hampered by the restrictions of the running gage, and the weight of machines was therefore reaching, if it had not already reached, its limit. Increased adhesion might improve the power of locomotives to haul heavy loads, but such loads would be spread over more axles, and it was improbable that individual axle loads would be much affected. Therefore, the extended distribution of load could be disregarded except in respect of its effect upon the service of the track. Speeds, however, stood upon a somewhat different footing. It was not unreasonable to suggest that railways in Great Britain might have to anticipate schedule speeds for fast passenger traffic of 70 miles an hour, involving maximum speeds during portions of the journey of at least 100 miles an hour. With regard to the improvement of the track to meet the increased speed, experience and mathematical analysis suggested that a properly designed and supported rail, weighing 100 lbs. per yard, would meet the conditions, but to give the best results for high speed it was desirable that a section of rail with a greater total depth than was laid down in the British standard specification without much disturbance of the relative proportions of the head and foot should be adopted. It seemed probable that, as the length of rail, 45 ft. might be generally adopted. The joint was likely to remain the weak spot in British track practice. Monsieur Cuenot's investigations pointed to the possibility of the joint difficulties being reduced by the application of the principle of a direct support, and it seemed likely that a suitable design for a supported joint would become a necessity in the case of track designs for improved services. Two forms of cross-tie were now being tested, one of reinforced concrete and the other a combination of steel and timber, and as to security of fastenings the combination tie would certainly be superior. Broadly speaking, it would be good practice to use a heavy rail and to reduce the subordinate equipment to as few parts as possible, and a high ideal of perfection in up-keep was to be recommended, even though a larger expenditure as compared with past practice was necessary.

Mr. Blum, who reported for all countries not specially dealt with in other reports, expressed the opinion that the primary reason for the strengthening of tracks was not the increase in the speed of the wheel loads, but the greater increase in the traffic, particularly freight traffic. The weakest part of the track, the rail joint, was stated to be most fatigued not by the fast trains but by the slower running trains. Speeds of 130.5 miles an hour had actually been attained on a line having a weaker superstructure than that now used for the express lines of the Prussian State Railways without any danger to the track, and but little anxiety need be felt if higher speeds were used on the existing track. That was the opinion of the majority of the railways from which he had elicited opinions. Opinions dif-

ferred as to the extreme limits of speed admissible, but many of the railway officials consulted were of the opinion that speeds up to 80 miles an hour and wheel loads of 9 tons would be admissible.

Hermann Rosche, who reported for Eastern Europe, expressed the opinion that the cross-tie superstructure at present in common use could be made to serve the needs of heavier wheel loads and higher speeds. It would be necessary, however, to use 100-lb. rails.

The report for America was brought up by M. L. Byers, of the Missouri Pacific. Mr. Byers pointed out that the maximum speed of trains had during the past 20 years increased from about 60 miles an hour to over 90 miles, and that there had contemporaneously been a considerable increase in the weight of locomotives culminating in the huge Mallet compounds placed in service during recent years. The long series of tests of Mr. Conrad, of the Paris, Lyons & Mediterranean, indicated that rail wear on straight lines occurred less rapidly the stiffer the rail, and his conclusion was that the wear increased in inverse proportion to the deflection. The result has, in a general way, been confirmed by experiments of the Pennsylvania Lines and others. He believed that the extent to which the present standard American track could be strengthened was so great in proportion to the probable increased requirements of higher speed in the near future as to make improbable the immediate need for straight track, and one or two rail sections especially designed for a radical change in the type of roadway construction. He believed that the use of one rail section, especially designed for curves, offered possibilities of economy in rail wear, and should be further investigated, and that no compromise section of rail could be designed which would be economical under all conditions of curvature.

The conclusion at which the meeting arrived on the subject of track improvement in a general way confirmed the expressed opinions of the reporters, and indicated that, for the moment, the only practical direction by means of which the strengthening of the track could be carried out was in relation to cross-ties. Formal resolutions were adopted by the section, which will no doubt be confirmed, that all companies would be well advised to investigate with a greater approach to accuracy than hitherto the important question of the dynamic action of rolling stock passing over tracks at high speeds.

FOREIGN RAILWAY NOTES.

The French Chambers have approved the construction of 540 miles of railway in Algiers, in many different sections, but part of them such that they will make a line parallel with the coast farther in the interior than the present line.

President Nilo Peçanha in his annual message to the Brazilian Congress says: "Facts relative to the railway situation of Brazil show the uninterrupted efforts of the government to extend the railways into the interior of the country. While there was no great extension of trackage during 1909 it may be seen that during 1910 an extension of lines exceeding the greatest expectancies will be opened to traffic. During the past year 366 miles of railway, of which 290 miles belonged to the Federal Government and 76 miles to state governments, were opened to traffic. The total railway mileage of the country was increased from 11,844 miles to 12,183 miles. Within a few months lines to the extent of 1,477 miles will be placed in use, all under the ownership of or concession from the Federal Government, which fact indicates the desire of the government to develop means of transportation and secure the greatest possible results within its power. The construction now going on follows the policy of the formation of great interior systems, by means of the principal lines, by which districts of important commercial interests are knit together, extending the area with facilities for shipping products, and reducing the cost of transportation, subjecting it to a system of simple and uniform freight rates."

TRANSPORTATION AND TRAFFIC IN HOLLAND.*

BY LOGAN G. M'PHERSON.

The area of Holland is 12,648 miles; its population in 1907 was 5,747,269.

Prosperity was first attained by the Netherlands because the great cities of Amsterdam and Rotterdam are at the mouths of the Amstel and the Rhine, over which commerce is conveyed to and from the interiors of Belgium and Germany. It was this traffic that gave Amsterdam medieval prominence as a port of reception and distribution for the wares of other countries, and in this respect it retains a foremost rank, its activity as a seaport, as a mart for the products of the Dutch colonies of the East Indies and as the center of the diamond cutting industry accounting for the fact that Amsterdam is a great financial center.

The country is devoted in large measure to agriculture, but has also attained a certain development in manufacturing. Cotton goods are made in the Twenthe and Brabant district; rice from Japan and India is distributed throughout Europe from the mills at the Zaanstreek. Holland also refines crude sugar from the West Indies, and that extracted from the beet.

The lands of Holland in large part lie below the level of the sea from which they are protected by dunes formed by the wind and by dykes, the erection of which began hundreds of years ago. The saturation of the land led to the digging of ditches for draining the soil which the farmers cultivated to that degree of selfsufficiency characteristic of the peoples of central Europe. It was an easy matter to propel a small boat along one of these ditches. The development into a small and then into a larger canal was easy and natural. Thus have grown the canals of Holland, which now aggregate a length of 2,408 miles. There have been constructed and are maintained in part by the national government—342 miles; in part by provincial governments—493 miles; in part by local governments—805 miles; by various combinations of national, provincial and local governments—148 miles; by private companies—372 miles; by combination of private companies and one or another government—248 miles. Practically every town and almost every farm in the country touches one of these canals, which are naturally the generally accepted means of transportation for freight of all kinds. Under the regular control of the government are also 23 waterways, with a length of 554 miles, formed by the principal rivers.

Since 1900 no dues and tolls have been charged by the national government for the use of the rivers and canals under its supervision. On the canals owned by private companies, certain tolls are charged, but they have to be approved by the government and are only nominal. In some few cases certain tolls are levied by the separate provinces. These, however, are also but nominal, the entire extent of the inland waterways upon which tolls of any kind are levied being but a small percentage of the total.

The charges made by the watercraft for transportation on the rivers and canals are not under any governmental regulation and there is no combination among the proprietors of the craft for the maintenance of rates, the boatmen charging what they can get.

There are two companies which own about 700 boats each. About 150 separate lines of small steamers give regular service to every town in Holland and there are many craft, each owned by the boatman, who lives upon it with his family. Ferry lines and lighters are owned by the railways and many of the manufacturing companies own and operate craft engaged especially in their service.

In such a fogbound, webfooted, amphibious country it might not seem that there were any need for railways. The canals have ever been but little used for the carrying of passengers, but there are land roads which have gradually attained a length of about 3,000 miles and the demand for passenger transportation in the interior of Holland has not been great. Yet there was need for railways, and the story of their development is interestingly told by Edwin A. Pratt in his book, "Railways and Their Rates." William I. King, of Holland, in 1833 had plans prepared for a

*A preliminary report to the National Waterways Commission.

railway from Amsterdam to connect at the border with Germany line to Cologne, it being his belief that steam road and canal were essential to international traffic, and the canal through the which were supplemented by the more rapid canal of the Netherlands, which are not frozen over in winter as are the waterways. The monarch, however, was unable to obtain the necessary capital and the first line constructed in Holland was by a private company from Amsterdam to Haarlem in 1846. A committee subsequently instituted, reported that, although the principle of the building of railways should be left to private enterprise, they recommended that a law from Amsterdam to the German frontier should be constructed by the state. The States General received the recommendation, but the parliament afterwards obtained the necessary capital upon his personal guarantee at 4½ per cent. interest. The government afterwards considerably aided in the work of construction and in the general operation. The cost of the line so far exceeded the estimate that at the time of his death William I. had paid out of his private fortune, and to his absolute loss, \$500,000 in interest.

The management of the line speedily drifted into inefficiency and it was transferred with other concessions in 1844 to a private company which found it necessary to reconstruct the deplorably defective plant. After this was done there was no traffic, about all that came to the way being during the periods when low water or ice impaired navigation. The efforts of Englishmen who had obtained the concession secured the services of a traffic manager who worked out the idea that if full train-loads of coal could be secured at the Westphalian mines in Germany they could be run through for consumption in Holland at a very low rate and that the cars could obtain return loading, likewise at a very low rate, of Spanish ore from the ports. Both iron masters and colliery owners perceived the advantage that the exceedingly low rates for shipments in full train-loads would give them, and contributed their efforts toward building up the traffic. It was not forthcoming in adequate volume, however, until the railway company encouraged its agents to combine the business of coal dealers with their regular duties. In this way the consumption of Westphalian coal was increased, in Holland to the considerable displacement of the English coal which had formerly monopolized the markets. The railway company became so prosperous that its shares went to a premium.

Two or three other lines were built by private capital in the next dozen or fifteen years and had a hard struggle for existence. In 1860 the government perceived the necessity for uniform rail communication, specially for the benefit of the northeastern provinces which had no railway facilities at all. The expense of construction, because of the necessity for numerous bridges and the difficulty of obtaining sure foundations, deterred the subscription of private capital. Therefore the government built a number of lines and bought up certain small railways that had got into pecuniary difficulties. It was opposed to the direct operation of the railways by the state, and in 1863 conceded to a "company for the Exploitation of the State Railways," the permanent way and structures of the state lines, it being agreed that the company was to provide the rolling stock and undertake the management. In 1890 the government purchased the lines developed from the nucleus formed by the original project for the development of the Westphalian coal traffic, and in the same year entered into a new arrangement by which the operation of the state lines is divided between the Company for the Exploitation of the State Railways and the Holland Iron Railway Company, giving to each running powers over the lines of the other to enable it to reach any town to which it would otherwise not have access. The result of this is to provide competing rates to and from any place in the country, stimulating a service that provides a great number of quick trains carrying goods in competition with the waterways at exceedingly low rates with a speed and promptness for which quick service charge would be made in either Germany or France.

Each company pays a fixed rental for the state lines it operates and its charges are under scales authorized by the state for the railways. When either company attains a dividend exceeding 4

per cent a portion of the surplus is to be paid to the state. Should the dividend fall below 3 per cent for two years in succession the company has to withdraw from the contract. The state can also suspend the operation of the lines at any time after giving six months' notice. The total mileage operated by these two companies is 1,078 miles. There are about 400 miles of state lines, mostly electric and telegraph, operated by private companies. The investment of the government in the two private systems is about \$100,000,000, the total outstanding capitalization of the two companies is \$100,118,000. These companies have paid dividends ranging respectively from 4½ and 5 per cent in 1909 to 3 per cent in 1908, and the rental paid to the government averaged about 1½ per cent upon its investment. With dividends at 3 per cent, the return upon the total capital (therefore including about 14 per cent), the operating companies, in that they did not provide the capital expended on the road-ways and structures, do not seem to provide either interest or sinking fund thereon.

As nearly as can be calculated from available data, the revenue of the operating companies from the transportation of passengers, baggage and freight during 1908 was \$21,935,725, and their expenditures for maintenance and operation, \$17,456,137. The revenue from passengers and baggage is about equal to that derived from freight, for which the charges have to be kept at the lowest possible scale in competition with the waterways, and in competition with the Prussian railways leading from the ports of Germany.

The statistics of the rivers and canals in the Ministry of Waterstaat are very incomplete. It is not possible to arrive at the total capital expenditure upon the inland waterways of Holland, as this expenditure has been made throughout long periods of time, not only by the national government but by provinces and communities. Adequate records of the totals have not been kept, and if they had been it would be impossible to allocate them between the purposes of drainage and navigation. The annual expenditure by the national government upon the maintenance of the inland waterways has during the past ten years ranged downward from about \$2,000,000 to \$2,000,000 a year. The totals of the maintenance expenditures of the provincial and local governments and the private companies could not be procured. Statistics of the traffic are also unobtainable, but it is estimated that of the freight transported in Holland the inland waterways carry 90 per cent and the railways 10 per cent, or perhaps a little more.

The ascertainable facts and statistics in regard to transportation and traffic in Holland show that neither the national government nor the provincial or local governments receive any return upon the capital expended in the construction and improvement of the rivers and canals; that upon the limited extent for the use of which tolls are charged these tolls are but nominal, the expenditure of the various governments for maintenance and operation being, in the largest part, without offset. The expenditures for the maintenance and operation of the railways are defrayed by the state corporations charged with their administration. These companies have also been able to pay dividends to their shareholders, as well as a rental to the government that averages 1½ per cent upon the capital investment, and the government also shares in the dividends when they exceed 4 per cent. That is, even in Holland, the one country in the world where it might reasonably be expected that the use of the inland waterways would be attended with direct pecuniary profit, they certainly do not return upon capital but do not make their current maintenance. In this one country of the world where it might be supposed that the maintenance of the railways could not be other than a losing struggle for their existence, these railways are able to pay a return upon capital, but dividends to shareholders.

In Turkey a new railway gives an outlet to a very valuable deposit of phosphatic rock, and passes over a plateau which under the Romans was very productive, and is now full of interesting ruins.

THE RIGHT TO STRIKE: ITS LIMITATIONS.*

By JOSEPH J. CEELEY

What limitations are there upon the right of a large group of men to combine and strike when such action directly imperils the safety or welfare of the public? How far can such forces be controlled by organized society through the mandates of its courts, the only tribunals that the public has devised for interpreting and applying the rules which must govern the conflicting conduct of men?

Novel questions have recently arisen by reason of combinations of capitalists, yet the courts have found little difficulty in dealing with and satisfactorily settling such questions, not alone by reason of the few statutes which have been passed upon the subject, but rather by the application of those time-honored principles of justice and equity which have received the sanction of ages. The law is not inadequate nor the courts impotent to deal with the equally novel and important questions presented with so much aggressiveness by combinations of laborers.

A strike may be defined to be a cessation from employment by two or more persons, pursuant to a common design or understanding, for a cause other than a mutual termination of employment by employer and employee. A strike as the public has come to recognize and understand it has certain characteristics not pertaining to the ordinary quitting of employment by an employee. In the first place, the striker does not really wish to relinquish his employment. He simply aims to interrupt the ordinary course of business to which he has been a party as a means of coercing the employer, through the inconvenience and loss which his action causes, to accede to his demands. His quitting employment is, therefore, but a means to attain an end and both must be lawful to justify the action taken.

Moreover, in the ordinary strike the grievance is usually not so much that of the individual as that of a combination of individuals to gain what is termed a mutual benefit. Furthermore, the joint action of several persons quitting their employment at a prearranged time is entirely different in character and effect from the ordinary act of quitting employment by the individual laborer.

It has been frequently stated by labor leaders and others, even by tribunals who should weigh their words with more exactness and care, that laborers have a right to enter into combination and to strike for whatever reason they choose or for no reason at all. Such a broad statement is, however, inaccurate and frequently misleading, for the right to strike, as an examination of the authorities plainly shows, is not an absolute right, but one which, like the great majority of privileges which the citizen possesses, is limited by the co-equal rights of others.

Ordinarily, in the case of an effective strike, but two parties are primarily affected—the employer and the striking employee, though the public is in the end the party most surely, if but indirectly, affected by every strike, for upon the result of the strike depends the transfer of some economic advantage. For instance, if the strike be one to enforce the familiar demand for shorter hours or higher wages, its success means a higher cost of the article produced, and this higher cost it can safely be asserted is not long borne by the employer, but is soon reflected upon the consuming public in the form of a higher price for the article produced.

There is, however, a class of strikes in which the public is directly affected, and in the consequence of which it has a paramount interest, as, for instance, strikes upon public-service instrumentalities which interrupt commerce, transportation, communication or other matters connected to the welfare of the public. In such a strike the striking employees know that their unrestricted power of interference with the operation of those instrumentalities, which society has created for its welfare and convenience, supported (as are the strikers) by its patronage, and for common protection, is the most effective weapon which

the strikers possess to coerce the employer into acceding to their demands. The courts have had occasion to give but slight judicial attention to this class of cases lately so menacing to the public.

One is frequently met by the statement that what one may do the many may do. That is obviously not true, for the reason that the act of the many is not the same in intention or effect as the individual act. A man may walk down the street as he chooses, but a body of men may not walk down the same street in procession without a permit from the public authorities. Here is a clear illustration that the right of the individual to walk upon the street is subject to the limitation that he may not walk in concert with large numbers, even though he wishes so to do.

While the law permits the individual not under specific contract to quit his work arbitrarily and for little or no reason, his right to do this is subject to the limitation that he must not do so at such time or in such a manner as to destroy his employer's property or endanger the public safety. If he were engaged as engineer upon an engine, he would not be justified in quitting at a time when he had such a fire or head of steam on as might, by leaving the engine unattended, cause an explosion and so endanger the public safety or destroy his employer's property. Again, an individual under contract not terminable at will may not lawfully break his agreement, and so to cease work under such circumstances is unlawful. The character of the contract to work for another is such that except in certain peculiar instances public policy does not compel the specific performance thereof by the individual, although still branding the breach as illegal and awarding damages therefor.

In spite of the somewhat unsettled state of our law in this respect, it is clear that even the right of the individual to cease work is limited: (1) By the paramount right of the body politic to assure its own safety, and (2) by the co-equal rights of other individuals.

Notwithstanding the existence of these two general restrictions upon the individual's right, the value of freedom of movement and choice among its citizens is considered of such paramount importance to the community that the right of the individual to cease work is regarded as a right higher in degree than most of those rights with which it comes in contact, so that the single person may exercise his right for an arbitrary, absurd or illogical cause, if he will, or for any cause not affirmatively stamped by the law as illegal.

At the outset we encounter this striking difference between the status of the individual and that of the group, that whereas the privilege of the individual to work or not, as he sees fit, is treated as of the greatest importance to society at large, the right of the group to strike simultaneously, containing as it does, potentialities of far-reaching harm and destruction to the whole body politic through its many citizens affected, is regarded not as of supreme importance, but only as of equal rank with the privileges of others, and since the exercise of this right almost inevitably works intentional injury to others, those who take upon themselves to invoke its aid are held strictly accountable for its use in a justifiable manner and for a justifiable end. The privilege of using this right to quit work arbitrarily, which we see in the case of the individual, no longer exists in the group, who are permitted to avail themselves of it only when such use can be justified; it cannot be said to be justified when the damage inflicted is out of all proportion to the benefit sought for or when the end striven for is arbitrary or contrary to the accepted law.

As the strike by a combination of individuals must be acts of individuals plus the effect of concerted action, the combination must of necessity be subject to such limitations as apply to individual action, and also to such limitations as are peculiar to the resulting action of the combination, for the reason that the power of concerted activity is essentially so different and so

*From an article in the *North American Review* for May, 1910.

rest, and its use so infinitely more coercive in combination with individual effort, that its exercise in the same manner as that allowed to individual activity would completely overwhelm the society subjected to the part of it that is striking. Surely, then, the right to use such enormous power, a power derived from the very existence of organized society, must of necessity be a qualified privilege which can only be taken justifiably or reasonably with due regard to the rights of that society which makes its exercise possible, and not in such a manner as directly or intentionally to injure or unnecessarily interfere with or oppress the public.

In a recent case the Supreme Court of Massachusetts said:*

"There is a fact which puts us further than we have been in the past. That is the increase of power of citizens has over the individual citizen. Take, for example, the power of a labor union to compel by a strike compliance with its demands. Speaking generally, a strike to be successful means not only coercion and compulsion, but coercion and compulsion which, for practical purposes, are irresistible. A successful strike by laborers means in many if not in most cases that for practical purposes the strikers have such a control of the labor which the employer must have that he has to yield to their demands. A single individual may well be left to take his chances in a struggle with another individual. But in a struggle with a number of persons combined together to fight an individual the individual's chance is small, if it exists at all. It is plain that a strike by a combination of persons has a power of coercion which an individual does not have.

"The result of this greater power of coercion, on the part of a combination of individuals, is that what is lawful for an individual is not the test of what is lawful for a combination of individuals; or to state it in another way, there are things which it is lawful for an individual to do which it is not lawful for a combination of individuals to do.

"It is settled in this commonwealth, as we have already said, that the line within which a combination of individuals like a labor union must confine its actions is drawn much closer than in case of the same individuals acting separately."

In arriving at their conclusion upon this question, the courts have applied certain well-known principles which have received the approval of many ages in dealing with combinations, whatever their purpose. The court has inquired:

First: What is the purpose of the combination? (a) Is it a lawful purpose? (b) Is it an unlawful purpose?

If the combination is found to be for an unlawful purpose the court will enjoin the carrying out of such purpose by any means whatever.

Second: If the combination is found to be for a lawful purpose, are the means used or designed to be used to carry the combination into effect lawful or unlawful? If unlawful means are to be used the courts will interfere to prohibit such use.

The so-called "right to strike" is thus seen to resolve itself instead merely into a right to strike in order to attain a justifiable end. Our courts, especially those of Massachusetts, the only state in which the questions relating to this right have been considered in any extensive way, in passing upon cases involving the right to strike follow these general principles and seek to determine whether the purpose of the strike is one which a reasonable man would consider a justifiable end in view of all the surrounding circumstances, keeping in mind the co-equal rights of others and the general grounds of public policy.

The Supreme Court of Massachusetts has said:†

"It is settled in the commonwealth that the legality of a strike depends (in case the strikers are not under contract to work) upon the purpose for which the combination is formed—the purpose for which the employees strike."

Adopting this method, the courts have passed specifically upon a number of situations and have established certain causes as ones sufficiently meritorious to justify a strike and have labeled others as unjustifiable, and the right to strike can be said to exist only for the purpose of promoting a cause in the first class and to be non-existent where the cause falls within the second division.

Some instances in which such combinations were found to be for an unjustifiable end, hence an unlawful purpose, are:

Where the object was:

1. To secure a monopoly of a trade or calling.

2. To create or maintain a cartel stage.

3. The sympathetic strike.

4. To procure the dismissal of a person from an organization not belong to an organization.

5. To induce the violation of a contract on the part of a third person.

6. To violate the actor's contract.

7. To enforce the collection of a fine on an employee levied for the purpose of compelling him to join in a strike.

8. To force upon the employer rules for arbitration made wholly by the union.

9. Improper interference with the right of the employers to have access to a free labor market.

It will be noticed that courts have largely had to consider such combined action as dealt with the interference of co-equal rights of the other individuals. The courts have said that "in this, as in every other case of equal rights, the right of each individual * * * may be said to end where that of another begins."

The right to labor is the primitive right of man; deny it to him and the right to live is denied. The right to labor includes the right to dispose of one's labor. The right to dispose of one's labor with full freedom involves the correlative duty on the part of others to abstain from any obstruction of the fullest exercise of such rights. The denial of this right not only affects the individual, but is an attack upon the public welfare and so is against public policy. For both of these reasons, therefore, the court will enjoin any unjustifiable infringement of this right.

Thus far have the courts gone in interpreting and applying the law for the preservation of individual rights, in defining what limitations shall be applied to combined action which interferes with co-equal rights of others as individuals. The application of the same principles would seem adequate to protect the public from the consequences of much of the hasty, inconsiderate, or improper concerted action in those cases where such action vitally affects the public welfare. Certainly the interest of the public should have as prompt and as effective consideration and protection as those of the individual or group of individuals.

The right of the body politic to assure its own safety is the highest conceivable right. Why should not the concerted action of large bodies of men deriving their income from the patronage of the public, tending directly to public injury, be subordinated to the paramount right of the body politic to assure its own safety? Why should the lesser rights be protected and the greater right be subjected to unrestrained attack?

Such paramount right of the public would seem to be a sufficient justification for legislative action creating tribunals to which matters growing out of industrial disputes involving the public welfare should be left for compulsory arbitration and settlement, as soon as the creation of such a tribunal be deemed expedient. Until such a method of controlling this sort of industrial strife be created, it will be the duty of courts to interfere, whenever it is shown, in due course of legal procedure, that the public safety or welfare is threatened to determine not only the legality of the issues involved, but also whether in any event the concerted action is such as is likely to endanger the public safety or welfare, and if such be found to be a fact, then by their mandate to prohibit such arbitrary concerted action on the part of any group of men.

Certain railways west of St. Paul may enviously note that the harvest in Hungary is so extraordinarily great that the railways are laying sidings and building storehouses and buying or borrowing freight cars to enable them to handle it all. In good years Hungary may export the equivalent of 100,000,000 bushels of grain. The heaviest grain traffic is likely to be in the last half of July and the first half of August.

*Pickering v. Wick, 192 Mass., 582, 583.

†Reynolds v. Lucas, 198 Mass., 294.

A SIMPLE METHOD FOR RERUNNING CURVE TRACK CENTERS.

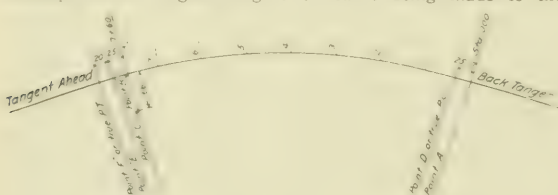
Railway engineers are often required to rerun curves on constructed lines not monumented, but text books give no methods for the doing of such work. The following method, illustrated by an example, is used by A. B. Hogue, a transitman for the Kanawha & Michigan, who says that it takes less time than the ordinary method of running the tangents to an intersection.

Referring to the figure herewith, point A is assumed as the P. C. and point B as the P. T. These points are obtained by sighting along the rail on tangent and measuring over half the gage, setting a hub between the rails, or putting a tack in the nearest tie. Having obtained these points by eye as nearly as possible, the problem is to obtain the true P. C., P. T. and degree of curve.

Setting up on A, stations are run between the rails to B, deflections from tangent being taken to each station. The deflections are set down in the field book, together with deflection differences. The following table contains this data for the curve illustrated:

Station	Deflection	Difference
7+60.....	7° 06'	0° 59'
8.....	2° 31'	0° 58'
9.....	1° 33'	0° 58'
10.....	0° 35'	.....

In the column of differences, select the difference running most uniformly and assume this as the chord deflection for the curve. In the example given the difference is taken as 59 min., so that the curve was evidently originally a 2-deg. curve, the assumption for original degree of curve being made to the



Rerunning Curve Track Centers.

nearest even 10 minutes or nearest degree, as obtained from the deflections to measured center line found between the rails. Multiply the distance from A to B by the degree of curve and divide by 200, thus obtaining the deflection angle for this length of curve. In the example given this is,

$$\frac{760 \times 2}{200} = 7.60 = 7 \text{ deg. } 36 \text{ min.}$$

Deflect this angle from the tangent to point C, approximately on radius through B, the distance from B to C being carefully measured. In the example this is 6.6 ft., which is divided by the sine of the central angle to obtain distance to shift P. C. In the example the central angle is 15 deg. 12 min., and 6.6 ÷ 0.2618 = 25.17 ft., the distance the true P. C. is to be moved ahead from point A on tangent.

To check: The deflection from A to Sta. 4, approximately the middle of the curve, was 3 deg. 30 min. The curve having been taken as a 2-deg. curve, the deflection should be 4 deg. 0 min., the difference between the true and the observed deflection being 30 min. The tan. for 30 min. = .00873; and 400 × .00873 = 3.49 ft., the distance a 2-deg. curve starting from A would strike inside of Sta. 4. Multiply the distance between A and D by the sine of the central angle subtended by 400 ft. of curve. In the example this is 25.17 × sin. 8 deg. (13947) = 3.49 ft. (same). Thus a 2-deg. curve starting from D would strike Sta. 4. If good judgment is used in selecting the degree of curve from data obtained on the trial survey, the curve starting from the true P. C. at point D should strike center near the middle of the curve. If it does not, the difference will be found by the check calculation, and the correct radius and proper shift for P. C. can be obtained by the use of standard curve formulae.

Move from A to D on tangent, setting hub on permanent point for this correct P. C. Run the curve for a length equal to that from A to B, this being in the example 760 ft., to point E. Set on point E and turn angle into tangent, obtaining difference between this angle and the total deflection angle, calling the difference d. Then $d \div D = \text{length to move E ahead, or distance from E to F, the true P. T., the length in the example being 20 ft.}$ The total deflection angle for the curve is equal to the deflection angle to E plus $d \div 2$. In the example $d = 24 \text{ min.}$ and the total deflection angle = 7 deg. 36 min. + 24 min. ÷ 2 = 7 deg. 48 min. This can be checked with the transit after setting the true P. T.

CONCRETE CONSTRUCTION PLANT ON A SHORT TIME JOB.

When the contract for the concrete foundations of the new Boston & Maine locomotive shops at East Somerville, Mass., was placed with the Aberthaw Construction Co., Boston, Mass., last November, it was stipulated that the work be completed in the shortest possible time. The contractors therefore decided to erect a complete concrete mixing and handling plant, although the entire job contained less than 2,000 yards of concrete.

The resulting costs, as well as the speed obtained, justified the erection of the construction plant, although it was in operation only about five weeks. These costs per yard were:

Labor, mixing and placing.....	\$0.79
Rental of plant.....	.89
Handling and erecting of plant.....	.18
Total.....	\$1.36

The arrangement of the construction plant was as follows:

A single spur track from the railway was run to the site, approaching it at right angles to the buildings and at about the middle of the group. Some 200 ft. from the building site, and on the right-hand side of the spur track approaching the work, the mixing platform, mixer and elevator were placed. The siding was paralleled by a narrow-gage track on the same side as the mixer. The mixer platform and the narrow-gage track were built about on the level with the body of a freight car. Turnouts on the narrow-gage track were provided on either side of the mixer platform for passage of cars and storage for idle ones. The aggregate could be unloaded to the mixer platform direct from the freight cars or into narrow-gage cars which could be dumped direct into the mixer. The cement shed was about 100 ft. from the mixer, alongside the narrow-gage track and the siding. Cement was unloaded from the freight cars into the cement shed and transferred to the mixing platform by wheelbarrows or narrow-gage cars.

As the tops of the foundations were several feet above ground level, the track for delivering the concrete was raised so that it could be dumped from the narrow-gage cars direct into the forms. The raising of the narrow-gage track brought the dump cars too high for the mixer to discharge into them, so a short elevator tower with an automatic trip bucket was erected. The mixer discharged into this bucket, which was hoisted and dumped into the cars. A portable engine supplied power for the mixer and for a hoist to operate the elevator.

The reinforcing steel and lumber for forms were unloaded on the opposite side of the track from the mixer and nearer the site of the building. The steel was bent and the lumber cut for the forms and carried into place by hand.

A Russian engineer, A. Nikitin, has published a book on the narrow-gage railways of Russia. Although the minister of public works in 1896 proposed the use of about \$750,000 of government funds for such railways, his idea was not approved, and private companies gradually developed the system. In 1885, Russia had 635 miles of narrow-gage railways, of which about one-fourth were state projects. This number increased, in 1906, to 1,400 miles, including the Trans-Caucasian line 23 miles long, and the Livvahan line, 130 miles long.

General News Section.

The Gault, Colorado & Santa Fe has received 6,500 hardwood ties from Mexico.

The Cincinnati, New Orleans & Texas Pacific has increased the wages of locomotive engineers about 10 to 12 per cent.

Three hundred and fifty switchmen of the Southern Pacific lines in Texas have had their pay increased three cents an hour, the increase to date from the first of April.

At Philadelphia last week the freight claim agent of the Philadelphia & Reading was arrested on a criminal charge and held in \$800 bail for selling some unclaimed eggs which were unfit for food.

Two men arrested at Fairfield, Cal., have confessed to being the robbers who rifled the mail car on a Southern Pacific train at Benicia, Cal., April 17. They say that they secured at that time only \$16.

A fire which occurred on the night of July 24 destroyed a number of loaded freight cars, also the Cleveland, Cincinnati, Chicago & St. Louis freight transfer house at Linndale, Ohio. The estimated loss is \$200,000.

In the supreme court of the District of Columbia July 21, the Humboldt Steamship Company filed a petition to compel the Interstate Commerce Commission to assume jurisdiction over common carriers in Alaska. In a recent decision, the commission held that it had no authority over carriers in Alaska.

A press despatch from Montreal says that the Canadian Pacific has reached an agreement with its conductors and trainmen, by which the men have gained nearly all of the demands which they presented. The standard rates of pay east of Chicago will be recognized by the Canadian Pacific. The agreement takes effect as of May 1 last.

L. J. Lyons, district attorney, has entered suits in the Federal courts in Missouri against five different railways for violation of the Hours-of-Service law. The roads sued and the penalties demanded in each case are as follows: Missouri Pacific, \$22,000; St. Louis & San Francisco, \$3,700; Missouri, Kansas & Texas, \$13,500; Chicago Great Western, \$2,500, and the Kansas City Southern, \$400.

At Carbondale, Pa., on Monday night of this week, rioting in connection with the strike of track laborers of the Delaware & Hudson resulted in fatal injury to one man and less serious injuries to a number of others. The roadbed was damaged by dynamite at Avoca, and at a number of places the track was made impassable by the removal of spikes. The despatches say that the strikers number 1,200.

The strike of 12,000 employees of the Northeastern Railway of England, begun on July 18, was suddenly ended on July 21 by the surrender of the strikers. They had been unable to secure recognition and support from the Amalgamated Society of Railway Servants. The press despatches say that the suspension of traffic during the three days of the strike made it necessary for 50,000 men in coal mines, ship yards and other industries to stop work.

The State Forest Commissioner of New York has sued the New York Central and the Delaware & Hudson for heavy penalties and damages due to fires set by locomotives on State forest lands. The fires occurred in 1908; the alleged damage done by the New York Central amounted to \$57,000, and the amount of penalties demanded is \$1,103,000. On the Delaware & Hudson the damage was \$94,000, and the penalties claimed aggregate \$1,400,200.

Owing to the great scarcity of laborers the Canadian government has decided to admit from all countries except Asia, railway construction laborers who are mentally, morally and physically fit, willing to work and who are guaranteed employment by contractors. This means that contractors in the prairie provinces and on the Pacific coast will be able to secure large numbers of first-class men who, under the strict interpretation of the immigration regulations, might be disbarred either for lack

of the required \$25 or for not coming from the country of birth or naturalization.

William Whyte, first vice-president of the Canadian Pacific in charge of the interests of the company at Winnipeg and west of there, quoted in a long article in the *New York Times*, has a very good opinion of the Railway Commission of Canada and of the course of the government in general in railway regulation. The commission has uniformly aimed to give to the people and the corporations a square deal. Any citizen can now get prompt redress for any grievance against the carriers, which is a marked improvement over former conditions. The railways welcome the aid of the commission in settling difficulties between themselves and the public. William Wainwright, fourth vice-president of the Grand Trunk, speaks in a similar vein. His company has been put to heavy expense in carrying out the orders of the commission, but he feels sure that, on the whole, the commission has been of inestimable value to the road. The commission is now entering on its sixth year.

California Railway Men in Politics.

J. F. McCarthy, of San Francisco, an engineman of the Southern Pacific, and L. H. Collett, of Fresno, an engineman of the Atchison, Topeka & Santa Fe, are president and secretary, respectively, of an organization made up of enginemen, conductors, firemen and brakemen which has been formed in California to deal with state legislative matters. The members propose to take a hand in state politics. They propose to see that hysterical legislation, tending to reduce the earning powers of railways and hamper their managements, shall be discouraged. The leaders in this movement are members of the brotherhoods of the classes of employees named, but they say that they have the support of the entire railway labor element of California. They have already held meetings at a number of places and have received marked attention from the politicians of the state.

The Grand Trunk Strike.

The strike of conductors and trainmen on the Grand Trunk continues, and the company is gradually restoring its freight service with new men. The officers of the company and the representatives of the strikers are very brief in their statements. The company says an experienced man is in charge of every train, and, on Monday of this week, it was claimed that freight, except perishable freight, was being received at all stations. At the beginning of the strike, early last week, hardly any freight trains could be run, but now considerable numbers are running on all divisions. Just how much progress has been made in clearing up the blockade it is impossible to determine from the meager reports given out.

The Canadian Minister of Labor, Mr. King, made repeated proposals that the dispute between the road and its employees be submitted to arbitration, the government to defray the expenses, but nothing came of these proposals. In a telegram sent on Sunday, President Hays reminded Mr. King that the road had shown itself favorable to arbitration, but that the time for such action had passed; and that "it is only necessary that we should have protection to which we are entitled to enable us to resume the full operation of the road."

Violence was reported from Brockville, Ont.; South Bend, Ind., and Brattleboro, Vt. On Friday night of last week there was a mob at the station at Brockville and seven men were injured. At South Bend there was rioting on Sunday and considerable disturbances on other days. Air-brake hose were cut in freight trains and employees and policemen were stoned. The Governor of Indiana was requested to furnish troops to help keep the peace; but at last accounts, although the militia were held in readiness, the Governor said that the sheriff could maintain order. The local authorities at South Bend insisted upon the retirement of Pinkerton's men as a condition of taking action to protect the railway. A freight train was derailed at South Bend on Tuesday of this week, but it does not appear

whether or not this was due to malicious tampering with the tracks, though rails had been found loosened in other places.

The shops of the company at Montreal and other places, which were closed when the strike was begun, were re-opened on Tuesday of this week.

The trainmen of the Wabash, who run over the Grand Trunk tracks from Detroit to Niagara Falls, decided on Saturday to return to work.

The Growth of Cities.

In May and June there was an exhibition in Berlin of municipal architecture and engineering, which, in view of the growing concentration of population in large towns, are arts of tremendous and pressing significance. The exhibition was rich in statistical diagrams, one of the most significant of which showed that while in 1895 the German Empire had 28 great towns with an aggregate of 7,300,000 inhabitants, forming 14 per cent. of the population of the empire; in 1910 it has 45 such towns, with an aggregate of 13,400,000 inhabitants, forming 21 per cent. of the population of the empire—a growing concentration of population parallel to that in this country, as the census of this year will show.

Of course, such a growth of city population has been made possible only by the construction and working of city and suburban railroads, the plans and performances of which formed a large part of the exhibition, including the great model of the Berlin City & Belt Railway, which was shown in Chicago in 1893.

The statistical diagrams exhibited show some facts which ought to convince us that Chicago and Seattle are not the only places that have had a marvelous growth. The city of Berlin is shown to have received 18,330,000 tons of freight in 1908, and to have shipped 3,720,000; and of the freight received no less than 42 per cent. came by water, though Berlin is on an insignificant stream, which, however, is navigable for barges bringing English coal, lumber, etc., from the Baltic, and Siberian coal, etc., from the South. From 1895 to 1906 the freight business of Berlin increased from 10,700,000 to 21,700,000 tons.

The City & Belt Railroad (elevated), which had 75,500,000 passengers in 1875, carried 149,100,000 in 1908. It has but a small part of the city traffic.

Steel in Freight Car Construction.

The article on Steel in Freight Car Construction, by C. A. Seley, mechanical engineer of the Rock Island Lines, which appeared in the *Railway Age Gazette* of July 8, 1910, page 84, should have been accompanied by the statement that the paper had been presented before the Franklin Institute of Philadelphia, and was published in the proceedings of that society.

The Mount Ari Railway.

The Mount Ari Railway was built to carry timber from the Mount Ari Forest. This is perhaps the most expensive road ever constructed in Japan. The Mount Ari forest is located in the unpopulated region 40 miles east of the city of Kagi, Formosa. The wealth of this forest was discovered in 1899 by the Japanese government. It covers over 50,000 acres. The fertile soil, abundant rainfall and steady climate contribute to the growth of the trees. Added to this, no storm of any damaging force visits this region, making it an ideal timber forest. There grow Chinese oak and several other kinds of trees at the elevation of about 4,000 ft. above sea level, red cypress trees which are called the "Japanese cypress trees" at 5,000 ft. and oak at 7,000 ft. An estimate of the amount of timber available in linear feet is as follows:

Name	From 4,000 ft. to 5,000 ft.	From 5,000 ft. to 6,000 ft.	From 6,000 ft. to 7,000 ft.	From 7,000 ft. to 8,000 ft.
Red cypress	1,017,000	1,115,000	677,000	258,000
Chinese oak	1,082,000	1,106,000	276,000	70,000
Pine	3,600,000	1,879,000	987,000	6,000
Bamboo	2,911,000	250,000	2,000	—
Other	1,955,000	848,000	1,000	—
Miscellaneous	10,073,000	8,372,000	40,000	304,000

The red cypress is better than Chinese oak, and it is especially fit for furniture and wheel material.

After the discovery of the resources of this forest, the Formosa government decided to appropriate the timber for its own railway supply. The transportation of the timber was first carried on by

floating down stream, but later this method was abandoned on account of insurmountable difficulties due to the necessary improvement of the So-bun-kai river for the above purpose. In 1905 the Formosa government decided to construct a railway, which decision was a result of the report submitted by an eminent forester, Dr. Kawae, after a minute investigation in person.

The construction of the railway in this region was by no means an easy task. Even for the locating survey the men were confronted with inexplicable difficulties, because the topographical features of this region are extremely craggy. The construction work, which was commenced in 1907, was recently completed, after several lives had been sacrificed.

The length of the entire road is 41 miles. The maximum curvature is 38 deg. and the maximum grade is 21 per cent. The track construction is as follows: Sand and crushed stones are used for the roadbed, 11 ft. wide on 1:1½ slope embankment, and 17 ft. wide in rock cuts of 1:½ slope.

The bridges are constructed with maximum load of one ton per lineal foot. Timber was preferred for bridges, because they can be reconstructed with the product of the Mount Ari forest at greater ease and less expense, and also the initial cost is reduced.

Tunnels are 9 ft. 6 in. in width and 13 ft. in height. There are no supports used on the part of hard rocks, but 6 in. x 9 in. beams and columns and 2 in. or 3 in. boards are used for the part of soft rocks as the supports. Oak ties, 5 ft. x 6 in. x 4 in., are used with spacing of 2 ft. 4½ in. between ties. At present 30-lb. steel rails are used.

Engines weigh 12 to 20 tons, and 6 ft. x 15 ft. freight cars with 4 wheels and 6 ft. x 20 ft. box cars with capacity of 5 to 10 tons each will be used. The train will run three or four trips a day with its traffic capacity of 60 tons per train at the speed of 10 miles per hour. The present estimate of total transporting capacity of this road is about 70,000 tons per year.

Seven stations are located between the terminals of Kagi and Mount Ari Forest as water supply and freight stations. The total cost of the construction of this road is \$2,000,000, that for one mile amounting to \$47,000.

We are indebted for the above details to T. Kitagawa, University of Wisconsin.

How to Get Public Documents.

The Government Printing office advises that in the fiscal year ended June 30 more than half a million public documents were purchased by people from every part of this country, and by some in foreign lands. Over \$87,000 was received for these publications, a proof that public documents have become a commodity that thousands of readers are willing to pay for. At the same time the numerous inquiries addressed to various officers indicate that, generally speaking, the public has only a hazy idea as to how public documents can be obtained and how their prices may be learned. Any inquiry regarding public documents that may be addressed to the Superintendent of Documents, Government Printing Office, Washington, will meet with prompt attention.

State Regulation.

There is more "water" in the stock of the average American farm to-day than there is in the stock of the average American railway. Take a highly cultivated Illinois farm, and there are thousands of them worth all the way from \$150 to \$200 per acre. Does any man claim that the value is represented by the original cost of the land, plus the labor and improvements that the owner has put upon it? A great percentage of that value comes from its proximity to good market towns, from the railroad that crosses it, the interurban road, the telephone and the rural free delivery. Chicago has 24 railways. Only six have depots of their own. The rest enter through leases and trackage rights. The original roads secured their entry into the city for next to nothing. Many of these \$200 per acre farms cost \$125 per acre.

Anyone who believes that railway securities are a source of untold wealth to those who hold them can secure all of them that he may desire at reasonable rates. Not all the restrictive legislation is in the west. Within the last year a transportation company in the east desired to issue an additional series of bonds. Before they could do this they had to obtain the consent of the state commissioners. Before they obtained that consent they had to bind themselves to expend the money for certain prescribed improvements, and had to further bind them-

selves to put the bonds on the market at a price fixed by the commission. That happened to the Boston Elevated Railroad Company, in Massachusetts.

Now what is to be the ultimate benefit of this eternal nagging of the commission? In Illinois they are making us run on a narrow-gauge railroad with a two-cent passenger rate on one side of us and a \$2,000,000 waterway on the other, for the ostensible purpose of "regulating" the freight rates. For much of the general misunderstanding as to the real position of the railways, the roads themselves are to blame. The most successful regulator, as well as the most reasonable one, is more publicity.—*Walter L. Ross, Vice-President, Chicago & Alton.*

Estimating Timber Lands.

The Department of Agriculture is estimating the present stand of saw timber on each township and section of national forest land in Arizona, New Mexico, Arkansas and Florida. It will probably take until the close of 1912 to complete the work.

Up to the present time in Arizona all the saw timber on the Coconino Forest has been cruised, including the Grand Canyon division, all on the Prescott, more than half of the Sitgreaves, about one-fifth of the Apache; in New Mexico, the Gallinas division of the Lincoln, and half of the Pecos. Field parties are now at work in Arkansas on the Arkansas National Forest, and in Florida on the Choctawhatchee. During the present field season it is anticipated that the estimates covering the Apache, the Gila and the Pecos, in New Mexico, and the Mount Graham division of the Crook, in Arizona, can be completed, and that for the Manzano, in New Mexico, which was estimated in 1908, thoroughly revised. During the winter of 1910 and 1911 the Choctawhatchee and the Ocala, in Florida, and the Arkansas and the Ozark, in Arkansas, can be finished. Thus it is likely that by 1913 all saw timber in District 3, comprising the forests of the South and the Southwest, will be cruised and mapped so that purchasers can negotiate sales promptly and the government will know just what timber should be sold first and of how much it can safely dispose.

New Haven Stockholders.

Some of the largest stockholders in the New York, New Haven & Hartford are: New England Navigation Company, 172,946 shares; Mutual Life Insurance Company, 35,640; Pennsylvania Railroad, 34,900; Adams Express Company, 34,730; American Express Company, 23,493; New York Central, 11,248; C. Pratt & Co., 10,563; A. G. Vanderbilt, treasurer, 6,195; W. W. Astor, 5,051; M. F. Plant, 4,000; J. J. Astor, 4,112; Lewis Cass Ledyard, director, 20,542; C. M. Pratt, director, 6,690; J. P. Morgan, director, 4,371; C. S. Mellen, director, 3,580, and William Rockefeller, 1,600. The New England Navigation Company is a subsidiary of the New Haven and the shares owned by it may properly be considered as treasury stock of the New Haven.

The Bureau of Railway Economics.

The Bureau of Railway Economics, briefly noticed in these columns last week, which is to "disseminate correct knowledge in regard to freight rates and other questions in which the railways and the public are jointly interested," has been put in charge of Logan G. McPherson. The office of the bureau is to be in the Munsey building at Washington. Mr. McPherson has been a frequent contributor to the *Railway Age Gazette*, and is the author of two valuable works on transportation, "The Working of the Railroads" and of "Railroad Freight Rates in Relation to the Industry and Commerce of the United States." Before becoming interested specifically in railway economic matters, Mr. McPherson was a newspaper man, and it was while doing newspaper work that he first became interested in railway economics. Being a journalist he has peculiar qualifications for presenting that aspect of the railway question which will be best understood by the general public. That there is here a fine opportunity for doing good and for bringing the railways and the public together on an issue in which their interests are almost identical goes without saying. The fundamental misunderstanding of railway matters by the general public has so often been commented on that nothing further need

be said about it. But there is another object which should be served by this bureau, the enlightening of the railways themselves. Usually when the railways find it necessary or desirable to go to the public with a proposition which they must present, it is necessary first to make a study of various alternative propositions that may be adopted, and then select that one which allows of the most full and fair justification.

The Guayaquil & Quito.

The Guayaquil & Quito runs from Duran, Ecuador, on the Guayas river, opposite the port of Guayaquil, to Quito, the capital, connection between Guayaquil and Duran being made by steam ferryboats. The distance between Duran and Quito is 287.5 miles. It is owned and operated by Archer Harman, of New York, and associates. The officials of the company in Ecuador are all Americans, as also are the conductors and engineers and executive clerks. The firemen, brakemen, telegraph operators, station agents, laborers, etc., are natives or negroes.

Starting at sea level, at Duran, at one point along the line attains a height of 11,841 ft. above the sea. This is at Urbina. The maximum grade is 5.5 per cent. and the maximum curvature 29 deg. The gage is 3 ft. 6 in. and the rails used are 55 lb.

There are 45 stations, 27 of which are telegraph offices. The executive offices are at Ambato, 196 miles from Duran, and 8,500 ft. above sea level. The floating equipment consists of one river steamer, one tugboat, four wooden lighters and four steel lighters. As the ocean liners do not come right up to port but anchor three miles down the river, transfer of company's material must be made by lighter or tug. The company owns 26 locomotives, with 22-in. stroke, 42-in. driving wheels, steel fireboxes, heating surface of firebox 100 sq. ft., and a total tractive power of 31,250 lbs. Fuel used is coal, and all engines are equipped with Westinghouse air brakes and the Le Chatelier water brake. The passenger equipment consists of five first class coaches, three second class coaches, six baggage and express cars and two chair cars. The coaches are made of pine, with a length over the buffers of 40 ft., breadth of 8 ft. 4 in. and height inside of 8 ft. 3 in. They are nearly all constructed in the company's shops at Duran, equipped with Westinghouse air brake, water brake and hand brakes. They are lighted by kerosene lamps, no heating being required.

The freight equipment consists of 46 freight box cars, capacity 30,000 lbs.; 40 coal cars, 30 flat cars, 35 stock cars, one pay car, one tool car, four dump cars, one derrick car, one weed killer and one steam shovel. They are all equipped with air and hand brakes.

The shops at Duran have a total area of about 7,500 sq. ft. About 2,500 locomotives and cars are annually repaired in these shops. They contain 12 lathes, five saws, one overhead crane, eight blacksmith forges, one 5-ton hammer, and much other smaller machinery. About 200 men are regularly employed.

The officials are: Archer Harman, president, New York; E. H. Norton, vice-president, New York; F. B. Stewart, vice-president, Ambato; H. W. Henderson, general manager, Huigra; M. K. Jones, superintendent of transportation, Huigra; A. A. Bond, engineer of maintenance of way, Huigra; W. H. Morse, superintendent of motive power, Duran; J. R. Stewart, auditor, Ambato, and A. N. Paget, treasurer, Ambato.

Estimate of 1910 Earnings and Expenses.

Data now at hand indicate that the total gross earnings of the railways of the United States reporting to the Interstate Commerce Commission amounted, in the year ended June 30, last, to approximately \$2,845,000,000, an increase of \$350,000,000 or more. The ratio of increase in earnings will be shown by the official figures, when they are issued some time in the fall, to have been very close to that indicated here, which is 14 per cent.

These gross earnings are based on the operations of an average mileage of 236,500 miles, or 3,500 miles more than the average reported by the commission for the fiscal year 1909. The mileage figures, however, are more difficult to estimate than the aggregate earnings, for the reason that the mileage included in the monthly aggregate statements of the commission vary in such fashion as, for instance, 237,189 miles for last December and 235,924 miles for March, three months later. The average

for the nine months for which the commission's monthly statements are available is 236,338.

Year before last the average operated mileage increased nearly 5,000 miles, in comparison with which the mileage added to operation the past 12 months will look small, whatever the exact figures turn out to be. Unquestionably the effects may be traced here of the comparative scarcity of railway capital for extension purposes during several years past.

Estimated mileage and gross earnings for the fiscal year are compared with the official figures for 1909 in the following tables, gross earnings including earnings from "outside operations," but not, of course, income from investments or other sources other than operation:

	Miles operated, average.	Gross earnings.
1910.....	236,500	\$2,845,000.000
1909.....	233,000	2,494,115.500
Increase.....	3,500	350,884.500
Increase, per cent.....	1.5	14.0

Calculations of operating expenses and net earnings are subject to more reservation than gross earnings, on account of the extraordinary effect upon expenses of the wage adjustments of the final three months. Few railway companies have published their statements for June and not all those for May. For other reasons, also, such as the unusually severe winter, net earnings have fluctuated extremely during the year. Thus the year opened with an increase of 15 per cent. in net, comparing rationally with the expansion in the volume of business done. November brought a gain in aggregate net earnings of no less than 25 per cent., but December saw an actual decrease, despite the increased mileage reporting. In the three succeeding months, net earnings again rose, but not at anything like their old rate, while in April the rate of gain dropped off sharply and thereafter decreases of 2 to 5 per cent. prevailed.

In the following comparison of estimated expenses and net earnings with the official figures of 1909, outside operations are included in expenses and net. Taxes are not included in expenses, but are shown separately:

	Operating expenses.	Net earnings.	Taxes.
1910.....	\$1,918,350,000	\$926,650,000	\$98,000,000
1909.....	1,662,102,000	832,013,400	89,026,200
Increase.....	\$256,248,000	\$94,636,600	\$8,973,800
Increase, per cent.....	15.4	11.3	10.0

—Wall Street Journal.

Proposed Tunnel Under New York Bay.

Stephen M. Hoyer, president of the New Jersey & Staten Island Junction Railroad Company, announces that plans are being prepared for a tunnel across the narrows of New York bay, between Staten Island and Long Island. Mr. Hoyer says that the tunnel can be made in a year at a cost of \$6,000,000, and he is thinking of having a road wide enough for both railway tracks and carriages. The length of such a tunnel would be about two miles.

The Land of Evangeline Route.

With the announcement that the Canadian Pacific has obtained control of the Dominion Atlantic, the *Railway News* of Toronto prints the following: The Dominion Atlantic Railway is the best local system in the Dominion and has enjoyed the best and most progressive management, indeed it more resembles a trunk line than a system of railway confined to one province; whilst its regularly operated water lines extend to St. John, N. B., and Boston, Mass., carried on by veritable types of ocean liners which perform their schedules year in and year out, summer and winter, with the regularity of express trains. * * * In 1880 there were only 24,000 barrels of apples exported to the English markets from the "Valley"; in the season of 1909-1910 nearly 800,000 barrels were sent across the ocean, these figures being an advance of 100,000 over the previous season. As enormous numbers of young orchards come into bearing each year it makes the yearly ratio of increase in output very marked, and this increase will continue as yearly large additional tracts are broken and fruit trees planted.

During these years of development the present Dominion Atlantic has been gradually formed. Starting with the Windsor & Annapolis, operating 87 miles of road, within the period

from 1892 to 1897, the Cornwallis Valley Railway and Western Counties Railways were purchased when the present name was assumed. In 1895 the St. John-Digby Steamship Service was inaugurated, followed in 1897 by ships on the Yarmouth-Boston route. Since then the Yarmouth Steamship Company and Midland Railway properties were acquired. * * * The company now operates 297 miles of rail lines and 529 miles of water lines. * * *

The Dominion Atlantic Company's fleet now consists of the following ships: Prince Arthur, Prince George, Prince Rupert, Prince Albert, Boston and Yarmouth. These craft include models of the latest development in marine architecture; they are efficiently manned and maintained with the same scrupulous care and cleanliness that prevails in the Royal Navy. The Prince George and Prince Arthur are fitted with torpedo boat types of engines and hold records exceeding 22 knots per hour; connecting with these ships in addition to the regular service from Yarmouth to Halifax are the special limited through trains. "The Flying Bluenose," made up of day coaches and chair cars, making the run between Yarmouth and Halifax, 217 miles, with only nine stops. Eight round trips are made weekly between Boston and Nova Scotia throughout the summer by the steamship lines of this company. It is estimated that between 80,000 and 100,000 passengers will use these water lines to and from Boston during the next 12 months.

Statistics of Railways for 1909.

Owing to a typographical error, the table taken from returns to the Interstate Commerce Commission showing statistics of railways for 1909 and previous years, which was printed in last week's issue of the *Railway Age Gazette*, was not entirely correct. We print herewith a correct table. The apparent error in 1908 and 1909 in the increase in mileage during the 12 months is caused by the fact that the commission in these two years did not include in its report the mileage of switching roads. The increases shown, therefore, are the actual increases in mileage comparing like with like, while the figures for the miles of road completed are not like figures in 1909, 1908 and 1907.

STATISTICS OF RAILWAY IN 1909 AND PREVIOUS YEARS.

	1909.	1908.	1907.	1906.
Miles of road completed	236,569	233,673	229,951	224,368
Increase, 12 months.....	3,215	5,980	5,588	6,362
*In hands of receivers.....	.....	.....	3,926	3,971
Locomotives, number	57,212	57,698	55,388	51,672
Cars owned, passenger.....	45,584	45,292	43,973	42,262
Cars owned, freight.....	2,073,606	2,100,784	1,991,557	1,837,914
Cars owned, total.....	2,218,280	2,244,357	2,126,594	1,958,912
Employees	1,502,323	1,455,244	1,672,074	1,621,385
Per 100 miles of road.....	638	622	735	699
Total stock and funded debt.....	\$13,711.9	\$12,840.1	.....	\$14,570.4
Stock and debt per mile road.....	59,259	57,230.0	.....	67,936.0
Gross earnings, millions.....	2,418.7	2,393.8	2,589.1	2,325.8
Average per mile.....	10,381	10,533.0	11,383.0	10,460.0
Passengers carried, millions.....	891.5	890.0	873.9	800.0
Carried 1 mile, millions.....	29,109.3	29,082.8	27,718.6	25,176.0
Tons freight carried, millions.....	1,558.6	1,533.0	1,796.3	1,631.4
Carried 1 mile, millions.....	219,803.0	218,381.5	236,601.4	215,377.6
Average rate per ton-mile, mills.....	7.6	7.5	7.6	7.5
Average passenger fare per mile, cents.....	1.9	2.0	2.0	2.0

*Not reported in the present abstract.

†In millions. This represents only securities outstanding in the hands of the public.

Record Discipline on the Lehigh Valley.

"Record Suspensions" having been found to be as efficient as actual suspensions, it being a matter of personal pride with the men to have a clear record, it has been decided by the Lehigh Valley to revise further its system of discipline so that, beginning July 1, 1910, employees with imperfect records will have an opportunity to clear them by loyal and efficient service in the future. Clear records for stated periods will be recognized by credit allowances, and heroic or meritorious service, whether in or out of the usual line of duty of the employee, will be rewarded by further credit allowances. Employees having a clear record for two years prior to July 1, 1910, will be entitled to cancellation of all demerits prior to that date. A clear record for one year prior to July 1, 1910, will cancel all demerit records prior to January 1, 1905, and a clear record for twelve consecutive months at any time after July 1, 1910, will cancel demerit records to that date.

Employees not having a clear record for one year prior to July 1, 1910, will retain their records as entered upon the books, but a clear record for twelve consecutive months at any time

Traffic News.

The Wabash Railroad lately took from Detroit to the Missouri river a train of 61 freight cars all loaded with automobiles.

The Western Pacific is now receiving large numbers of new passenger cars and it is expected that the line will be opened for through passenger traffic on August 22.

The traffic departments of the Union and Southern Pacific roads contemplate charging for tickets good in sleeping cars a rate somewhat higher than that for ordinary tickets, probably an addition of a half a cent a mile.

Rates on coffee in carloads to Chicago and other western cities from the Atlantic coast and from Gulf ports were the subject of a conference last week at White Sulphur Springs, W. Va., but, it is stated, without result. Another conference is to be held in Chicago August 4.

The roads in the Western Trunk Line Committee, after a conference with Chairman Knapp at Washington, have followed the Eastern Lines in agreeing to postpone from August 1 to November 1 the date for the application of their proposed increased freight rates.

The Western Pacific has taken its first long fruit train from Sacramento to Salt Lake City and it is said that the time of all previous runs between those cities was beaten. What this time was is not stated, but the train reached Denver nine hours ahead of the scheduled time.

Over 2,000 bales of cotton were received in New York last week from Fall River, Mass.—which might be likened to carrying coals to Newcastle. Many Fall River mills are now idle, owing to slack demand for cloth, while the price of cotton in New York has been very high.

The Interstate Commerce Commission will give a hearing in New York City August 15 on the question of approving the proposed advances in freight rates in Official Classification territory. A hearing on the same subject will be held at Boston August 16, and at Chicago August 22.

Knight & McDougall, grain dealers, have sued the Delaware & Hudson for \$257,499, the value of bills of lading held by the plaintiff for which the railroad could not produce the freight. It seems that the grain had been delivered to parties not entitled to it. This suit is based on the irregularities for which arrests were recently made at Albany.

The city of Trenton is to issue \$50,000 in bonds for improving the water front of the city. This improvement looks to the future deepening of the Delaware river, so that there shall be a 12-ft. channel from Philadelphia to Trenton. At present Trenton can hardly be classed as a "port," though it is only about 30 miles from deep water at Philadelphia.

The Philadelphia Rapid Transit Co., which already does a considerable traffic in merchandise, has established a freight station at Front and Market streets, Philadelphia, in a building which cost \$30,000, and will increase the freight service to Doylestown and intermediate stations. Four cars are now in use and 20 new cars have been ordered. These cars are 32 ft long and 6½ ft. wide.

The railway commission of Texas has given out a statement showing that the freight earnings of Texas railways for the 11 months ended May 30, 1910, amounted to \$59,804,435, an increase over the previous year of \$1,783,806. Passenger train earnings amounted to \$25,799,553, an increase of \$1,781,651. Gross earnings in the 11 months amounted to \$87,116,680, an increase of \$3,742,400, and operating expenses amounted to \$66,204,028, an increase of \$3,997,442. This left net revenue of \$20,882,651, a decrease from the previous year of \$225,042.

Through the courtesy of one of its members, Charles B. Hopper, general freight agent, the members of The Traffic Club were the guests of the Goodrich Transit Co. aboard the new steamship Alabama on Wednesday afternoon, July 27. This ship has just been put in commission and will ply between Chicago, Grand Haven and Muskegon. The trip on the 27th was a stag party and was in the nature of a christening, with the usual water on the side. A buffet luncheon was served aboard the Alabama as it left the wharf at the foot of Michigan avenue at 2 o'clock. The occasion was thoroughly enjoyed by

the large number who attended. This is the second outing of the season, the first one being held at the Beverly Country Club, June 23, at which 160 members were present.

The business of delivering tickets to prospective passengers at their residences or hotels, which seems to be growing rapidly in the larger cities, has become of so much consequence on the New York Central in New York City that uniformed messengers are employed in the service. According to an officer of the road, the "Chicago commuters" are particularly pleased with this accommodation. A Chicago commuter is a person who goes to Chicago once a week or oftener. Having their tickets and checks arranged for by their secretaries before leaving their home or office, these passengers can pass through the station and enter the train just like an ordinary commuter; that is to say, their minds may be devoted wholly to introspection, their feet finding the proper platform gate without conscious mental guidance.

The Interstate Commerce Commission will on August 1 begin an examination of the books of the transcontinental lines in connection with the Rocky Mountain rate cases recently decided by the commission. In these cases, it will be recalled, the commission found that the rates charged by the carriers were unreasonable and ordered a reduction of about 20 per cent. The cases included the well-known Spokane rate case, the Portland-Seattle, the Salt Lake City, the Reno and other cases. The commission decided to proceed with caution, and before making a final order to make a comparison. John H. Marble, chief of the division of prosecution; J. M. Jones, chief of the tariff division, and Charles A. Lutz, chief examiner, acting for the commission, and having conferred with the roads, will base the comparison on the business of October, 1909, and January, April and July, 1910. Forty accountants will go over the revenues of the railways in these months, and will compare them with the revenues that would have been earned if the reduced rates as now ordered by the commission had been in effect. Checking will be carried on in San Francisco, St. Paul, Salt Lake City, Denver, Omaha, Spokane, Los Angeles, El Paso, Tucson, Prescott, Portland and Seattle. It is estimated that the entire force of 40 men will take four months to do the work. When the comparative figures are finally presented to the commission it will decide whether the orders making the reductions are to become operative or whether the results demand their revocation or modification.

INTERSTATE COMMERCE COMMISSION.

The Interstate Commerce Commission has ordered that all tariff publications, classifications or supplements thereto filed with the commission on or after September 1, 1910, must indicate by the use of black face type [bold face type], or by the use of symbols with proper footnote explanations, all changes in rates, which are increases over rates formerly in effect, and all changes in rules, regulations or classification ratings, whereby any rate or charge may be increased.

The Interstate Commerce Commission has ordered that when the commission, under authority of Section 15 of the act to regulate commerce, as amended, suspends a tariff publication, classification or supplement thereto, each and every carrier shall, by itself or agent, on receipt of lawful notice of such suspension, immediately post at its stations and file with the commission, on one day's notice, supplement stating that such tariff publications, classifications or supplements thereto are under suspension, and that the rates therein contained will not be applied or charged until further notice, or until such specified dates as the suspension order of the commission may name. Such supplement must bear on its title page the following notation: In compliance with special order No. 6 of the Interstate Commerce Commission of July 13, 1910.

Brooklyn Lighterage Rules Found Reasonable.

M. Messon Co. v. Pennsylvania Railroad. Opinion by Commissioner Clark.

The complainant, a dealer in lumber at Brooklyn, N. Y., claims that the lighterage rules of the Pennsylvania, as applied to Wallabout basin, are unreasonable, but the commission does not find this to be the case. (191 U. S. C. C., 30.)

Misunderstanding Between Complainant and Defendant.

Edward G. Davies & Lumber Central v. Opinion by Commissioner Clark.

The hearing of this case showed that the circumstances in connection with the shipment in question were unusual and not previously correctly understood by either complainant or defendant; therefore, no order was entered. (19 I. C. C., 3.)

Rates on Bananas Reasonable.

Waco Freight Bureau et al. v. Houston & Texas Central et al. Opinion by Commissioner Cockrell.

The reasoning in *Payne v. M. I. & T. R. R. & S. S.*, 15 I. C. C., 185, is followed and import rates from New Orleans to Texas common points are not held to apply to bananas. The commodity rate of 72 cents now in effect on bananas is not found unreasonable. (19 I. C. C., 22.)

Tap-Line Allowances.

Industrial Lumber Co. v. St. Louis, Watkins & Gulf et al. Opinion by Commissioner Clark.

The complaint is of unjust discrimination in rates on lumber from Oakdale, La., to Port Arthur, Tex. The complaint is dismissed without prejudice awaiting completion of plans now under way to carry into effect the views expressed in *Star Grain & Lumber case*, 17 I. C. C., 338. The commission will not attempt to equalize discriminatory conditions created by tap-line allowances by reducing the rate complained of. (19 I. C. C., 50.)

Rates on Lemons Reduced.

Arlington Heights Fruit Exchange et al. v. Southern Pacific et al. Opinion by Commissioner Prouty.

Under the conditions shown by the record in this case the commission fails to find that the present rate on oranges from points in southern California to the East is unreasonable. Present rate on lemons from points in southern California to the East is unreasonable to the extent that it exceeds \$1 per 100 lbs.

The commission is investigating the refrigeration and pre-cooling charges on citrus fruit shipments from California, and all questions relating to those issues are reserved for further consideration and future disposition. If in any case the advanced rate on lemons complained of herein has been paid, reparation will be awarded on the basis of the \$1 rate upon proper proceedings. (19 I. C. C., 148.)

Satisfactory Through Route Now in Existence.

Southern California Sugar Co. v. San Pedro, Los Angeles & Salt Lake et al. Opinion by Commissioner Lane.

The commission can only be asked to establish through routes and joint rates when the transportation point at which the complainant is located is not reasonably served by a through route now existing. In this case the complainant asks for a through route and joint rate on sugar from New Delhi, Cal., to Missouri river points via the Pacific Electric Railway, on the tracks of which the complainant is located, and transcontinental railways through Los Angeles. The line of the Southern Pacific, which runs within three-fourths of a mile of the complainant's plant, is found by the commission to form, with its eastern connections, a reasonable and satisfactory through route from New Delhi. Complaint dismissed. (19 I. C. C., 6.)

Including Advertising Matter with Merchandise.

Ouerbacher Coffee Company v. Southern Railway et al. Opinion by Commissioner Clark.

Complainant is engaged at Louisville, Ky., in shipping coffee in packages to various dealers in other states. Light articles of small value are included in the packages as premiums for the purpose of advertising or stimulating the sale of the coffee. Official and Southern Classifications provide for inclusion of advertising matter or articles in packages, but defendants decline to extend that privilege to complainant. Some dealers who offer premiums ship the premiums separately and distribute them on presentation of coupons that are included in the packages. Obviously if all were required to ship in that way no discrimina-

tion would appear. It is held that it is unjustly discriminatory for defendant to grant to other shippers the privilege of including advertising matter and articles in packages of merchandise and to refuse the same or similar privilege to complainant. (19 I. C. C., 366.)

Discrimination Against San Pedro.

Harbor City Wholesale Co. of San Pedro, Cal., v. Southern Pacific et al. Opinion by Commissioner Harlan.

Los Angeles, Cal., was originally made a terminal rate point because it was close to the harbor of San Pedro. While there is not much freight movement from eastern points to Los Angeles by way of the harbor of San Pedro, there is nevertheless actually some traffic that moves in that way, and there is therefore potential competition by water. While carriers are not compelled to meet competition as the law now stands, yet the granting of a low rate to Los Angeles because it is near the harbor of San Pedro and depriving San Pedro of the benefit of its own geographical position while affording that benefit to Los Angeles, constitutes an undue discrimination. When one community leans on another for its competitive rates, the benefit of such rates ought not to be denied to the point where the competitive conditions exist. (19 I. C. C., 323.)

Reparation Awarded.

Felton Grain Co. v. Union Pacific et al. Opinion by Commissioner Clements.

Rate on shipment of hay from Henderson, Colo., to Breau Bridge, La., found unreasonable. (19 I. C. C., 63.)

Stanley Newding v. Missouri, Kansas & Texas et al. Opinion by Commissioner Cockrell.

The rate on second-hand beer bottles from St. Louis, Mo., to San Antonio, Tex., found unreasonable. (19 I. C. C., 29.)

Pennsylvania Smelting Co. v. Northern Pacific et al. Opinion by Commissioner Clements.

A rate of \$12 per net ton on lead ore from the Coeur d'Alene district of Idaho to Carnegie, Pa., reduced to \$11.40 per net ton. (19 I. C. C., 60.)

Baer Brothers Mercantile Co. v. Missouri Pacific et al. Opinion by Commissioner Clements.

Following the reasoning in 17 I. C. C., 225, the charge on shipments of beer from Pueblo, Colo., to Leadville found unreasonable. (19 I. C. C., 18.)

H. F. Cady Lumber Co. v. Missouri Pacific et al. Opinion by Commissioner Clements.

A charge of 28 cents per 100 lbs. on shipments of lumber dressed in transit from points in Louisiana to Omaha, Neb., found unreasonable. A reasonable rate would have been 23 cents. (19 I. C. C., 12.)

Northern Lumber Manufacturing Co. v. Texas & Pacific et al. Opinion by Commissioner Clements.

Demurrage and storage charges collected as a result of the railways demanding rates in excess of those in their legally filed tariffs should be refunded, and this applies to cases in which such charges are collected on shipments as to which no rates are published. (19 I. C. C., 54.)

STATE COMMISSIONS.

The members of the Public Utilities Commission of Maryland are James M. Ambler (chairman), Joshua W. Hering and Philip D. Laird. The office of the commission is in the Builders' Exchange, Baltimore.

COURT NEWS.

At Guthrie, Okla., July 18, District Judge Huston decided in favor of the railways the tax cases involving levies for 1909 which were contested, on the grounds of alleged irregularities, by the Rock Island, the St. Louis & San Francisco, the Missouri, Kansas & Texas and the Atchison, Topeka & Santa Fe. Injunctions were granted forbidding the collection of the taxes in cases where boards failed to make estimates properly, or when levies were made before valuations were certified by the state auditor because of a delay by the state board.

REVENUES AND EXPENSES OF RAILWAYS.

[illegible][illegible]

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

R. C. Vaughan has been appointed assistant to D. B. Hattie, second vice president of the Canadian Northern Steamships Limited, with office at Toronto, Ont.

The office of F. H. R. Green, president, general manager and purchasing agent of the Texas Midland, has been changed from Terrell, Tex., to New York City. The Terrell office will hereafter be in charge of Eugene Corley, assistant to the president.

F. C. Herr has been appointed claims agent of the Buffalo & Susquehanna Railroad and the Buffalo & Susquehanna Railway, with office at Galetton, Pa. He will have charge of the investigation of claims against these properties, and perform such other duties as may be assigned to him by the general manager.

C. E. Friend, auditor of the Canadian Northern, at Winnipeg, Man., has been appointed general auditor, with office at Winnipeg, and J. D. Morton has been appointed assistant comptroller, with office at Toronto, Ont. L. W. Mitchell, acting treasurer, at Toronto, has been appointed treasurer of the Canadian Northern, the Canadian Northern Quebec, the Canadian Northern Ontario and the Halifax & South Western, with office at Toronto. R. S. Gosset has been appointed auditor of disbursements of the Canadian Northern and the Canadian Northern Quebec, with office at Toronto.

Operating Officers.

Luther M. Jones, whose appointment as superintendent of telegraph of the Atchison, Topeka & Santa Fe has been announced in these columns, has been connected with the telegraph department of that system for the past 20 years.



L. M. Jones.

Mr. Jones was born at Creighton, Mo., January 23, 1870, and began railway work as station agent's helper at his native town in 1888. He soon qualified as an operator, his first appointment as such being in August, 1888, at Columbus, Kan., on the Kansas City, Fort Scott & Memphis, now a part of the St. Louis & San Francisco. In November, 1890, he went to the Atchison, Topeka & Santa Fe as operator at Neosho Rapids, Kan. He next went to the despatcher's office at Arkansas City, Kan., remaining there until April, 1891, when he was appointed a clerk in the office of the superintendent of telegraph at Topeka, and four years later he was made chief clerk. In August, 1902, he was appointed assistant superintendent of telegraph of the entire system, which position he held at the time of his recent appointment.

Charles A. Plumley, a chief train despatcher of the Baltimore & Ohio Southwestern, has been appointed division operator, with office at St. Louis, Mo.

W. C. Muir, superintendent of the Canadian Northern Express Co. and the Canadian Northern Telegraph Co. at Winnipeg, Man., has been appointed general superintendent of both companies, with office at Winnipeg. These companies operate the express and telegraph business on the Canadian Northern.

E. W. Grice, general superintendent of the Chesapeake & Ohio at Hinton, W. Va., has been appointed also general manager of the Chesapeake & Ohio of Indiana, with office at Richmond, Va.

W. E. Otterson, station master of the Wabash terminal at Pittsburgh, Pa., has been appointed superintendent of terminals for the new Salt Lake City Union Depot & Railroad Company, at Salt Lake City, Utah.

G. W. Hamilton, chief despatcher of the Third and Fourth districts of the Western Pacific at Portola, Cal., has been appointed trainmaster of the First and Second districts, with office at Winnemucca, Nev., succeeding O. Meadows, resigned.

B. W. Moore has been appointed a trainmaster on the Pine Bluff district of the Missouri Pacific-Iron Mountain system, with office at Little Rock, Ark., succeeding W. J. Lawrence, resigned. He will have jurisdiction over the lines from Little Rock to McGehee and from Benton to Pine Bluff.

Traffic Officers.

P. W. Kaill has been appointed a traveling freight agent of the Oregon Short Line, with office at Butte, Mont.

J. L. Bladon has been appointed division passenger agent of the Norfolk & Western, with office at Cincinnati, Ohio, succeeding Allen Hull, retired.

S. B. Franklin has been appointed a commercial agent of the St. Louis & San Francisco, with office at New Orleans, La., succeeding W. J. McMahon.

F. R. Porter has been appointed division freight agent of the Grand Trunk Pacific, in charge of territory including Watrous, Sask., and the West, with office at Edmonton, Alb.

A. L. Anderson has been appointed a traveling passenger agent of the Chicago, Milwaukee & St. Paul, with office at Omaha, Neb., succeeding Edward Mahoney, promoted.

J. D. Mansfield, commercial agent of the Denver & Rio Grande at San Francisco, Cal., has been appointed general claim agent of the Western Pacific, with office at San Francisco.

A. M. Fenton, district freight and passenger agent of the Chicago, St. Paul, Minneapolis & Omaha at Duluth, Minn., has been appointed assistant general freight agent, with office at Minneapolis.

E. A. Jack, Jr., chief clerk in the office of the traffic manager of the Terminal Railroad Association of St. Louis, has been appointed freight claim agent, succeeding S. D. Webster, assigned to other duties.

J. C. McDonald, general passenger agent of the National Railways of Mexico, having resigned, the duties of that office will be assumed by C. W. Fish, whose appointment as traffic manager has been announced.

Lewis L. Davis has been appointed a commercial agent of the Union Pacific, the Southern Pacific, the Oregon Short Line, the Oregon Railroad & Navigation Company and the Oregon & Washington, with office at Milwaukee, Wis.

O. P. Bennett, traveling freight agent of the Chicago, Peoria & St. Louis at Peoria, Ill., has been appointed general agent, with office at Minneapolis, Minn., where the company has recently established a general freight agency.

George W. Smith, agent of the Union Line, Pennsylvania Lines West of Pittsburgh, at Minneapolis, Minn., has been appointed export agent, with office at Chicago; Harry C. Wilson, agent at Kansas City, Mo., succeeds Mr. Smith; Lyle G. Griffin, agent at Omaha, Neb., succeeds Mr. Wilson; Louis W. Blessig, agent at Sioux City, Iowa, succeeds Mr. Griffin, and Stephen J. Alexander succeeds Mr. Blessig.

G. A. Blair, general eastern agent of the Chicago, Milwaukee & St. Paul at New York, has been appointed assistant general freight agent, with office at Chicago. W. W. Hall, New England freight and passenger agent at Boston, Mass., has been appointed general agent, succeeding to the duties of Mr. Blair,

and J. H. Skillen, commercial agent at Buffalo, N. Y., succeeds Mr. Hall, effective August 1.

S. V. Derrah, assistant general freight agent of the Denver & Rio Grande at Salt Lake City, Utah, will also represent the Western Pacific at Salt Lake City as assistant general freight agent.

Charles Sorg, Jr., has been appointed a traveling freight and passenger agent of the Chicago, Burlington & Quincy, with office at Dallas, Tex., succeeding C. E. Lewis, resigned to become assistant city passenger and ticket agent of the Galveston, Harrisburg & San Antonio at Houston, Tex.

George Pepall has been appointed assistant foreign freight agent of the Grand Trunk, with office at Toronto, Ont., succeeding F. R. Porter, who goes to the Grand Trunk Pacific. Mr. Pepall will continue to represent the National Despatch-Great Eastern Line in connection with export traffic via that route.

J. F. Hixson, district freight and passenger agent of the Southern Pacific at Reno, Nev., has been appointed district freight and passenger agent, with office at Fresno, Cal., succeeding E. W. Clapp, transferred to the general offices in San Francisco. J. M. Fulton, general agent at Reno, succeeds Mr. Hixson.

A. A. Polhamus has been appointed general agent, passenger department, of the Canadian Pacific, with office at Los Angeles, Cal. A. L. Powell has been appointed a traveling passenger agent, with office at Brandon, Man., succeeding W. J. Wells, transferred, and W. H. Snell has been appointed eastern passenger agent of the New York territory, succeeding F. W. Dudley, resigned.

Engineering and Rolling Stock Officers.

C. T. Broxup, locomotive superintendent of the Manila Railroad, at Caloocan, Philippine Islands, has resigned.

Frank L. O'Donnell has been appointed assistant road foreman of engines on the Philadelphia division of the Pennsylvania Railroad.

F. W. Alexander has been appointed assistant division engineer of the Canadian Pacific, with office at Calgary, Alberta, succeeding T. Martin, promoted.

T. H. Haggerty has been appointed smoke inspector on the Chicago terminal division of the Chicago, Rock Island & Pacific, with office at Chicago, succeeding E. A. Lutzow, resigned.

F. I. Cabell, engineer maintenance of way of the Chesapeake & Ohio at Richmond, Va., has been appointed also chief engineer maintenance of way of the Chesapeake & Ohio of Indiana, with office at Richmond.

J. S. Berry, superintendent of bridges and buildings of the St. Louis Southwestern at Tyler, Tex., has been transferred to St. Louis, Mo. William Quinn, master carpenter at Tyler, succeeds Mr. Berry, in charge of the Texas lines of the company.

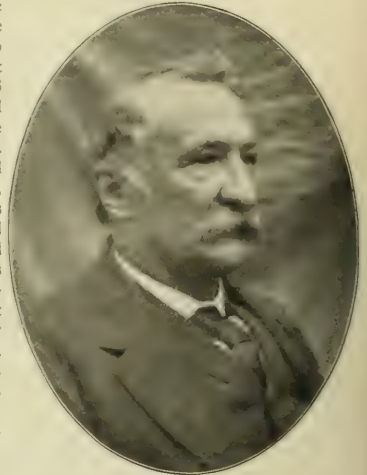
G. E. Ellis, formerly signal engineer of the Chicago, Rock Island & Pacific at Chicago and recently connected with the Federal Signal Company, has been appointed signal engineer of the Kansas City Terminal Railway, with office at Kansas City, Mo.

OBITUARY.

Edward A. Smith, formerly prominent in railway circles in Kansas City, Mo., died at St. Louis, Mo., on June 22, at the age of 75 years. Mr. Smith was for 12 years general agent of the Missouri Pacific at Kansas City, and was also for a number of years general agent of the Kansas City, Memphis & Birmingham, now a part of the Frisco system. He was employed in the engineering department of the Atchison, Topeka & Santa Fe when that company was building its line between Kansas City and Topeka. His last position was general freight agent of the Decaturville, Osceola & Northern, now also a part of the Frisco.

Paul J. White, formerly an assistant engineer on the Central Railroad of New Jersey, died July 13, at his home in Bethlehem, Pa. Mr. White was born in Philadelphia on November 4, 1830.

He began railway work as an engineer for the Pittsburgh, Fort Wayne & Chicago, and was also on the Memphis & Charleston. From 1856 to 1866 he was principal assistant engineer of the Lehigh & Susquehanna division of the Central Railroad of New Jersey, and for the three years following was employed between Easton, Pa., and Hokendauqua. He was engaged in the construction of the Lehigh & New England near Bloomsburg, N. J., from 1869 to 1873, and was then engaged by Collins Brothers to become an engineer on the Madeira-Mamore Railroad in Brazil. Mr. White started on the journey but was turned back when the ship on which he was a passenger was wrecked on the coast of North Carolina. From 1878 to 1887 he was locating engineer for the New York, Lake Erie & Western, now the Erie Railroad, in McKean county, and carried out similar work for the Pennsylvania Railroad in Chester, Jefferson and Center counties. He had charge of the work of construction and extension of the Lehigh Coal & Navigation Co. from Wind Gap, Pa., to Saylorsburg. Mr. White was active in several fraternal organizations and in county affairs. For the past 15 years he lived in retirement and for the last five years has been suffering from the illness which caused his death.



Paul J. White.

FOREIGN RAILWAY NOTES.

Japan purposes to spend \$20,000,000 for new railways in Corea, of which manufacturers and dealers in supplies will take due notice—likewise Puget Sound dealers in bridge timbers, etc. The railway from the capital at Seoul to the Manchurian border at Wiju, which was built in a hurry to meet the needs of the war with Russia, is to be rebuilt and improved. This will connect with the Manchurian line from Antung to Mukden, and the whole line, together with that from Seoul to Fusan, on the straits opposite Shimonoseki, will form really the Japanese connection with the Siberian Railway, the whole distance from Mukden southeast to Fusan being about 500 miles. Japan also contemplates considerable expenditure for improvements of its old lines in Japan, with comparatively small additions to mileage.

The Russians are said to have more than a hundred engineers and some 12,000 laborers at work on the Amoor Railway, following down that river to Chabarowsk, where the Ussuri Railway will connect it with Vladivostok, thus giving Russia a line wholly on its own soil to the Pacific. This new line will be 1,483 miles long, through a very thinly peopled country, and for a large part of the distance difficult, so that the cost per mile has been estimated at more than \$100,000, which is probably exaggerated. The cost is increased by the refusal of Russia to employ Chinese laborers, who are close at hand and cheap; but the government sends Russians some 5,000 miles at great expense, in hopes that they will settle the country on the line. It is hardly to be hoped that the road will yield any profits to speak of, at least for a long time to come; but Russia apparently feels unsafe without something better than steamboats on this border, while China, just across the river, has a growing railway system and is beginning to have an army, and Japan already has both and is exercising a good deal of power in Manchuria.

Railway Construction.

New Incorporations, Surveys, Etc.

BIRMINGHAM, SELMA & PENACOLA.—An officer writes that the plans call for a line from Birmingham, Ala., south to Bessemer, Blocton, Centerville, Marion and Selma, to Penacola, Fla., about 230 miles. Track has been laid on 100 miles. There will be one steel bridge. The principal revenue will be derived from carrying coal, timber, iron ore, marble and cotton. J. C. Suttle, Vick, Ala., and H. E. Reynolds, Centerville, are interested.

BROWNWOOD NORTH & SOUTH.—According to press reports, construction work is to be started about August 1 on the section from Brownwood, Tex., north to May. The line is eventually to be extended further north to a point on the Texas & Pacific. John Mead, chief engineer, Brownwood. (March 25, p. 849.)

BUFFALO & LAKE ERIE TRACTION.—See Jamestown, Chautauqua & Lake Erie.

BUTTE, BOISE & SAN FRANCISCO.—Incorporated in Montana, with \$25,000,000 capital, to build from Butte, Mont., southwest through Montana, Idaho, Oregon and California to San Francisco. It is estimated that it will cost \$40,000 a mile to build the line. It is understood that the right-of-way will be secured at once and construction work started soon. W. H. Haviland, former state senator of Montana, president; T. Tomich, vice-president; T. H. McCabe, secretary, Butte, and V. S. Ruelene, Paris, France, treasurer.

CANADIAN NORTHERN.—A contract is said to have been given to McMillan Brothers for building from Edmonton, Alb., west to the Pembina river, 70 miles.

Plans are said to be made for extensive improvements on the main line between Edmonton, Alb., and Winnipeg, Man., including new ballast and 80-lb. rail to replace the present 60-lb. rail.

CHICAGO, ROCK ISLAND & PACIFIC.—An officer writes that work is now under way putting in new rail between Des Moines, Iowa, and Council Bluffs.

CINCINNATI & PITTSBURGH ELECTRIC.—An officer writes that this company has been organized to build an electric line from Cincinnati, Ohio, following as near as practicable the north side of the Ohio river to Pittsburgh, Pa. Contracts have not yet been let, but it is expected that work will be started in the near future. A. E. Cox, president, Huntington, W. Va.

COLORADO EASTERN.—This company, which operates a 17-mile narrow-gage line from Denver, Colo., east, and owns valuable terminal property in Denver, has plans made, it is said, for building a line under the name of the Denver & Omaha Short Line, between Denver and Omaha, Neb. The proposed route is from Denver east for about 250 miles to a point 12 miles north of Lenora, Kan., thence northeast via Hastings, Neb., to Omaha, a total of 500 miles. It is estimated that the construction and equipment will cost about \$20,000 a mile. The company proposes to increase its capital stock from \$1,000,000 to \$20,000,000. Surveys and plans for such a line were made before the panic of 1907, and were then dropped because the time was unfavorable for financing the project.

DENVER & GULF.—According to press reports, a contract has been given to the Shumway Construction Co., New York, for building 55 miles of line from Lamar, Colo., the work to be started in July and finished by January, 1911. The company plans to build a line from Denver, Colo., southeast to Dallas, Tex. F. A. Umsted, president, Texhoma, Okla.; W. R. Evans, vice-president, Lamar. (March 18, p. 749.)

DENVER & OMAHA SHORT LINE.—See Colorado Eastern

GULF & NORTHWESTERN.—An officer is quoted as saying that this line has been located and nearly all the rights-of-way secured in the state of Kansas. Financial arrangements are being made and it is expected that construction work will be begun about August 1. The plans call for a line from Oklahoma City, Okla., northwest through Kansas, to Sterling, Colo., where connection is to be made with the Union Pacific and the Chicago, Burlington & Quincy. An extension is eventually to be built

from Oklahoma City, south to Denison, Tex. J. B. Dault, president, Goodland, and E. B. Ketchum, consulting engineer, Salt Lake City, Utah. (April 8, p. 940.)

GULF, TEXAS & WYOMING.—According to press reports, this company has under consideration the question of building the proposed extension to Lubbock west from the present western terminus at Seymour, Tex., via Paducah, in Cottle county. Surveys to Paducah are to be made and if these are favorable it is understood that the company will build the line. (May 27, p. 1241.)

HAMPDEN RAILROAD.—An officer writes that plans are being made to incorporate this company in Massachusetts, with \$1,000,000 capital, and headquarters at Springfield, Mass. As soon as the preliminary steps have been taken application will be made for a certificate of exigency. The plans call for a line from Springfield and Holyoke to Bondsville, about 25 miles, where connection is to be made with the Massachusetts division of the Boston & Maine and the New London Northern division of the Grand Trunk System. The directors include: R. D. Gillett, Westfield; H. H. Vowman, Springfield; A. W. Eaton, Pittsfield; A. D. Robinson, H. W. Ely, Westfield; J. A. Skinner, Holyoke, and F. T. Ley, Springfield.

HANFORD & SUMMIT LAKE (ELECTRIC).—An officer writes that a contract has been given to Libby & Heins, Santa Cruz, Cal., for building from Hanford, Cal., westerly via Grangeville and Hardwick to Summit lake, 18 miles, and work is to be started at once. Maximum grades will be 0.3 per cent. and maximum curvature 3 degs. There will be about 1,500 ft. of pile trestle work. C. King, president, and J. B. Rogers, chief engineer, Hanford. (July 15, p. 142.)

HUMBOLDT & EASTERN.—Permanent surveys are being made for this line, which is to connect Eureka, Cal., with Red Bluff or Redding. The line must be finished from Eureka east to Wildwood, in Trinity county, within five years. E. E. Skinner, secretary, Eureka. (Dec. 17, p. 1213.)

JAMESTOWN, CHAUTAUQUA & LAKE ERIE.—Application has been made to the New York Public Service Commission, Second district, for permission to electrify this road, which runs from Westfield, N. Y., to Jamestown, 37.5 miles, and is operated by the Buffalo & Lake Erie Traction Co.

JOHNSTOWN & ALTOONA (ELECTRIC).—Bids are wanted and contracts may be let soon to build this line. The plans call for a line from South Fork, Pa., northeast via Portage, Cresson and Gallitzin, to Altoona, 30 miles. About 34 per cent. will be rock work. There are to be 12 bridges along the line, and the company will build a power house. G. U. G. Holman, general manager, Johnstown. (April 15, p. 1066.)

KNOXVILLE, SEVIERVILLE & EASTERN.—This company is planning to build an extension from Sevierville, Tenn., east to timberlands, about 15 miles. The company's men will probably carry out the work.

MISSOURI, KANSAS & TEXAS.—This company will extend its line from Chitwood to Joplin to connect with the union depot terminals. The improvements are to be finished the first of next year, when the new station will be opened. New freight yards are also to be built.

NEVADA NORTHERN.—According to press reports, this company is making preliminary survey for a branch to be built in Nevada from the east side of Steptoe valley to the Nevada Mines Co., at Ward, 14 miles.

NEWPORT & SHERMAN'S VALLEY.—This company is said to be making surveys for a 16-mile extension to be built in Perry county, Pa. The company now operates a 29-mile line from Newport, Pa., southwest to New Germantown.

NEWTON NORTHWESTERN.—According to press reports, surveys are to be started at once by the J. A. Kauffman Co., Dayton, Ohio, from Newton, Miss., northwest via Conehatta and Walnutgrove, to Carthage, about 45 miles. D. L. Raglan, president, Newton. (June 17, p. 1568.)

NEW YORK DOCK RAILWAY.—The New York Public Service Commission, First district, will hold a hearing July 29 on the application of this company for a franchise to operate a railway along its dock system. The line is to be about three miles

long and will extend from a point near the Catharine street ferry, in the borough of Brooklyn, to Atlantic basin. The directors include: J. B. Summerfield, G. E. Spencer, C. E. Hotchkiss, H. M. Haviland, W. MacFarland Lord, W. Haviland, A. N. Taylor, C. A. Lewis and C. Jackson.

NEW YORK SUBWAY.—Bids for subway construction, which it was expected would be asked for in July, may not be ready until the latter part of August or the early part of September. (April 26, p. 1065.)

NORRISTOWN TRANSIT CO.—See Philadelphia & Western.

OREGON RAILROAD & NAVIGATION CO.—According to press reports, this company is planning to build a cut-off from Coyote, in Morrow county, Ore., east to Stanfield, 26 miles. The cost of the work will be about \$800,000.

PACIFIC & IDAHO NORTHERN.—According to press reports, a contract has been given to Maney Brothers & Co., Ogden, Utah, to build the extension from the present terminus at Evergreen, Idaho, northeast to Meadows, 16 miles. The contract calls for the completion of the work by November 1. (June 17, p. 1568.)

PENSACOLA, MOBILE & NEW ORLEANS.—A contract has been given to Henry McLaughlin, Pensacola, Fla., for grading a section of 10 miles on the line under construction from Pensacola, northwest to Mobile, Ala., 60 miles. Grading has already been finished on 30 miles. The work involves the handling of about 40,000 cu. yds. per mile. E. McLaughlin, president, and L. G. Wilkinson, superintendent of construction, Pensacola. (April 8, p. 971.)

PHILADELPHIA & WESTERN.—Under the name of the Norristown Transit Co. a charter has been secured in Pennsylvania to build a four-mile line from Norristown, Pa. The new company has a capital of \$24,000. Charles E. Ingersoll, president.

PHILADELPHIA RAPID TRANSIT.—It is officially stated that this company will apply for a franchise to extend its line from Chester avenue, Yeadon, to the Sixty-ninth street terminal.

ST. LOUIS & KANSAS CITY ELECTRIC.—An officer writes that contracts will be let about October 1 to build from Kansas City, Mo., east via Blue Springs, Oak Grove, Odessa, Higginsville, Marshall, Arrowrock, New Franklin and Columbia to St. Louis, 250 miles. The line is to be double-tracked and the work will be heavy. Maximum curvature is to be 4 degs. The plans include putting up station houses, power houses and barns. D. C. Nevin, president; W. B. Cauthorn, chief engineer, 1014 Commerce building, Kansas City.

SAVANNAH & SOUTHWESTERN.—Incorporated in Georgia, with \$1,000,000 capital, to build from Savannah, Ga., west across the state of Georgia to Fort Gaines, about 250 miles. The incorporators include: F. R. Durden, E. M. Frank, Savannah; J. H. Perkins, W. C. Perkins, D. M. Bradley and P. M. Anderson.

SOUTH DAKOTA INTERURBAN.—An amendment to this company's charter has been filed in South Dakota, increasing the capital stock from \$1,000,000 to \$2,000,000. The company was organized, with headquarters at Centerville, to build about 160 miles from Sioux City, Iowa, northwest to Bijou Hills, S. Dak. Permission has been asked to make Chamberlain, on the Missouri river, the western terminus instead of Bijou Hills. The promoters have been securing right-of-way during the past year. The incorporators include: F. E. Graves, W. E. Muller, C. E. Todd, Bijou Hills, and G. A. Miller, Academy, S. Dak.

SOUTHERN CAMBRIA (ELECTRIC).—Construction work has been started on a line, or an extension north to Ebensburg, Pa. The line is eventually to be further extended north to Carrolltown.

TEXAS CENTRAL.—An officer writes that the stockholders have been asked to authorize a \$20,000,000 mortgage. No definite plans have been outlined as to future extensions.

VIRGINIAN RAILWAY.—An officer writes that plans are being made for the revision of grades and alignment between Harper, W. Va., and Clarksville. This work is made necessary on account of some large wooden trestles which will have to be renewed within a cost of two

Railway Financial News.

CHESAPEAKE & OHIO.—A statement by the company says when present plans are completed, the Chesapeake & Ohio of Indiana, the successor of the Chicago, Cincinnati & Louisville, will have outstanding \$8,200,000 bonds and \$3,000,000 stock. No part of either will be offered to the public, as the entire issue will be held in the C. & O. treasury. These securities about cover the purchase price and obligations assumed thereunder in the C., C. & L. acquisition.

COLORADO & SOUTHERN.—The New York Stock Exchange has listed \$3,000,000 additional refunding and extension mortgage 4½ per cent. bonds due 1935. Of these bonds \$262,000 were issued for refunding purposes: \$803,110 for betterments and improvements for 1909, of which \$48,242 have already been appropriated and \$754,868 is held for future expenditures; \$225,631 for the acquisition of \$100,000 stock and \$176,000 first mortgage 6 per cent. bonds of the Denver & Interurban; \$63,520 for \$60,576 stock of the Fort Worth & Denver City, and \$1,645,739 for \$81,600 stock and \$1,872,880 first mortgage 6 per cent. bonds of the Stamford & Northwestern.

CHICAGO, CINCINNATI & LOUISVILLE.—See Chesapeake & Ohio.

CHICAGO GREAT WESTERN.—This company has bought the property of the Leavenworth Terminal Railway & Bridge Co., or control of its stock. The Bridge company has \$600,000 stock and \$600,000 bonds.

CHICAGO SOUTHERN RAILWAY.—See Southern Indiana.

LEAVENWORTH TERMINAL RAILWAY & BRIDGE CO.—See Chicago Great Western.

KENTUCKY & INDIANA BRIDGE CO.—The agreement between the Baltimore & Ohio Southwestern, the Chicago, Indianapolis & Louisville, the Southern Railway and the Kentucky & Indiana Bridge & Terminal for the organization of a new company to build a new bridge over the Ohio river has been filed in the county clerk's office at Louisville, Ky. See an item in regard to this bridge under Louisville, Ky., in the *Railway Age Gazette* of July 8, page 107.

MANILA RAILROAD.—Speyer & Co., New York, are offering \$2,000,000 first mortgage 4 per cent. bonds due 1939 at 86. The government of the Philippine Islands guarantees payment of interest on these bonds. The Manila Railroad, which succeeded the old Spanish company holding concessions from the Spanish government, was organized in 1906 under the laws of New Jersey and holds concessions for 820 miles of railway on the island of Luzon. The \$3,652,800 7 per cent. cumulative preferred stock and \$2,130,700 common stock are owned by the Manila Railway. The lines authorized are divided into "northern lines," comprising 350 miles of line north of Manila, and "southern lines," comprising about 470 miles south of Manila. There are now in operation 286 miles of northern line and 60 miles of southern line. The northern and southern lines and their accounts are kept distinct, as if owned by separate companies, but are under the same management. The present offering of bonds is part of an authorized issue of \$30,000,000, secured by a first mortgage on all of the southern lines.

ST. LOUIS & SAN FRANCISCO.—The New York Stock Exchange has listed \$578,000 additional 4 per cent. refunding mortgage bonds. Of these bonds, \$64,000 were issued to retire an equal amount of underlying bonds, \$14,000 were issued for refunding purposes, and \$500,000 for additions and improvements.

SOUTHERN INDIANA.—A plan for the reorganization of this company and its consolidation with the Chicago Southern Railway has been prepared and is being considered by the reorganization committee. The *Commercial and Financial Chronicle* says that it is expected that the plan will be placed before depositing bondholders for their approval before the end of the month.

The court has ordered the receiver to deposit with the Bankers' Trust Co., New York, money to pay the interest coupons due August 1, 1909, on the first mortgage 4 per cent. bonds, together with interest thereon at 6 per cent., in all about \$11.20 per coupon.

Supply Trade Section.

Fire destroyed 15 freight cars of the Chicago, Rock Island & Pacific in the yards at Chicago. The loss was about \$20,000.

The Chicago Air Brake Co., Chicago, has been incorporated, with a capital of \$10,000, by A. L. Myers, Sidney Lyon and David Jetzinger.

The Jeffrey Mfg. Co., Columbus, Ohio, will move its Denver office from 1711 Tremont place to the First National Bank building on Aug. 1.

The Vaughn Rail Support Co., Chicago, has been incorporated with a capital of \$5,000. The incorporators are: Garrie I. French, David R. Jones and James E. Turner.

Winthrop B. Lillis, general foreman of the Illinois Central shops at Waterloo, Iowa, has resigned to accept a position as superintendent of the Greenlee Brothers Company, Rockford, Ill.

The American Spark Arrester Co., Indianapolis, Ind., has been incorporated with a capital of \$100,000. The incorporators are: T. A. Van Horn, C. A. McCotter, H. N. Knight, C. F. Remy, J. W. Sale, E. E. Perry and V. E. Butler.

The Whipple Supply Company has taken larger quarters at 50 Church street, New York, rooms 2065 and 2066. On June 1 it established western offices in the First National Bank building, Chicago, in charge of H. F. Keegan, western manager of sales.

The Chickamauga Steel & Iron Company has been incorporated under the laws of New Jersey with a capital stock of \$5,000,000, divided into common shares of the par value of \$100 each. The incorporators are: George W. Adams, Montclair; Robert W. Pollock, 51 Chambers street, New York City, and Francis Van Winkle, 134 Guernsey street, Brooklyn. The Registrar & Transfer Company, of 15 Exchange place, Jersey City, is the registered agent of the concern.

The Union Machine Co., Inc., 164 University avenue, St. Paul, Minn., has been appointed selling agent for the products of the Plunger Plastic Packing Co., Inc., St. Paul. These products include the D. & L. throttle rod stuffing boxes and Plunger plastic packing. The packing in this box can be applied with a full head of steam in the boiler, and the box can be applied to old or new locomotives without change of throttle rod or connections. It has been in satisfactory service for three years.

The Isthmian Canal Commission will receive bids until September 16 to furnish and erect machinery to operate the Stoney gate valves for controlling the main culverts, and machinery to operate the cylindrical valves for controlling the lateral culverts of the upper lock and the Pedro Miguel lock (Circular No. 596); until August 15 for water meters and steel billets (Circular No. 597); until August 19 for steel castings, manganese steel bushings, steel, iron, brass condenser tubes, cast iron pipe, sluice gate, valves, pumps, etc. (Circular No. 598).

W. M. Chamberlin, manager promotion department of the Detroit Lubricator Company, Detroit, Mich., has resigned, effective August 1, to become manager of a bureau of general service of The American Supply & Machinery Manufacturers' Association, to be located at Detroit. The establishment of this bureau is in line with the inauguration of an aggressive campaign by this association for the furtherance of the mutual interests of its members. G. K. MacEdward will succeed Mr. Chamberlin as manager of the promotion department of the Detroit Lubricator Company. He has been associated with the Gray Motor Company.

The American Water Softener Company, of Philadelphia, Pa., has recently received orders for 15 water softening plants from the Norfolk & Western, ranging in capacity from 12,500 to 18,000 gallons per hour, and also an installation of similar de-

sign for the Toronto, Hamilton & Buffalo at Hamilton, Ont. The business in the latter department is equally good and includes recent orders from the Salisbury Water Works, Salisbury, N. C.; Town of Weston, Ont.; Decatur Water Works Co., Decatur, Ala.; Philadelphia Paper Mfg. Co., Philadelphia, Pa.; Merchantville Water Co., Merchantville, N. J., and the Midvale Steel Co., Philadelphia, Pa.

Albert W. Jack, vice-president of the Star Headlight Co.,



Albert W. Jack.

Rochester, N. Y., died at the Graham Hospital in that city on July 20. Mr. Jack was one of the "old timers" in the railway supply business. He was born in New Bedford, Mass., in 1841, and for 25 years was a member of the firm of Grier & Jack, Chicago, dealers in railway supplies. He next went with Hibbard, Spencer & Bartlett, Chicago, as a sales manager, and then moved to Toledo, Ohio, where he started a railway department for the Libby Glass Co. Twelve years ago he left the latter concern, and went with the Star Headlight Co. as sales manager. Mr. Jack was prominent in Masonic circles.

The Allis-Chalmers Company, Milwaukee, Wis., has lately received the following orders for electric equipment: The Nairn Linoleum Company, Newark, N. J., one 100-h.p., 550-volt, three-phase, 60-cycle squirrel cage induction motor; Marquette Motor Company, Saginaw, Mich., two 100-k.v.a., 4,600/115-volt, and three 150-k.v.a., 4,600/460-volt, oil-filled, self-cooled transformers; Florida Mining Company, one 115-k.w. belted machine, 2,300-volts, 60-cycle, three-phase current, 900 r.p.m., and four 250-k.v.a. oil-filled, self-cooled Allis-Chalmers transformers; DuPont Powder Company, 11 type "K" direct-current motors and 15 induction motors; North Shore Electric Company, Evanston, Ill., 172-k.v.a., 60-cycle, 2,300/5,300-volt transformers; Colonial Crayon Company, Port Clinton, Ohio, one 50-k.w. generator, four induction motors and two lighting transformers; The Electric Light Company, Manitowoc, Wis., one 100-k.w. alternator; The Layton Milling & Electric Company, Layton, Utah, one 50-h.p. and two 10-h.p., 220-volt, three-phase, 60-cycle, squirrel-cage induction motors; State Home for Feeble Minded, Polk, Pa., two 125-k.v.a., two-phase, 60-cycle, 1,100-volt generators.

U. S. Steel Quarterly Earnings.

The United States Steel Corporation's total net earnings for quarter ended June 30, 1910, was \$40,170,960, an increase of \$2,554,084 from quarter ended March 31, 1910, and an increase of \$10,830,469 from quarter ended June 30, 1909. Unfilled orders on hand June 30, 1910, amounted to 4,257,794 tons, a decrease of 1,144,720 tons from March 31, 1910, and an increase of 199,855 tons from June 30, 1909. The regular quarterly dividends of 1 1/4 per cent. on the common stock, and 1 1/2 per cent. on the preferred stock was declared. The United States Steel Corporation will hereafter make public on the 10th day of each month the aggregate tonnage of unfilled orders on hand at the close of the previous month, according to a resolution adopted Tuesday.

The foregoing earnings compare with previous quarters as follows:

Quarter ended:	Total net earnings.
March 31, 1910.....	\$87,618,876
December 31, 1909.....	49,982,746
September 30, 1909.....	38,246,907
June 30, 1909.....	29,340,491
June 30, 1908.....	20,265,756
June 30, 1907.....	45,503,705
June 30, 1906.....	40,125,033
June 30, 1905.....	30,305,116
June 30, 1904.....	19,490,725
June 30, 1903.....	36,642,308
June 30, 1902.....	37,666,068

The unfilled orders on hand June 30, 1910, were 4,257,794 tons. This compares with previous quarters as follows:

Quarter ended:	Unfilled orders.
March 31, 1910.....	5,402,514
December 31, 1909.....	5,927,031
September 30, 1909.....	4,796,833
June 30, 1909.....	4,057,939

TRADE PUBLICATIONS.

Core Drills.—The Davis "Calyx Diamondless" core drills, manufactured by the Ingersoll-Rand Company, New York, are described in Bulletin No. 9001, issued by that company. The classes of work for which these drills are adapted are considered at length, as are also the cost of drilling, the operation of the drills and the apparatus used in connection with them. The bulletin contains 48 pages and 52 illustrations.

Hydraulic Jacks.—Richard Dudgeon, New York, has just issued booklets 9 and 11. Booklet No. 9 is printed in the Spanish language and especially illustrates and describes the new Universal hydraulic jack. Booklet No. 11 is printed in the French language and contains descriptions and illustrations of the Universal hydraulic jack and pressure pumps, as well as a number of types in which this jack may be obtained. These booklets will be sent to interested parties on request.

Union Pacific.—"Sights and Scenes from the Car Windows" is a 130-page booklet giving brief descriptions of the principal towns along the line of the Union Pacific from Council Bluffs, Iowa, to San Francisco, Cal., intended for the use of passengers on that line. Interesting points about each community are brought out, and suggestive photographs are used to illustrate the descriptions. Another booklet describes the automatic electric block signals in use on the entire line from Council Bluffs to San Francisco.

RAILWAY STRUCTURES.

GREENVILLE, S. C.—A contract is said to have been given by the Charleston & Western Carolina to the Gallivan Building Co., Augusta, Ga., for putting up five brick warehouses on Court street, in Greenville. The contract is said to be worth \$70,000.

HOUSTON, TEXAS.—The Houston Belt & Terminal Company has given a contract to the American Construction Company for building a steel bridge across the ship channel above the Turning Basin. It will have a 240-ft. draw. The 120-ft. opening will be large enough to allow the passage of two large sized steamers.

IOWA CITY, IOWA.—The Chicago, Rock Island & Pacific has let the contract to T. S. Leake & Co., Chicago, for building a one-story brick freight house, 30 ft. x 200 ft.

JOPLIN, MO.—See Missouri, Kansas & Texas under Railway Construction.

KAMLOOPS, B. C.—According to press reports, a contract has been given by the Canadian Pacific to McDermott & Co., Winnipeg, Man., for putting up a machine shop and roundhouse in Kamloops. The Canadian Pacific is to supply the steel. The estimated cost of the improvements is \$250,000.

LA GRANDE, ORE.—Plans are now being made by the Oregon Railroad & Navigation Co. for a brick and steel machine shop to be built at La Grande. The building is to be 130 ft. x 130 ft., and will cost about \$11,000.

LITTLE ROCK, ARK.—The Chicago, Rock Island & Pacific contemplates the building of a 20-stall roundhouse, 300-ton coal chute, 165,000-gal. steel tank, 40-ft. track scale and cinder pit.

McMINNVILLE, ORE.—The Oregon Electric is said to have secured land in McMinnville, to be used as a site for a station and terminal.

MURRAY, UTAH.—It is reported that the Oregon Short Line will build a passenger station and freight house to cost about \$10,000.

MUSKOGEE, OKLA.—The Missouri, Kansas & Texas has let a contract, it is said, for a new freight house to be 60 ft. x 500 ft., at Muskogee. Work on the building, which is to cost \$200,000, will be started August 1, and must be completed in 90 days.

NEW ORLEANS, LA.—The Illinois Central has prepared plans for new inbound and outbound freight warehouses in the Poydras street yards, but no work has yet been authorized.

OSWEGO, N. Y.—An officer of the New York Central & Hudson River writes that a contract has been given to the Lackawanna Bridge Co., and work is to be started at once on a freight car shop at Oswego. The building is to be of steel and concrete construction, one-story high, 80 ft. x 560 ft.

OTTAWA, ONT.—According to press reports, the contract was let recently for the superstructure of the Le Pas bridge on the Hudson Bay Railway. (July 22, p. 176.)

PECOS, TEX.—The Kansas City, Mexico & Orient has begun work on a passenger station of native stone.

PORTLAND, ORE.—The Oregon Railroad & Navigation Co. has awarded the contract for the building of a new freight station to Lewis A. Hicks & Co., San Francisco, Cal. (July 22, p. 176.)

PORTOLA, CAL.—The Western Pacific will build 10 additional stalls to the roundhouse, which now has a capacity of 10 locomotives.

SACRAMENTO, CAL.—The War Department is said to have granted permission to the Northern Electric and the Vallejo & Northern to build the bridge over the Sacramento river at M street, in Sacramento. It is understood that contracts for building the bridge will be let at once. (July 8, p. 1071.)

ST. JOSEPH, MO.—It is said that the St. Joseph & Savannah Interurban Railway Co. will build one pile trestle 50 ft. high and 500 ft. long, and two minor trestles from 14 to 56 ft. each in length.

ST. LOUIS, MO.—See St. Louis & Kansas City Electric under Railway Construction.

SCRANTON, PA.—An officer of the Delaware, Lackawanna & Western writes that the company expects to open the new shops at Scranton on or before January 1, 1911. The shops will be used entirely for the repairs and the rebuilding of locomotives, but not for new work. (Sept. 24, p. 568.)

SOUTH FORK, PA.—See Johnstown & Altoona (Electric) under Railway Construction.

TAYLOR, TEXAS.—It is officially stated that the International & Great Northern will erect at once three more solid steel and concrete buildings at the new shops and roundhouse plant. The three buildings will cost about \$15,000.

VANCOUVER, B. C.—Plans are being made by the British Columbia Electric, it is said, for a five-story reinforced concrete steel terminal station and office building to be built at Vancouver. (Dec. 17, p. 1218.)

It is said the Great Northern has secured a tract of land on Falls creek, on which it will build terminals comprising a depot, shops and yards.

WAUKEGAN, ILL.—The Elgin, Joliet & Eastern has let the contract to the Unit Construction Co., Chicago, for building a one-story reinforced concrete roundhouse.

WILMINGTON, N. C.—Bids are wanted August 16 by C. R. Humphreys, city engineer, Wilmington, for the superstructure of a 142 ft. steel highway bridge, to be built over the tracks of the Atlantic Coast Line, at Sixth street, in Wilmington.

Date News.

The items in this column were received after the published departments were closed.

Improvements to cost \$50,000 are to be made this fall to the freight terminals of the Seaboard Air Line at Savannah, Ga.

The Cazenovia & Sauk City will let contracts about August 1 for locomotives and cars. Joseph Durin, president, Cazenovia, Wis.

The St. Louis & San Francisco is reported to have ordered 500 stock cars and 250 tank cars from the American Car & Foundry Company.

Engineers are said to be locating a line for the Denver North-western & Pacific through Provo canyon. Two other canyons have been mentioned as the possible route into Salt Lake City, Utah.

The first passenger train to make the trip through the new Michigan Central tunnel under the Detroit river ran through on July 27. It is expected that work on the tunnel will be completed by October 1.

A press despatch says that railways in nearly every section of the country have decided to discontinue after October 1 the practice of giving stop-over privileges on limited tickets whenever such stop-over extends the original limits of the tickets.

The New York Public Service Commission, Second district, has given permission to the railways to suspend until November 1 increases in freight rates which it had been proposed to put into effect on various dates from August 1 to September 15.

The Sterling-Moline Traction Co. has been incorporated at Sterling, Ill., with \$1,500,000 capital. The company proposes to begin work about the middle of August on an electric line from Princeton, Ill., north to Sterling, thence southwest to Moline about 80 miles.

An officer of the Cazenovia & Sauk City writes that this company, which is building a line from Lavelle, Wis., southwest to Cazenovia, which will eventually be extended to Richland Center, has grading and bridging all done and contracts for track laying are to be let about August 10.

The Valley Park, St. Louis & Eastern has been incorporated in Illinois with \$100,000 capital and office at East St. Louis, Ill. The plans call for a line from a point on the Mississippi river, opposite St. Louis, Mo., east across the state of Illinois to Gary, Ind. The incorporators include: W. C. Plass, O. B. Plass, St. Louis; C. Neustadt, J. H. Suess, East St. Louis, and H. Schrader, Belleville, Ill.

The Puebla & Pacific has been organized in New York, and with an office at Mexico City, to build under the concession granted last May to A. B. Adams, Inc., from Puebla, Puebla, Mexico, south to Laguna de Chacahua, on the Pacific coast. Lic. Francisco Alfaro is interested. The concession provides that the entire line must be finished within eight years. (See Mexican Roads, par. 27, p. 1324.)

The National Railways of Mexico is making improvements on the line from Acambaro, Guanajuato, southwest to Uruapan, 143 miles. A contract has been given to Bell, Sims & Blackford, Mexico City, for re-alignment work, and broadening the gage on about 38 miles. It is understood that the contract is worth \$500,000. The company is carrying out with its own men similar work on the rest of the line.

Three new steamships are to be built immediately for the United Fruit Company for service between Boston and the tropics. The contract has been awarded to Workman, Clark & Co., of Belfast, Ireland. The material for the first ship is being assembled. The contract means the opening of a new service to the Isthmus and Colombia. The first ship will be ready for delivery on May 1, 1911. The second will be in commission a month later and the third on July 1. The steamers will be over 5,000 tons gross register, each with a length of 400 ft. and a 55-ft. breadth of beam. They will carry 150 saloon passengers and 65,000 bunches of bananas. It is planned to carry cargoes of a general nature from Boston to Jamaica, Colon and Santa Marta.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Illinois & Great Central is in the market for one 4-6-0 direct joint locomotive.

The Illinois & Great Central has ordered 15 Pacific type locomotives from the American Locomotive Company.

The Washburn & Southbound has ordered four 12-wheel locomotives from the Baldwin Locomotive Works.

The Baltimore & Ohio, as reported in the *Railway Age Gazette* of July 8, has ordered 50 simple Mikado locomotives from the Baldwin Locomotive Works, for delivery during December, 1910, and January, 1911.

General Dimensions.

Weight of drivers	.....	About 215,000 lbs.
Total weight	.....	About 270,000 "
Length	.....	24 m. x 32 m.
Weight of drivers	.....	64 m.
Working steam pressure	.....	Wagon top
Heating surface, tubes	.....	205 lbs.
.....	.....	About 4,784 sq. ft.
.....	.....	230 "
.....	.....	5,914 "
.....	.....	389 "
.....	.....	21 ft.
.....	.....	Wide
.....	.....	120 m.
.....	.....	84 "
.....	.....	Open-hearth steel
Grate area	.....	70 sq. ft.
Water capacity	.....	9,500 gals.
Coal capacity	.....	16 tons

Special Equipment

Axles	.....	Open-hearth steel
Bell ringer	.....	Ochse
Boiler lagging	.....	85 per cent. magnesite
Brakes	.....	Westinghouse ET and Am. Equal. Driving Brake
Brake beams	.....	Diamond special
Couplers	.....	Tatum-Prendergast
Driving boxes	.....	Cast-steel—Elvin lubricator
Headlight	.....	Schroeder
Piston and valve-rod packings	.....	U. S. Metallic
Safety valve	.....	Two 4-in. Coale
Sanding devices	.....	Hanlon
Tubes	.....	Aluminum iron
Valve gear	.....	Walschaert
Wheel centers	.....	Cast steel

CAR BUILDING.

The National Railways of Mexico has ordered 20 passenger coaches from the American Car & Foundry Company.

MACHINERY AND TOOLS.

The Washburn has inquiries out for several plate machines and a number of miscellaneous tools.

IRON AND STEEL.

The Queen & Crescent has ordered 250 tons of steel for bridge work.

The Boston & Maine has placed a bridge order requiring 250 tons of steel.

The Pennsylvania Railroad has placed orders for six small bridge spans, requiring about 700 tons.

The Durham & South Carolina is in the market for 60 tons of 40-lb. relaying rail with fastenings.

The Denver & Rio Grande has ordered 800 tons of bridge steel from the American Bridge Company.

The Missouri Pacific has placed an order for shops at Salina, Kan., requiring 1,000 tons of fabricated steel.

The Baltimore & Ohio has ordered 200 tons of steel from the American Bridge Company for a subway at Chicago.

The Louisville & Nashville has divided a bridge order for 550 tons of steel between the Virginia Bridge Company and the Louisville Bridge & Iron Company.

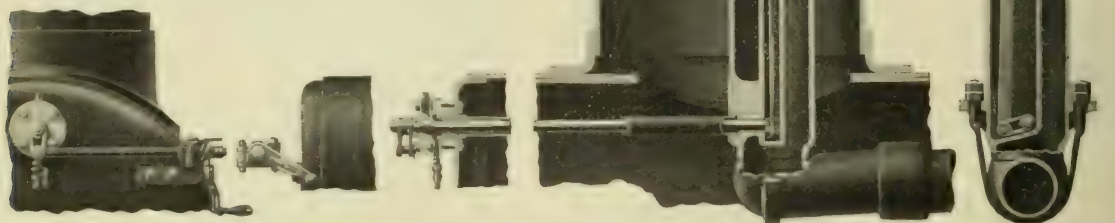
The Chicago & North Western has placed bridge contracts as follows: Pennsylvania Steel Company, 2,100 tons; American Bridge Company, 2,500 tons; Cambria Steel Company, a beam bridge, 300 tons, and another small span with the Jones & Laughlin Steel Company, 140 tons.

General Conditions in Steel.—It is reported that the July business in fabricated structural material will probably aggregate about 100,000 tons, as several contracts will be closed within the next few days, the largest one being for 10,000 tons for the southern section of the New York Central Terminal. Rails are quiet, although the Carnegie Steel Company has received an order for 75,000 tons for export trade. Heads of the subsidiary companies of the United States Steel Corporation, who met in New York a few days ago, report that orders on the books indicate fairly steady operation for the next three months and a heavy movement is looked for in the fall. The bulletin of the American Iron & Steel Association furnishes complete statistics for the production of pig iron for the first six months of the year, showing that it is the largest half year's output in the history of the industry. The output was 15,012,392 gross tons as against 14,773,125 tons for the last half of 1909 and 11,022,346 tons for the first half of 1909.

New Locomotive Throttle Valve.

The locomotive throttle valve, shown herewith, was invented by J. S. Chambers, a superintendent of motive power of the Atlantic Coast Line. It is said to have been in service for over three years with satisfactory results.

The apparatus combines throttle valve, throttle box and stand pipe. The base of the stand pipe is cast straight if the throttle stem enters above the center line of the dry pipe, but when it enters below this line, the elbow is cast on the stand pipe. This



Application of Chambers' Locomotive Throttle Valve.

design of valve is also applicable to the use of a throttle stem which enters the dome above the boiler shell, in which case the stand pipe casting is slightly altered.

The throttle, or main, valve has a single balanced disk resting on the top of the stand pipe. It is unseated by the upward movement of the balancing piston which slides in a finished cylindrical seat and telescopes, at the top, over the reduced end of the valve. The shoulders of the valve stem and of the balancing piston are arranged to permit a slight movement of the latter before meeting. This preliminary movement unseats the small balancing valve at the top of the main valve and allows steam to enter the chamber under the balancing piston to balance the main valve.

The connecting rod extends downward within the balancing chamber and connects, through an internal crank, with the operating shaft, which is connected, through an external crank, to the transmission rod.

The operating handle, in normal position for closed throttle, extends away from the operator, and is latched to prevent accidental opening. A downward and backward movement opens, successively, the balancing valve and the throttle. The amount of throttle opening is indicated by the position of the handle and is limited by a stop which limits the travel. That part of the operating shaft within the boiler is surrounded by a casing which is threaded into a steam-tight bushing in the stand pipe wall, and on the other end into a sleeve which is packed into a stuffing box with metallic packing. With closed throttle, the operating shaft is entirely unaffected by the steam.

As the balancing valve opens and the pressure increases in the balancing chamber, the outward end thrust upon the end of the operating shaft is distributed upon a number of annular bearing

shoulders on the operating shaft and working against a babbitted bearing in the packing gland. This babbitted packing also prevents the escape of any steam or condensation into the back end operating shaft casing while the throttle is open.

The stuffing box has a ground ball joint which conforms to the slope of the boiler head. Unintentional interior disconnections are impossible in a Chambers valve, since there are no loose pins in the operating mechanism. The only pins used are on the ends of the lifting rod, and these have countersunk heads and riveted ends. As the operating levers are within the stand pipe, and it is placed close to the side of the dome, an inspector may easily enter it to make repairs. No clearance, except that required for the lift, is needed on top of the throttle valve. It is, therefore, possible to place the valve high in the dome, so as to get as dry steam as possible. The steam passes through only one valve and there is little counter-current or obstruction to impede its flow.

The main valve, being single seated, does not require frequent regrinding, since unequal expansion of two ground joints is not to be considered. Pressure on the upper side of the valve tends to keep it seated, and the movement imparted by the flow of steam makes this valve, to a large extent, self-grinding. The main valve is readily accessible upon removal of the dome cap, and regrinding can usually be effected without removing the valve or seat. If, however, the combined balancing ring and seat is to be machined, it may be taken out of the stand pipe by the removal of three tap bolts.

Regulation of a Chambers valve is said to be so close that no special drifting valve is necessary for mountainous sections. The holding of an opening as small as $\frac{1}{16}$ in. is said to be practical, so that the engineman can admit a small amount of steam to properly lubricate the cylinders and balance the reciprocating parts while drifting. The regulation remains under control, without the necessity of continually opening and closing the throttle or locking the throttle handle in a fixed position.

The Chambers valve is manufactured by the Watson-Sullivan Company, New York.

Buda Inspection Car.

B. S. Jenkins, general superintendent of telegraph on the Canadian Pacific, completed an inspection of the lines from Winnipeg to Vancouver on July 8. The trip was made in a Buda No. 16 motor car without trouble of any kind. The car carried Mr. Jenkins, his son and the driver, for the entire distance, and John Fletcher, superintendent of telegraph, and Frank E. Camp, head of the telephone department, from Field to the coast. The No. 16 car is built on the same lines as the No. 14 section car, the chief difference being in the seating arrangement and the addition of a canopy top. The No. 100 Buda inspection car, which is of the automobile type, is particularly adapted to long distance inspection trips on account of its cost saving features, convenient appointments and the speed attainable. This car has been run 14 miles in 13 minutes and the company claims that regular passenger train time can be maintained with it. The performance of such cars is rapidly dispelling the idea that gasoline cars are adapted only to short distances.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY FRIDAY EDITIONS IN JUNE, BY
THE RAILROAD GAZETTE (INC.), 88 FULTON ST., NEW YORK

CHICAGO: Plymouth Bldg. CLEVELAND: Williamson Bldg.
LONDON: Queen Anne's Chambers, Westminster

W. H. BOARDMAN, President

E. A. SIMMONS, Vice Pres. & Treas.

HENRY IRE, Secretary

The address of the company is the address of the officers

EDITORS:

W. H. BOARDMAN, <i>Editor</i>	ROY V. WRIGHT	R. B. VANCE
SAMUEL O. DENN,	ERNEST McCULLOUGH	W. F. HOPPER
<i>Western Edit. Mgr.</i>	G. L. FOWLER	F. E. LESTER
BRADFORD BOARDMAN,	WILLIAM FOREY	F. W. KRAEGER
<i>Eastern Edit. Mgr.</i>	S. W. DENNING	H. H. SAMMONS
	CLARENCE DENNIS	

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico	\$5.00 a year.
Canada	\$6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies	15 cents each.

Shop Edition and the eight M. M. and M. C. P. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class

VOLUME 49. FRIDAY, AUGUST 5, 1910. NUMBER 6.

CONTENTS

EDITORIAL:

Editorial Notes	211
The Railways in Public Relations	212
Waterproofing of Bridge Floors	212

LETTERS TO THE EDITOR

ILLUSTRATED:

Two, Three and Four-Track Railways in Indiana.....	216
Wine Self-Dumping Ash Pan.....	218
Air Rail Loaders	218
Standard Culvert Tops: Chicago & North Western.....	219

MISCELLANEOUS:

Transportation and Traffic in Russia.....	214
Rail Fastenings and the Life of Ties.....	216
International Railway Congress.....	220
Semaphore Blade Point.....	222

SHOP SECTION.

EDITORIAL:

Editorial Notes	223
-----------------------	-----

ILLUSTRATED:

Improved Firebox with Hollow Arch and Combustion Chamber.....	225
Shop Kinks	227
Car Repair Shop Notes: N. Y. C. & H. R. at East Buffalo.....	231
Flangeless Shoes and Wedges and Removable Side Motion Plates.....	240
Oxy-Acetylene Welding and Cutting	242
Experimental Mallet Articulated Locomotive: Canadian Pacific.....	246

MISCELLANEOUS:

Mechanical Articles During July	224
Railway Tool Foremen's Convention.....	237
How the Foreman Can Promote Shop Efficiency.....	241
Operation and Organization of E. Altoona Engine House: Penn. R.R.	244

GENERAL NEWS SECTION.....

255

SUPPLY TRADE SECTION.....

264

THE Connecticut legislature in 1907 passed an act establishing a special commission to give hearings and draw up for the consideration of the next legislature (1909) a bill for a public utilities commission to supersede the present railway commission of the state. A number of hearings followed, and after considerable friction a bill was drawn which, after a bitter and

long and costly struggle in the legislature of 1909, could accomplish except a request of the matter to the people by a constitutional issue in the state campaign of the coming autumn. So interesting and unique phases of it, with meaning outside of Connecticut, relates to the attitude and policy of the New York, New Haven & Hartford, whose president opposed the measure. But he opposed it primarily because its publicity features would cramp freedom of action in matters calling for a quick decision, such as extensions on the acquisition of new properties, involving sometimes added capitalization. The situation in Connecticut is peculiar. The state has to deal not with a number of steam railway companies but practically with a steam railway corporation. Except the New London Northern, the single-track line giving the Grand Trunk and the Central Vermont an outlet at New London, the New Haven owns or controls all the steam lines in the state. The monopoly is, moreover, an old dividend payer with its policy under the check of a body of some 17,000 stockholders sure to resent any reduction of dividends. There is thus a natural restriction—or should be if the stockholders and directors are even moderately vigilant—more potential than a public utilities commission. A question, therefore, almost certain to arise in the next legislature is how far by law such an exceptional condition should be recognized in a new commission act. Shall such an act follow the precedent of other states with many independent railways and where "permission" must be asked of a commission for almost every new plan or shall allowance be made for the natural restraints due to single ownership and the dividend requirement of an old and highly standardized railway corporation? This somewhat novel question the next legislature of Connecticut must answer as well as the scope of the proposed commission's authority over the 700 miles or more of the New Haven's street railway lines in the state. But the latter, with rival lines building or projected, with monopoly incomplete, and with closer relations of necessity and convenience to the public than the steam road, have a different status and must meet a different line of reasoning.

THE transfer last week of stocks held by the Pearson-Farquhar Syndicate disclosed a situation having several interesting possibilities, and made a new situation perhaps as interesting. The syndicate was headed by Dr. F. S. Pearson, who handled the English end, and Percival Farquhar, who managed the operations in this country. This syndicate planned a transcontinental system. They bought stock of the Rock Island, the Lehigh Valley, the Wabash, the Missouri Pacific; the last-named company controls the Western Pacific through stock ownership in the Denver & Rio Grande. Most of their purchases were made around the top of the market at the end of 1909 and the beginning of 1910. By using securities already bought as collateral for loans by which to buy more securities, they got so far extended that they could not stand against the falling market. Their holdings were taken over by a syndicate headed by Kuhn, Loeb & Co. and Sir Ernest Cassel, of England, just before they got to the danger point. A heavy liquidation would have demoralized the market and the desirability of preventing such a situation was in itself enough to explain the action of Kuhn, Loeb & Co. The undertaking was interesting in the possibilities of such a transcontinental system as was planned by the Pearson-Farquhar Syndicate. The sequel is interesting in the consideration of what Kuhn, Loeb & Co. may do with the stocks taken over. As to the first, it does not seem that these roads could have been welded into a single strong system without tremendous expense. The eastern end, the Wabash and the Lehigh Valley, need not be considered as necessary to the system, since the lines west of Chicago could operate advantageously by giving their traffic at Chicago to some other trunk line. Of the western roads, the main line of the Rock Island and the Western Pacific are in good shape and have strong po-

sitions. The weak link is the Denver & Rio Grande. The amount of money which would have to be spent to put this on the same level as the other roads would seem to make the scheme impracticable. The policy of Kuhn, Loeb & Co. has, in general, been to centralize their banking operations in roads which are parts of the same system, or are so situated that the community of interest resulting from having their financing done by the same firm that finances neighboring roads would make for greater efficiency in operation. In this respect the firm is in contrast to J. P. Morgan & Co., who tend rather to deal with roads as individual propositions. With this policy in mind, it is hard to see why Kuhn, Loeb & Co. would care to keep their holdings in Rock Island. To run this road in conjunction with the Harriman lines would be of advantage to neither. The more probable explanation of Kuhn, Loeb & Co.'s action is that they took over these holdings primarily, aside from the need of supporting the market, because of the hold that they or the Harriman lines would get on the Western Pacific. If this interest is large, and it is believed that the Pearson-Farquhar Syndicate went into Missouri Pacific heavily, it would result in all the transcontinental lines south of the Hill territory being operated in harmony.

THE RAILWAY IN PUBLIC RELATIONS.

THE following is an extract from a kind of editorial for the guidance of the electorate of the land in which *The Outlook* advises voters as to their duties in the political campaign of the coming autumn:

The railway question is another form of the fundamental issue between oligarchy and democracy. The railway oligarchy has regarded the railways as private property to be administered for the benefit of private owners; democracy has regarded the railways as public highways to be administered for the benefit of the public.—*The Outlook*, July 30, 1910.

This reflects what may, we think, be called not unjustly the radical view of the status of the railway in its relation to the public and to public interests—and a view not the less radical because it has of late years been so often expressed in acts of positive legislation, though, as a sweeping generality, heard more often from the lips of the politician than read in the educated editorial utterance. The flaw in it is that it contains only the half truth rather than the whole truth. It is a truism only as modified by important, if not vital, amendment.

The theory, in the first place, that proclaims the present existence of an oligarchy that regards the railways as private properties, like a factory or farm, to be administered for the benefit of the owner or owners, has the flimsiest basis in existing fact. Here and there may be found, as a kind of relic of a past railway age, an officer of a railway who holds somewhat to this "private" view, but almost never unreservedly. If found, he is an antique, old-fashioned, relegated down to us from an expired period, a kind of railway Bourbon who learns nothing and forgets nothing. As a phantom, however, conjured up from nothing he has some value as an illustration to show at one extreme of the basic conception of the railway the wrong idea at the other extreme. The spectral "private" railway is in fact some misinterpretation of the subject the railway as a public highway pure and simple, which *The Outlook* practically expounds, at least to the extent of a keynote in the electoral motif. We may come to that idea yet, when, if ever, the government takes over the railway. But not yet.

The true idea of the railway in this country, and that shared by most intelligent railway men, contemplates the railway as a kind of intermediate property with private and public elements in close fusion. It is private as financed by private funds and making private profits. It is public as holding chartered rights to having power to conduct business and being a common carrier in rendering a service of vital relation to public economy and convenience, and as a legal entity among other more or less private public corporations. The status is well expressed by the adjective quasi-public, public in some sense, private in others, the latter including a certain fundamental right

of the honest railway investor to a fair return. And that right, it is to be emphasized, is not merely a personal and fiscal one, but, when unduly threatened, protected behind constitutional bulwarks. It is a right vested not only in justice but in organic law, and with the secondary intrenchment of state statute. The trouble is in drawing the equitable line and determining where the public right ends and the private right begins. On that point rests the civic railway problem in its up-to-date phase.

Ten years ago, and for a long period before that, there was danger that the line of equity between railway and public might be drawn too far from the center and too much in favor of the railway. The "private property" idea was still overmuch prevalent. So was the illegal rebate, so was "high" railway finance; and an aggressive railway policy materializing in swift consolidations was in progress and did not end until a few years later. But recent times and events have changed all that. The "private ownership" policy is, as stated, so near extinct that it may as well be called so. Railway consolidation has paused. High finance has dropped to lowest terms, as well as the illegal rebate; and "regulation" has got a firm seat in the saddle. All along the line the railways are on the defensive against multiplied foes outside and with inside obstacles also to overcome, involving grave questions of making financial ends meet. The pendulum, having swung too far toward the railway interest a decade or two ago, has now swung the other way.

It is in such an exigency, with railway questions on a national scale in transition, that the appeal lies not to the polls and the individual voter but to the trained intelligence, the formulae of science tested and confirmed by experience, the specialist who has made railway problems his study and, further on, the courts as interpreters of railway law. Even such a national issue as the tariff is now under the immediate purview of a federal commission. It is in many respects a bigger question than the railways and bears more directly on public welfare. Yet the average voter understands it none too well and still less does he grasp the complex rights and wrongs of the public relation to the railways. Under such conditions one must see with real regret any attempt of so well-meaning and able a magazine as *The Outlook* to thrust the railways into the foreground as a popular and political issue lying between two such catchwords as oligarchy and democracy. Politics and its reflex influence on official action and policy is a bad solvent of an intensive economic situation. And the appeal to the polls means new politics and a fresh overdose of a drug already administered to the railway patient too freely.

WATERPROOFING OF BRIDGE FLOORS.

THE committee on masonry, in its report at the last meeting of the American Railway Engineering and Maintenance of Way Association, concluded, from replies received to a circular sent to members, that failures of waterproofing are due to two causes: (1) Faulty details, such as flashing along webs of girders and around corners and angles of steel work; (2) The formation of cracks from any cause. The committee decided that for any system of waterproofing to be successful the concrete must be reinforced to prevent temperature and shrinkage cracks.

Ineffective waterproofing of bridge floors causes annoyance by the discoloration of columns, beams and arches as well as discomfort by dripping or leaked water on persons using the subway of which the bridge floors form the ceiling. Waterproofing of concrete bridge floors is attempted by (1) the incorporation of some compound with the concrete to make it dense, (2) the painting of the upper surface with a general asphaltic paint, or, (3) covering the slab with a membrane composed of layers of asphalt-saturated fabric. The ineffectiveness of any one method alone has led within the past few years to a combination of the compound or paint with a

membrane covering. Joints are well and are generally filled with a mastic, yet the worst leaks are at the joints. Ball trough floors leak more than concrete floors, and an attempt to make them waterproof is a constant effort of filling the troughs with concrete and covering with concrete, the frame. Concrete well puddled and with a smooth top surface in the upper portion is hardly dense enough to be practically impervious, but is frequently reported as such, because it is entirely too wet, hence the moisture and tendency to crack. Wet concrete should be kept in a dry place.

In the 1910 progress report of the committee referred to, much interesting and valuable experience is given from which the committee drew the conclusions here mentioned. The most valuable idea given prominently is that of economizing. Efficient waterproofing requires careful selection and application of labor. In the last analysis it comes down to faithful performance, the personal equation is a prime factor. For large road surfaces exposed to wide ranges of temperature, where no waterproofing is used, T. L. Condon so distributes the reinforcing that under the live and dead loads the stresses shall not exceed 19,000 lbs. per sq. in. in the steel and the combination of shrinkage stresses with live and dead load stresses shall not exceed 25,000 lbs.; also for cross reinforcing, where there is presumed to be nothing but shrinkage stress, he allows a stress of 50,000 lbs. per sq. in. All of these stresses are allowed only in steel having an elastic limit of not less than 50,000 lbs. per sq. in., and for bars having a mechanical bond. He determines the shrinkage stress by considering that the concrete has a tensile strength of 200 lbs. per sq. in. and balances the tensile strength of the concrete by a stress in the steel of 50,000 lbs. per sq. in. Hence, the amount of reinforcing to take care of shrinkage stress alone would be $\frac{1}{200}$ of the cross-section of the concrete in the direction to be reinforced against cracking.

Waterproofing washes do not give satisfaction in many cases. L. J. Hotchkiss, assistant bridge engineer, Chicago, Burlington & Quincy, reports the use of asphaltic paint, which, he says, can be easily scraped off the concrete with a knife blade; and a tar paint which penetrates the concrete to a depth of perhaps $\frac{3}{8}$ in. and cannot be scraped off. The tar paint is composed of 1 part kerosene, 4 parts Portland cement and 16 parts refined coal tar. A membrane is used on many roads, in some cases consisting of layers of felt with asphalt between them and in other cases burlap is used instead of felt. Mr. Hotchkiss found the tarred felt somewhat stiff and lacking in tensile strength. It was found so difficult to fit into angles or over the various corners or inequalities of the surface on which it had to be laid that it was abandoned. Mastic composed of 1 part asphalt and 4 parts sand was tried, but this quickly cracked and was abandoned. A burlap saturated with asphalt was tried and gave good results. It was, however, expensive and hard to handle on account of its stiffness. A plain 8 oz. burlap was later used and found to be very strong, extremely pliable and easily put in place. It has been used in all subsequent work. For the first two seasons it was laid 3-ply and covered with 1 in. of asphaltic mastic. Mr. Hotchkiss said:

"A few leaks developed at each of the columns of the bridge. The mastic covering was found to be torn apart over the columns of the curb line. At this point the concrete slopes steeply down from the main girder over the street to the thinner girder over the sidewalk. It is thought the tendency of the ballast to slide down this incline developed a force sufficient to rupture the waterproofing. The slide from the street girder to the sidewalk is being made much flatter. Before the burlap mat was laid on, a piece of gas pipe is placed at the end of the street girder and the mat laid over it. As the mat is completed the pipe is withdrawn, leaving a projection or fold in the mat. This is pressed down as smoothly as possible and the mastic carried over it. By this means we hope to provide an expansion joint which will take care of any movement which may occur and at the same time secure a continuous layer of waterproofing material. We are also making the mat five-ply instead of three.

"The three-ply protection has now been in service about two years and has given fair satisfaction. As previously mentioned, a few small leaks have developed, but none of them is serious. With the use of a five-ply mat, and the change in method over the curb line columns, we expect to get entirely waterproof subways which will remain in that condition indefinitely.

"In this connection, but one more item should be mentioned, and that is the importance of proper drainage. It is apparent that the drainage of the subway is of great importance. It is not sufficient to have the waterproofing material laid on, but it is necessary to have the drainage system properly arranged and maintained.

"The drainage system should be so arranged that the water can flow off the surface of the subway and into the street. It is not sufficient to have the drainage system properly arranged and maintained, but it is necessary to have the drainage system properly arranged and maintained. The drainage system should be so arranged that the water can flow off the surface of the subway and into the street. It is not sufficient to have the drainage system properly arranged and maintained, but it is necessary to have the drainage system properly arranged and maintained.

"The decision as to what is the best kind of asphalt for this work is very hard to make. We have used both Gilsonite and oil asphalts, and are not yet prepared to say which is the best. We have made various laboratory tests. These include the determination of the specific gravity, the percentage of bitumen, of paraffine and inorganic matter, the percentage of volatilization at various temperatures, the condition of the material at 6° F., the difference in penetration of a weighted needle before and after the material had been heated to 400° F. These tests are not considered conclusive. There is, however, a wide variation in the behavior of different asphalts under the tests, and they furnish the best guides to making a selection.

"We expect to try a partially distilled coat of tar pitch instead of asphalt, placed in the manner outlined above, and believe that with either material, placed carefully under efficient supervision, a durable and waterproof coating may be secured."

To apply a membrane covering, the practice is to heat the asphalt to a temperature specified by the company supplying it and then swab it over the concrete, which has been previously cleaned, with mops. Over the hot asphalt is placed a layer of burlap in 40-in. strips, this layer being then coated, after which a second layer, or ply, is laid, the process being continued until 3, 4 or 5-ply work is done, as required by the specifications. The asphalt mastic is composed of 1 part of asphalt heated to about 400° F. and 4 parts of clean torpedo sand heated in pans to drive off all moisture. The sand and asphalt are then mixed and heated together in open kettles to a temperature of nearly 450° F., being constantly stirred during the operation to prevent sticking and burning. The mastic is laid in two layers and lightly tamped or rolled.

The appearance of many subway bridges of handsome design shows them to be marred by leaking, even where considerable expense has been incurred for waterproofing. It apparently shows that proper drainage has been neglected. A ballasted floor should therefore be so formed on top that water may readily flow away. A series of depressions should be made with a 2 per cent fall toward the ends of the bridge. These depressions should be about 4 ft. wide on top with a straight slope each way to the bottom. When the floor is made of a number of slabs the joints should have a key recess to be swabbed with hot asphalt and then tamped full of asphalt mastic. Water that may get through the membrane will be able to run off on the surface of the slab to the ends of the bridge. On top of the waterproofing membrane tile drains should be laid in the bottom of each depression and end in a cross tile back of each abutment. It is evident that with ample provision made for water to flow off, the waterproofing will guide this water to the drains and will not, as is now too frequently the case, have to act as a reservoir. Waterproofing and drainage should go hand in hand.

Letters to the Editor.

UNENTERPRISING SUPERINTENDENTS.

CHAS. M. MORTON, Roxbury, Worcester, Mass., July 11, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The article in your issue of July 1 in regard to politeness on the part of employees toward the public has interested me very much, because the writer assumes that the superintendents of most railways are making constant effort to secure and keep.

polite-spoken men in the service. As a matter of fact, I do not believe there is one superintendent in ten who ever gives the matter a thought. Why should they? Their superior has never insisted that politeness toward the public was absolutely necessary. The matter of being polite is left entirely with the individual, to do as he pleases, from the superintendent down.

If it is an agent who is at fault the passenger or shipper who is wrathful will address a letter to the superintendent or perhaps the general manager. In the latter case it is probably referred to the superintendent without comment, unless it should happen that the complainant is personally known to the management. In either case some little correspondence results and the agent is cautioned by a curt and unfeeling letter from the superintendent not to quarrel with the public. This ends it; the file is closed. This agent will be careful for a time, perhaps—it will depend on how well he likes his job—but a great many do not. Or, he may be an old offender and know by experience that he will not be discharged. I have known cases where men of this disposition have been retained for years.

What should be done, if possible, is to bring the operating branch of the management to understand the importance of politeness toward the public, and let superintendents be selected who are capable of understanding what is wanted. They will then have little difficulty in selecting agents and conductors who are naturally polite and willing to see that their clerks and brakemen are courteous. There is an opportunity for many roads to become popular with the public by taking action along this line. Let it be known that the traffic department of the road is not entirely dominated by the operating department, so that a complaint may be handled on its merits with a view to correction, and the atmosphere will begin to clear of complaints at once. The management of a road that is willing to do this will make a record.

I wonder how many superintendents have ever asked an agent, conductor, brakeman or telegraph operator, in hiring him, if he expected to deal kindly and fairly with the public, telling him that if he did and made friends for the company (and himself as well) among his customers, his service in this respect would be regarded with great favor? There are not many in the West, judging from my own experience. I am sure I was never asked such a question. Let politeness become a condition in the hiring and retaining men in the service, and let the head of each department know that this is essential, and they or their lieutenants will find time to become acquainted with and watch the men under them with some measure of care.

As it now stands very few roads are well acquainted with the men they have meeting the public, and the officers pay but little attention to complaints unless some influential shipper makes one and makes it strong enough to warrant a change. I am not anxious to have this article printed, but am writing it for the benefit of the editor who wrote the article referred to, as it seems to me he blames our employees of to-day, when I know that as a class they are to-day better in every way than they were fifteen years ago. They are better educated, and consequently more ambitious.

Almost anything can be done with a young man starting in the service who is ambitious; and just as soon as the management of any road sees fit to take advantage of such a man's temperament, good results are sure to follow.

Large complaints come to the traffic department of a road, and the traffic department should be given more authority, at least sufficient to warrant a careful investigation on their part without fear of insulting the operating department. This, with a reform in hiring superintendents and men who will make friends for the company, will go a long way toward solving the problem.

This is a large subject and the railways need friends among the people. Some more articles in your paper touching on the first, in the matter will go a long way toward fixing the attention of prominent railway officers on the needs of the situation.

W. J. BOTTEN.

TRANSPORTATION AND TRAFFIC IN RUSSIA.*

BY LOGAN M'PHERSON.

The area of European Russia is 2,166,829 sq. miles. In the interior, as well as vast tracts of forest, are fertile lands on which are raised rye, maize, wheat and other grains; cattle, sheep and horses are grown in great numbers; extensive coal-beds underlie different regions; there are veins of gold, silver, platinum, copper, iron, lead, zinc and tin.

The backward development of the means of transportation is exemplified by the fact that the miring of Napoleon's army in the swamps was a prime reason for the lack of success attending the march on Moscow. The first governmental highway was completed between St. Petersburg and Moscow in 1834. The national highways were gradually extended until at present they cover about 10,000 miles. Although the national government bears the entire expense of maintenance, amounting to \$3,650,000 annually, two-thirds of these roads are under the direction of district officers, and the other third under the direction of local communities.

The rivers of Russia are among the largest in the world, the Volga flowing through 2,220, the Ural 1,500 and the Dnieper 1,340 miles. The first attempt at canal construction was at the instance of Peter the Great, who wanted to establish connection between the Don and the Volga, but work was brought to a sudden stop in 1701 by the war with Sweden and never resumed. An attempt at connecting the Don and the Oka was also brought to an end by the war with Turkey. The first completed canal connected the Volga with Ladoga Lake, and was under construction from 1704 to 1706. This was the first step in that network of waterways providing communication between the Caspian and the Baltic seas, which were built at various times during the next hundred years. Before their construction vessels were dragged overland from one river to another. During the first half of the nineteenth century a half dozen small canals were built to connect the Dnieper and the Moscow with the Volga. Many of these were enlarged during the last quarter of the century and many have fallen into disuse. The Moscow is the only river on the improvement of which considerable expenditure has been made. For the last fifty years have been discussed projects for connecting the Black and the Baltic seas; the Baltic sea with the Arctic ocean; the Caspian, the Azov and the Black seas. They are still being discussed without practical result, the railways having developed channels of traffic that cause these projects to be of less importance.

The total extent of natural and artificial waterways in European Russia is 37,000 miles, of which about 22,000 miles are navigable, the remaining 15,000 miles being available for rafting. Of the navigable reaches steamboats traverse a little over 13,000 miles. The work of the government has been principally devoted to connecting the rivers that flow into the various seas. Of the rivers and their tributaries thus connected a length of only about 2 per cent. is of canals. Before the days of steamboats the hauling was largely by hand, as many as 600,000 men engaging in this labor in the intervals of agricultural employment. The loading and unloading of all traffic is even now done exclusively by workmen in a most primitive manner without any mechanical appliances except the so-called windlass.

Of the craft now used on these waterways 3,295 are steamboats and 23,175 barges. A half dozen companies own from 10 to 55 steamers each, and 626 merchant vessels are owned and operated by local communities. Barges, as a rule, are still owned by small proprietors, who generally possess one or two, rarely as many as five.

All of the canals have been built by the government, with one or two inconsiderable exceptions, which were subsequently purchased by it. During the last hundred years the capital expenditure on the interior waterways has approximated \$500,000,000. The average annual appropriation for improvements

* A preliminary report to the United Waterways Commission.

during the past ten years has been \$4,000,000. The annual expenditure for maintenance and operation is about \$1,000,000. The tools are charged except on the Volga with the Ural and Tessa rivers and the Moscow improved waterway. The total return to the government from these tolls is \$20,000 a year, of which \$75,000 is passed to the general state revenue.

In 1907 these waterways carried 39,663,000 tons of freight. The traffic is very largely of raps of logs and timber, some forming from 90 to 100 per cent. of the traffic on many of the rivers.

All of the inland waterways are under the supervision of the Ministry of Ways of Communication through the Section Waterways under which are inspectors of navigation. For such craft as carry mail and run on a regular schedule, the government fixes maximum rates of freights, below which these crafts can charge as they please. Rates on other watercraft are made at the will of their owners and are subject to wide fluctuation. There are, however, regular classifications of freights.

Russia for many centuries has been an agricultural country, the traditions of the vast majority of its population being that of tillers of the soil. This has been a large factor in preventing the momentum given manufacturing by Peter the Great continuing with anything like a corresponding pace. This condition contributed to the delay in the extension of railways. The first was a short line built in 1836 to connect the Czar's palace at Tzarskoe Selo with St. Petersburg. The next line was that between St. Petersburg and Moscow, celebrated as having been built under the Czar's dictum that it pursue an absolutely straight line, the dispute between contentious engineers, each of whom favored a different route, thereby being settled. This line was completed in 1846.

There was not a great deal of railway building during the next 20 years, the principal construction being directly by the government to serve military and strategical purposes. About 1860 it became evident that the great natural resources of the empire were susceptible of tremendous development, and both Russian and foreign capital was enlisted in the construction of railways to serve commercial needs. The government in nearly all cases issued bonds to the proprietors, guaranteeing the interest and in some cases dividends on shares.

From the first the government prescribed maximum rates for passengers, for live stock, and freight in general. From the first were tariffs for fast freight and slow freight. The latter was of three classes, the first including metal wares, cotton and woolen goods, wine, tea, coffee, sugar and other high class merchandise; the second principally the raw materials of manufacture; the third, foodstuffs, wood, stone, coal and so forth.

The railways soon carried freights at less than the maximum rates, adjusting their tariffs to their own profit, and bringing about through competition the same kinds of discriminations between shippers and between localities, that arose out of similar conditions in the United States. There was bitter complaint on the part of shippers and the government suffered because the loss of revenue to the fighting companies compelled it to furnish large amounts to make up its guarantees of interest. Various laws passed between 1880 and 1886 endeavored without success to bring about an equitable and orderly status. In 1889 a new law was passed establishing special departments in the Ministry of Finance for the reform and subsequent direction of all matters pertaining to the tariffs. This law is still in effect.

The control of the tariffs is under a Tariff Council, presided over by the Minister of Finance and composed of Directors of the Ministry of Ways of Communication, representatives of agriculture, trade and manufactures, and of the private railways; a tariff committee composed of members of different ministries, which decides less important questions; and the Department of Railway Affairs, which works out the adjustment of railway tariffs. The decisions of each body are subject to appeal to the next higher body, those of the Minister and Tariff Council to the Senate. Under this law was under-

taken the occupation of statistics of traffic and the bi-weekly publication of the *Monthly of Russian Railway Traffic*.

To do away with unrestrained competition between rival lines, the government made regulations distributing the traffic between such lines, and adjusting the division of through rates. New tariffs were finally established for the different railways that provide fixed terminal charges for the different classes and progressively lowering, that is, tapering charges for transportation. The practice of the railroads, which tended to nullify the effect of the protective tariff by making lower charges on import freight was abolished.

It was soon found that exceptional rates would have to be made for the great staple products if they were to find any extended markets. Special rates were therefore made upon grain, salt, coal, lumber, kerosene and naphtha, flax and hemp, sugar, live stock. In the succeeding years the number of exceptional rates has been vastly extended to meet the needs of particular commodities in finding a market. Very low rates have been made on long distance traffic, especially that destined to Siberia, which as a market for manufactures of Russia is analogous to the region west of the Missouri river, which is a market for the manufactures of the eastern and middle districts of the United States. Especially low rates have been made on products of export and that the products of one region may compete with those of another in common markets.

It will be seen that the modification of the tariffs of Russia has been similar to that in the tariffs of Germany. In both countries following discontent with the rates made by the railways under the regime of free competition, the government endeavored to bring the tariffs under a mathematical formula, to which, however, it was soon found that numerous exceptions would have to be made in the interest of industry and commerce. These exceptions in Russia, as in Germany, have become very numerous and very important. While their main purpose has been to build up traffic to and from the port of St. Petersburg and to develop traffic with Siberia, they have also in large measure tended to foster traffic between one place and another within the empire.

In an important respect the Russian government not only permits but promotes that competition of the railways with the interior waterways which has been a natural development in the United States, but has been forbidden in both Germany and France. During the season of navigation the railways make "navigation tariffs," which are lower than their regular tariffs, in order to compete with the rivers and canals.

The Russian government in the adjustment of railway rates finds itself between the horns of a dilemma. Inasmuch as the revenue of the state railways and the taxation of the private railways is the source of a considerable revenue which is much needed, there is little or no making of experimental rates for the purpose of developing traffic. Reductions in rates are only made when it is absolutely certain that an increased traffic will bring a greater net revenue.

The length of railways in European Russia on December 1, 1909, was 31,345 miles of standard gage, which is five feet. In addition there were 1,355 miles of lines of narrow gage and secondary importance. These figures are exclusive of 1,976 miles in the Grand Duchy of Finland. Of the standard gage lines in European Russia the government owns and operates about 20,000 miles; private companies about 11,000 miles. The cost of these lines has averaged about \$40,000 per mile. In 1908 the railways of the empire, including the 9,000 miles in Asiatic Russia, carried 145,000,000 passengers and 180,619,596 tons of freight, the revenue per mile averaging over \$10,500. The government is still obliged to make contributions to the private lines under its guarantee of interest, but the amount decreases almost steadily year by year. It points to this and to the fact that some of the commercial lines are beginning to pay dividends as justification for the assertion that there is great opportunity for the profitable investment in Russia of capital in additional rail-

ways that are much needed in the development of the great natural resources of the empire.

The freight cars used on the Russian railways at first had a capacity of but four tons. Later nine tons became the standard, but in recent years many cars with a capacity of twenty tons have been placed in service. Here, as in other countries of Europe, it has been difficult for the railways, even with the offer of especial inducements, to persuade shippers to provide loading in the large quantities necessary to make the use of large cars profitable, but the situation has improved in recent years.

The facts and statistics embodied in this report were obtained either directly from officials of the Russian ministry or from publications authorized by the Russian government.

RAIL FASTENINGS AND THE LIFE OF TIES.

We are indebted to Hermann von Schrenk, supervisor of timber preservation of the Chicago, Rock Island & Pacific, for the following abstract of, and comment on, a paper on the effect of rail fastenings on the life of ties, presented by Herr Oberingenieur Zwingauer, of Berlin, at a recent meeting held in that city.

Attention is called in his address to the decreasing quantity of hardwoods and the consequent necessity for using more and more pine for tie purposes. It is generally recognized that the length of life of all kinds of ties depends upon two factors: protection against decay and protection against mechanical wear. The lecturer says that the protection of ties against decay, as now practiced in Germany, fully serves its purpose; that is, one can efficiently treat ties chemically so as to obtain a long length of life. The protection against mechanical wear, however, is not as efficient as it might be. He finds that maintaining a solid track by screw spikes and tie plates adds very materially to the mechanical life of ties. One of the most important points in the application of screw spikes has been more or less overlooked, viz., the maintenance of a correct relation between the diameter of the hole bored for the screw spike and the diameter of the core of the screw spike. In an interesting table he shows that there is a variation in the diameter of the core of screw spikes, used on the various railways in Germany, France, Austria and Switzerland, of from 0.59 to 0.65 in., and in the whole screw of from 0.79 to 0.90 in. This table is as follows:

	Spike.		Difference	
	Core diameter.	Outside diameter, including thread.	Hole diameter.	between core and hole (bored) diameter.
	in.	in.	in.	in.
Imperial Rys. of Alsace Lorraine	0.65	0.85	0.85	0.20
Oldenburg Government Rys.	0.59	0.85	0.61	0.08
Württemberg State Railways	0.59	0.81	0.61	0.08
French Eastern Railway	0.65	0.90	0.59	0.06
Prussian State Railways	0.65	0.85	0.61	0.04
Saxon State Railways	0.59	0.79	0.65	0.04
Bavarian State Railways	0.59	0.79	0.65	0.04
Mecklenburg State Railways	0.59	0.79	0.65	0.04
Austrian State Railways	0.59	0.79	0.69	..
Swiss State Railways	0.59	0.88	0.69	..

It will be noted that the size of the holes bored for the screws varies from 0.35 to 0.61 in. In other words, there is as large a difference as 0.29 in. between the size of the core of the screw and the hole bored in the tie. So, for instance, the Imperial Alsace Lorraine Railways, for a screw spike having a core diameter of 0.65 in., bore a hole 0.35 in. in diameter, the Prussian State Railways, for a screw having a core diameter of 0.65 in., bore a hole 0.61 in. in diameter, while the Austrian and Swiss Railways, using a screw with a core diameter of 0.59 in., bore a hole 0.59 in. in diameter. The finding of this variation led Herr Zwingauer to make a series of tests to determine the influence of the size of the hole bored for the reception of the screw spike on the holding power of the screw. The results are shown in the table.

The conclusion from this table is that "the figures show with sharp dividing line for the greatest holding power, which in

the case of pine is 0.51 in., and for oak and beech, 0.59 in.," using a screw having 0.65 in. core diameter.

In view of the fact that many roads in this country are laying experimental sections of track with screw spikes, it would seem from the above results that it will be very essential to make a critical study as to the influence of the diameter of the hole

Average Holding Power (in pounds) in Wooden Ties of Screw Spikes and Other Spikes with Various Size Holes.

Size of hole—	Screwspikes (Diameter, 0.65 in.).					Ordinary spike.	
	0.43 in.	0.47 in.	0.51 in.	0.55 in.	0.59 in.	Without hole	0.20 in. hole
Pine ...	4,280	4,930	5,200	4,680	4,470	....	2,920
Oak....	9,430	9,110	9,830	10,100	9,390	....	8,560
Beech...	11,350	11,660	11,880	12,580	12,260	....	....

on the holding power of the screw for our various American tie woods. It is, of course, all important that the maximum holding power of the screw be obtained.

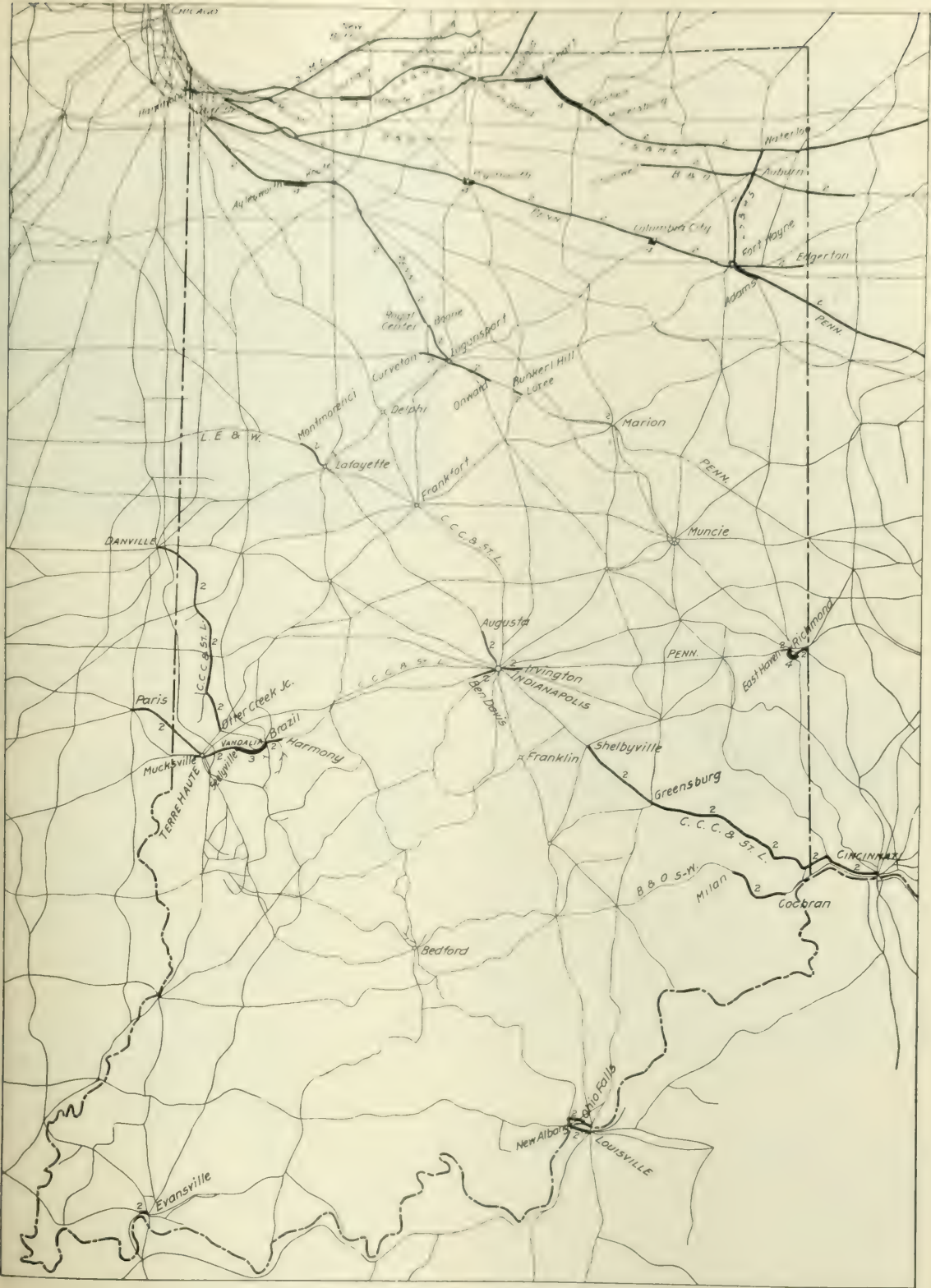
From a recent examination of sections of an experimental track, provided with screw spikes, I received the impression that too little attention has been given to the matter of boring holes, and I believe that the results obtained by Herr Zwingauer are of particular interest to American roads at this time.

TWO, THREE AND FOUR-TRACK RAILWAYS IN INDIANA

Those sections of railways in the State of Indiana on which there are two or more main tracks are shown in the accompanying map. On the White Water Division of the Cleveland, Cincinnati, Chicago & St. Louis there is some double track which does not appear on the map, as exact information of its location is wanting. In the region of Chicago, where the ground is literally covered with tracks and where almost every line is at least double, we have not attempted to show the situation on this small scale map. The limits of this Chicago territory are indicated by the line drawn across the northwest corner of Indiana.

Railways of two tracks, three tracks and four tracks are distinguished from each other in the map by the thickness of the lines in the drawing. The termini of the sections having more than one track are as follows:

INDIANA.	No. tracks.	Approx. miles.
<i>Baltimore & Ohio.</i>		
Mark Centre, Ohio, to Cromwell	2	52
McCool to Chicago, Ill.....	2	43
<i>Baltimore & Ohio Southwestern.</i>		
Cochran to Milan	2	16
Louisville, Ky., to New Albany	2	4
<i>Chicago & Eastern Illinois.</i>		
Danville, Ill., to Otter Creek Junction.....	2	49
<i>Cleveland, Cincinnati, Chicago & St. Louis.</i>		
Cincinnati, Ohio, to Greensburg	2	68
Greensburg to Shelbyville.	2	20
Crosby to Augusta	2	14
<i>Erie.</i>		
Griffith to Hammond (joint with C., C. & L.)	1	9
Hammond to Chicago, Ill. (C. & W. I.).....	2	20
<i>Grand Trunk.</i>		
Port Huron, Mich., to Chicago, Ill.....	2	380
<i>Lake Erie & Western.</i>		
Lafayette to Montmorenci	2	9
<i>Lake Shore & Michigan Southern.</i>		
Edgerton to Millersburg	2	51
Millersburg to Goshen	3	8
Goshen to Osceola	4	25
Osceola to Lyndick	2	17
Lyndick to Rolling Prairie.....	3	13
Rolling Prairie to Laporte	2	7
Laporte to Durham	4	6
Durham to Pine	2	33
Pine to South Chicago	4	9
Indiana Harbor to East Side, Ill.....	4	6
<i>Louisville & Nashville.</i>		
Howell to Evansville	2	2
<i>Michigan Central.</i>		
New Buffalo, Mich., to Grand Crossing, Ill...	2	68
<i>New York, Chicago & St. Louis.</i>		
At Fort Wayne	2	3
Hessville to Grand Crossing, Ill	2	17



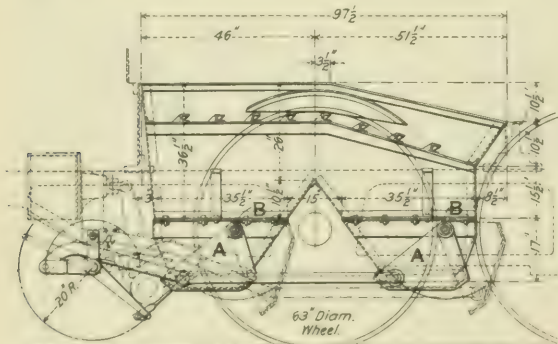
Two, Three and Four-Track Railways in Indiana.

Pennsylvania Lines.

	No. tracks.	Approx. miles.
Van Wert, Ohio, to Adams	3	28
Adams to Fort Wayne	3	5
Fort Wayne to Columbia City	2	19
At Columbia City	4	1
Columbia City to Plymouth	2	45
At Plymouth	4	2
Plymouth to Whiting	2	67
Whiting to Colehour, Ill.	2	3
Ohio State line to Richmond	2	4
At Richmond	4	1
Richmond to East Haven	2	3
Irvington to Indianapolis	2	5
At Marion	2	3
Loree to Bunker Hill	2	2
Onward to Curveton	2	17
Logansport to Boone	2	9
Royal Centre to Kouts	2	15
Kouts to Ayersville	1	4
Ayersville to Thomas Station	2	28
Ohio Falls to New Albany	2	6
Indiana Lines		
Indianapolis to Ben Davis	2	6
Harmony to Brazil	2	3
Brazil to Seelyville	3	8
Seelyville to Macksville	2	9

WINE SELF-DUMPING ASHPAN.

The Atlantic Coast Line has adopted the Wine self-dumping ashpans as the standard on all of its locomotives, the changes to be made as rapidly as possible. The general feature of the design is shown in the accompanying drawing. The bottom of the hopper is closed by the slide A, which is pivoted or hung from the stud B. The mechanism by which it is moved to and fro consists of an ordinary arrangement of levers and connections which are operated from the side of the locomotive. It



Self-Dumping Ash Pan.

will be seen that the bottom is in the form of a pan that rises on all sides around the bottom of the hopper and thus seals it against leakage. When opened, it swings clear of the bottom so that there is a free opening for the flow of the ashes.

The hoppers are separated from the main body of the pan and are held to it by key bolts, so that when it is necessary for a workman to go into the pan the keys can be easily knocked out and the hoppers dropped down.

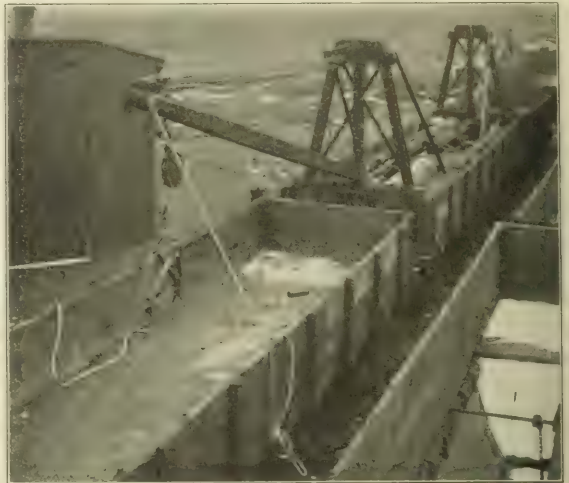
AIR RAIL LOADER.

The equipment here illustrated for handling rails has been developed on the Baltimore & Ohio, and has given excellent service in handling rails up to the heaviest in general use.

It consists of two stiff-leg derricks set up in the ends of a wooden gondola and equipped with the necessary appliances for operating the lifts by air. The drawing shows the details of the derricks, the timber frame on which they are carried, and the cylinders, air tanks, pipes and four-way cock.

The transverse 12-in. x 12-in. timbers of the frame rest on the floor of the car, and are securely bolted to it with 3/4-in. bolts. The photograph shows the general arrangement of cylin-

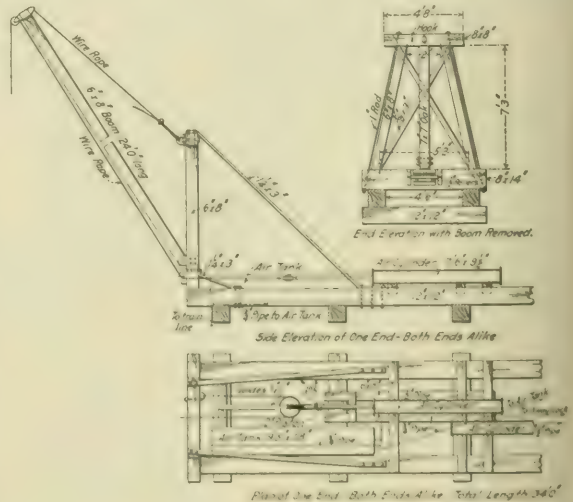
ders, air tanks and feed pipes, and also the tongs for lifting the rail, with the lines and pulleys for lifting the boom. The boom is furnished with two rings for attaching the sheave; these, with the links on the end of the 3/4-in. cable which supports the boom, enable the position of the sheave to be adapted to the length of the car placed for loading or unloading. Air



Air Operated Rail Loader.

is supplied through a 3/4-in. pipe tapping the train line 2 1/2 ft. back of one of the angle cocks and leading to the two storage tanks. The rail loader is operated at 70 lbs. pressure, and it is necessary to equip the work train locomotive with an extra air pump in order to maintain this pressure for rapid work.

Seven men to a boom are required to work the loader to its capacity. One such gang will load or unload as much rail in



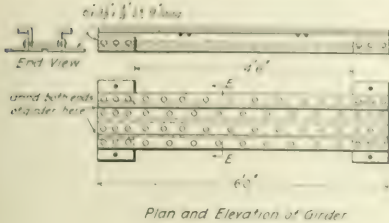
Details of Rail Loader.

a day as a gang of 20 men throwing it on or off the cars. With gangs operating both ends of the loader simultaneously, the work will proceed somewhat less than twice as fast—on account of having to switch the cars more frequently—but the cost of handling per ton will be less.

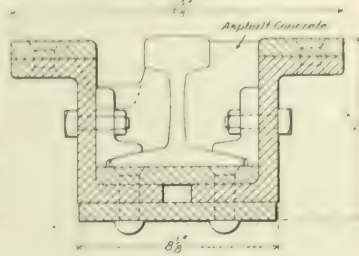
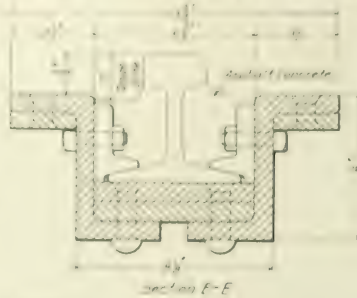
We are indebted to G. D. Brooke, division engineer of the Baltimore & Ohio, for the above description.

STANDARD CULVERT TOPS: CHICAGO & NORTH WESTERN.

For narrow culverts, such as those under frame and streets the Chicago & North Western has lately adopted reinforced concrete slabs with the rails carried in a trough girder built up of Z bars and narrow plates, the details being shown in the accompanying cuts. These show the standard used on culverts.

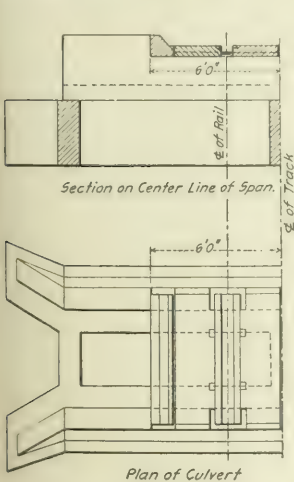


Girder for Standard Culvert.



Section of Special Girder.

with 4 ft. 6 in. openings, and a modified design for culvert or gutter crossings on paved streets. The trough girders for carrying the rails rest at the ends on the culvert walls and for the whole length on the edges of the slabs. The slabs are 6 ft. long and 6 in. thick, reinforced top and bottom with electrically welded wire cloth having a 2 in. x 3 in. mesh of Nos. 0 and 5 wire. Between the rails the slabs are 2 ft. 1 1/2 in. wide and the same width of slab is placed against the outside on each side of the track. In the standard design a curb is placed on the outside of the outer rail and a slab 3 ft. 1 1/2 in. wide is used on the inside when the line is double tracked. On paved streets the curb is omitted and the rail is dropped in an ingenious manner to bring the head flush with the top of the slab, which is even with the surface of the pavement. The



Half Plan and Sections of Standard Culvert.

space on each side of the rail in the trough girder is filled with an asphaltic concrete. This may be readily removed if required and at the same time is preserved from rust, while there is no space for dirt to collect. The construction seems well calculated to secure a good piece of work at reasonable cost as it is standardized and simple.

The bills of material, for one track, are as follows:

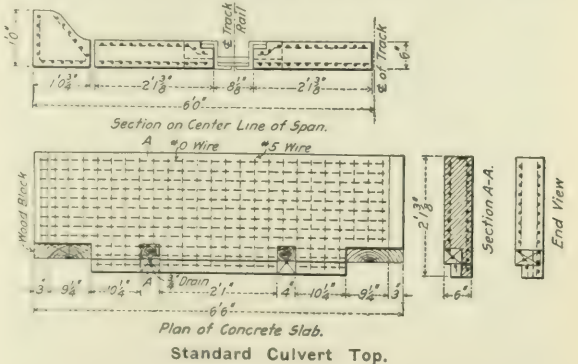
- STANDARD CULVERT.
Concrete deck for one track:
10 wire sheets.
1 1/4 cu. yds. 1:1:2 concrete.
1 piece cedar 4 in. x 12 in. x 6 ft. for blocks.

- Add to above material for each additional track:
10 wire sheets.
1 1/4 cu. yds. 1:1:2 concrete.
1 piece cedar, 4 in. x 12 in. x 6 ft. for blocks.
10 cast-iron rail clips.
10 connection bolts for rail clips.
8 anchor bolts, 1 in. diameter, split end with wedge, hexagonal nut and 3 in. thread.
Material for one girder:
2 6 in. x 8 1/2 in. x 3/4 in. Z-bars, 6 ft. long.
2 3 1/2 in. x 3/4 in. plates, 6 ft. long.
1 6 1/4 in. x 3/4 in. plates, 6 ft. long.
1 8 in. x 3/4 in. plate, 6 ft. long.
4 6 in. x 4 in. x 3/4 in. angles, 9 in. long.

- SPECIAL CULVERT.
16 ft. 1 1/2 in. wide concrete deck for one track:
10 wire sheets.
2 cu. yds. 1:1:2 concrete.
1 piece cedar, 4 in. x 12 in. x 6 ft. for blocks.
Add to above material for each additional track:
10 wire sheets.
1 1/4 cu. yds. 1:1:2 concrete.
1 piece cedar, 4 in. x 12 in. x 6 ft. long.
2 girders.
8 cast-iron rail clips.
18 connection bolts for rail clips.
8 anchor bolts, 1 in. diameter, split end with wedge, hexagonal nut, 3 in. thread.
8 3/4 in. x 3/4 in. bars, 2 in. long.
Material for one girder:
2 6 in. x 8 1/2 in. x 3/4 in. Z-bars, 6 ft. long.
2 3 1/2 in. x 3/4 in. plates, 6 ft. long.
1 6 1/4 in. x 3/4 in. plates, 6 ft. long.
1 8 in. x 3/4 in. plate, 6 ft. long.
4 6 in. x 4 in. x 3/4 in. angles, 9 in. long.

GENERAL NOTES.
Plates and shapes: Open-hearth structural steel.
Rivets: Rivet steel, 3/4-in. diameter.
Composition of concrete in deck to be 1 part of cement to 1 part of sand to 3 parts of torpedo gravel.
Rail joint to be off girder in every case.

The drawings were given to us by W. H. Finley, assistant chief engineer of the Chicago & North Western, who writes:



"The special culvert is designed to span the gutters where we cross public streets. The conditions specified were that we should give a 4-ft. clear span and that the rail should not project above the level of the street. Our standard plan was designed to meet conditions where we require track drainage that cannot be taken care of by ordinary track box. This frequently occurs in cuts and other places. In fact, it is intended for any low, shallow opening where height does not permit a regular construction. Various schemes have been developed for crossings of this sort, such as three rails with the running rail between

the two reinforcing rails, etc. In other designs, by putting in reinforced concrete slabs, we avoid the open pit and can carry derailed cars without danger of a mix up. It will be noted that the rail does not require any special work, and that the fastenings are so arranged that the section men can readily take out and replace a rail." The plans were made in the office of J. F. Stern, bridge engineer of the road.

INTERNATIONAL RAILWAY CONGRESS.

TOWN TUNNEL CONSTRUCTION.

Several interesting reports were brought up on tunnel construction. The subject of great town tunnels in Great Britain had been entrusted to Francis Fox, who gave an historical survey of tunnel construction which has mainly been within the London area. He pointed out that it was the existence of the great bed of London clay which had enabled the construction of the deep tube electrical railways to be carried out without injury or disturbance to any great extent of the property on the surface. By the system which was adopted for the tube railways the tunnels had been placed at such a depth that not only was interference with the innumerable sewers, water and gas pipes, telegraph and telephone cables avoided, but the water in the gravel beds was not encountered except at the stations. Mr. Fox's historical survey extended back to the Thames Tunnel of Brunel, from which he noted that engineers had learned many lessons, the troubles which arose in connection with its construction having been largely due to the fact that it was placed at too high a level. Mr. Fox proceeded to describe in chronological order the construction of the Metropolitan & District Railway tunnels and the first tube railway, the City & South London. He reminded the congress that the Tower Subway was the forerunner of all tunnels driven by circular shields, one of the assistant engineers having been James G. Greathead, whose name will ever be identified with tubes and tube tunneling. It was usual, he pointed out, in tube tunneling to construct two separate tunnels, a practice which presented many advantages, chief among which was the fact that such a method was cheaper, owing to the smaller amount of excavation. The other tube railways, the Waterloo & City, the Central London, the Great Northern & City, the last named distinguished by the fact that the tunnels were constructed of sufficient size to accommodate the rolling stock of the Great Northern Railway, and the later tube railways constructed by the Underground Electric Company of London were also described. Mr. Fox pointed out that the Charing Cross, Euston & Hampstead, with a length of 8 miles, was constructed in something over two years by Price & Reeves. Mr. Price introduced his electrical digger for the purpose of accelerating that work with great success, and a distinct improvement in the air of the tunnel was perceptible whenever the electrical excavator was at work. Other tunnels described were the Mersey Railway, the Glasgow District Subway and that of the Glasgow Central Railway.

Mr. Fox expressed the opinion that the construction in congested districts in London of shallow railways such as had been proposed would involve such enormous cost as to be prohibitive, although outside congested districts, or under new streets, there was little doubt that shallow subways would be generally adopted. An important reform suggested by Mr. Fox with which those who have experience of the long underground walks imposed on those who use the tube railways in London will be in sympathy is that the cars should deliver passengers at platform level immediately between the up and down rails. On the subject of the ventilation of tube railways, while admitting that on some of the existing lines there were deficiencies in this respect, he expressed the belief that if laid out on a scientific basis a satisfactory ventilation system could be introduced. From purely engineering matter Mr. Fox passed on to deal with more controversial points, suggesting that in consideration of the enormous boom that had proved to the public, and the low fares charged, the tube and other suburban railways should be ex-

empted from local rates and passenger duty. He believed that any such relief would contribute to the public welfare by encouraging further construction, and suggested that municipal assistance for raising capital should be authorized. The opinion was also expressed by this reporter that omnibus and motor traffic should be called on to contribute towards the construction and upkeep of roads in order that the competition between them and tube railways should be placed on a fair basis.

The subject of tunnels under large cities other than London was reported on by M. Canat, chief engineer of the Paris, Lyons & Mediterranean. There were, he pointed out, few instances of such tunnels in the case of main lines of railway in Europe, although in America they were more common. When such tunnels were constructed they were of two types, the ordinary tunnel with metal roof, examples of which were to be found at Budapest, at Berlin, at Boston, at Philadelphia and in the New York subway; and the arched tunnel, the latter the method adopted on important main lines, such as the New York Central and the Pennsylvania Railroad at New York, the Sceaux line and the Austerlitz line at Paris, and elsewhere. The shield method had been tried for such tunnels, but the difficulties were so great that that method of construction had to be given up. In the construction of the Paris tunnels innumerable obstacles were met with, quicksand being encountered, while another difficulty peculiar to the Paris subsoil was the frequent occurrence of old quarries. A remarkable feature about the building of arched stations, as in the case of the Paris Metropolitan line, was that even where the tunnel was at a great depth below the surface of the ground there was no hesitation to have a very flat arch, even with a span of 46 ft., and the Orleans Railway had even constructed such a flat arch, having a span of 66 ft. 3 in., at the entrance to the Quai D'Orsay station. Special works were found in the tunnel of the Pennsylvania Railroad which formed the approach to the central Manhattan station. With regard to crossings, the most remarkable work of the kind that had been carried out was that under the Place de l'Opera of the Paris Metropolitan, where there were three tunnels, one over the other. M. Canat said it had been difficult to obtain information as to the net cost of town tunnels, but at Budapest the cost, including superstructure and electric installation, had been \$265 a yard, while at Berlin the average cost of the tunnel alone had been \$495 a yard, and the Vincennes—Porte-Maillot had cost \$400 a yard. The ventilation of town tunnels was a very complex problem. A commission appointed by the Municipal Council of Paris has the subject under investigation at the present time. The solution at present adopted in Paris consisted in providing large ventilated openings up to 500 square ft. wherever possible, only using fans if the openings were too small or too far apart. That mixed solution had given appreciable, if incomplete, results.

ALPINE TUNNELS.

This subject was reported on by F. Hennings, of the Zürich Polytechnic School, who described the Jungfrau line tunnel, the Ricken tunnel, the Loetschberg, the Karawanken and the Simplon tunnel. Opportunities for visiting the works of the Loetschberg tunnel, giving direct communication between Berne and the Simplon, had been afforded delegates while in Berne, and a considerable number took advantage of the invitation. It will be remembered that the tunnel is a double track tunnel, and that trouble has been experienced with water bearing sands and gravels, with the result that the tunnel had to be diverted, adding 805 yards to the length of tunnel to be driven. In the case of the Jungfrau line tunnel, which was also visited by delegates, this has been opened for traffic for some time past to Eismeer, which is 10,368 ft. above sea level, and the continuation of the tunnel from Eismeer station to the Jungfraujoch, 11,330 ft. above sea level, is now in progress. The tunnel will be finally continued from the Jungfraujoch to the Jungfrau station, which will be the terminus of the line. That station will be 13,432 ft. above sea level. From thence a lift 240 ft. in height will convey passengers to the summit of the mountain. It was pointed out that the tunnel was remarkable, not only

on account of its great elevation, but for the steep grade over two miles of tunnel, ending at the present terminal station, Eismeer, being on a gradient of 25 per cent. The section of tunnel now being driven, 2 1/2 miles in length, has a gradient of 6 1/2 per cent., and the final section to the final station will be 2 1/2 per cent. The difficulties in connection with the distribution of water and the gradient prevented the Brandt hydraulic drills from being used. Up to Eismeer station electric percussion drills of the Siemens-Schuckert type had been employed, but in the section above Eismeer station the work was being carried out with Ingersoll compressed air drills, with which the monthly advance was 115 yards, compared with 85 yards on the lower-ward-Eismeer section with the electric drills. The Jungfrau is a narrow-gauge tunnel, 11 ft. 9 3/4 in. wide and 13 ft. 11 1/2 in. high. The total length to the Jungfraujoch will be four and a half miles, and there will be the further section thence to the summit station. Tunnel ventilation during operation was also discussed by this reporter. Mr. Hennings, in an interesting résumé, stated that the system which had been found to give the best results was that of Saccardo. The reporter recommended the double-track system of construction in the case of long Alpine tunnels, the use of a top cut instead of a separate top heading, and where high rock temperatures, or great pressures, or much water were expected, he advised the construction of an under-heading as a satisfactory system. It was also desirable, he thought, that experiments should be made with armored concrete blocks to determine their suitability for tunnel lining. The cost of Alpine tunnels was difficult to determine, but the contract price of the double-track Loetschberg was to be \$610 a yard. The mean cost of the south side of the Karawanken tunnel was \$1,010 a yard, while the cost of the difficult pressure sections of the St. Gothard and the Simplon tunnels was estimated at over \$4,500 a yard. The cost of operation was a most important point in connection with Alpine tunnels, and another important detail was the upkeep of the track. The quick wear of the rails and plates in the Simplon tunnel was a quite unexpected phenomenon and had not yet been explained. In the St. Gothard tunnel during the years 1900-1907 the upkeep of the track cost \$395 a mile per year, or twice as much as in the open country.

M. Canat reported on tunnels in mountainous countries outside the Alps. Many tunnels were described in this report. As a general rule, it was stated, most of these long tunnels were straight in plan, and a typical cross section had a width of between 26 and 27 ft., with a height of about 19 ft. 8 in. above rail in the case of double-track tunnels and a width of 16 ft. 5 in. for single-track tunnels. In the case of tunnels of medium length the top heading system was frequently employed, but in other parts of Europe there were few instances of such construction. At the same time, top heading working had economy in its favor. For very long tunnels, however, bottom heading working was to be recommended. With regard to machine drilling, the Brandt drill was unique of its kind, but had not yet succeeded in establishing its superiority. Compressed air drills were of many types, and they all worked well and gave good results. Electric drills had now passed beyond the experimental stage. Many statistics were also submitted as to the ventilation of tunnels in operation, and this reporter confirmed the statement made elsewhere that the Saccardo system had proved satisfactory, but had the disadvantage of being comparatively high in cost of operation.

IMPROVEMENTS IN LOCOMOTIVE BOILERS

Nine reports were presented on this important subject. Practically the whole interest of the discussion turned on the economies which have followed the adoption of superheating in locomotive work. It was shown, in the course of the debate which followed the reading of the paper by George Hughes before the Institution of Mechanical Engineers recently, that, in addition to the Lancashire & Yorkshire and the Great Western Company, other British companies were now carrying out tests of the economy of superheaters, notably the London, Brighton & South Coast Railway. It is common knowledge that on the

Continent the majority of railway administrations have been for some time trying superheated steam on locomotives.

M. Darroze brought before the Congress some interesting figures on his report for France, Belgium, Italy, Spain and Portugal. He pointed out that the economies of fuel and of water were in direct ratio with the amount of superheat, being greatest when the locomotive did considerable, and above all, continuous work. In trials carried out on the Belgian line, the realized economies had reached 29.64 per cent. of coal and 28.67 per cent. of water, but attention was directed to the fact, now generally recognized, that the saving only began to be appreciable with from 80 to 108 deg. Fahr. of superheat. In service as well as in test runs the economy of superheating has been clearly demonstrated. Single-expansion superheated steam locomotives could, it was claimed, show an economy of coal of up to 18.20 and even 22 per cent, as compared with similar saturated steam locomotives which had done the same work. It was shown that a temperature of 608 deg. Fahr. was, in the case of single-expansion locomotives, the best from the point of view of efficiency and the proper preservation of the different parts. By equipping a compound locomotive with a superheater, its efficiency was increased, the four-cylinder express compounds of the former French Western Railway being from 13 to 14 per cent. more economical than similar compounds using saturated steam. Moreover, superheating made it possible, in the case of compounds, to effect economies of coal which were found on the Belgian State Railway, and 7.3 to 10 per cent. in the trials made on the Italian State Railway, also with express locomotives—both figures being per indicated horsepower. As superheating was more economical the lower the initial pressure of the steam, it was not, as a rule, advisable to have a high pressure in the boiler. The great cost of upkeep of boilers working at high pressures was thus avoided.

G. Nolte, the reporter for Russia, produced more confirmatory evidence as to the gain following superheating. He said that, when properly managed, the superheated steam locomotives consumed, as a rule, 15 to 30 per cent. less water and 8 to 20 per cent. less coal than saturated steam locomotives for an equal amount of power. The small additional cost of lubrication was held to be comparatively unimportant. He pointed out that the improvement of the parts in contact with the superheated steam was continually progressing. The Stumpf valve gear would probably make superheated steam working still more economical, and it was consequently advisable to try and adapt it as perfectly as possible to the conditions obtaining in locomotive service. Moderate superheating had proved unsatisfactory, even in the case of compounds. It was desirable to attain high temperatures—up to 662 Fahr.—in the valve chest. Loss through superheated exhaust steam was hardly to be feared. The best steam pressure for superheated steam working appeared to be about 170 lbs. per square inch. With proper treatment, the cost of maintenance of the superheated steam locomotive was not higher than that of the saturated steam locomotive. In Germany, Holland, Switzerland and northern Europe superheated steam is now being used on a larger scale. The reporter stated that the W. Schmidt smoke-tube superheater, which was generally preferred, seemed at present the most suitable system for producing superheated steam. The superheaters of the Pielock and Clench-Goldsdorf designs had at present only received limited applications, but as they were cheap and easy to build and look after, they seemed useful in cases in which one was content with steam having a temperature of 518 to 554 deg. Fahr. Superheated steam compound locomotives with four cylinders are now frequently used, and progress in this direction seems to promise good results.

In America, with one exception, those roads which have equipped engines with superheating appliances have done so as an experiment only. The Canadian Pacific has adopted superheating extensively and has at the present time about 475 such engines in service. The engines with the Schmidt smoke-tube superheaters are entirely successful, and during their first six months' service showed a saving of 18 per cent. in fuel com-

pared to compound consolidation engines of a similar, though slightly smaller, type which had been constructed two years previously. The results obtained have been, on the whole, exceedingly satisfactory. Figures derived from extensive service on all sections of the road, and based on the total quantity of fuel delivered to the engines, have shown an economy in fuel of from 10 to 15 per cent. in passenger service. A noticeable difference between simple engines using superheated steam and two-cylinder compound engines using saturated steam is in the greater flexibility of the simple engine. The general experience in Canada and the United States, therefore, with regard to the use of superheated steam may be summarized by the statement that a substantial economy in coal has been effected; that on account of conditions this economy is not as great in freight service as in passenger service, and that in the latter a considerable benefit is obtained from the increase in the capacity of the engine.

PERISHABLE FREIGHT.

The reports under this title elicited a long discussion. J. M. Culp, Southern Railway, who reported for English-speaking countries, dealt with the matter from both aspects. His main argument was that as the commodities forming the list of perishables are distinguished by the fact that practically the entire list contributes to the support, or amelioration, of human life, it was of the very highest importance that this particular form of traffic should be delivered to consumer with the least possible deterioration. A disposition to full co-operation on the part of the producer must, however, be assumed and relied on. Mr. Culp said experience had proved the adequacy and success of the American car. He pointed out that the present types of cars had been evolved from experiments, beginning with the refrigerator car patented by William Davis, of Detroit, Mich., in 1868. That car was built primarily for the transportation of fish. No improvement effected by carriers—not excluding quicker schedules—had produced such economic results as the refrigerator car. The present fresh meat, fruit and vegetable industries, represented in America by millions of dollars of investment and affecting thousands of square miles of territory, were almost entirely the product of this. The production and distribution of fresh meats had evolved during the past 30 years from strictly local distribution to a national wealth reaching into the millions; the traffic from fruit and vegetable-growing districts had brought wealth to wide areas and thousands of individuals.

In England conditions greatly modified the necessity for specializing the handling of perishable freight. Although each management reported that perishables originated to some extent on their lines, the need for special facilities appeared mainly in connection with imports. English railway managements relied mainly on rapid transit for the successful handling of perishable traffic.

The management of Indian railways unquestionably felt that with the present demands their traffic in perishables did not require the use of other than ventilated vans or wagons handled in passenger train schedules—a conclusion which Mr. Culp assumed to be sound. From demonstrated results in other sections of the civilized world there might be found by the management of the Indian railways in the fruit and vegetable traffic a fertile opportunity not only for increasing their own revenues but for stimulating the production of a variety of food products, lessening the disastrous effects resulting from the occasional failure of any one of the crops now grown.

The Australian situation was unique by reason of the encouragement being given by the government through the provision of cold storage depots, which, together with the provisions already made by the carrier, presaged a large growth of traffic in that territory.

Richard Bloch, of the Orleans Railway, who reported for all countries except those using the English language, treated his subject with great thoroughness. Mr. Bloch found that, as a general rule, these traffics were growing rapidly in consequence of more general prosperity, in crease in wealth and in population and greater and greater facilities given by the administra-

tions. This progress was especially striking in the case of produce, such as fruit and vegetables, where the different countries in a way supplement each other.

Mr. Bloch dealt with the work of the International Clearing House established at Brussels, which liquidates all the accounts concerning the joint through traffic of England, France, Holland, Belgium, Germany, Switzerland, Austria-Hungary and Italy. The continuity of the growth of this traffic showed clearly that the saturation point of the international market was far from being reached, and that there was still room, and ample room, for all the efforts on the part of exporting countries. Under these conditions, it was thus not a question of a fight of ejection between these different countries; far from opposing each other, the progress of the one would contribute toward helping the progress of the other. This was shown by the instance of the German market, where the new and growing intervention of French trade did not hinder the continuous increase of imports from Italy. Rather must it be a strife of emulation, in which, besides the qualities peculiar to the producers, success would depend less on the rate charged for the carriage than on the care devoted to it.

SEMAPHORE BLADE PAINT.*

BY ROBERT JOB.[†]

In painting semaphore blades the common practice some years ago was to use the so-called English or Chinese vermilion, the red sulphide of mercury. This pigment was mixed or ground with linseed oil, and, while the paint was fresh, the coating gave a brilliant and striking signal. It was found, however, that on exposure to light and sulphur fumes a gradual darkening took place, due to the chemical reduction of the pigment or the formation of the black sulphide.

Under favorable conditions a fair life was obtained, but in unfavorable surroundings, darkening or blackening took place rapidly, and repainting became necessary after relatively short exposure. Unfortunately, too, the price of the material was extremely high and out of all proportion to the durability obtained. Owing to these reasons, strenuous efforts were made to secure a substitute equally brilliant at the outset, but having the advantages of greater serviceability, with lower initial cost. Experiment was made with various inorganic pigments, such as American vermilion (basic lead chromate), mineral orange, and other substances, but they were found to be unsatisfactory in one characteristic or another, and did not have the requisite brightness of color or else did not retain the color satisfactorily on exposure.

The field of organic reds had been largely developed and thorough trials were made of a number which appeared promising. It was found, as a result of these service tests, that many of these reds, such as eosine, were extremely fugitive and faded very rapidly on exposure; others gave fairly satisfactory results. The para diazo reds were the most permanent and generally satisfactory and retained their brightness for considerable periods of time, even under unfavorable surroundings. The shade of this red was not as bright and striking as desired, though it was improved by the addition of mineral orange (Pb₃O₄). The latter material, when present in any considerable proportion, caused blackening, due to formation of lead sulphide, but good results were obtained when the proportion of mineral orange did not exceed 10 per cent. Other diazotized and developed aniline reds have recently been brought out, and exposure tests of these are now under way. The para diazo red was precipitated upon various bases, but in service tests barium sulphate was found the most satisfactory. Paints prepared with varying proportions of para diazo red precipitated upon barium sulphate were tested carefully by exposure and it was found desirable to have present not less than 20 per cent. of the red in order to ensure a good degree of permanency with little evidence of fading after a year's service.

*From a paper presented before the American Society for Testing Materials, June 30.

[†]Director of laboratories, Milton Hersey Co., Ltd., Montreal, Que.

Shop Section.

THE first prize of \$50 in the shop kink competition, which closed June 15, has been awarded to C. J. Crowley, passenger inspector at the West Burlington (Iowa) shops of the Chicago Burlington & Quincy. The winner of the second prize of \$25 is E. A. Gross, master mechanic of the Central of Georgia, at Columbus, Ga. Eight other collections of kinks were entered in the competition, all of them good, and some of which follow the prize winners closely, so closely, in fact, that the awarding of the prizes proved a most difficult task. Of the ten collections, one was made up entirely of engine house kinks and another of car repair kinks. All of the kinks will be published in the September Shop Number. The names of the competitors, other than the prize winners, with no attempt to arrange in the order of merit of the collections are: William G. Reyer, general foreman of the Nashville, Chattanooga & St. Louis, Nashville, Tenn.; John V. Le Compte, assistant foreman, Baltimore & Ohio, Mt. Clare shops, Baltimore, Md.; K. J. Lamcool, special apprentice, Chicago, Indianapolis & Louisville, La Fayette, Ind.; A. S. Willard, foreman, Norfolk & Western, Crewe, Va.; C. J. Drury, general round-house foreman, Atchison, Topeka & Santa Fe, Albuquerque, New Mex.; Guy A. Adams, foreman freight car shops, Boston & Maine, Concord, N. H.; James Stevenson, foreman, Pennsylvania Railroad, Olean, N. Y.; and S. S. Lightfoot, bonus demonstrator, Atchison, Topeka & Santa Fe, San Bernardino, Cal.

WE announce an engine house kink competition to close September 15, 1910. A first prize of \$35 will be given for the best collection of two kinks, and a second prize of \$20 for the next best collection. More than two kinks may be submitted, but the judges will base their decision on what they consider to be the best two in each collection. Contributions that are used for publication, but are not awarded prizes, will be paid for at our regular space rates. Nowhere are time and labor saving devices of greater value than in an engine house, and this is especially true during times of heavy traffic, when every minute saved in getting an engine ready for service means dollars in the treasury. Kinks may be found in greater or less numbers in every engine house, but their use has often become so common that their value, as compared to methods used elsewhere, is overlooked or forgotten. A master mechanic remarked some time ago that if the kinks used in all the engine houses could be collected and the more important ones placed in general use, the effect on improved engine house efficiency and output would be stupendous. Won't you help to make the results of this competition as valuable and effective as possible by contributing your mite? No great effort will be necessary on your part. Send us blueprints, sketches or photographs of the kinks and describe their construction, use and advantages in a simple way, being careful to make the descriptions as complete as possible. Possibly you have time or labor-saving methods or practices which do not require illustration. If so, don't hesitate to send them to us. If you have only one kink which you consider of value, send it in and if acceptable it will be paid for at our regular rates.

FOUR other competitions, in addition to the enginehouse kink competition announced above, will be held within the next five months. The one to close October 15 will be on "The Care and Selection of Machine Tools and Shop Equipment." The subject has purposely been made as broad as possible in order that all of our Shop Section readers may be able to participate. For instance, the above title need not be used as the subject or title of the article submitted. It may be on such subjects as the

care of bearing, the care of pneumatic tools, the storage of machine tools, the care of small tools or their abuse, the care of tools in a roundhouse or car repair yard, how a foreman should go about selecting the proper machine tools to recommend for use in his shop, or any one of a dozen or more subjects which come under the general title suggested. Prizes of \$35 and \$20 will be given for the two best articles; such others as are accepted for publication will be paid for at our regular rates. The articles should contain from five hundred to fifteen hundred words.

The competition to close November 15 will be on car repair kinks. The same conditions will apply as for the competition on enginehouse kinks, announced above. Any kink used in car repair shops or yards for either freight or passenger cars or at the terminals in connection with the cleaning or repair of car equipment may be included. We have a large number of readers in the car department, but comparatively few car repair kinks have been brought out by the general shop kink competitions, although several were submitted in the competition which closed June 15. The three articles on "Car Repair Shop Notes," in the May, June and August Shop Numbers, show that there are many labor and time-saving devices in use in the average car repair shop and yard. The good things in the car department, as in the engine house, do not appear to become generally recognized, even in any one locality, as may be seen by looking over the three articles above mentioned. The three plants considered are in the same part of Buffalo and within a mile or two of each other, and yet splendid devices were found in each one of the three, which could have been used to advantage in the other two shops or yards, and yet were entirely unknown to their foremen. If our car department readers all over the country, and outside of it, for that matter, will co-operate with us in bringing to general knowledge the many kinks which they have found of value, it should assist them greatly in giving a better account of the forces and equipment under their care.

The competition to close December 15 will relate to "Increasing Shop Output" and the same general conditions will govern as for the competition on "Care and Selection of Machine Tools and Shop Equipment." As in the case of the remarkably successful competition on "How a Foreman Can Promote Shop Efficiency," held last spring, the new competition is intended to cover a larger and broader field than that covered by the shop kink competitions. We want to know how you increased the output of your shop or department by improving the organization, rearranging the equipment or handling it to better advantage. The competition should, for instance, bring out articles on a good shop schedule and the result of its installation, a successful shop dispatching system, the arrangement and operation of a first-class bolt manufacturing plant, the best flue handling plant, how a car repair yard increased its output by better methods, how a better system of organization and operation was instrumental in improving the conditions at an engine house, or how the same results were secured with the same equipment, but smaller labor costs. These few subjects are presented merely as suggestions. There are at least a hundred more equally as good.

The fifth competition, to close January 15, will be on shop kinks and will include any kink used in connection with the repair and maintenance of locomotives or cars of all kinds. It will be governed by the same conditions as the shop kink competitions which have been held recently. The prizes will be \$50 and \$25 for the best two collections of three kinks. More may be submitted, but the award will be based on what the judges consider to be the best three kinks in each collection. In this, as in all the above announced competitions, kinks or articles which

do not win a prize, but are accepted for publication, will be paid for at our regular rates. Contributions may be entered in any of these competitions at any time between this and the closing date.

ALTHOUGH the Shop Number of the *Railway Age Gazette* has been in existence less than a year, it has been so cordially and enthusiastically received as to leave no doubt of the great need of the foremen for assistance in improving the efficiency of their departments and shops. It was with their needs in mind that the competitions outlined above were drawn up. Two of them, the engine house and the car repair kinks competitions appeal to special interests in the mechanical department to which the value of greater efficiency and improved economy is of prime importance, but about which little has been published which appeals to or has proven to be of much interest to the foremen in these departments. The other three competitions should appeal to our Shop Number readers generally. The subjects are carefully worded to cover a broad field and the conditions are such that the foreman of any department, or specializing in any class of work, will be enabled to participate in any one or all three of them.

THE experimental Mallet articulated compound locomotive that was placed in service on the Canadian Pacific some time ago, and which is described in another part of this issue, has proven so successful that five more of the same type are being built at the Angus shops of that company. The locomotive was designed under the direction of H. H. Vaughan, assistant to the vice-president, and differs radically from other locomotives of this type on American roads. The most important changes are in the design of the boiler and the arrangement of the cylinders. It is doubtful if a boiler of ordinary design would have the capacity of the one on the experimental locomotive, but it is, of course, not wise to adopt the new type of boiler generally until it can be proved superior to the ordinary type. To do this the five new engines will be equipped with the ordinary type of boiler and a smoke box superheater, and their performance will be compared carefully with that of the first locomotive. Mr. Evans' paper was written several months ago, and since that time the experimental locomotive has handled its tonnage satisfactorily and the arrangement of its cylinders has proved entirely successful. Extensive tests of the locomotive are being made, the results of which, it is expected, will shortly be available for publication.

A GENERAL superintendent who has been studying the problem of locomotive fuel economy suggests that improvement can best be made by securing some means of accurately weighing and charging up the fuel delivered to each locomotive. Methods of doing this, which are fairly accurate, have been used on a number of roads with splendid results. The more or less general adoption of the practice of pooling locomotives has, however, complicated the problem considerably, as was shown by H. H. Vaughan, assistant to the vice-president of the Canadian Pacific, in a paper which he recently presented at the joint meeting of the American Society of Mechanical Engineers and the Institution of Mechanical Engineers. He said: "It is almost impossible to determine the fuel consumed by an engine on an individual trip, and consequently difficult when pooling to keep any record of the amount of coal used by different men. A record may be kept by engines, but it is then impossible to locate the responsibility for any excessive consumption. The practical result is that on pooled engines, individual fuel records are of comparatively little use. With assigned engines, while trip records may not be individually accurate, the average of several consecutive trips soon becomes so, as the variation of the amount of coal left on the tender, while important on one, is of comparatively small importance on a number of trips. There

is no doubt in the writer's mind that individual coal records, whether by trip or by period, are an important factor in obtaining economical results in fuel consumption, both from men and from engines, and he ascribes the good results that have been obtained on the Canadian Pacific largely to the careful way in which the records have been watched."

IN speaking on the tool room check system at the Railway Tool Foremen's convention, O. T. Harroun, tool room foreman of the Chicago & Alton at Bloomington, Ill., emphasized the importance of getting the higher officials to view the tool room in the light of a shop barometer, rather than as a non-producer. H. W. Jacobs, assistant superintendent of motive power of the Santa Fe, expressed the same thought in a little different way a few years ago, when he likened it to the ammunition for an army. No matter how well the army may be drilled or otherwise equipped, it is not of much account in time of battle if without ammunition. Progressive shop superintendents and general foremen have come to this same conclusion, and the tool room and its equipment has gradually been improved until it is regarded by many as the strategic point in planning a campaign for improved shop efficiency. With this development the tool room foreman has been forced to a higher plane and has become a more important factor in shop efficiency and economy. This was quite noticeable in connection with the work of the Railway Tool Foremen's convention, which met in Chicago last month. Although this association was only formed last December and the number of members in attendance was not very large, yet the papers were enthusiastically and carefully discussed, the matter of higher efficiency and greater economy being kept always in the foreground. With such a start this association promises to give a good account of itself within the next few years.

MECHANICAL ARTICLES DURING JULY.

For the benefit of Shop Number readers who may wish to look up mechanical articles which appeared in the *Railway Age Gazette* since the Shop Number of July 1, the following outline of such articles is presented:

Steel in Freight Car Construction. By C. A. Seley, mechanical engineer, Chicago, Rock Island & Pacific. A four-page abstract of a paper presented before the Franklin Institute, tracing the development of the use of the steel frame in gondola and box car construction, thus utilizing the side framing in carrying a considerable proportion of the load. Illustrated. *Railway Age Gazette*, July 8, page 84.

New Tank Car. Illustrated description of a new type of tank car, designed by the Chicago Steel Car Co. *Railway Age Gazette*, July 15, page 116.

Co-operative Engineering Education. By Prof. Herman Schneider. A paper read before the annual meeting of the Society for the Promotion of Engineering Education, and dealing with the progress made in the co-operative engineering courses at the University of Cincinnati. The students spend alternate weeks in the schoolroom and the workshops of Cincinnati, principally the shops of the machine tool builders. *Railway Age Gazette*, July 15, page 122.

Tests of Self-Cleaning Front Ends. A two-page summary, illustrated, of several series of tests made on the testing plant of the Pennsylvania Railroad at Altoona, to determine the best front-end arrangement for its Atlantic type passenger locomotives. *Railway Age Gazette*, July 15, page 124.

Steam Turbine Electric Locomotive. Illustrated description of the Reid-Ramsey turbine electric locomotive built by the North British Locomotive Co., Ltd., Glasgow. *Railway Age Gazette*, July 22, page 132.

Locomotive and Car Shops of the National Trans-Continental, Winnipeg, Can. A general description of this new shop plant, with data as to the various shops and their arrangement. Illustrated. *Railway Age Gazette*, July 22, page 154.

Chair Car. Illustrated description of new chair car for the Chicago, Burlington & Quincy. *Railway Age Gazette*, July 22, page 137.

Pooling Locomotives. Abstracts of papers on this subject, presented before the joint meeting of the American Society of Mechanical Engineers and the Institution of Mechanical Engineers. *Railway Age Gazette*, July 29, page 183.

Fifty-Ton Gondola Car. Illustrated description of a car with a steel underframe built by the Chicago, Milwaukee & St. Paul at its West Milwaukee shops. *Railway Age Gazette*, July 29, page 184.

IMPROVED FIREBOX WITH HOLLOW ARCH AND COMBUSTION CHAMBER.

BY E. F. GAINES.

Superintendent of Motive Power, Central of Georgia.

Several years' experience in the anthracite district of Pennsylvania caused me to become quite familiar with the combustion chamber—both the original, as applied to the Wootten type firebox, and the modified form, as used to form a part of the brick wall. While there were mechanical objections to this device, which I will take up later, there is no question but that it improved combustion and proved economical in the burning of fuel. Further, the life of the tubes was greatly prolonged, and in no case during their life did they give as much trouble as in the ordinary type of boiler. I have also found, from two engines of exactly the same type, except that one had a combustion chamber and the other had not, that the boiler with the combustion chamber, although having less total heating surface, due to the flue heating surface cut out by the combustion chamber, was in every respect the better steamer of the two. While the combustion chamber boiler has less total feet of heating surface, yet the additional firebox heating surface in the combustion chamber is of so much more value as to offset the loss in tube heating surface.

The Wootten type boiler has for years been standard on the Philadelphia & Reading, and it is well justified by the results obtained. Other roads have used it somewhat in a more or less

tender it more or less objectionable. In the first place, it is almost impossible to prevent having a large number of seams on account of the junction of the different plates coming at the throat of the combustion chamber. This is even true where a single plate is used for both the firebox and the combustion chamber by welding the two sheets together, as the throat sheet seams are still located at this point. Where the brick arch is used it is necessary, about once a week, to draw the fire and allow the arch to cool and to put a man behind it to shovel out the accumulation of cinders to prevent stopping up the tubes. This, of course, requires considerable time, and withdraws the locomotive from service while the work is being done. There is also an objection on account of the trouble experienced with cracked sheets, unless the mud is kept from accumulating in the water space underneath. Where water that is high in solid matter, either mud or scale, is used, this matter must be looked after very carefully.

Knowing the desirable features of the combustion chamber as regards saving of fuel, diminution of smoke, longer life of tubes and better steaming engine, I made a careful study of the whole matter to see what could be done to get the advantages of the design in question and eliminate the objections, and finally evolved the idea of building a boiler with an abnormally long firebox and partitioning off sufficient space at the front end by a vertical brick wall to form a combustion chamber, thus allowing the use of an ordinary spark hopper in the bottom of the chamber for the withdrawal of sparks. I further believed that the

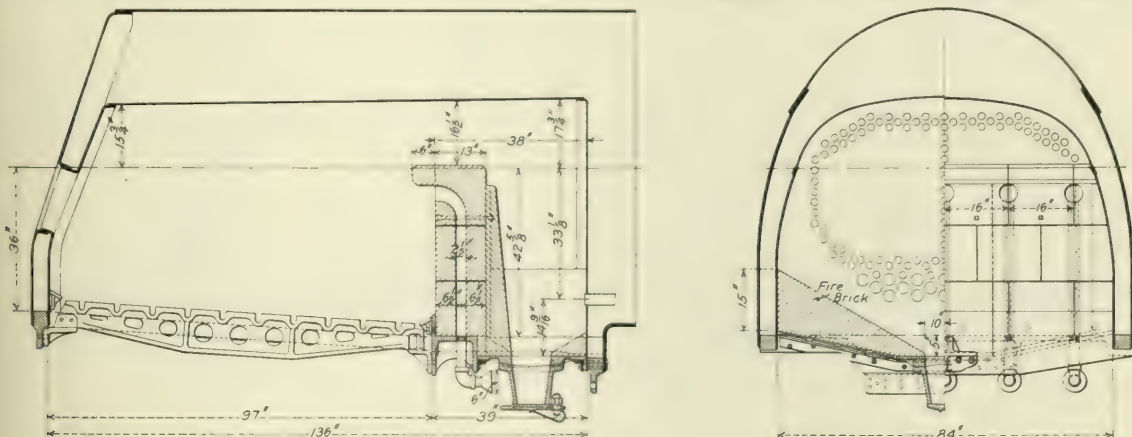


Fig. 1—Combustion Chamber and Hollow Arch as Applied to Engine 1014.

modified form, and within the last few years several roads have applied it to engines using bituminous coal. As far as I have been able to ascertain, the results have been uniformly successful. It would seem that in such types of locomotives as require extremely long tubes, a much better heating surface can be obtained by the use of a combustion chamber and shortening the tubes, at the same time reducing the mechanical troubles due to long tubes. An illustration of the application of a combustion chamber may be found in the *Railway Age Gazette* of May 27, 1910, in the boiler of the Mallet articulated compound locomotive for the Delaware & Hudson. Some of these bituminous burning engines with combustion chambers have brick arches in connection with them, while others do not use the arch. The non-use of the brick arch seems to me to defeat the principal purpose of the chamber itself, which is largely based on the theory that to properly consume the unburned gases a sufficient volume of air must be mixed with them before their temperature has been lowered by coming in contact with the comparatively cold surface of the tubes, and that the province of the combustion chamber is to allow the air and gases to mix in proper proportions and burn in the combustion chamber before entering the tubes.

The present form of firebox with combustion chamber, as generally constructed, has several mechanical defects which

admission of heated air at a point near the top of the bridge would be of advantage in approximating complete combustion. To accomplish this the brick wall in question was made hollow, with passages through it, so that air might enter from the outside, go through the wall itself, which being hot from the high temperature of the firebox would heat the air and turn it loose to mix with the gases at top of bridge, the idea being that they would mix and burn during their passage from that point to the tubes.

This design eliminates the trouble of removing sparks which gather in the combustion chamber and stop up the tubes. It admits highly heated air at the most desirable point for complete combustion. It also protects the flues from cold air, no matter at what point in the fire there happens to be a hole.

To carry out the idea in question, the management allowed me to apply a new back end embodying these principles (Fig. 1) to the boiler of one of our large consolidation engines, No. 1014, which had been in an accident and had a badly crippled back end. The grate area of the new firebox was made identically the same as that of our 22 x 30-in. consolidation locomotives, which are free steamers and economical as regards fuel. The combustion chamber was made shorter than would have been used if the boiler had been designed in toto for the engine. It was necessary, however, to design a back end that would go

on the old boiler and suit the running gear of the present engine, which somewhat modified the design from what would have been considered best practice. Nevertheless, the engine has now been in service some fifteen months, and so far we have yet to have the first trouble from leaking tubes, although the engine is running in a district where other engines are giving us trouble more or less all the time, and where the average life of a set of tubes is about 30,000 miles. It has been found that this engine will steam with grades of fuel that other engines cannot use; it would thus appear to be of advantage in utilizing low-grade fuels, and would probably prove satisfactory in burning lignite. The engine so far has made 37,832 miles, and the tubes are apparently in as good condition as the day they were applied. It will soon be due for general overhauling, but it is not the intention to do any work on the tubes at that time.

It has been found that the small amount of sparks that accumulate in the combustion chamber can readily be removed through the spark hopper at the bottom, but as a matter of fact the amount of sparks carried over the arch is very small. This is probably due, in the first place, to the use of a large nozzle ($6\frac{1}{2}$ in.), the mild exhaust not lifting anything but the smallest particles over the arch. As these small particles are lifted over, such as are combustible are probably burned before they strike the tubes, and the only sparks that are found in the combustion chamber or front end are very fine particles of slate, and there are very few of these. The amount of smoke emitted is noticeably less than on the other engines. The fuel

ent mines, and they are designated as "A," "B" and "C." On the data sheet of the comparative tests engine 1014 is the one with the combustion chamber; engine 1020

Comparative Tests on Central of Georgia, Showing Advantages of Hollow Arch and Combustion Chamber.
Southwestern Division—Freight Service—Macon and Columbus.

	Engines			
	1014.	1020.	1719.*	1715.
Coal A:				
Coal consumed, per 1,000 ton-miles, lbs.	102.00	152.00	108.00	119.00
Water evaporated per lb. of coal, lbs.	8.10	5.70	8.57	7.72
Relative efficiency	100.00	67.11	94.45	85.72
Excess of coal consumed, per cent.		49.02	5.88	16.67
Coal B:				
Coal consumed per 1,000 ton-miles, lbs.	100.00	141.00		114.00
Water evaporated per lb. of coal, lbs.	8.12	5.65		7.44
Relative efficiency	100.00	70.93		87.72
Excess coal consumed, per cent.		41.00		14.00
Coal C:				
Coal consumed per 1,000 ton-miles, lbs.	96.00	139.00		110.00
Water evaporated per lb. of coal, lbs.	8.25	5.93		7.66
Relative efficiency	100.00	71.95		90.92
Excess coal consumed, per cent.		44.79		14.58
General average of all coals:				
Coal consumed per 1,000 ton-miles, lbs.	99.00	144.00	108.00	114.00
Water evaporated per lb. of coal, lbs.	8.15	5.76	8.57	7.81
Relative efficiency	100.00	68.76	91.67	86.84
Excess coal consumed, per cent.		45.46	9.09	15.15

*Engine 1719 out on test of Margaret and Petros coals, account of arch burnt out and no material on hand to repair.

†Based on engine 1014 as unit.

Engine 1014—21 x 32-in. Cooke consolidation, with new firebox and combustion chamber, with hollow brick wall and provision for mixing hot air with burning gases. Total heating surface, 2,987.33 sq. ft.

Engine 1020—Same class engine as 1014, but with original boiler unchanged and no brick arch. Total heating surface, 3,022.29 sq. ft.

Engine 1719—22 x 30-in. Baldwin consolidation, wide firebox, and Wade-Nicholson hollow arch. Total heating surface, 3,230 sq. ft.

Engine 1715—Same as engine 1719, but without brick arch. Total heating surface, 3,230 sq. ft.

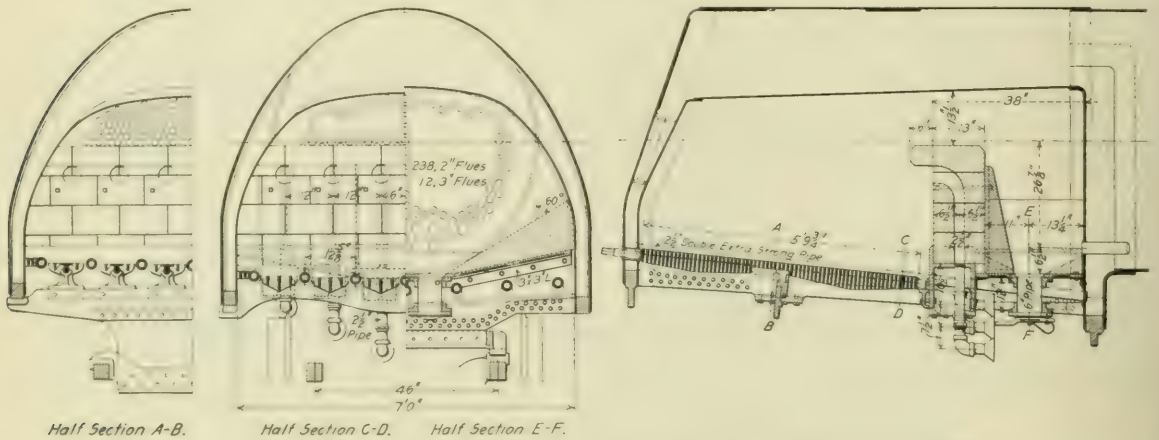


Fig. 2—Combustion Chamber, Hollow Arch and Water Bars as Applied to Engine 1065.

consumption has been considerably less, and the engine in every way has proven extremely satisfactory.

The management has also allowed me to apply this revised back end to the boiler of another consolidation locomotive, No. 1065, of smaller size, the firebox of which had been badly damaged by low water. On this locomotive I decided to utilize the experience I had had in regard to circulation of water in Wooten type fireboxes with longitudinal grates having a water bar between each grate. This was embodied in the second engine, in connection with the hollow brick arch and combustion chamber, as shown in Fig. 2. This engine has been in service about four months since being rebuilt, and while no official tests have been made as yet, however, the road locomotive engineers and engineers report that it is one of the most satisfactory engines on the division, and there is every reason to believe that the fuel economy will be as good as on the first engine.

A record of a test of the first engine is given herewith. In this test the train was composed of 18 cars (100,000 lbs. capacity) of compact coal, and the same train was used throughout the entire series of tests, thus eliminating any error due to the difference in class of work or weights used during the test. The same engineer and firemen were used on all the tests. Three grades of coal were used from three differ-

ent mines, and they are designated as "A," "B" and "C." On the data sheet of the comparative tests engine 1014 is the one with the combustion chamber; engine 1020 is a sister engine of the same class, but with the original boiler not equipped with a brick arch; engine 1719 is an engine of better design with a wide firebox and a Wade-Nicholson hollow brick arch; engine 1715 is the same class as the 1719, but without the arch. Engine 1719 was not used in the tests with the last two grades of coal, as the arch gave out and we did not have material on hand to make repairs. The showing made by the 1014 over the other engines was very satisfactory and substantial. In making the tests, all coal used was weighed and put in sacks. Following are the general data and dimensions of locomotives 1014 and 1065:

Engine	No. 1014.	No. 1065.
Type	2-8-0	2-8-0
Tractive effort	13,610 lbs.	34,000 lbs.
Weight in working order	147,875 "	148,875 "
on drivers	178,875 "	148,075 "
on truck	21,400 "	20,500 "
of engine and tender	310,875 "	294,575 "
Wheel base, coal	15 ft. 3 in.	16 ft. 0 in.
do " " " " " "	33 ft. 9 in.	34 ft. 3 in.
do " " " " " "	41 ft.	39 ft. 9 in.
Cylinders, diam. and stroke	21 x 32 in.	20 x 28 in.
Driving wheels, diameter	55 in.	57 in.
Boiler pressure	200 lbs.	200 lbs.
Firebox, length and width	96 x 84 in.	72 x 84 in.
Heating surface, tubes	2,984.08 sq. ft.	1,911.08 sq. ft.
do " " " " " "	12.9 "	8.5 "
do " " " " " "	62.4 "	50.0 "
do " " " " " "	2.987.3 "	2,137.0 "
Grate area	46.36 "	42.0 "

Shop Kinks.

From the Silvis Shops of the Rock Island Lines.

The most important shop plant on the Rock Island Lines is located at Silvis, Ill., about 175 miles west of Chicago. Four important divisions radiate from the point. The shops are comparatively new, having been placed in operation in February, 1904. G. W. Seidel is shop superintendent.

FIG. 1—JIG FOR DRILLING CYLINDER SADDLE BOLT HOLES.

A full set of cylinder saddle bolt holes may be drilled in three hours by means of the jig shown in Fig. 1. As indicated, they are drilled from the inside, the former practice at Silvis being to do it from the outside. The frame of the jig is constructed

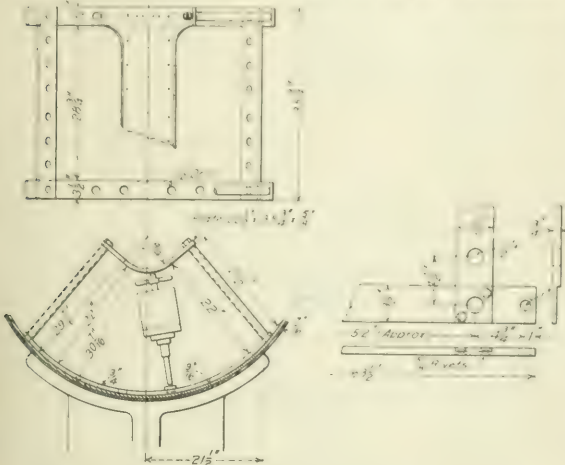


Fig. 1—Jig for Boring Cylinder Saddle Bolt Holes.

of four pieces of 3/4 x 3 1/2-in. common iron and a 22 1/2 x 35 3/4 x 5/8-in. plate, the plate being fastened to the base by long bolts and pipe spacers, as shown. Hardened steel bushings, 1 1/2 in. outside diameter, are provided to guide the drill.

ENGINE TRUCK PEDESTAL CHUCK.

At the Silvis shops only the top end of the engine truck pedestal is machined, where it fits the frame. This work is done on a

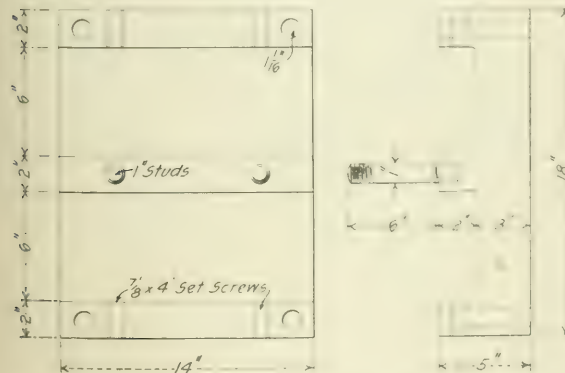


Fig. 2—Chuck to Hold Engine Truck Pedestals on Slotter.

slotter in a minimum amount of time by the use of the chuck shown in Fig. 2. The chuck holds two pedestals at a time, square with the cross-feed. The 1 x 6-in. studs clamp the pedestals to the chuck, and the chuck itself is bolted to the table by 1-in. bolts through the four 1 1/4-in. holes. In practice the pedestals are placed in the chuck and the four set-screws are set up by hand; the pedestals are then drawn down solid by two horseshoe clamps

used in connection with the table feed rod, after which the set screws at the ends are tightened with a wrench. In connection with the chuck, a new tool post has been designed (Fig. 3). These tool posts at the ends of the slapper and set on 6 in. apart so that two tools may be operated at the same time.

FIG. 3—SPECIAL TOOL POST.

A neat and serviceable tool rack for use in connection with the slotter is shown in Fig. 4. The top and shelves are of 1/4-in.

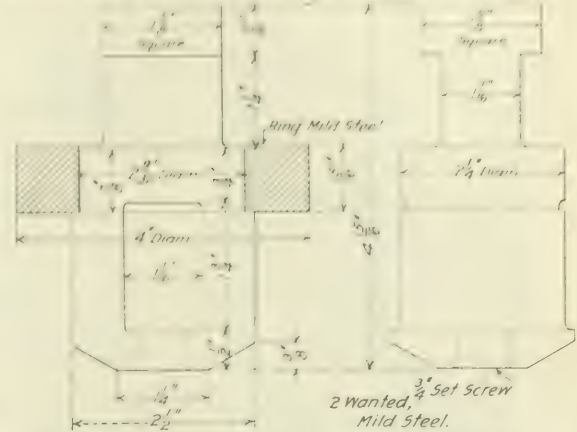


Fig. 3—Special Tool Post Used on Slotter for Machining Engine Truck Pedestals.

in. steel plate, the uprights being 3/4-in. rods with 3/4-in. pipe spacers. The drawer is constructed of No. 8 steel. The shop is equipped with a number of these racks, or tables, which have been found very useful.

TABLE FOR DRIVER BRAKE RIGGING.

An inexpensive rack, which keeps the driver brake rigging off

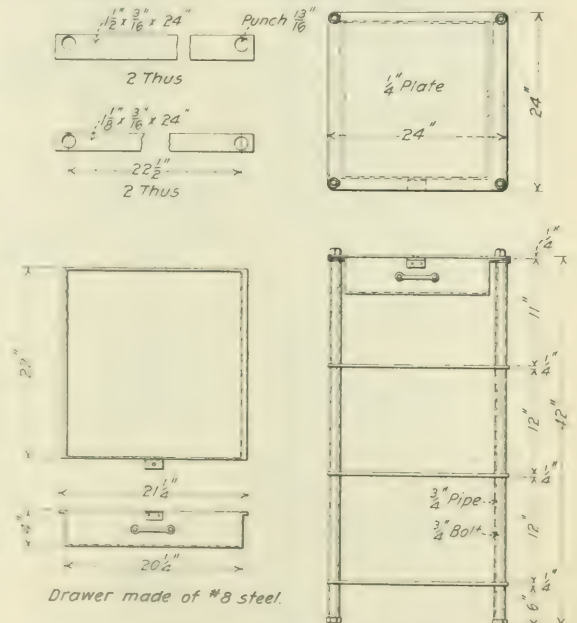


Fig. 4—Tool Rack.

the floor and economizes floor space, is shown in Fig. 5. The frame is constructed of 2 1/2 x 2 1/2 x 1/4-in. angle iron.

BOLT WAGON.

As the iron is sheared to length for bolts in the smith shop it is piled on the wagon or cart (Fig. 6), and is moved to the furnaces, thus saving any rehandling.

STAMPING STEEL RUNNING BOARDS.

A special set of dies for stamping the projections on steel running boards, or steps, to prevent slipping is shown in Fig. 7. The dies are made of mild steel blocks, 15 x 19 x 2½ in. in size, and are fitted with forty-nine ¾-in. pins, as shown. The four springs, one at each corner, raise the top die after the sheet is stamped. The dies are used in a hydraulic sectional flanger.

DIES FOR CORNER PATCH FOR WASHOUT PLUGS.

Another shop kink used in connection with the hydraulic sec-

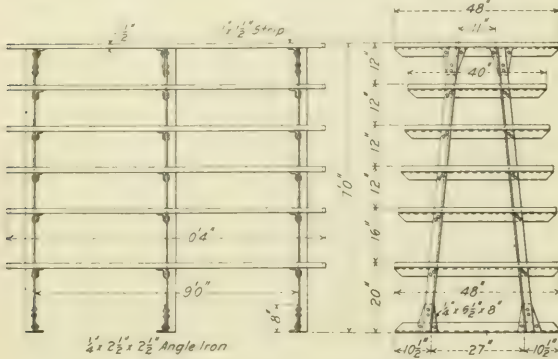


Fig. 5—Rack for Driver Brake Rigging.

tional flanger in the boiler shop is a set of dies for making corner patches for washout plugs. The male die is 5 63/64 in. in diameter and fits in the vertical ram of the machine; the lower die is 11 in. long, shaped at the top with a 5 7/8-in. radius, as shown in the drawing, Fig. 8. A 1½-in. hole is drilled in the bottom end

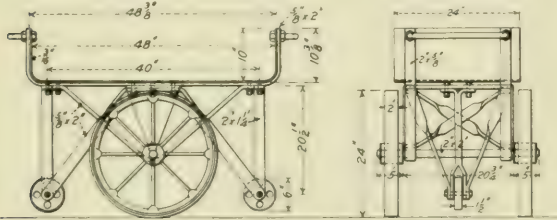


Fig. 6—Cart Used in the Manufacture of Bolts.

of the upper die and a taper keyway is cut through the die to hold the punch, which is 2 in. in diameter, in place. A 5/8-in. hole is punched in the sheet which is to form the patch, after which it is heated and placed between the dies. It is bent and the hole is flanged for the washout plug in one operation. After the dies have been closed the taper key is removed and the 2-in. pin is forced clear through the hole in the patch.

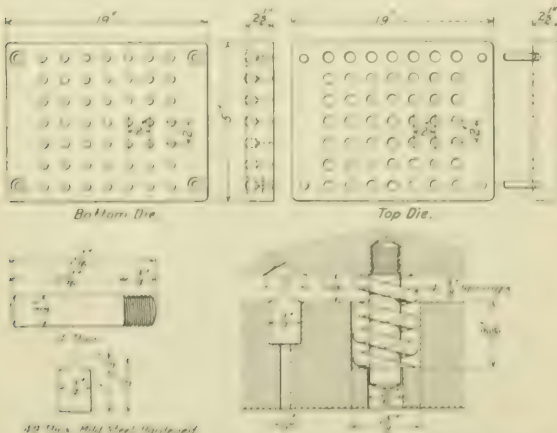


Fig. 7—Dies for Stamping Steel Running Boards and Steps.

OIL TANK FOR SPRING SHOP.

A handy oil tank for the spring shop is shown in Fig. 9. It is made of ¼-in. steel and is so constructed that a man can work both sides at one time. It has two compartments, the middle one

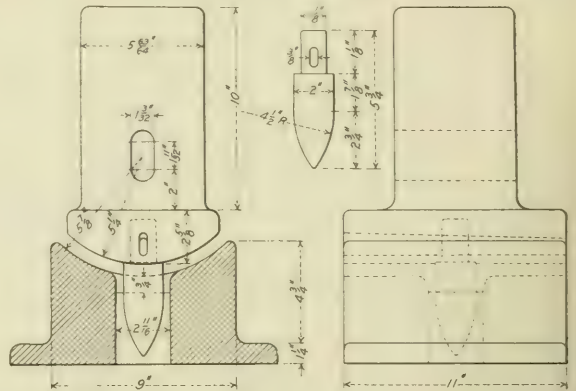


Fig. 8—Dies for Forming Corner Patch for Washout Plug.

for water and the outside one for the oil bath. A constant flow of water is maintained in the water compartment in order to keep the oil as cool as possible, the water entering through a 1-in. pipe coil and going out at one end through the 2-in. overflow

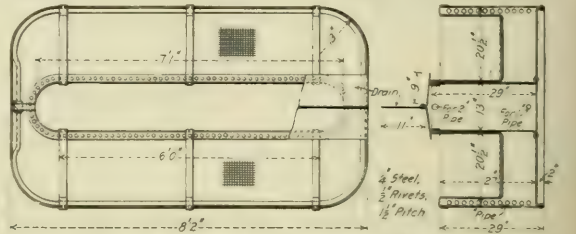


Fig. 9—Oil Tank in Spring Shop.

pipe. A netting is suspended in the oil on each side to hold the plates while submerged.

Kinks from Various Sources.

CUTTING HEAVY IRON UNDER STEAM HAMMER.

A device for cutting iron and steel bars which are too heavy

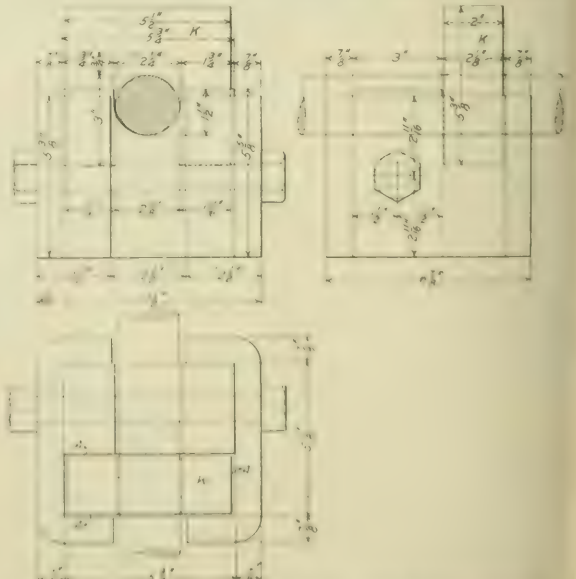


Fig. 10—Dies for Cutting Steel Bars Under Steam Hammer.

easily used and capable of variations not shown in the sketches. It may be used in the case of stock that is to be worked off or centered, as shown in Fig. 12, Nos. 1, 2 and 3, showing round, square and octagonal sections, respectively; No. 4 shows the bar as it is broken off, No. 5 with the end milled and centered, No.

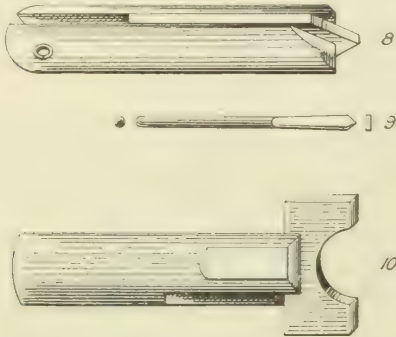


Fig. 13—End Tool for Lathes.

6 with the end milled and center bored; No. 7 is a small rod turned or milled with a hemispherical end to correct centers. One form of the tool which centers and end mills is shown in No. 8 (Fig. 13). There is a sliding center drill, which makes a 60-deg. countersink in the end, of a depth and diameter dependent on the amount of projection of the bit. The rest of the tool forms an end mill with two cutting faces. Where

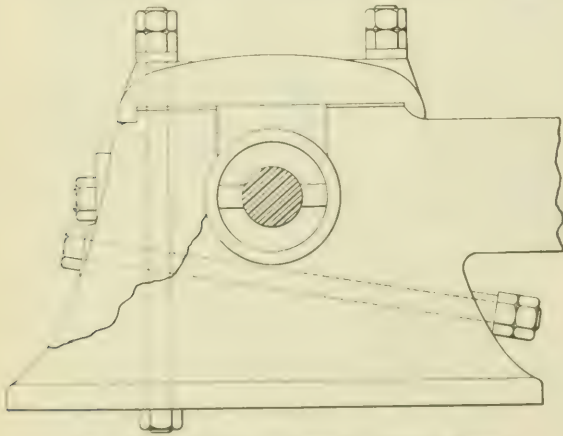


Fig. 14—Repairing a Broken Engine Frame.

center boring is desired the tool, instead of being slotted, is merely drilled to accommodate the small flat drill, No. 9. For ball milling, as in No. 7 (Fig. 12), the bit is made as shown in No. 10 (Fig. 13). The same holder may be used for either the center drill or ball tool.

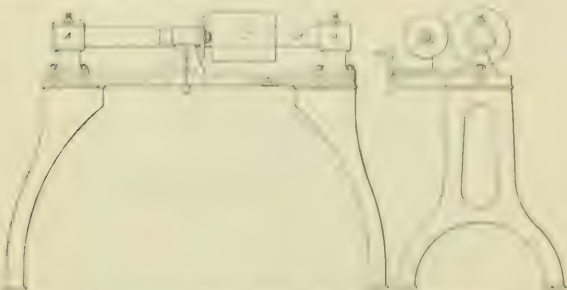


Fig. 15—Improved Grinder for Milling Cutters.

REPAIRING A BROKEN ENGINE FRAME.

The accompanying sketch (Fig. 14) shows a method that was successfully shown in a railway shop some time ago for repairing temporarily the frame of a stationary engine that had broken away at the main bearing. Two diagonal bolts were run in through the lower part of the fracture and the front leg of the frame, as shown. Then a part of the foundation was cut away so as to get at the lower end of an extension to the cap bolt that was sent down through a hole, that was drilled, and screwed into a nut at the lower end. The cap bolt was replaced with this, and the whole was so firmly held together that the engine

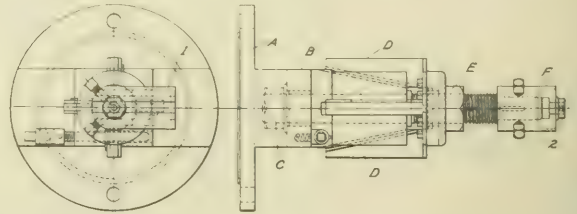


Fig. 16—Eccentric Mandrel.

could be worked to its full capacity until another frame could be made and fitted to place.

GRINDER FOR MILLING CUTTERS.

A certain shop bought a milling machine, which was used extensively, but had no accurate means of grinding the cutters. There happened to be a small lathe bed handy that had been discarded. The head and tail stocks were removed, and in their places brackets A A (Fig. 15) were placed. These were bored to take the mandrel B. A bearing with a shaft, pulley and emery wheel was attached to the carriage, that could be driven by an overhead drum. The milling cutter C, to be ground, was put on the mandrel and the latter clamped by the set screws in the brackets A. Adjustments were made by easing off on the screws and turning the mandrel. The traverse of the emery wheel was accomplished by hand through a feed screw, not

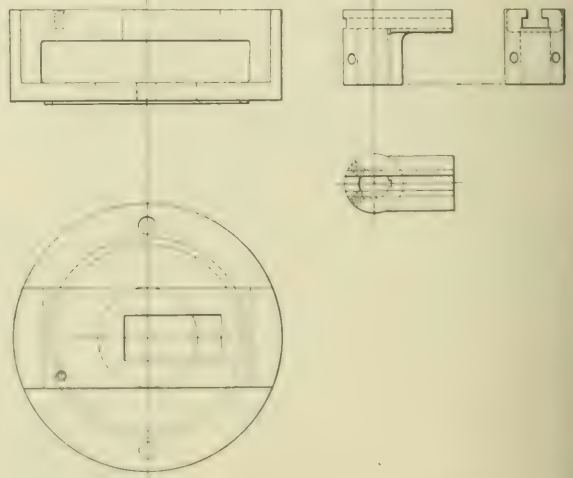


Fig. 17—Details of Way of Eccentric Mandrel.

shown, and the adjustment by the cross feed of the carriage. Rather crude for fine work, but it served its purpose for many months in a pretty big shop.

ECCENTRIC MANDREL.

The device for turning eccentrics, Fig. 16, combines an adjustability to care for a wide range of eccentric throws, quick setting of the work and rigidity while in operation. The base A is bolted to the faceplate and carries a way, or bearing, B, which extends across A. This way, Fig. 17, is really U-shaped, with

the two legs cast solid with the main body. This open portion serves as a space for the tightening and $\frac{1}{2}$ of the expanding mandrel. The end of the mandrel is put in through a rectangular hole in the face of the way, and is held set in any desired position of eccentricity by the nut C. The mandrel is provided with the expanding jaws D D, which move in and fit in the grooved guides in the usual manner, and are held out to the work by the nut E. With the eccentric set over the mandrel and held in this way there is considerable overhang, and on heavy work there would be apt to be a good deal of chatter. To obviate this and hold the work steady, a collar F, of sufficient length, is placed on over the end of the mandrel stem. This collar has a side projection or overhang, I, extending out on one side and in which there is an undercut way (Fig. 17). This overhang and its way are held in line with the main way, B, of the base by a key, and carries a small slide, 2, which may be clamped in any position by a nut. By setting 2 with the same offset, but in the opposite direction that is given to the mandrel itself, it offers a center bearing for the tailstock, so that the latter can be brought up against the work, and the mandrel can thus be securely supported.

In turning the eccentric the work is done just as though it were held on a solid mandrel carried at its ends by the head and tail stocks. For setting or removing the work it is simply necessary to drive out the key holding the collar F in place, back off the tailstock and slip the eccentric over the end of the mandrel. Another eccentric can then be put in place and clamped by setting up the nut E and keying on the collar F. With the device as shown eccentrics with throws ranging from 0 to 6 in. can be turned, and the adjustment from one to the other is easily and quickly made.

CAR REPAIR SHOP NOTES, NEW YORK CENTRAL & HUDSON RIVER AT EAST BUFFALO.

Extensive repair shops for both freight and passenger cars are maintained at East Buffalo, N. Y., by the New York Central & Hudson River. Heavy repairs are made to mail, baggage and horse cars, and light and running repairs are made to other classes of passenger equipment. Coaches which lay over at Buffalo are cleaned at East Buffalo. In addition to wooden freight cars a small number of steel cars are repaired, although with the exception of a few tools no special equipment has been provided for this work. A large amount of material is also manufactured at the shops for use on the division. Practically all of the work is done on a piece-work basis, including the work of the sweepers, cleaners and laborers. During March, 1910, about 450 men were employed, 360 of them being engaged strictly on car work, the others being connected with the store department, office force, etc. Heavy repairs were made to 422 cars of all classes.

The weather in the vicinity of Buffalo is severe and stormy during the winter months and plans are being made to extend the car repair shop so that all of this work may be carried on under cover. An addition 400 ft. long is to be added to one side of the shop this summer and another of the same size will probably be added to the opposite side next year, making the completed shop 300 ft. wide and 1,000 ft. long. We are indebted for assistance in collecting information for this article to W. O. Thompson, master car builder; Wm. Shone, general foreman; F. Deyot, Sr., assistant general foreman, and F. Deyot, Jr., apprentice instructor.

APPRENTICE SCHOOL.

At the recent meeting of the Master Car Builders' Association, J. J. Hennessey, master car builder of the Chicago, Milwaukee & St. Paul, in speaking on the consolidation of the M. M. and M. C. B. Associations, said: "The crying need is to interest more young men in the car department. I believe I voice the sentiment of nearly every man of experience in this hall when I say it is almost impossible to-day to find young men who have the proper training to take charge of a large

car shop. Why? For the reason that for years the opportunities for young men to come in and learn has at times been as good as they have been in the locomotive department. The result has been that the brightest young men have drifted into other departments, and the car department to-day it really is a hard to conduct its business as it should be conducted." This fact was thoroughly realized when the New York Central Lines adopted its new apprenticeship system in the spring of 1906 and provision was made for interesting and instructing the car shop apprentices at all points where schools were established. Schools were, however, placed only at the more important shop points and naturally greater stress was given to the work of the locomotive department. The car repair shops at East Buffalo are entirely separate from the locomotive repair shops, which are located at Depew, a number of miles distant. The school established at East Buffalo in August, 1906, was, therefore, for car shop apprentices only and was the first school established in this country for such apprentices based on modern apprenticeship methods.

The establishment and development of the school has not proved an easy task, but, judged from a practical standpoint, its work thus far has been successful; if all goes well the first apprentice to complete the four years' course will be graduated next September and the second one will complete his course in December. The experience of the past few years has developed the weak points in the system, all of which it will be possible to strengthen. It was predicted by many when the school first started that it would be a failure. They argued that there was not enough opportunity in a car shop, where practically no passenger car work was done, to hold the boys; that the equipment of the various departments, with the possible exception of the planing mill, is not extensive; that the apprentices would leave when they were forced to work in the repair yard during unfavorable weather, and that the rate of pay would be too low to hold them. There is more or less truth in all these arguments and it is also true that a high degree of skill is not required in the freight car repair shop and yard; but, on the other hand, men have never been thoroughly and systematically trained for this work and the greater service required of the cars and the wonderful development in car interchange have opened splendid opportunities to bright and ambitious young men who intend to make a specialty of car department work and are willing to work hard.

There were so few apprentices available when the school was started that the young handy-men and laborers were given an opportunity of attending the classes. These men have gradually dropped out, but apprentices have been added. Buffalo is an important manufacturing center, and the greatest difficulty has been that the boys do not look far enough ahead and often leave because they can get a little better pay elsewhere. With the extension of the shops, so that practically all of the work can be done under cover, and the moving of the school into better quarters, it is thought that still better results will be attained in holding the boys.

At present there are eleven regular apprentices, including two in the fourth or last year, two in the third year, three in the second year and four in the first year. They are learning the following trades: Tinsmith, two; machinist, five; carpenter or freight car repairer, three, and planing mill, one. There are two classes, each of which meets two mornings a week, from 7.30 to 9.30. The drawing course for the first few months is the same as followed by all shop apprentices on the New York Central Lines. It consists largely in redrawing correctly sketches which are not in scale, the dimensions being taken from models. These objects are in all cases selected from those with which the boys come in contact in the shop, the work being thoroughly practical from the very start. New principles are introduced gradually and one at a time as the work advances. After the first or general exercises are completed the apprentices are required to make rough sketches in their note books of simple car parts or castings, a supply of which are kept in the classroom. With these rough sketches as a basis accurate

mechanical drawings are then made on the drawing board. As the student advances, more and more difficult or intricate parts are assigned to him.

The problem course is practically the same as that used for the other trades. The problems, like the drawings, are based on shop practice and company standards. The first ones are very simple, but they gradually grow more difficult. The simple principles of algebra, geometry, physics and elementary mechanics are introduced as they are needed, but are not classified or spoken of as such. Whenever possible suitable apparatus is used to check or to explain the problems more fully. A good

Make all figures carefully. When all answers are filled in, return sheet to instructor for correction.

Go to the laboratory and set up the leverage model for a first-class lever as shown in Fig. 5. Place the stick on the fulcrum block so that a weight of 4 lbs. can be hung 24 in. to the left of the fulcrum as shown. Place the other weight holder 32 in. to the right of the fulcrum and add weights until the stick swings down level and both ends balance.

1. What weight did you add to make the balance? Ans. lbs.

2. Place a 6-lb. weight 18 in. to the left of the fulcrum and add weights to the holder located 24 in. to the right of the fulcrum. How many pounds are needed to balance? Ans. lbs.

3. Suppose we know the weights to be 3 lbs. and 4 lbs., and the 3-lb. weight was 28 in. to the right of the fulcrum. Find by trial how far to the left of the fulcrum the 4-lb. weight should be placed to make the stick just balance. Ans. ins.

General Classroom Problems. Sheet No. 1043.

(Study this sheet carefully and keep it for reference.)

Fig. 6 shows the model arranged for a lever of the third class. A third-

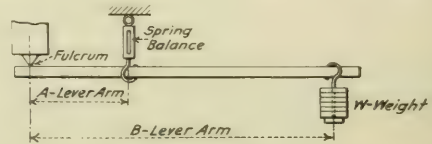


Fig. 6.

class lever like the second class has the fulcrum at one end and the weights pulling in opposite directions. The difference between a third and second-class lever is in the location of the weight and the spring balance.

As with the first and second-class levers the moment of the weight times its distance from the fulcrum must be equal to the moment of the pull on the spring balance times its distance from the fulcrum, when the stick is level and balanced.

The same error in figuring results will be found with this lever as was found with the second-class lever; that is, the weight of the stick and weight holder must be deducted in order to check the results obtained by arithmetic. Suppose that when no weights are on the holder the reading of the spring balance is 3 lbs. (Fig. 6) If we put 4 lbs. on the holder and then find the spring balance reads 11 lbs., this means that we must subtract 3 from 11 in order to get the correct weight, or 8 lbs.

General Classroom Problems. Sheet No. 1044.

Name..... Date.....
(Fill in the spaces left blank in the table below by trying the different weights placed on the leverage model arranged for a third-class lever as shown in Fig. 6. Make proper allowance for weight of stick and holder in each case. Prove the results by arithmetic.)

A	B	W	P
15	30	S	.....
15	60	.....	2
15	24	.....	2
7	35	S	.....
15	60	.....	.....
12½	30	.....	2
14	35	.....	2½
9	27	.....	3
20	60	6	.....
16	32	10	.....

General Classroom Problems. Sheet No. 1054.

Name..... Date.....
(Fill in the answers on this sheet and return to the instructor. Do the work on the blackboard.)

It is plain that with a third-class lever the movement of the points of application of the forces or weights will be the same as for a second-class lever. The diagram of similar triangles will also be the same and we must simply remember in each case whether we want the movement of the point of application or the point of delivery of the power. The only difference be-

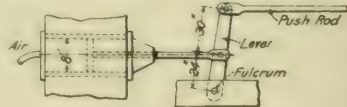


Fig. 7.

tween a second and third-class lever is that in the second class the power is applied farthest from the fulcrum and in the third class the power is applied nearest to the fulcrum.

1. Fig. 7 shows a tender brake rigging operated by an 8 in. by 19 in. air cylinder. If the piston moves 8 in., how far will the push rod move? Ans.

2. Draw the similar triangle diagram for Problem 1 on the blackboard and mark plainly all dimensions and distances moved. (Discuss with O. K.)

3. If the air pressure in the brake cylinder was 90 lbs. per sq. in., what would be the force transmitted by the push rod? Ans.

4. What class lever is this? Ans.

A model is just being completed which will assist the boys in grasping more thoroughly the principles of freight car construction and design. It is a 36-ft. box car built to a scale of 1½ in. to the foot. As shown by the accompanying illustrations, Figs. 8 and 9, one end and one side of the car are only partially finished, showing the construction of the framing of the car in detail. The metal parts are all hammered to shape from brass plate and are exactly to scale. It is planned to secure small truck models and to build a separate model of the foundation brake gear on a larger scale.

General Car Apprentice The East Buffalo car shops also

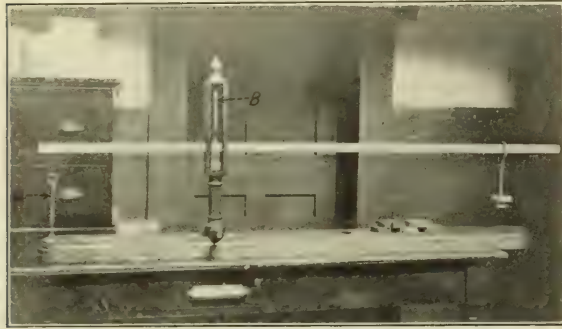


Fig. 1—Apparatus for Demonstrating Leverage Problems.

example of this is the apparatus illustrated in Fig. 1, which was designed at East Buffalo for demonstrating problems in leverage and is an improvement over similar apparatus in use at the other schools. Two small spring balances, A and B, of 15 lbs. capacity, are arranged as shown. These balances may be adjusted to a zero reading. By hanging weights on the end of the stick and adjusting the length of the arms, the reactions at the fulcrum and at the opposite end may be checked with the results of the calculations.

To give some idea of the problem work a few instruction and problem sheets on "Leverage" have been selected at random from different parts of the set and are reproduced as follows:

General Classroom Problems. Sheet No. 1029.

LEVERAGE.

(Study this sheet carefully and keep it for reference.)

By lever is meant a bar of any shape, either straight or bent, which is free to turn about a fixed point called the fulcrum. A fulcrum may be any form of round bearing or stationary prop or support.

Levers are divided into three classes according to the relative positions of the fulcrum and the weights with which they are loaded. In the first class the fulcrum, F (Fig. 2), is between the power, P, and the weight, W.

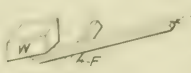


Fig. 2.

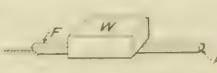


Fig. 3.

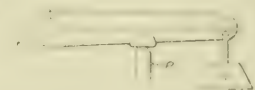


Fig. 4.

In the second class the fulcrum is between the power and the weight (Fig. 3). In the third class the power or force is between the fulcrum and the weight (Fig. 4). In all three classes the fulcrum, the power, and the weight are the same.

Levers may be used to push or pull. Power or force may be obtained in many ways, such as by steam, air or water pressures or through a weight acting downward. In the case of a lever, the power is the force that is applied to the lever, and the weight is the force that is resisted by the lever.

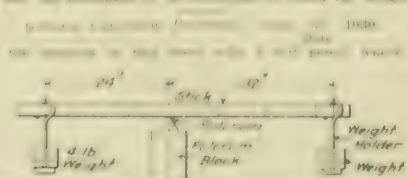


Fig. 5.

have what is termed a general car apprentice. The young man is a university graduate and intends to put in four years studying car repair work. He will spend six months each in the blacksmith shop, machine shop, planing mill, carpenter shop and air brake department. During the last year and a half he will

work is done. The rods are brought in at the end of the shop on a special steel cart for handling car rods shown in Fig. 10. Two men feed the rods to the double shear shown at the left in Fig. 11, while a third man piles the pieces on the cart shown in Fig. 12 and also in Fig. 11, at the same time counting them.



Fig. 8—Model of Standard Box Car for Use in Apprentice School.

assist the foremen, piecework inspectors, etc., becoming familiar with the work done by these men. He attends the apprentice school with the regular apprentices, taking the same work as they do.

MANUFACTURING BOLTS.

A number of improvements are being made in the routing and

One of these carts will hold 5,000 pieces for $\frac{5}{8}$ -in. bolts. The cart is moved to one of the three Ferguson oil furnaces where the rods are heated, after which they are forged in either the 2-in. Blakeslee or the $1\frac{1}{2}$ -in. or 1-in. Acme forging machines. As the heads are forged the bolts are thrown into the bolt cart, shown in Fig. 13. They are then moved down the line to one of

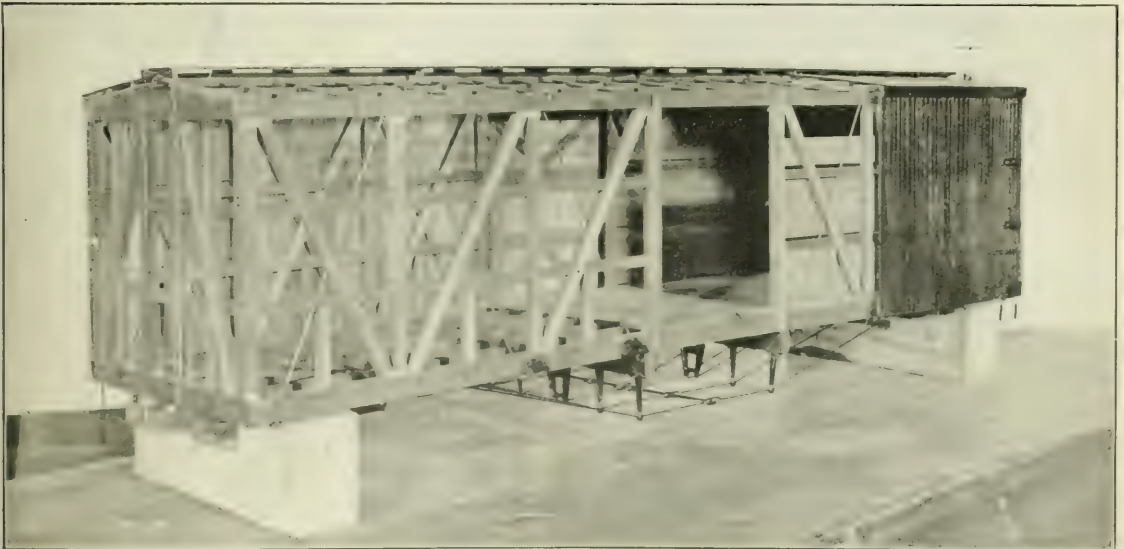


Fig. 9—Another View of Model of Box Car for Use in Apprentice School.

handling of work in the various departments, the most important change being in the manufacture of bolts in the blacksmith shop. To facilitate the handling of the carts in which the bolts are transported in the various stages of manufacture a concrete floor has been laid on the side of the shop where this

the six double head bolt cutters. A large number of bolts are also reclaimed from scrap by cutting them to shorter lengths and rethreading them.

PAINT STORAGE.

Paint is emptied from the barrels into 100-gal. tanks in the

paint storage building. The barrel is grasped at the ends by the hooks (Fig. 14) and is hoisted through an opening in the platform above. A specially designed truck, operating over rails on the platform, is run under the barrel, which is then lowered on the truck, resting on four rollers. The truck is moved over the tank in which the paint is to be emptied and the barrel is

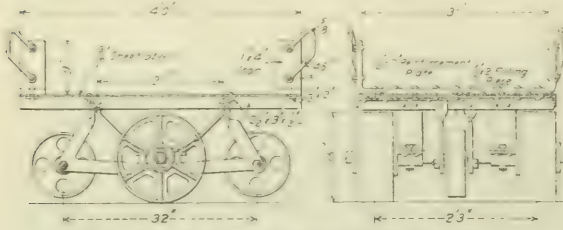


Fig. 10—Steel Cart for Handling Bar Iron.

rolled on the four rollers until the bung is at the top. This is knocked out and the operator, holding a piece of waste over the hole, turns the barrel until the opening is just above the tank when he removes the waste. The air cylinder for hoisting the barrels is 12 in. in diameter and has a stroke of 36 in. The

REPAIRING STEEL CARS.

Only a comparatively small number of steel freight cars are

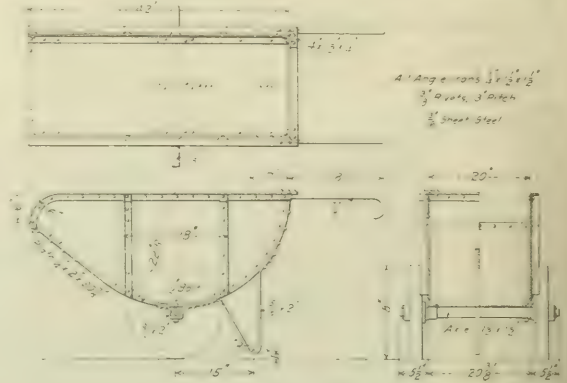


Fig. 13—Bolt Cart.

repaired at East Buffalo and very little special equipment has been provided for this work.



Fig. 11—Partial View of the Bolt Manufacturing Side of the Blacksmith Shop.

platform is 8 ft. above the floor. The paint in the storage tanks is continually agitated, so as to be ready for use at all times, by the introduction of compressed air at the bottom of the tank through $\frac{3}{8}$ -in. holes spaced 5 in. apart in the air pipe.

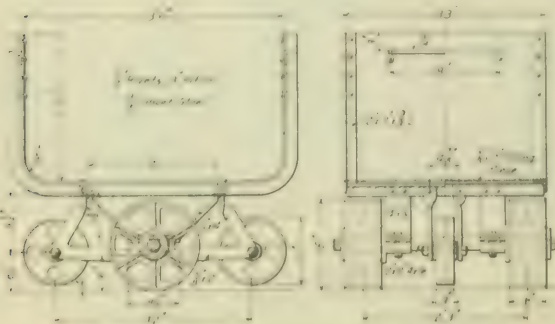


Fig. 12—Steel Cart for Iron Cut to Length for Bolts.

Rivet Heating Furnace. The portable rivet heating furnace (Fig. 15) is somewhat more elaborate than the home made heaters ordinarily used for this work on most roads. The top is 26 x 26 in. in size and the $\frac{3}{8}$ -in. sheet on the three sides is 13½ in. high. The wheels are 16 in. in diameter and the handles are constructed of 1 in. pipe. Draft is provided by coupling to the compressed air line.

Portable Tool Box.—The men engaged in steel car repair work keep their tools in special portable tool boxes, as shown in Fig. 16. They are constructed of heavy galvanized iron, the box or house measuring 33½ in. in length, 2 ft. in width and 2 ft. in height. The door opening is 14 in. square, the door being secured by a padlock when the box is not in use. The wheels are 16 in. in diameter. The tools include cold chisels, sledge and hammer, drills and wrenches; also pneumatic hammers, etc.

CAR DOOR TRUCK.

A simple and handy truck (Fig. 17) is used for handling car doors about the yard. The door sets between the metal guides on the truck and one end wedges between the two parts of the

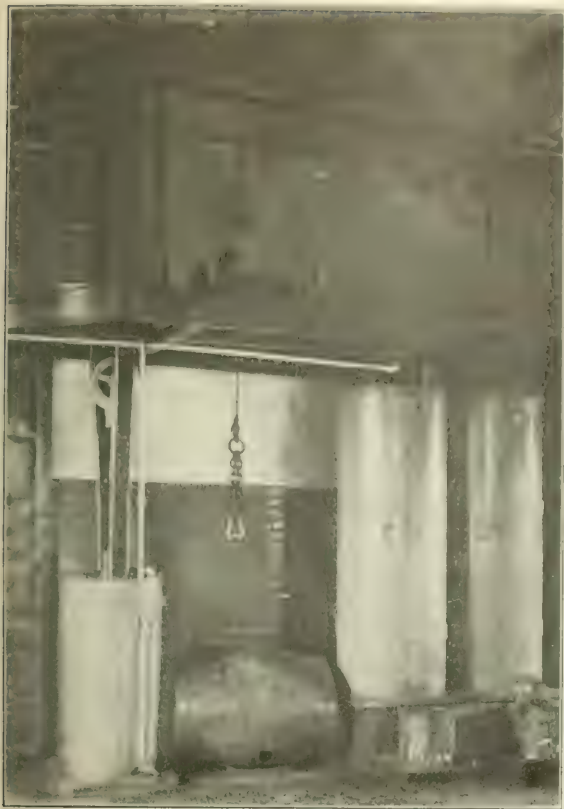


Fig. 14—Paint Barrel Hoist.



Fig. 16—Portable Tool Box for Steel Car Repair Gang.



Fig. 15—Portable Rivet Heater.

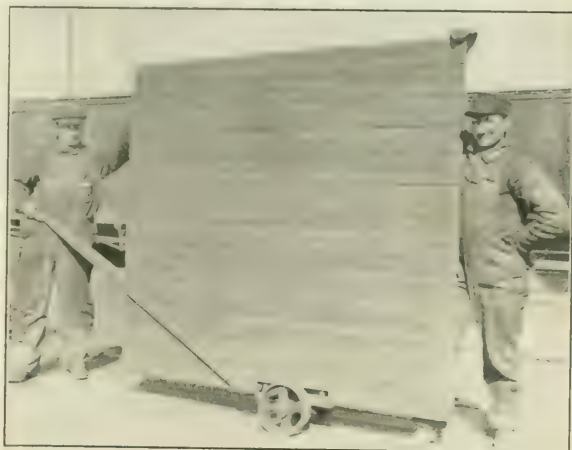


Fig. 17—Box Car Door Truck.



Fig. 18—Cart for Journal Box Packing.

wooden handle. The guides are constructed of $\frac{3}{8}$ by 2-in. iron, as shown, and are bolted to the $\frac{1}{4}$ -in. plate at the bottom, which is 6 in. wide and about $16\frac{1}{2}$ in. long. The wheels are $9\frac{3}{4}$ in. in diameter.

HOPE TRUCK.

A special cart, Fig. 18, is used in connection with the repacking of journal boxes. The wooden box is lined with galvanized iron. The old packing is pulled out of the journal box and

incline with steam pipes underneath, where it remains for about 18 hours while the oil and moisture in it are drained off and the packing is dried out.

GUARD ON VARIETY MOLDING MACHINE.

The most dangerous machine in a wood-working shop is the

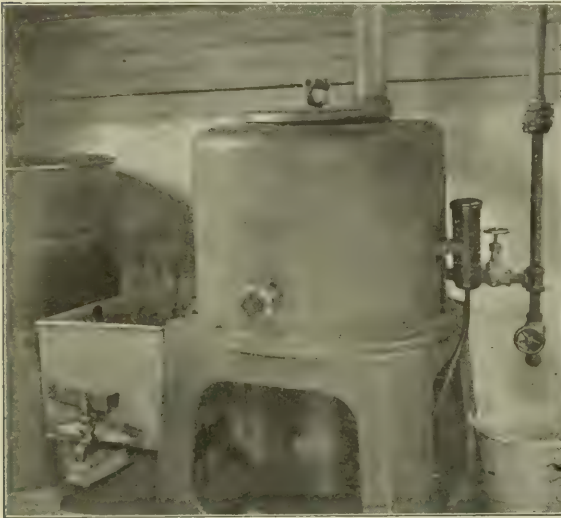


Fig. 19—Machine for Cleaning Journal Box Packing and Reclaiming the Oil.

dumped into one end of the cart; fresh waste for repacking is taken from the other end.

CLEANING JOURNAL PACKING.

Old packing from journal boxes and soiled waste from the shops are cleaned in a machine furnished by the Oil and Waste Saving Machine Company of Philadelphia. The packing remains in the machine for three or four hours. The oil is drained off into the tank at the left of the machine, Fig. 19. After being removed from the machine the packing is placed on an



Fig. 21—Pneumatic Revolving Crane.

variety molder. A pair of safety guards which may easily be adjusted for any class of work and which also act as clamps or guides for holding the work down while it is being passed over the cutter is shown in Fig. 20. This device was furnished by the American Wood Working Machinery Company.

CRANE FACILITIES.

Several portable cranes are used for handling material about the plant. A pneumatically operated revolving crane, Fig. 21, is used for loading and unloading the heavier material such as wheels, trucks, bolsters, etc.

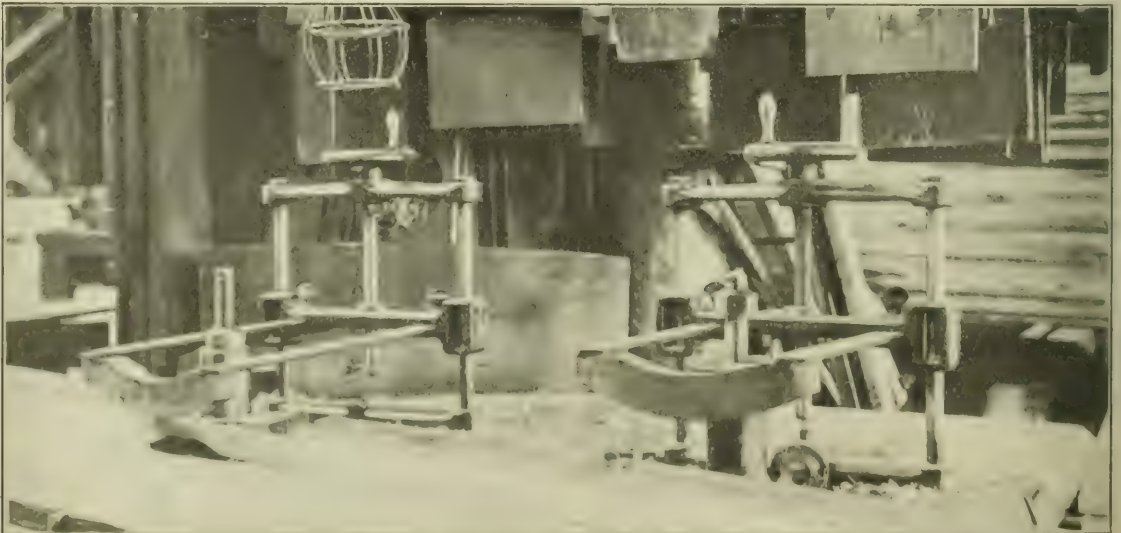


Fig. 20—Safety Guards and Clamps on Variety Molder.

RAILWAY TOOL FOREMEN'S CONVENTION.

The second convention of this association was held at Hotel Victoria, Chicago, July 12, 13 and 14, 1910. The meetings were fairly well attended and a good program was provided, considering the fact that the association was only organized last December. In the absence of the president, E. E. Paswell, formerly of the El Paso & Southwestern at El Paso, Texas, the first vice president, M. H. Bray, of the New York, New Haven & Hartford, New Haven, Conn., presided. The first paper, The Tool Room Check System, was prepared by the secretary, O. T. Harroun, tool foreman of the Chicago & Alton, Bloomington, Ill.; an abstract of it follows:

TOOL ROOM CHECK SYSTEM.

The tool room check system is the only way to keep a correct line on your tools. It is an endless task to inculcate in the minds of help the importance of being ever watchful in order that it will be known at all times just who has the tools. The most rigid discipline does not always prevent errors from creeping in. The tool room must have the co-operation of the gang foremen and the office in this matter. It is important that all tools be returned to the tool room every night. Where men leave the tools on the job over night some of them find their way to the night roundhouse men's private kits and never get back to the tool room. The tools disappear one by one. It would be well to have every man in both back shop and roundhouse open up his cupboard for inspection once every six months. I have known some rich hauls to be made under such circumstances. You can attribute the absence of a lot of tools to selfish gang bosses. Often one tries to outdo the other and encourages the men to "cop" tools for his gang. The only way to overcome this very unpleasant practice is to have all tools returned to the tool room every night before quitting time. It is a money saver, but it is hard to convince the management on this subject because of the time it takes to bring them in.

I have, in a large glass case, every man's name and number and a corresponding number with a pin for checks so the helpers can bring in the tools and the checks can be placed on the man's number and returned to him when calling for tools the next day. I divide the different men in groups; the machinists from 1 to 300, boiler makers beginning with 400, etc. Get the general foreman to understand that the tool room is the barometer of the shop rather than a non-producer. By being able to produce a tool with despatch when it is called for, time and labor are saved and money is earned for the company. When a man leaves the service he must have a tool clearance or he cannot get his time.

Discussion.

One of the members stated that at his shop each mechanic and helper was given six checks. All tools are supposed to be turned in every Saturday night. If not, on Sunday morning the man in charge takes the numbers of checks against which missing tools are charged and turns them over to the gang foremen, who advise the men as follows: "You will have to square yourself with the tool room or quit work."

Each man gets a set of small tools when he is employed. We have a printed form, giving the list of tools, which each man has to sign before he goes to work. When he quits he turns his tools in. If they are not all returned the missing tool is checked off and he must settle the matter at the office.

W. J. Eddy (Erie):—All the tool rooms on our system are under the general direction of a tool room supervisor. We give each man six checks when he goes to work; he signs a receipt for them and agrees to pay 25 cents for every check he loses. The tools are issued from the tool room in the ordinary way and have to be turned in every evening. If they are not the man's check and name are sent to the general foreman's office and in the morning he is not permitted to go to work, but is given one hour to explain why he did not turn the tool in, and is compelled to turn it in before he starts to work. When a

man quits, he must have a tool room clearance signed by the tool room foreman, before he is given his back.

TREATMENT OF HIGH SPEED STEEL.

August Meitz, tool room foreman of the Pere Marquette at Grand Rapids, Mich., in discussing the treatment of high speed tool steel.

Steel is often burned in making tools to such an extent that it is practically worthless. In the hardening process this same difficulty is frequently experienced: The blacksmith often brings the point to a dripping heat, and then puts it under an air blast pressure of 100 lbs., or thereabouts, which many times results in a portion of the point flying to pieces, and the remaining portion resembling a lump of cinder more than a tool point; when the machinist gets the tool he is compelled to grind from fifteen to thirty minutes to bring it to a proper point, but in most cases the tool is then too blunt to be used very long. If the tool dresser would harden the steel in oil, he would have much better results. As milling cutters, drills and reamers are machined the edges must not be burned, but the steel should be heated to a bright, almost white heat, and dipped into oil; then it should be taken out quickly and brought under a sharp air blast. This I have found to be the best process of hardening air hardening steel to keep the shape and edge, as in ordinary shops there is no pyrometer to regulate the temperature, which should be about 2,200 degrees Fahrenheit.

Discussion.

E. J. McKernan (Santa Fe): The Topeka tool room has an electrical furnace and an American gas furnace for high heat and preheating. With the Blue Chip steel we get the best results at 2150 deg. Fahr. We preheat to 1400 deg. Fahr. Then when you place it in the electrical furnace it is pretty well soaked through and absorbs the high heat; when you drop it in the barium chloride, you can let it stay as long as you want to. The air in the compressed air lines contains a certain amount of moisture which cracks the tools. Since we have taken the blast from the blacksmith shop we have had no trouble.

O. T. Harroun (C. & A.): I have been getting beading tools from the blacksmith shop, which were invariably so hard that my tools would not hold up in working on them. I told the master blacksmith he would have to devise some means of getting these tools so I could work them. Within the past two weeks he brought me a piece of steel and said: "Well, I have devised a means of stopping your kick on the annealing of high speed steel." He used the scale that comes off of the forgings at the big hammer. It was put in the box with the work in it and then placed in the furnace.

Question.—Doesn't it carbonize any?

Answer.—I do not know; I have not ground any of it.

H. Derby (Santa Fe): I have tried something along that line. I put the steel in the furnace; bring it up to a red heat and put it in a pipe full of pine sawdust. Put it in the center of a box and seal it up with fireclay and let it cool off.

Mr. Robinson: Take a piece of pipe of sufficient size to accommodate the steel; screw a cap on one end; fill up with sand; stuff the tools down in the sand; screw the cap on; put it in the furnace and let it heat up. You can pull it out if you want to use the furnace for anything else, or you can leave it in the furnace over night. Take it out the next morning, and you will find it well annealed. We have not noticed any difference in the steel after being annealed this way; it seems to do the same work and lasts just as long. I think the whole secret is to keep air from it.

Mr. McKernan: We have used the sand, but it must not have any moisture in it.

Mr. Bray: At New Haven we use slack lime. We heat our high speed steel to a dark red; at the same time heat two pieces of flat iron to a white heat and place the high speed steel between them before placing in the lime.

TOOL ROOM PRACTICE ON THE SANTA FE.

E. J. McKernan, tool room supervisor of the Santa Fe, described the practice on that system, as follows: The tool room is of as much importance to the railway shop as the arsenal is to the army. Without the arsenal the army would be practically helpless, and the same may be said of a railway shop without a well regulated tool room equipped with the necessary supplies. In order that we may reduce the cost of locomotive repairs and increase the output of the shops, it is necessary to have a complete and up-to-date tool room, wherein we can keep our tools to a standard and be able to manufacture all special tools required, such as are not furnished by manufacturers. A large amount can be saved by having all tools manufactured at one central point. Better supervision as to the need for tools and use of them can be had than is the case when they are manufactured at every point on the system. By concentrating the manufacture of all small tools at a central point a large amount of material which is usually carried at local shops for the manufacture of tools is eliminated, and charges for this material are correspondingly reduced. Machinery which is necessary for the manufacture of these tools in outside shops will be released from that work and may be used for other purposes or be transferred to points where it can be advantageously used.

A careful study should be made of the local requirements, and in place of allowing the different shop or tool room foremen to manufacture tools according to their own notions and ideas, they should be made at the central shop, according to carefully selected standards, and in an efficient and economical manner, after the best modern methods and practices. A large saving in the cost of small tools can be effected by standardization. The manufacture of special tools, devices and jigs, by shop or tool room foremen at the local shops should be discontinued and whenever any employee designs a special device or tool which he and the local master mechanic think to be advantageous or to possess merit, it should be submitted to the central plant where, if its manufacture is found warranted, it can be made standard for the system and be manufactured at the central plant. By the concentration of the manufacture of shop tools at a central point, which possesses facilities for doing this work, the tool room forces at the outside or local shops can be reduced fully one-half.

This plan has been practiced on the Santa Fe for the past five years and has resulted in a substantial reduction in the cost of tools. Each shop and roundhouse is furnished with a stock book in which they enter all the tools on hand, and also what they consider will be required for the coming month. This book is sent to my office with requisitions covering the tools required, and the books are checked against the requisitions. If it is found that the requisitions are proper, they are approved and forwarded to the storekeeper for necessary attention.

No tools are carried in any of the division storehouses, all of them being furnished from the central storehouse. We have standardized all the tools on the system and carry them in large quantities at the central storehouse. All lathe and planer tools of the various sizes are made up and carried in this central stock, and are given symbol numbers for convenience in ordering, which avoids difficulty in specifying sizes required when placing requisitions.

CARE OF PNEUMATIC TOOLS.

J. H. Simons, of the Ingersoll-Rand Company, made the following suggestions as to the care of pneumatic tools: It is doubtful if any piece of machinery gives a greater profit on its investment or cost than a pneumatic hammer or a pneumatic drill kept in good working condition, yet it is equally doubtful if there is any piece of high speed machinery so much abused by neglect to properly clean, oil and renew worn parts, which condition retards the full admission of air to the ports and rapidly wears down the efficiency and capacity of the tools. In pneumatic tools, as in all other high speed machines, the rapidly moving parts will wear in time: the pistons, ball races, balls, thrust

valves, etc., in pneumatic drills, and the throttle levers, bushings, valves, pistons and cylinders in pneumatic hammers; when the wear is sufficient to prevent the full and free admission of air, or allows the escape of air by leakage past a worn part, it reduces the efficiency, and the part, or parts, should be renewed. If this is done, the machines will maintain their efficiency indefinitely.

Operators seem to think that a pneumatic tool should run and develop its full power so long as all the parts are held together, without any regard to cleaning, oiling or tightening up. They should be thoroughly cleaned with kerosene or benzine once every twenty-four hours. A good plan is to thoroughly clean by pouring benzine or kerosene freely into the throttle handle. This dislodges all foreign matter and cuts the thick oil which can be removed by blowing the air through the tool under pressure; then lubricate in like manner with a good quality of light body oil. Sewing machine oil or a winter strained lard oil is good. Heavy oil should never be used on pneumatic hammers or piston type drills, as they cause the tools to work very sluggishly, with consequent loss of power. Heavier oils should be used on the rotary type of drills.

When pneumatic tools are not in use, a good plan is to keep them immersed in kerosene. They should be suspended so that the dirt and foreign matter will settle to the bottom of the vessel, and should then be thoroughly blown out and well lubricated before being put into operation, as kerosene leaves them dry.

We advocate the use of strainers on the tool and filters in the pipe line, arranged so that they can be readily taken apart and cleaned. A good form of pipe line filter is two cast flanged pieces properly tapped and threaded to fit the pipe line, bolted together, with a piece of gauze or fine mesh wire screen between. There are also sundry makes of automatic oilers for pneumatic tools which are placed in the hose line a short distance from the tool and which can be refilled at any time without disconnecting the tool from the hose. They are made in sizes to supply oil for from six to eight hours without refilling.

Another abuse, especially with regard to pneumatic riveting hammers, is a rapidly increasing tendency on the part of operators, particularly where the hammers are used in the construction of steel cars and in structural steel shops, and more especially where "hunky" labor is employed, to use pistons shorter than those adopted by the makers as standard. This is the most flagrant abuse to which a riveting hammer can be subjected and cannot be too strongly condemned. The riveting hammer is designed with parts properly proportioned to meet the requirements of the various classes of work to which it is adapted. Workmen have discovered that a shorter piston than the one furnished with the hammer increases the number of blows per minute and for a time facilitates their work. They usually make these pistons by grinding down a broken standard piston, thus removing the hardening in a large degree and leaving the striking part softer than it should be. These short pistons have a tendency to crumble and the broken parts cut the inner casing of the cylinder; if it is not damaged beyond repair from this cause, it is only a question of a short time when the cylinder will crack or the handle break. When cracked cylinders, broken handles and broken rivet sets are found the hammer should be carefully examined to ascertain whether or not the workman has substituted a short piston. This check can only be made when the hammer is in service as it has been found that the workmen carry the short pistons with them and make the exchange after taking the hammer out of the tool room, replacing the proper piston when returning the hammer at the close of the day.

A large industrial organization, operating some eight or ten plants, inaugurated a system about a year ago for keeping a thorough inspection and record of pneumatic tools from the day of purchase until they became obsolete or worn out. A record is kept of every item of repair made to a tool and a

report filed showing why the repairs were made necessary, that is, whether from abuse, lack of care, tool from natural wear and tear, or accident. The mechanical engineer in charge of this recently informed me that in looking over the report for the first six months he was greatly surprised to find that about 30 per cent. of the repairs could be directly attributed to neglect in cleaning and oiling and about 15 per cent. to the use of inferior hose.

Pneumatic tools should have between 90 and 100 lbs. of air to get the best results. The Canadian Government will not accept steam-tight rivets driven with pneumatic hammers unless they are operated by 110 lbs. air pressure.

In conclusion, allow me to offer a few suggestions applying to all makes of pneumatic tools, which, if followed, will insure more and better work from your equipment and will obviate delays and annoyances and minimize the expense of maintenance.

See that the tools are well cleaned and oiled before putting them in operation.

See that the pipe lines are thoroughly blown out before connecting the tool.

Use the best quality of air hose. It is cheaper and more satisfactory in the long run.

See that the pipe lines are provided with filters or that strainers are used with the tools, preferably both.

With drills, adjust the ball-bearings where they are provided so as to take up the lost motion, and be sure that they are firmly held by the lock nuts to prevent working loose or tightening up and binding when in use.

Be sure that the handle of pneumatic hammers is always on tight as the tools may be seriously injured by allowing it to work loose. This controls the joint between the handle and valve box and is of great importance.

See that the operators hold their riveting and chipping hammers firmly against the work. If the die or chisel is allowed to play in and out of the hammer while in operation, it will seriously damage the tool. Every blow should be delivered on the die or chisel and not on the forward end of the bridge of the cylinder in chipping hammers. With riveting hammers which have no bridge in the cylinder it often means the loss of the die and piston by being shot out of the tool.

See that the chisel and rivet sets fit properly in the nozzles and are of proper length, otherwise there is an opportunity for loss of power and injury to the tool.

Discussion.

E. J. McKernan (Santa Fe):—In our main shop they have a kind of a sub-tool room where all the air hammers, hose and various boiler maker's tools are kept, because the boiler shop is in an off-set of the main erecting shop, and we do not want the men to cover any more ground than necessary to get the tools and return them. The man in charge of this tool room is a boiler maker's handy man. He has a vat that is filled with coal oil, which is emptied in the evening on account of the insurance, and he soaks all the hammers in it. Before each motor or hammer is turned out it is thoroughly oiled, regardless of how many times a day. No. 1 is given out and Jones has it an hour or two, it gets oiled again. A man goes around and oils up the tools which are not turned in during the day. It has prolonged the life of hammers two to one.

TOOL ROOM PROGRESS.

M. H. Bray, of the N. Y., N. H. & H., in speaking on tool room progress, said in part: The installation of pneumatic tools made it necessary for the tool foreman to put on his thinking cap and work out new tools for use with these machines. All boiler work, such as cutting out and expanding flues, breaking staybolts to replace fireboxes and cutting off rivets, had been done by hand, but with the use of pneumatic drilling machines and hammers, it is now possible to cut out a set of 308 flues in sixty-five minutes, and expand them in five hours, where in

the past it was necessary to take from four to five times as long.

At about the time that pneumatic tools were installed, the first forged tools of high speed steel were tried out, chiefly of the large sizes used for turning steel tires. The results from this steel were so much better than from that formerly used that the smaller sizes for lathe and planer use were installed; with the use of this steel most shops put in a universal tool grinding machine, for grinding all tools used for turning, planing and slotting. It is customary now to have the operator of the machine keep on hand a sufficient supply of these tools ground to a standard shape, that experience has taught was best for the class of work it was to be used on. The use of this machine has done away with the custom of each man going to blacksmith to have a tool forged and grinding it himself. Now he has only to return broken or worn out tools to the delivery window of the tool room and receive a new tool correctly ground and hardened. At present the tool checking system is the hardest proposition to keep straightened out.

The tool room now has modern machinery, such as universal milling machines, lathes, shapers and grinders. The majority of the drills and reamers are made of high speed steel, as are the milling cutters and forged tools. Practically all small repair work on machines throughout the shop is done in the tool room, most of the special tools for use with compressed air are made there, and in many of the shops all taps, reamers, dies of different kinds and drills are made and compare very favorably with the purchased article.

The equipment of the future tool room should be of the best, and the room should be located in a well lighted part of the shop. The disbursing of tools must be done in a quick, orderly manner; all arguments in regard to tools should be decided by the tool foreman. The tool foreman should see that all tools such as reamers, drills, etc., are not abused, and in fact should have complete charge or oversight of the tools under all conditions. The tool checking system must be reorganized, so that it will be impossible for any workman to receive a tool without a check or receive his check for a lost tool.

Other Papers.—An extensive and practical paper on the making of spur, bevel and worm gears was presented by H. E. Blackburn. A paper on special tools was prepared by F. W. Luggen of the Big Four.

Demonstrations.—W. V. Young, of the Hoskins Manufacturing Company, Chicago, had been asked to prepare a paper on the heat treatment of steel. As his office was only a few blocks from the hotel the meeting adjourned to it, and a practical demonstration of the electric furnaces and the use of the pyrometer was given. Mr. Young mentioned the experiments performed by C. P. Berg, which were described in a paper before the Western Society of Engineers (see *Railway Age Gazette*, July 1, 1910, page 31).

A trip was made to the demonstrating plant of the Firth-Sterling Steel Company to study the treatment of Blue Chip high speed steel. On the last afternoon of the convention several of the members visited the plant of the Independent Pneumatic Tool Company at Aurora, Ill.

Election of Officers.—The following officers were elected for the ensuing year: President, M. H. Bray, tool room foreman, New York, New Haven & Hartford, New Haven, Conn.; first vice-president, E. J. McKernan, tool supervisor, Atchison, Topeka & Santa Fe, Topeka, Kan.; second vice-president, John Fuhrman, tool room foreman, Great Northern, St. Paul, Minn.; third vice-president, G. Gestoettner, tool room foreman, Chicago, Milwaukee & St. Paul, Milwaukee, Wis.; secretary-treasurer, O. T. Harroun, tool room foreman, Chicago & Alton, Bloomington, Ill.; chairman executive committee, J. W. Pike, Rock Island Lines, Silvis, Ill. The next annual meeting will be held in Chicago.

Suppliers' Association.—The suppliers' association was composed of the following companies, most of which had exhibits in the writing room of the hotel: American Specialty

Company, Carborundum Company, Chicago Pneumatic Tool Co., Crucible Steel Company of America, Faessler Manufacturing Co., Firth-Sterling Steel Co., Independent Pneumatic Tool Co., Ingersoll Rand Tool Co., Joseph T. Ryerson & Son, Niles Bement Pond Co., Scully Steel & Iron Co., Standard Railway Equipment Co. and The Midvale Steel Co. The officers were: W. H. Dangel, president; H. L. Mills, secretary; E. C. Cook, treasurer.

FLANGELESS SHOES AND WEDGES AND REMOVABLE SIDE MOTION PLATES ON DRIVING BOXES.

In a paper on "Locomotive Frame and Driving Box Construction," presented at the recent convention of the Master Mechanics' Association (see *Daily Railway Age Gazette*, June 22, 1910, page 1747), H. T. Bentley, assistant superintendent of motive power of the Chicago & North Western, said: "Flangeless shoes and wedges should be used to overcome the trouble experienced with flanges breaking. To facilitate the lining down of wedges, arrangements should be made so that they can be removed without disturbing the binders or underhung springs; the wedge bolts should be of sufficient strength and so arranged that in case of breakage it will be an easy matter to replace them."

Flangeless shoes and wedges were first applied on the Chicago & North Western in May, 1907, and have proved so successful that they are now being placed on all new Atlantic and Pacific type and consolidation locomotives used by that company. They were designed and patented by Charles Markel, shop foreman at Clinton, Iowa, and are especially valuable in connection with the Markel removable driving box bearings, which were illustrated and described on page 1365 of the June

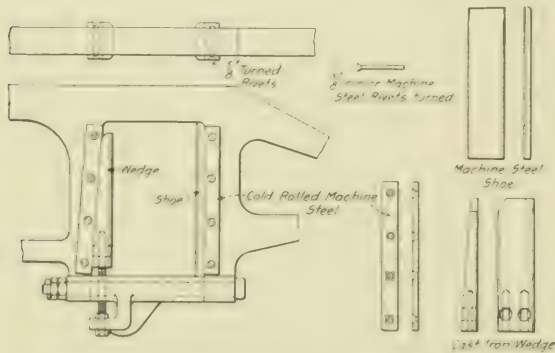


Fig. 1—Details and Application of Markel Flangeless Shoes and Wedges.

3 issue of the *Railway Age Gazette*. The details and the application of the Markel flangeless shoes and wedges are illustrated in Fig. 1. The side plates are of cold rolled machine steel and are riveted to the frame jaws by $\frac{1}{4}$ -in. hot rivets. The only work required on these plates is to cut them to the proper length, drill the holes and rivet them to the jaws. When they become sufficiently worn to require renewal, duplicate plates may easily be applied. The wedges are flat pieces of cast iron and may be machined at one-eighth the cost of the flanged wedge. The shoes are machined steel and only require machining on one side.

The principal advantages of the device are as follows:

No flanges on shoes or wedges to crack or break. Wedges may be readily adjusted, as there are no flanges to stick to the sides of the frame jaws. Shoes can be made from bar machine steel and will only require cutting off to length. Wedges can be machined for one-eighth the labor cost for the standard

wedges. This arrangement provides $1\frac{1}{2}$ in. more bearing to the shoes and wedges on the jaw faces, which is quite an advantage.

A standard wedge for an Atlantic type locomotive costs \$3.07 and the flangeless wedge costs \$1; the standard shoe costs \$2.34, while the flangeless shoe costs \$1.50. This makes a saving of \$3.91 on one shoe and wedge, or \$15.64 on the shoes and wedges for an engine with four drivers. As there are no flanges to crack and break the shoes and wedges will last for years by applying liners to take up the wear on the boxes. The cold rolled steel plates that are riveted to the frame jaws cost for labor and material on an Atlantic type locomotive \$4.75. It takes five hours to line down one standard flanged wedge at a labor cost of \$2.80. Only one hour is required to line down the flangeless wedge at a labor cost of 56 cents, or a saving of \$2.24 in lining down one wedge. This saving is due to the fact that it is only necessary to remove the wedge bolts, and to take out the wedge; it is not necessary to take down the binder, binder bolts or other parts of engine.

A jig for drilling the side plates is shown in Fig. 2. It is

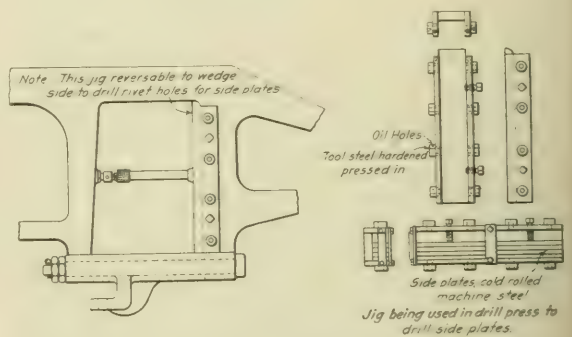


Fig. 2—Jig for Drilling Side Plates and Frame Jaws.

made from one of the standard shoes, it being only necessary to drill holes in the flanges and fit them with hardened steel bushings. Four side plates can be placed in the jig and drilled at one time; the same jig can be used on the frame jaws for drilling the rivet holes. The drawing shows applications of the jig for both purposes.

The arrangement by which the wedge may be removed by simply removing the wedge bolt and without taking down the binder, or disturbing any other part of the locomotive, is illustrated in Fig. 3. Part of the flange of the driving box is re-

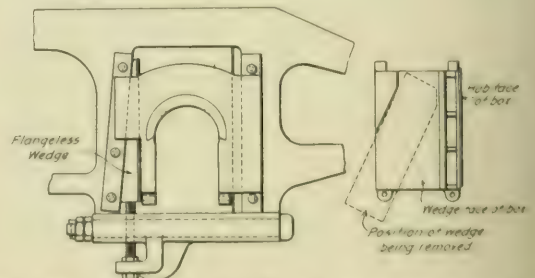


Fig. 3—Driving Box Used with Flangeless Shoes and Wedges.

moved on the inside on the wedge side. As there is no wear on the inside flanges of the driving box the partial removal of the flange does not effect its efficiency. It also leaves a free opening so that the wedge can easily be inspected to see if it is properly adjusted. The eccentrics on the main axle do not interfere with the removal of the wedge. The flangeless wedge

may be lined down in one fifth the time required for the standard wedge.

REMOVABLE SIDE MOTION PLATES FOR DRIVING BOXES.

The removable side motion plates for driving boxes, designed and patented by Mr. Markel, are shown in Fig. 4. Plates of this kind have been in use on the driving and truck boxes of an

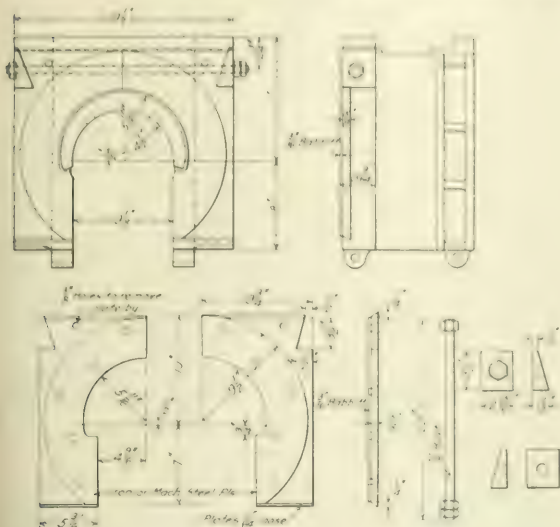


Fig. 4—Removable Side Motion Plates for Driving Boxes.

Atlantic type locomotive since December 1, 1908, with splendid results. Since that time the plates have been renewed on the left main box twice at an average cost of \$1.12 for labor and \$1.20 for babbitt, or a total of \$2.32. Two hours were required for doing the work. The plates may be removed and applied without disturbing any other part of the locomotive; it is only

the plate. The plates are made of cast steel and are 100,000 lb. each, except the upper and the lower and buffer box.

The board at the top and the bottom of the plates is cut off and the sides are made interchangeable by the use of the dovetail in Fig. 5. By using the plates for six driving boxes may be finished at the same time. Babbitt, one-quarter of an inch thick, is then sweat on the hub faces of the plates, after which they are faced to the proper thickness. The dovetail is placed in the driving boxes to fit a gap, making the boxes interchangeable. The motion plates fit loosely so that they may be applied by hand. The driving box is cored to take the bolt which holds the plates in place. The bevel blocks or washers are of cast steel and are machined and drilled on jigs shown in Fig. 5. The bevel block at the left, Fig. 4, has a cavity $\frac{1}{4}$ in. deep into which the hexagon head of the bolt fits to prevent it from turning while the nuts are being tightened and loosened. The cost of applying these plates to one box is as follows:

	Material.	Labor.	Total.
Two cast-steel plates.....	\$0.66	\$0.20	\$0.86
One bolt .....	.10	.05	.15
1 lb. washers .....	.20	.10	.30
Planing box .....	...	1.14	1.14
Total cost			\$2.45

As stated before, it costs \$2.32 to take up the side motion in one box equipped with this device. With the standard equipment it costs five or six times as much, including the cost of dropping the drivers, and keeps the engine out of service about 15 hours as compared to 2 hours with the removable plates. Excessive side motion will not be allowed on engines equipped with the removable plates, because of the ease with which it may be remedied, and breakages of other parts of the locomotive due to this cause will thus be obviated.

HOW THE FOREMAN CAN PROMOTE SHOP EFFICIENCY.

BY W. H. SNYDER,

Assistant General Foreman, New York, Susquehanna & Western, Stroudsburg, Pa.

The first step in improving shop efficiency is to have a proper organization. A good system of management has been defined as a means of causing men to co-operate for the cause of both employer and employee. In shops where foremen do not co-operate with each other the shop efficiency will be sure to suffer.

Staff Meetings.—At our shops the master mechanic and general foreman have established staff meetings; at a stated time the foremen are all called together and the question of shop efficiency is thrashed out from tip to toe; also the question of economy as to the saving of material, the proper methods of doing and handling work, the necessity of close inspection of work, etc. These staff meetings bring out a great many good points and add greatly to the shop efficiency.

Employment.—After the supervision is properly organized the next important question is the kind of men to employ. The various industries must compete for the best men and boys or else take the ones that are left over; any shop wanting to hold a high standard in efficiency must have skilled mechanics and good boys. They must not only be well trained, but well treated, or they will naturally drift into a more congenial shop—if one is to be found. It is human nature to secure the most comfort and the best treatment possible. What we need are men that are interested in the shops' success; conditions are changed as to shop methods, but the value of real interest means a great deal in shop efficiency, and when you have men who say "we" and talk about "our shop," it means more than one can realize.

The Apprentice.—A careful study and selection must be made when hiring apprentices. Many shops are earnestly and honestly trying to get apprentice boys that are active and show an interest in learning a trade, and they train them to be a credit to the trade and shop. The question is where to get the boys that will take the interest in their work and their employer, and work faithfully to do their best to learn and make a good showing in

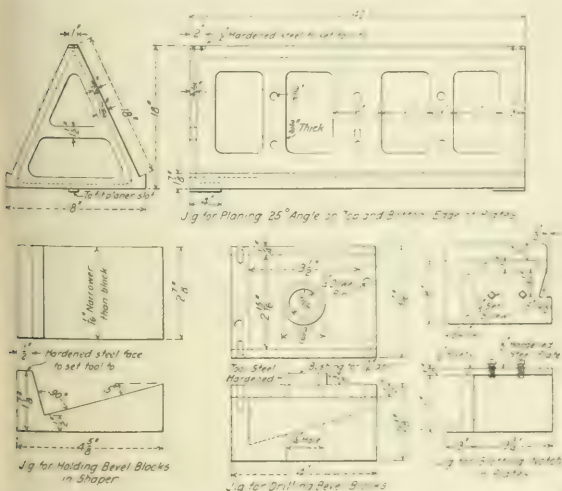


Fig. 5—Jigs for Finishing Removable Side Motion Plates and Bevel Blocks.

necessary to remove the nuts on the stud bolt with a socket wrench, after which the plates may be removed by hand by sliding in the dovetail groove from the center outward. After the plates are rebabbitted and faced to the proper thickness they are reappplied in the same manner. The tapered washers at each side of the plates force both plates tightly against the dovetail groove at the top of the box and hold them rigidly

both quality and quantity of output. Every shop takes pride in making good workmen as well as good mechanics, and there is no trouble with boys of this kind when you can get them.

The apprentice boy that will come to work at seven o'clock in the morning and at eight o'clock is at his dinner pail lunching, watching his boss, and waiting and looking for quitting time an hour or so before the time for the whistle to blow may just as well step down and out and give some one else a chance, for he is only a detriment to the shop efficiency.

The active apprentice is always noticed and watched by his foreman, and when the opportunity comes for advancement the best one is chosen. It is true that we cannot all have good positions, such as master mechanic, superintendent, general foreman, etc., but it is also true that there are times when a foreman is to be appointed and the man that has shown the most interest and has been the most active during his apprenticeship gets the preference.

Machinery and Tools.—The output of any shop is largely dependent on the machine shop, so it is important that the installation of machines be thoroughly investigated, and that the most powerful machinery be installed. In a shop where the machinery is already located the work will have to be carefully sorted out and the machine that is the best adapted for certain work should be assigned to do it. The heavy work must be taken to the heavier machines and the lighter work to the lighter ones, etc. Shop efficiency depends largely on the management of the machine department, and very often by the use of a special device excellent results have been obtained from the oldest machine in the shop.

Quality of Tool Steel.—After the machines have been properly arranged and equipped with the best facilities and shop kinks that can possibly be obtained, the question of tool steel comes up. There is nothing that will keep down machine output more than a poor grade of steel. In the purchasing of tool steel for machines such as lathes, planers, slotters, etc., the best grades should be used in order to keep the machines up to their maximum capacity. If you will stop and consider the time that is lost in a shop trying to use a poor grade of steel and the time that is required for a tool dresser to dress and keep it up, and the amount of steel that is wasted each time that a tool has to be dressed, you will find that a poor steel is the most expensive in the long run. After a tool is dressed it has to be taken to the tool room for grinding; a great many shops do not have the facilities for grinding in the tool room and the machine hand has to grind his own tools. The more trouble he has in keeping up his tools the more it will interfere with his efficiency. It is also important to use a good grade of steel for hand chisels, flue beading tools, boiler punches, rivet sets, etc., as these tools are expensive in their construction, especially the flue beading tools and rivet sets, and it does not pay to have high-priced tool-room men spend their time making tools of a poor grade of steel.

Special Devices.—The installation of special devices is becoming an important factor in shop efficiency, and the *Railway Age Gazette* deserves great credit for the competitions it has conducted so successfully the last few months. The special devices and kinks that are brought out by the competitions are of great value to any shop foreman. They give him, without any effort on his part, the benefit of years of experience and labor of mechanics from all over the United States, and I am sure that eventually a great many of these devices will be used generally, and by their use will add much to shop efficiency.

The use of fuel oil has greatly reduced shop costs in many ways. The use and introduction of oil furnaces has saved much labor in the handling of work from one shop to another, as heretofore flues, water bars, etc., had to be carted to a certain place where a forge was located, in order to have them annealed or swaged. In removing and applying locomotive driving wheel tires by the use of fuel oil the cost has been reduced about half at this shop. Also by the use of the same burner the cost of welding locomotive frames has been reduced to about one-half. Instead of taking the frames down and carting them to the

blacksmith shop to be welded, the frame is prepared and heated with a burner using crude oil. This saves the cost of removing the frames. The same burner is also used for straightening frames when locomotives come in with their front frames bent.

OXY-ACETYLENE WELDING AND CUTTING.

BY WILLIAM G. REYER AND R. W. CLARK.

General Foreman and Boiler Shop Foreman of the Nashville, Chattanooga & St. Louis, at Nashville, Tenn.

Side sheets can be successfully welded in a locomotive firebox in a comparatively short time and with very little trouble if the work is properly done. Provision must be made for contraction when the weld cools off. The cutting of the opening for the patch in the firebox should be done with a pneumatic hammer and not with the blowpipe, as in the latter case the steel will oxidize where it is cut and it will be difficult to make a successful weld. The sheet and the patch should be trimmed with a bevel such that when the patch is set up ready for welding the two sharp pointed edges will touch and an opening or V will appear leaving an angle of 45 deg. between the two edges of the sheets (Fig. 1). To allow for contraction

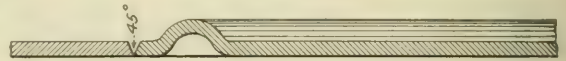


Fig. 1—Partial View of Patch About to Be Welded to the Side Sheet.

of the patch a U should be formed near its edge, as shown in Figs. 1 and 2, and projecting on the same side as the open side of the V formed between the edges of the two sheets. This can be made on a press, or under clamps or with a fuller. On a $\frac{1}{8}$ -in. sheet, for instance, the U depression should be about $\frac{1}{2}$ in. deep with a radius of about $\frac{1}{2}$ in. While the weld is cooling off the U should be hammered down with a pneumatic hammer. The U must, of course, project toward the fire side so that it may be hammered. In putting on a patch it is best to apply the staybolts before welding. Splendid results have

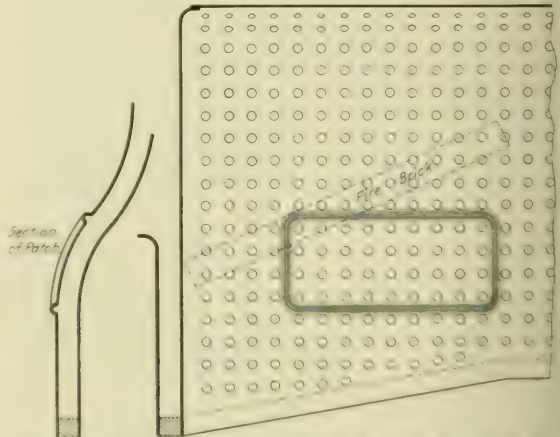


Fig. 2—Showing Patch Welded on Firebox Before U Was Hammered Down.

been obtained in making a large number of welds in this way, some of them directly under the arch on high pressure boilers.

The welding torch should be kept clean. If too much oxygen is used the metal will oxidize and will not weld. To get a perfect weld in applying a half side sheet form a U along the top of the sheet. In welding a fire door flange where the sheet is cracked in the knuckle of the flange, do not cut out any more of the door sheet than is necessary, keeping the weld as near the turn of the flange as possible, thus leaving it free to contract without putting much stress on the weld. If this can-

not be done it will be necessary to use a U. S. Standard process. It is good practice to hammer on the back of the flange after welding.

Cracks develop in the firebox that can be welded partially and, again, there are cracks that cannot be welded satisfactorily. For instance, if a crack in the knuckle of the flange runs the long way of the flange, it can be cut with a diamond point chisel and a good weld can be made. If the crack is around the knuckle of the flange it is useless to try to weld it, as there is no way to provide for contraction and the tearing out of the

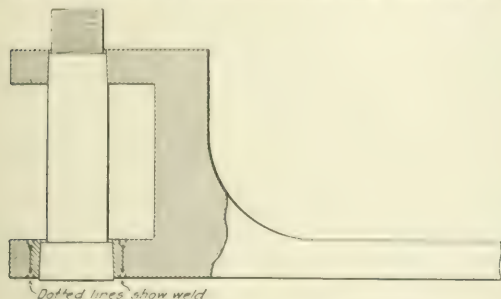


Fig. 3—End of Eccentric Blade Repaired by Oxy-Acetylene Welding.

weld will pull apart. Where the crack is in the center of a side sheet, we have never been able to make a successful weld; the first effort to weld a crack in a side sheet caused no end of trouble; the crack extended 12 in. from one staybolt to another, taking in three staybolts. It was cut out with a diamond point tool and apparently welded very satisfactorily, but after the weld cooled off it was found that the next row of staybolts had developed a similar crack—the contraction had pulled the sheet apart in the weakest place. The new crack was cut out and welded and after cooling a similar crack developed which opened $\frac{1}{2}$ in. We continued to weld one crack after another until the first weld made had broken. We tried to

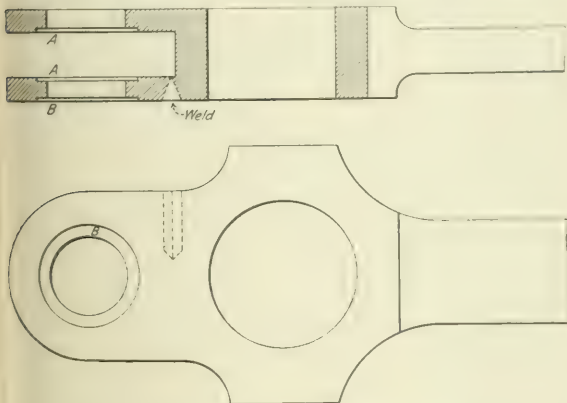


Fig. 4—Damaged Jaws on Rods Which May Be Repaired by Oxy-Acetylene Welding.

weld it again but found it impossible to make a successful weld because of oxidation. We cut out the bad place in the sheet and applied a patch, which proved entirely satisfactory.

This process is not only convenient and reliable, but is economical for welding links, link lifters, link blades, intermediate ends on side rods, crossheads, driving boxes, reverse levers, quadrants, guide yokes, driving wheels, driving wheel tire flanges, Leeds coupler, channels on tank truck frames, lubricators, frame braces. For cutting purposes it cannot be excelled. When engines come into the roundhouse with badly cut

driving blades at the pin hole, it is the practice to remove the link out, countersink it on both sides and to place a bushing in position, as shown in Fig. 3, and weld with the oxy-acetylene torch. The V's indicated by the dotted lines are 45 deg. and about $\frac{1}{4}$ in. deep. The hole is then reamed to standard size. Before we installed the oxy-acetylene plant it was necessary to apply a new end to the eccentric blade, which, under the best conditions, would consume eight to ten hours, whereas this work is now done in one hour.

We experienced trouble with our knuckle bushings and washers wearing into the rods, thereby weakening them. We now weld these worn places, restoring them to original thickness. The jaws, in one case, were worn at A and B (Fig. 4) and cracked at the point indicated by the arrow. Rods scored,

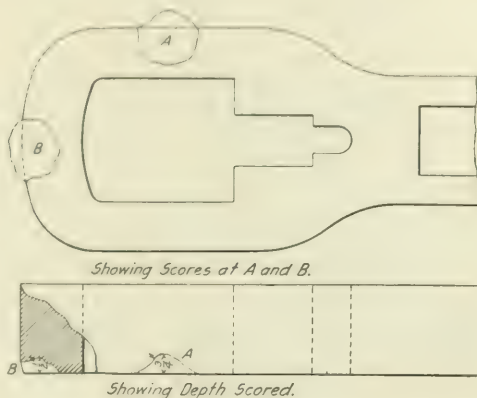


Fig. 5—Scored Connecting Rod Repaired by Oxy-Acetylene Welding.

as shown in Fig. 5, are also easily repaired by welding on material.

The top of the flanges were cut on the tires of a derailed engine, as shown in Fig. 6. Under former practice it would necessitate reducing the tire $\frac{3}{4}$ in. in diameter. With the oxy-acetylene process the tire, which was practically new, was repaired and put in first class condition at a cost of \$1. To have turned the tire, reducing it $\frac{3}{4}$ in. in diameter, would have cost \$7.06, and in addition we would have lost $\frac{3}{4}$ in. of tire wear. We reclaim any number of quadrants and latches by building up the worn teeth, thus effecting a large saving. On steel driv-

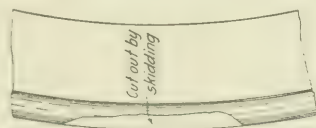


Fig. 6—Steel Tire Cut by Skidding and Reclaimed by Oxy-Acetylene Welding.

ing boxes where the cellar bolt wears the hole oblong we drill a larger size hole and countersink it. A plug is driven in and welded. The hole is then drilled to the original size. We build up reverse levers to proper size when they become worn from the latch. Where we find guide yokes cracked we chip out the crack and weld it with oxy-acetylene, thereby economizing in both labor and material. Front end couplers on locomotives crack in different places and are condemned by the inspectors. We weld these cracks successfully. We have likewise reclaimed a number of fractured channel beams. We have also welded tool holders, staybolt taps, shafts, carpenter chisels, bits, hammers, adz, and iron pipe, including branch pipes, dry pipes and air pipes of all sizes.

A piece of shafting 122 in. long and $4\frac{1}{2}$ in. in diameter, used in connection with the hoisting engine of a yard crane was badly

worn, as indicated in Fig. 7. A new shaft would have cost \$25. The shaft was turned down at the worn part and a sleeve was made with the inside diameter corresponding to the diameter of the part turned down and the outside diameter to the full diameter of the shaft. The sleeve was cut to proper length to

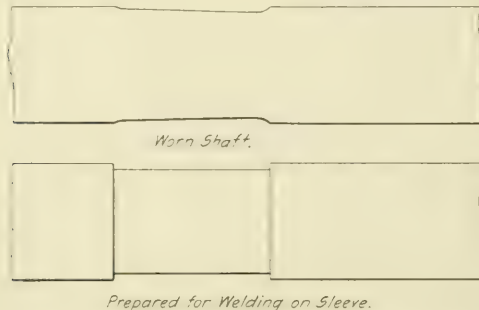


Fig. 7—Worn Shaft Which Was Repaired by Oxy-Acetylene Welding.

fit between the shoulders and then split in two halves and welded on the shaft. A little filing finished the job. The cost of repairs did not exceed \$1.50. The success of the work lies in the skill of the operator, and this can only be acquired by practice and careful study.

OPERATION AND ORGANIZATION OF THE EAST ALTOONA ENGINE HOUSE, PENNSYLVANIA RAILROAD.*

BY WILLIAM FORSYTH,
Associate Editor, *Railway Age Gazette*.

The most interesting example of American engine house practice is that in the classification yards of the Pennsylvania at East Altoona, Pa. Here the traffic from three divisions of the road is concentrated, classified and despatched. The freight tonnage passing through this terminal is claimed to be the largest handled by any single system of freight yards in the world. The total capacity of the yards is 10,500 cars. During the month of November, 1909, the engine movement at this engine house was as follows:

Average number of locomotives despatched east and west in 24 hrs. 243
Maximum number despatched in 24 hrs. 300
Maximum number despatched in 1 hr. including switch engines. 40

The trains are operated by consolidation locomotives, and on account of the grades on the eastern slope of the Allegheny mountains westbound trains require three locomotives, two in front and one as a pusher. Eastbound, the line follows a comparatively light gradient along the Juniata river, and here large trains can be handled by one consolidation locomotive. There are 35 switch engines, requiring 70 engine crews for day and night operation. During the month of November, 1905, there were handled over the ashpit a total of 6,497 engines. The number of men employed in the yards during the month averaged 1,012, and the number of men employed about the engine house, shops and coal wharf and on the motive power roll was 700. Near the center of the length of the terminal is located a large engine house, with ashpits, coal wharf, sand supply, a good-sized machine shop, storehouse and office with bunk rooms overhead; also a power house, a fan house for heating, an oil house, and toilet and locker house.

THE ENGINE HOUSE

The engine house is in diameter and cross-section the largest structure ever erected for this purpose. It has an exterior diameter of 395 ft. and a 100-ft. turntable. There are 52 stalls 90 ft.

deep. The main portion of the house is 65 ft. wide and 30 ft. high. On the outer circle there is a lean-to 25 ft. wide and 18 ft. high. The engines head in toward this lean-to and the smoke-jack is located alongside the main columns at the outer portion of the main building. The main portion of the house was made 30 ft. high to accommodate a traveling crane, but columns for supporting the crane have not been erected, as jib cranes secured to the main columns were found more desirable. There are four drop tables, operated by electric motors, two of them for driving wheels, one large table for all wheels except the engine trucks, and another for pony truck wheels.

The coal wharf is a large structure arranged with a trestle approach having a grade of 3.88 per cent. The coal is dropped from hopper cars directly into bins, and no cover is provided for the cars, as they are emptied entirely by gravity, and no men are employed in the unloading. A special gate and hood are used for regulating the flow of coal from the pockets to the tender. A steel gate drops below the floor of the pocket, and is operated by a compressed air cylinder. At one end of the coal wharf is a sand house, where sand is dried in large stoves and descends through a grating to a reservoir, from which it is elevated by compressed air to the sand bins overhead, and flows by gravity to the engines.

Near the approach to the coal wharf are four ashpits, each 240 ft. long, two on each side of the wharf incline. Each pair is operated by an overhead 5-ton electric crane which spans four tracks, two of them over the ashpits for ash cars. Ashes are dumped from the engines into steel buckets which run on wheels on a track in the ashpit. These buckets are elevated by the crane and transferred to the ash car, where they are dumped. Beyond the ashpits at the extreme end of the coal wharf are inspection pits, 80 ft. long and 3 ft. deep, and connected by an underground passage extending under the coal wharf track.

The work performed in an engine house includes almost everything in connection with locomotive repairs that does not require the locomotive to be sent to the general repair shop. No attempt will be made to itemize these repairs. The work which must invariably be performed periodically consists of boiler testing every six months; boiler washing, from once a week to once a month, as necessity arises; staybolt testing each week; examination of smoke-box, draft arrangements and ash pans each week; testing steam and air gages each month; washing tenders each month; gaging height of pilots each week; gaging tank water scoops each trip; testing air brakes each week; draining main reservoirs each week.

Reporting and Performing Daily Work.—When a locomotive arrives the first information the organization receives as to work necessary is in the engineer's report, which he delivers at the inspection pit when the locomotive is turned over to the inspectors. Five inspectors are here employed, as the work must be done thoroughly in a minimum amount of time, so that the hostler can move the locomotive to the ashpit and make room on the inspection pit for other locomotives waiting. One inspector examines the underpart of the locomotive and tender; one on each side inspects the outside parts, such as driving wheels, rods, steam chests, guides, crossheads and Walschaert valve gear; there are two air-brake inspectors, one to operate the brake valve and inspect the fittings in the cab and the air pump, and the other to inspect all other parts of the air and sanding equipment.

All defects found by the inspectors are entered upon regular blanks and transmitted, together with the engineer's report, to the gang leader in charge at the inspection pit, who decides whether it is necessary to send the engine to the house or whether the repairs are so slight that they can be made on the outside repair pits in connection with the outbound storage tracks. His decision is marked upon the report, and upon the steam chest of the locomotive, and the reports are forwarded to the work distributor's office by pneumatic tube in 45 seconds. This saving in time over the 10 minutes ordinarily required by messenger is a decided advantage to the work distributor, as he

*From a paper of "Locomotive Inspection," presented at the annual meeting of the American Society of Mechanical Engineers and the Institution of Mechanical Engineers, Birmingham, England, and London, July 25 & 26, 1910.

is able to assign the work to various gang members and have the necessary material ordered before the locomotive enters the fire house or on the repair track.

While the inspectors are at work, the lamps and fuses are filled and trimmed by two lamp fillers. There is no further necessity for the engine house force to open the tool boxes, which are locked by the engineer and the keys supplied with his time card, are delivered to the engine despatcher at the foreman's office. The engineer is thus relieved of all responsibility outside the care of the locomotive.

The engine moves from the inspection pit to the ashpit, where the firebox, ash pan and smoke box are cleaned. It then moves to the coal wharf, where the tender is filled with coal, and a little farther on reaches the sand house, where it receives a supply of sand and water. It then moves into the engine house or to the outbound storage tracks, as necessity requires. If it goes to the engine house the track number and the time of arrival are reported by telephone by the turntable motorman to the work distributor, who by this time has the work which was reported by the inspector and engineer subdivided and assigned to various gangs. After completing the work these gangs report the locomotive ready for service to the engine house office, where arrangement is made for the movement of the locomotive to the storage siding to await assignment to a train. If the locomotive does not go to the engine house it is moved directly from the sand house to the storage siding, and the necessary work is assigned to a gang located on the storage tracks to make light repairs, after which the locomotive is reported ready for service.

Engine Tracing.—At East Altoona there are sometimes as many as 200 locomotives within the engine house jurisdiction, and it was found necessary to inaugurate some efficient method of locating them exactly at all times, so that men sent to make repairs will have no difficulty in finding any particular locomotive required. This is accomplished by telephone. Each time a locomotive moves to another locality the engine tracer in the foreman's office is advised as to where it came from and where it has been delivered, giving the number, the location on the track and the time in each case. When traffic at East Altoona is normal the engine house must deliver ready for service one locomotive every five minutes during the whole 24 hours of the day, as the engines for three divisions are here concentrated. It is vitally important that everything should run in absolute harmony, as any interruption in this rapid flow would quickly result in a congestion on the road.

Engine Despatching.—After the engine tracer has been advised that a locomotive is placed on the storage track for service, he informs the engine despatcher, to whom the crew callers report. The engine despatcher is also in touch with the yardmaster, and is the middle man between the engine house foreman and the yardmaster. As soon as the yardmaster receives information that he needs a locomotive and crew for a certain train of a given class at a certain time, he advises the despatcher, who immediately calls out a crew, and when they arrive assigns to them the locomotive selected, which is standing on the outbound storage track. The houses of the engine men have been equipped with telephones connected with the engine house office, an arrangement which dispenses with messengers and enables the crews to be called promptly.

The fireman usually arrives first, and after receiving his time card and keys takes charge of the locomotive, relieving the engine watcher of any further responsibility, and immediately prepares a fire for road work. The engineer, upon arrival, after receiving his time card at the engine house office and inspecting the bulletin board to read any new orders, goes to the locomotive and oils the machinery, and then waits until he is given the proper signal to move out of the storage yard. The crews are usually called in sufficient time to prepare the locomotive properly for road work prior to leaving the storage track.

Organization of Staff.—For the operation of this locomotive terminal an elaborate organization has been worked out, based upon the principle that none but the heads of sub-departments

should receive any positive instructions from the foreman. The foreman is the work distributor. The responsibility of supplying material and the supervision of the workmen are placed directly upon these gang leaders, who are foremen of their respective gangs. Certain questions of discipline must be handled by the foreman personally, but questions relating to rates of pay, transfers, discipline, etc., ought to originate with the gang leaders, and their duties are not confined to giving out work to the men after the distributor has assigned it. This results in successful operation, and it also gives some dignity to the position of gang leader, and at the same time relieves the foreman of petty details.

The foreman of a large engine house should not be an ordinary shop man, but should have some outlook over and interest in the operating department. He should be a good disciplinarian, commanding the respect of his men, should display clear judgment and form conclusions quickly. He should be a good all-round organizer, and capable of taking care of business promptly during rush hours. He should know how to make brief and intelligent reports and possess mechanical ability. He should be broad-minded enough to recognize that there is a commercial side to transportation, and should not be overburdened with office work. His assistants should possess sufficient ability to decide what work may be slighted or not done at all, and a locomotive still be safe to make one or more round trips.

The engine house foreman receives from the division master mechanic instructions pertaining to such matters as the number of men required, rates of pay, discipline, maintenance of his entire plant, and standards. He receives from the division superintendent instructions relating to crews and despatching of locomotives, and carries out such discipline of the engine crews as may be imposed by the division superintendent through the road foreman of engines. He must co-operate with the road foreman of engines concerning the condition of power and its performance on the road, and the amount of coal and oil consumed. He must carry out orders issued by the road foreman of engines concerning the assignment of locomotives and crews. At East Altoona the engine house operation is a continuous one throughout the day and night, and the night force is practically the same as the day force.

Reporting directly to the engine house foreman are the *assistant day foreman* and *assistant night foreman*. Reporting to assistant foremen for office work are the *first clerk*, who takes all the foreman's and the assistant foremen's dictation, and the *second clerk*, who has charge of all messengers and ordinary clerks who may be engaged in computing the time and earnings of the men and in getting together all the information required by the master mechanic's shop clerk and for properly keeping the records. Next in order is the *engine despatcher*, to whom report the *engine tracer*, the *callers* and the *clerks* who keep the records of engineers and firemen of locomotives arriving and departing. The engine despatcher marks up the crew board, issues time cards to engine crews going out, and accepts and approves them upon their return.

Next in order reporting to the assistant foreman are the various *gang leaders*. First is the gang leader in charge of the machine shop. The work of his men is confined to machine and vise work, and they are not called upon to leave the machine shop and make repairs in the locomotive shop or storage yard except in cases of emergency. Their work is chiefly preparing and fitting the repair parts which the engine house employees apply to the locomotives. The gang leader in charge of the blacksmith shop has charge of all smiths and helpers, as well as the forces of flue welders and laborers in the engine house engaged in piecing flues and preparing them for locomotive boilers. The gang leader of the power plant has full charge of stationary engineers and firemen, electricians and wiremen. Another gang leader has charge of the ordinary helpers and sweepers in the engine house, who keep the shop property clean.

The foreman in charge of all employees actually handling locomotives, from the time they arrive at the terminal until they

are turned out, also of all workmen engaged in the engine house or storage yard, is called the *work distributor*. Clerks reporting to his two assistants receive the engineers' and inspectors' work reports and copy the work required on slips of paper numbered consecutively and properly dated. These slips are then delivered to the gang leaders of the men who perform the work.

The men composing the gangs working on a piece work basis are divided into pools of three or four men, with leaders. The *pool leaders* are under the direction of gang leaders. When the earnings of three or four workmen are pooled it is found that each man is determined that the others should perform their fair share of work, and in case one man fails to do this the remainder insist that the lazy or careless workman be taken out of their pool.

The gang leaders at the inspection pits are in charge of inspectors, lamp fitters and engine preparers, who handle the locomotives between the inspection and ashpits.

There are three assistant gang leaders in charge of the engine preparers. Assistant No. 1 has charge of all work in cleaning fires and placing the locomotives in the engine house or storage yard and of the ashpit men and crane operators who load cinders. Assistant No. 2 has charge of the coal gagers and sand house men, turntable operators and men engaged in handling locomotives from the engine house to the storage yard. Assistant No. 3 has charge of the men handling locomotives in the storage yard and despatching them when ordered for service, including engine watchers, switchmen and engine timers.

Next reporting to the work distributor is the gang leader of boiler washers, whose men wash out the tenders, blow out, wash, fill and fire all boilers, and watch locomotives until they are removed from the engine house. Next is the gang leader of staybolt inspectors, whose men test staybolts and examine fireboxes and tubes. There is a gang leader of boiler makers, engaged in renewing tubes and staybolts, patching, testing and calking tubes, and general boiler work. A gang leader of engine cleaners has charge of men cleaning locomotives and tenders. There is a regular schedule for doing this work, and it is so arranged that the work is performed when the locomotives are receiving staybolt repairs or boiler washing. A gang leader of spongers is in charge of packing journal boxes and other work relating to lubrication. In the engine house there is a gang leader of machinists, who are engaged in setting valves, renewing packing and all other general machinist work on the locomotive proper. The gang leader of tank repairs is in charge of repairs to tenders, frames, tanks and couplers, of renewing truck wheels, and other tender repairs. The gang leader of air-brake repair men keeps in order the air brakes and sanding equipment. The gang leaders of men on piece work should have not more than ten or twelve men under them, with the exception of the gang on boiler work.

EXPERIMENTAL MALLET ARTICULATED LOCOMOTIVE.*

BY G. I. EVANS,
Chief Draftsman, Canadian Pacific.

A Mallet articulated locomotive was designed and constructed by the Canadian Pacific during 1909, embodying some original features which, in addition to its being the first of its kind on that road, made it, as stated above, an experimental locomotive. The object of this paper is to briefly describe some of the details of its construction and tests made on it, and what it is doing in regular service. As the locomotive was to be used in pushing service in the Rocky mountains, it was necessary that it should traverse curves of at least 15 deg. and have comparatively high tractive power. Following are the general dimensions and data for the locomotive:

Length	99 ft. 0 in.
Coal	40 cu. yd.
Water	100 cu. ft.
Weight	262,000 lbs.
Tractive effort	27,400 lbs.
Weight on driving, working order	262,000 "
Weight, total in working order	262,000 "

Weight of engine and tender, working order	391,000 lbs.
Weight on drivers + tractive effort	4,570 "
Tractive effort X dia. drivers + equivalent heating surface	975 "
Equivalent heating surface + grate area	975 "
Weight on drivers + equivalent heating surface	77 "
Wheel base, front engine	10 ft. 4 in.
" " rear engine	10 ft. 4 in.
" " total engine	35 ft. 2 in.
" " engine and tender	60 ft. 7 in.
Cylinders, diameter and stroke, high pressure	34 in. X 26 in.
Cylinders, diameter and stroke, low pressure	34 in. X 26 in.
Valves, diameter and kind, high pressure	11-in. piston
Valves, diameter and kind, low pressure	12-in. piston
Driving wheels, diameter	58 in.
Driving axles, size	Main, 9 1/2 in. X 12 in.; others, 9 in. X 12 in.
Boiler, kind	Radial stayed, wagon top
Pressure	200 lbs.
Firebox, length and width	80 in. X 69 1/2 in.
" thickness of sheets	3/4 in., 1/2 in., 3/4 in. and 1/2 in.
" water spaces	Sides, 4 1/2 in.; throat, 5 in.; back, 3 1/2 in.
Tubes, number and diam. in front section	281, 2 in. O.D., and 12, 2 1/2 in. O.D.
" length in front section	86 in.
" number and diameter in rear section	289, 2 in. O.D.
" length in rear section	109 in.
Heating surface, tubes	2,605 sq. ft.
" firebox	180 "
" total	2,785 "
Superheating surface	430 "
Equivalent heating surface	3,415 "
Grate area	58 "
Tender tank, kind	Semi-water bottom
" frame sills	Centre, 13 in.; sides, 10 in.
" trucks, kind	Equalizer
" wheels, size	34 in.
" axles	5 1/2 in. X 10 in.
Water capacity	5,000 Imp. gals.
Coal	12 tons

*Equals total heating surface + superheating surface X 1.5.

Construction, General.—Reference to the drawings shows that there is considerable difference between this design and other locomotives recently put into service on American railways. The most striking difference is in the arrangement of the cylinders, the shortness of the front bumper or footplate, and the position of the superheater. The absence of front and back guiding trucks is also noticed. This arrangement of cylinders, whereby the two pairs are brought together near the center of the locomotive, permits of an extremely simple pipe arrangement, cutting out a number of packed expansion joints, everyone of which is a continual source of trouble through leakage. The removal of the cylinders from the front also permits of shortening the overall length of the locomotive, and, as locomotives of this type are very long, every foot possible must be saved to permit of their being taken into existing roundhouses. Provision has been made for changing the piston packing rings by simply removing the front cylinder heads, disconnecting the main rod from the crosshead, and pushing the piston out into the space between the two cylinders. The piston valves have also been taken care of in a similar manner, so there can be no objection to this arrangement on account of inaccessibility.

Boiler and Superheater.—The boiler is of the wagon top type, as shown in Fig. 2, is radially stayed, and has an unusually small front ring and smokebox. There are three separate compartments in the barrel, the front of which is practically a feed-water heater, and, owing to its small diameter, is full of water all the time. The injectors discharge into this compartment, which is connected to the boiler proper by two equalizing pipes 4 in. in diameter, one of which is located on the side center line and the other on the top. The second or middle compartment is for the superheater, which consists of double loops of 1 1/4-in. seamless steel tubing dropped down into the path of the hot gases from the firebox. There are 69 of these superheater elements. One end of each connects to the saturated header, which takes steam from the boiler, and the other connects to and discharges into the superheater header, which is connected direct to the high pressure cylinders. When the locomotive was first turned out the superheater was connected to the low pressure cylinders, but, from tests made subsequently, it was changed as described. The reasons for this are explained further on. Two 3/4-in. blower pipes are so located as to blow jets of steam diagonally across the superheater compartment through the tubes to bring down any soot.

There is no steam in the superheater pipes when the throttle is closed, but no cases of burning out have developed after about four months' service, nor is any trouble anticipated, as this condition applies, although to a lesser degree, to other

*A paper presented before the Canadian Railway Club, Montreal.

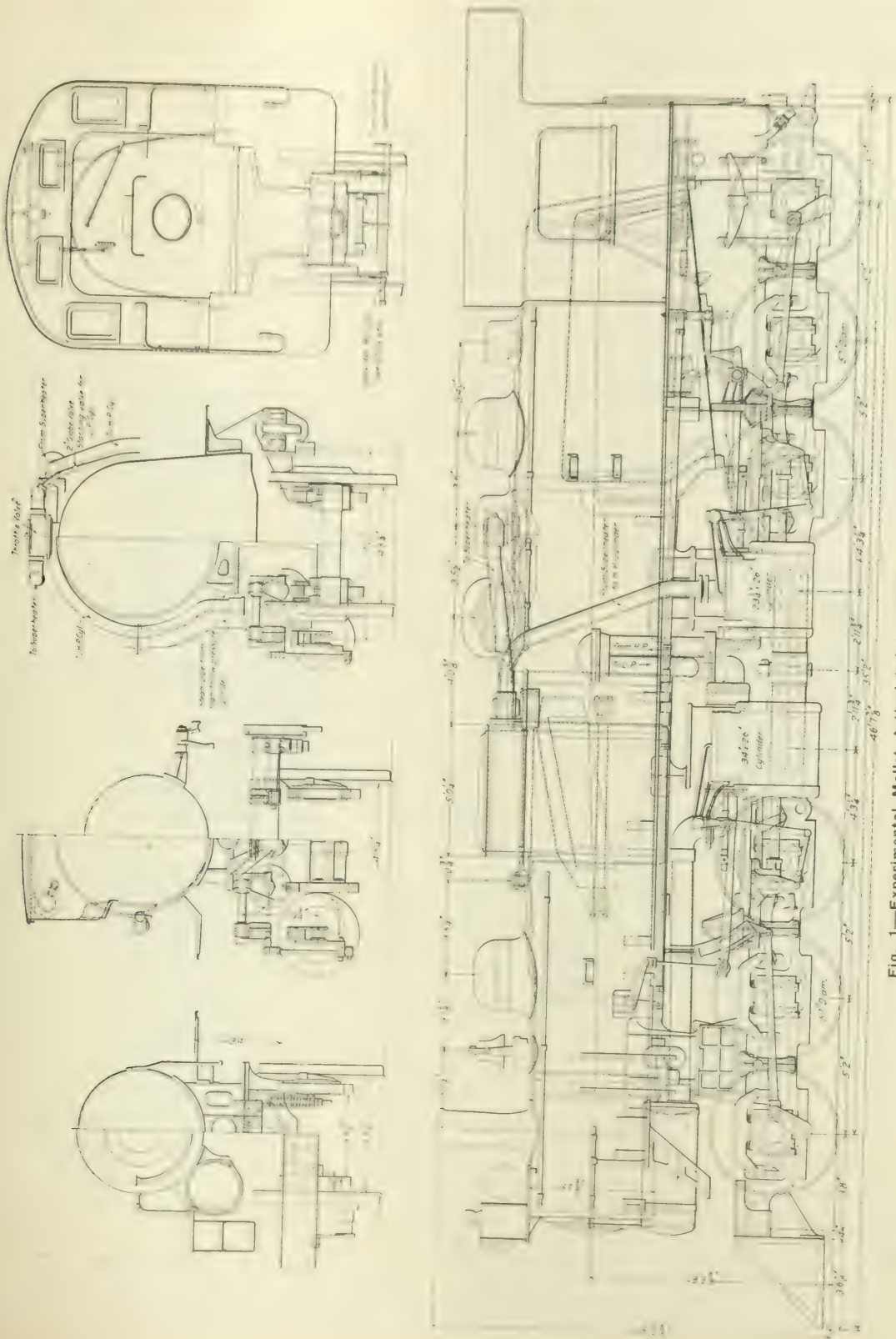


Fig. 1—Experimental Mallet Articulated Locomotive, Canadian Pacific.

types of superheaters which are giving good service. The superheater pipes are secured to the headers by union nuts and are readily removable for repairs, one element at a time, through the opening at the top of the boiler, which is closed by a flanged steel door. If necessary, the complete superheater, header and tubes may be lifted out bodily.

The back compartment is the boiler proper or steam generating section and the construction is similar to ordinary boilers, except that the radii on the corners of the firebox, both inside and outside, are larger than usual to decrease the rigidity of the sheets and reduce staybolt breakage.

There are four flue sheets in the boiler and two sets of flues. The front set is 96 in. long and the back 109 in., with a 63-in. superheater compartment between, and although cleaning holes have been applied underneath, it is seldom found necessary to use them, all cinders being carried through by the action of the draft.

The front section of the boiler is really a feed-water heater, and has 281 tubes 2 in. o.d. and 12 tubes 2½ in. o.d., giving 1,230 sq. ft. of heating surface, leaving 1,555 sq. ft. in the steam generating section (tubes and firebox). The measure of steaming capacity of this locomotive, as expressed by the

T.P. (max.)

formula $\frac{\text{T.P. (max.)}}{\text{H.S. (Total)}} \times \text{dia. drivers}$, is shown in comparison

with others of a similar type in the following table, and, as the Canadian Pacific locomotive has a superheater, the equivalent heating surface has been used:

Road	Builder	T.P. (max.)	H.S. (total)	x diam. drivers
Can. Pac.	Can. Pac.	975	975	
B. & O.	A. L. Co.	715	715	
Gr. N. (excl.)	B. E. W.	813	813	
Gr. N. (incl.)	B. E. W.	690	690	
Ex. & C.	A. L. Co.	910	910	
B. N. W. & P.	A. L. Co.	773	773	
Can. Brazil	A. L. Co.	913	913	

It might seem that the Canadian Pacific locomotive would not steam satisfactorily. This, however, is not the case, as an inspection of the boiler pressures in Figs. 9 and 10 will show.

The injector check valve is located on the top center line of the boiler, and consists of a cast-iron body, with connections for the right and left hand injectors, and a third connection suitable for a pipe or hose coupling, which is used for filling or blowing off the boiler.

Throttle, Steam and Exhaust Pipes.—The throttle valve is located on the top of the boiler, outside, and consists of an iron casting having two 5-in. steam pipe connections, one on either side. The joint to the boiler is made by a brass ball ring, having an opening 12¼ in. in diameter. The throttle casting extends down through this and connects to a cast-iron dry pipe, which takes steam from a dome set further forward on the same course. The arrangement of this is shown clearly on the boiler drawing, Fig. 2. Outside steam pipes lead from the throttle to the saturated header of the superheater and steam, after passing through it, goes directly to the high-pressure cylinders, also through outside pipes, which are heavily lagged to prevent condensation, as are also the pipes from the throttle. This portion of the piping is, of course, all high pressure, but no special importance attaches to it, as there is no movement in the pipes, the high-pressure engine being attached rigidly to the boiler. There is therefore no chance of leakage if the joints are properly made.

The steam exhausts from both high-pressure cylinders into a common header or receiver bolted over the ends of the steam chests, this header connects by a 7 in. pipe to a similar one on the low-pressure cylinders, which connection, however, must be flexible, as the movement of the front truck begins to affect the piping at this point, and to minimize its effect the connection has been placed directly over the pivot point of the front truck.

The exhaust pipe between the two headers extends upward about 6 ft., which was done to give sufficient volume, and this pipe, down to the point where it enters the low-pressure header, is braced solidly to the boiler and the connection which bolts to the low-pressure steam chest rotates about it, due to the move-

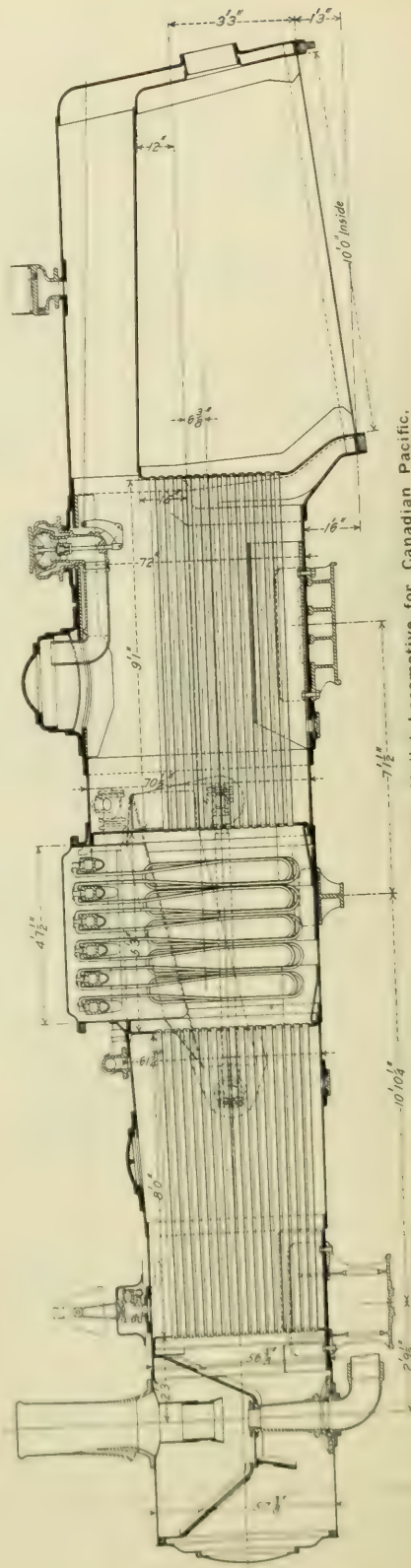


Fig. 2—Boiler and Superheater, Mallet Locomotive for Canadian Pacific.

ment of the front engine. The rotation is about 2 deg. on a 20-deg. curve, which is the greatest the locomotive will be called on to traverse. The joint is packed with asbestos, and is provided with ballbutt packing rings, and is the only one in the pipe system in which packing is used.

The exhaust pipe connects to the cylinder and under side of the smokebox by ball joints, and both ends have a small rotary movement, but as the angular movement is only 2 deg. 30 min. on a 20-deg. curve, the extension between the two cylinders is only 3 in., which is taken up by the sliding of the pipe flanges on the flat faces of the ball rings. The flanges are held to their seats on the ball rings by 10 springs of 200 lbs. capacity each, or a total of 2,000 lbs. The extension due to the truck movement being provided for in this way, the use of the packed expansion joint is unnecessary. The arrangement of this portion of the piping, which may be called the low-pressure system, is shown by Fig. 3. The dotted lines show the movements of the pipes on a 20-deg. curve, and the diagram underneath shows the movements of the pipes as they would have been if the low-pressure cylinders were at the front of the engine. A comparison of the two arrangements shows that, with the cylinders at the front, the angular movement of the exhaust pipes would be 15 deg. 19 min. and its extension 1 1/2 in., which would necessitate the use of two universal ball joints with packing and a packed expansion joint instead of the two simple ball rings, which are sufficient to take up both the rotary movement and

the rotation 15 in. shown 3 1/2 in. each at the cylinder flanges are turned laterally. In the frame connection casting which joins the two engines together. The arrangement of the cylinders and their fastening is shown by Fig. 4.

Walschaert valve motion is used. The design varies but slightly from that used on other Canadian Pacific locomotives, except in the radius bar lifting link on the low-pressure engine, which, of course, must have flexible connections to permit of movement between the boiler, to which the reversing arm is attached, and the truck. It must also be made as long as possible, as when the locomotive is rounding a sharp curve the boiler will swing about 9 in. off the center line of the track at this point, and the angle taken by the lifting link causes the radius bar to raise in the radius link, thus shortening the travel of the valve when the engine is in forward gear and lengthening it when in backward, the radius bar being down for forward and up for backward gear. This applies to all Mallet locomotives having the radius bar suspension arranged in this manner, but is comparatively unimportant if sufficient clearance is allowed between the radius link and the block at the top.

Provision has also been made for varying the cut-off in the low-pressure cylinders independently of the high pressure. That is, the low-pressure cut-off may be lengthened or shortened without affecting the high pressure. The high-pressure reverse shaft has two arms on the right-hand side. One of these is 11 1/2 in. long, and is connected to the power reverse cylinder,

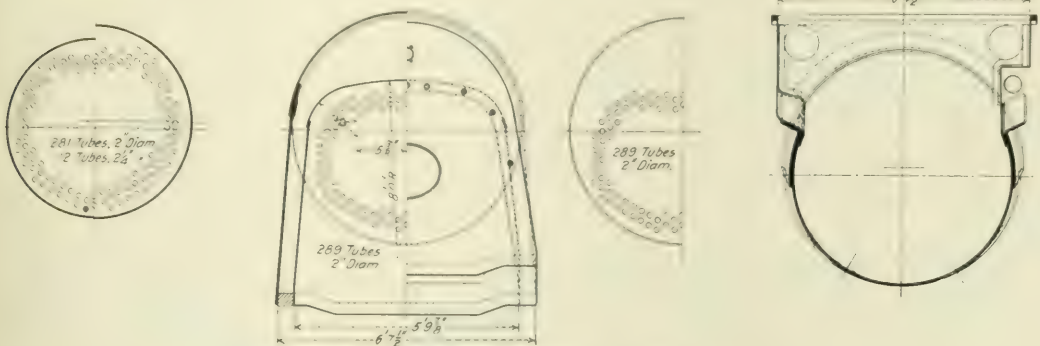


Fig. 2A—Cross-Section Through Boiler for Mallet Locomotive.

extension. The receiver pipe movement would be the same, provided the connection to the high-pressure cylinders was directly over or close to the frame connection pin. The pipe is usually given flexibility by a packed universal ball joint and a packed expansion joint. From this it will be seen that, with the low-pressure cylinders at the front, and following the usual pipe construction, five packed joints would have been used, but with the arrangement adopted there is only one packed joint and two ball rings.

Cylinders, Valves, and Valve Motion.—The cylinders are of the piston valve type, with inside admission on the high pressure and outside on the low pressure, which permits of the most satisfactory arrangement of steam pipes. The diameters are: High pressure, 23 1/4 in. x 26 in.; low pressure, 34 in. x 26 in. All four are cast separately, without saddles, and are bolted together by vertical flanges in the usual manner. The high pressure have a cast-steel saddle which is common to both cylinders, and which bolts rigidly to them and to the boiler. This connection to the boiler is a very important one, the barrel being under pressure at this point, and the saddle is secured with 1 1/4-in. bolts, having a taper of 1/8 in. in 12 in., driven into holes reamed from the pressure side.

The low-pressure cylinders have no saddle, as there is a movement between the boiler and truck at this point. A small steadying casting has, however, been applied, which slides across the flat surface on the top of the cylinders, but no weight is transmitted to the truck by it. The main frames are slabbled

the stroke of which is 12 in., and as the high-pressure radius bar lifting arm is forged to the same shaft, the lift or fall of the radius bar is always proportional to the travel of the power cylinder piston. The arm on this shaft, to which the low-pressure reach rod connects, has a slotted upper end with a sliding block, to which the reach rod pin connects. This block is held in any desired position by means of a screw adjustment. The shortest length of the arm is 12 1/2 in., and with the longest power

piston travel of 12 in. the movement of the reach rod is $\frac{12}{11.5} \times$

12.5, or 12 in., nearly. If, by means of the screw, the reach rod block is moved up to 14 in. from the shaft, the movement of the reach rod becomes $\frac{12}{11.5} \times 14$, or 14.6 in, with a consequent

increase in the rise or fall of the low-pressure bar, which will increase the travel of the valve.

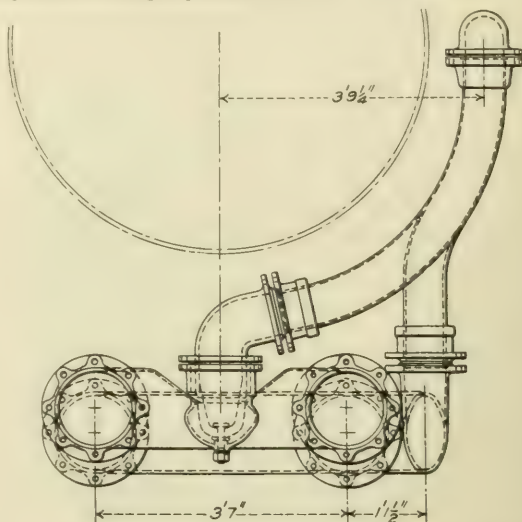
A simple form of power reverse gear is used, consisting of a 6-in. steam cylinder, with its piston rod connected to the reach rod shaft as described above. Rapid movement is prevented by an oil dash pot, the piston of which is connected to the same rod as the piston of the power cylinder.

Frames, Spring Rigging, and Weight Distribution.—The frames on each engine are in one piece and are slabbled for the cylinder fits and for the front bumper and back footplate, which makes a very simple arrangement, there being no frame splices

to break or get loose, and at the same time it gives a stronger cylinder fastening. The sections of the top and bottom rails are $4\frac{1}{2}$ in. wide x $4\frac{1}{2}$ in. deep, top, and $4\frac{1}{2}$ in. wide x 3 in. deep, bottom, on both frames. Owing to the rather unusual conditions of weight distribution, the design was gone into very carefully and the sections were not only checked against the piston thrust, which is usually all that is considered, but against the weights carried by the frames. The bending moment and shearing forces for the front engine are shown by Fig. 5. These have been worked out considering the frame as a beam supported at four points (where it rests on the springs), the reaction being equal to the sum of the loads supported by the springs.

Fig. 5 shows that the proportion of the boiler weight carried by the front engine is concentrated at a point midway between the first and second wheels, or 31 in. ahead of the middle wheel, and as this is the only point on the front truck at which the boiler is supported, the weight must be such that its moment about the center of the truck will equal the moment of the weight of the front truck itself acting at the distance its center of gravity is located in rear of the center of the truck. On most Mallet locomotives now in service this is not the case. The actual point of support of the boiler on the frames is set forward (considering a truck with the cylinders at the front) of the virtual point sufficiently far to make the moment of the truck weight considerably greater. This is done to prevent rocking in a longitudinal direction, and, of course, tends to allow the truck to drop at the front, to correct which a suspension bolt working on ball seats connects the lower rail of each back engine frame to the upper rails of the front engine, and any tension put on them by screwing up on the adjusting nuts pulls down on the rear end of the front engine frame, correcting the effect of the center of gravity of the front system falling ahead of the center of the truck. On the Canadian Pacific Mallet this

rocking effect is checked by the frame connection castings, which have jaws that interlock in such a manner as to make longitudinal rocking impossible.



The arrangement of these castings and their pin connection is clearly shown in Fig. 4. The construction at the joint is very substantial. A turned pin 4 in. in diameter is used, and with this arrangement of interlocking jaws the pin is put in triple

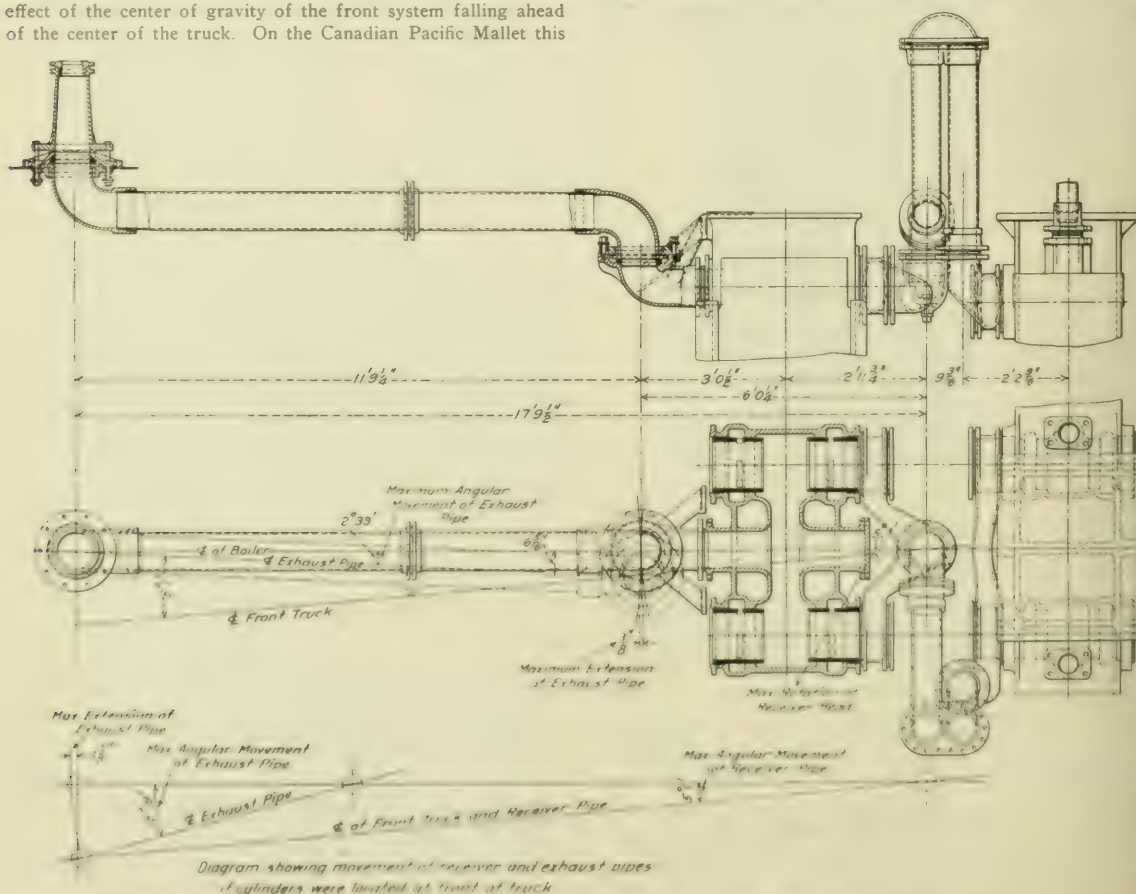


Fig. 3—Steam, Exhaust and Receiver Pipes. Dotted Lines Show Position on 20-Deg. Curve.

shear when pulling, but for buffing blocks which are more severe, it is entirely relieved and the block is taken up by the socket joint formed by the metal around the pin on the front casting fitting into a machined pocket on the back casting. As the extension of the exhaust pipe, due to the truck movement

boiler without causing undue flange pressure or danger of derauling. On the other hand, those who advocate the use of trucks do not believe as safe an engine can be obtained without as with them. In any case, more advantages and better arguments can be advanced for eliminating the truck, such as

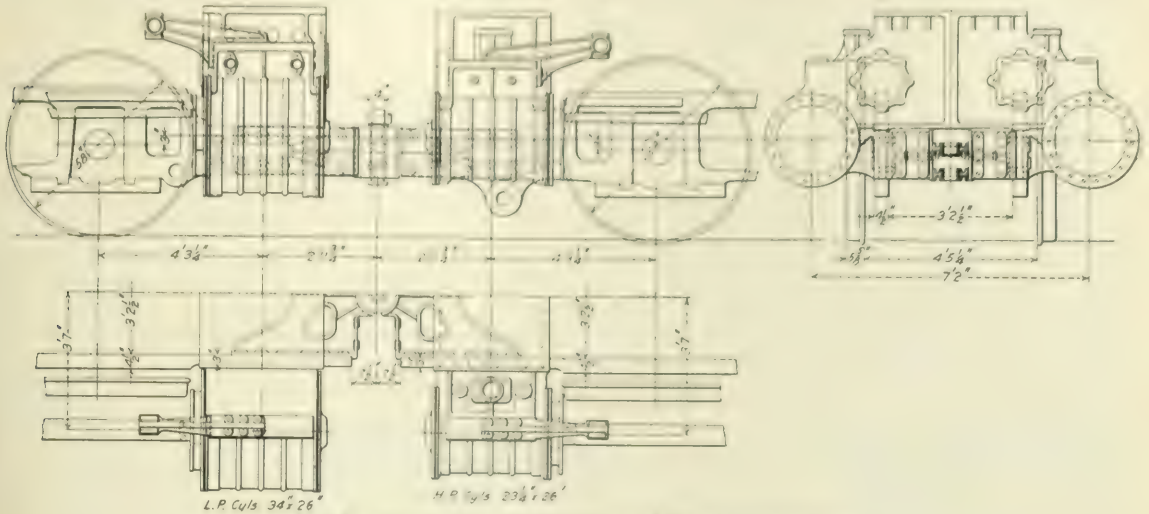


Fig. 4—Arrangement of Cylinders and Frame Connections.

must be taken up by the sliding of the pipe flanges on the ball rings, and as only the rotary movement has been provided for on the receiver pipe, the importance of having a solid connection for the frames of the two engines is seen.

The spring rigging is of an ordinary type. The front engine is equalized from back to front and has a cross equalizer at the front. The rear engine is also equalized through its whole length, but has no cross equalizers. The weights carried by the front and back engines are not equal, but are so distributed that approximately 9,000 lbs. more weight is carried by the front than by the back. As the effect of pushing or pulling a train is to reduce the weight on the front truck, and the service for which the locomotive was built calls for continued maximum

the decrease in the total length of the engine, saving in weight, etc., and it can also be shown that the flange pressure is sufficiently low to ensure perfect safety.

On the Canadian Pacific locomotive trucks are not used, and the weight of the boiler, which offers the principal resistance to curving, as the truck must swing laterally underneath it, is supported partly by friction plates and partly by a spring

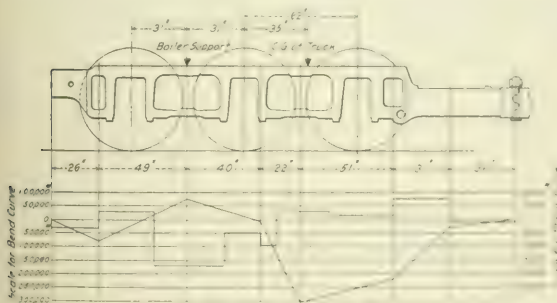


Fig. 5—Diagram of Bending Moment and Shearing Forces.

tractive effort for considerable distances, it is important that the ratio of adhesive weight to tractive power be sufficiently high to ensure the engine holding the rail. As this ratio is 4.57, which is about as low as is desirable, it will be seen that any transfer of weight from the front truck would further reduce the adhesion factor and tend to make the front engine slip.

Guiding Power of the Front Engine.—Mallet articulated locomotives are built both without and with guiding trucks, and in most cases where leading trucks are used a truck is also placed at the rear end, back of the last pair of drivers. The theory advanced for omitting these trucks is that, in going ahead the front engine is in itself a truck and the front drivers are able to enter a curve against the resistance of the

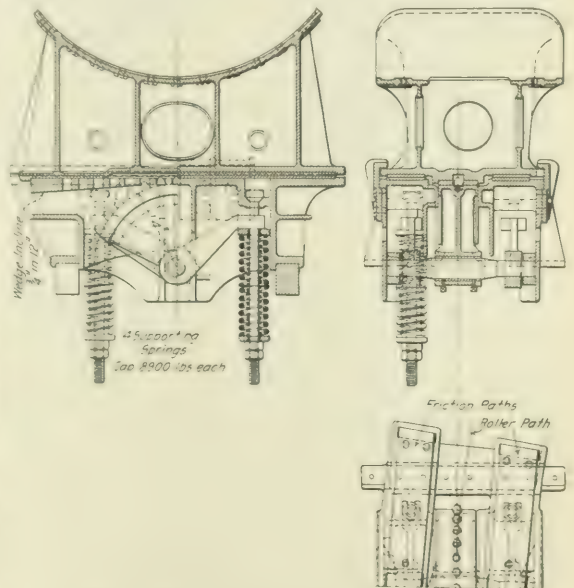


Fig. 6—Boiler Bearing and Guiding Device.

suspended roller. The arrangement of this device is shown by Fig. 6, and its construction and action are as follows. There are two main castings, one of which is mounted on the frames, the other bolted solidly to the boiler moves with it, across the frame casting. The weight of the boiler and attachments resting on the front truck at this point is 40,000 lbs., and one-half of this, or 20,000 lbs., is carried on friction plates, four of

which are set on each casting, forming two approximately radial plates, with an $8\frac{3}{4}$ -in. space between. The total area of these plates is 834 sq. in., and provision has been made for lubrication, each plate having oil grooves connecting with an oil box on the top casting. Under these conditions the coefficient of friction may be taken as .08, which gives 1,600 lbs. at starting as the resistance due to friction. This resistance decreases slightly, as will be explained later. In the $8\frac{3}{4}$ -in. space between the two friction paths on the upper casting is the roller path, which consists of two wedge-shaped blocks, having an incline of $\frac{3}{4}$ in. in 12. These are set with their thin ends at the center line between the frames, and these ends have also been made flat for a distance of 2 in. on each side of the center.

The roller on which the inclined blocks travel is carried by two equalizers supported on springs, which in turn are carried by the bottom castings, and any movement of the truck sideways, as when entering a curve, causes the inclined blocks to force the roller downward against the resistance of its supporting springs, which produces a force to pull the boiler around the curve with the truck and relieve the leading flanges of the back engine from the excessive pressure which would otherwise result. The greater the movement of the truck sideways, the greater will be the deflection of the springs, and there will be a constantly increasing rolling resistance, as shown by the truck-guiding power chart, Fig. 7, reference to which shows the curve marked "rolling resist-

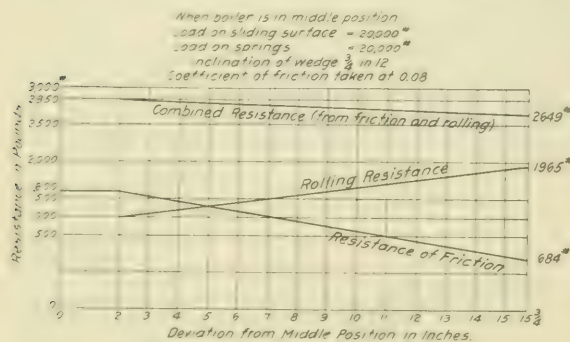


Fig. 7—Guiding Power of Front Truck.

ance" as starting at a point which corresponds with the beginning of the incline, or 2 in. from the center. The resistance at this point rises immediately to 1,250 lbs. and increases to 1,765 lbs. at $15\frac{3}{4}$ in., or the maximum movement sideways.

As mentioned above, the frictional resistance decreases slightly. This is due to the reduction of weight on the friction paths as the truck moves sideways, caused by the additional weight carried by the springs and, consequently, by the roller also. The decreasing frictional resistance is shown by the drop in the curve marked "frictional resistance," and begins 2 in. from the center or the point where the roller picks up weight. The total resistance offered by the boiler to the truck moving sideways is shown by the curve marked "combined resistance." When the locomotive is entering a curve, for the first 2-in. truck movement to either side the resistance is only that due to friction, or 1,600 lbs. When straightening out, as on leaving a curve, the inclined surfaces tend to slide the boiler back to its normal position on the center of the truck against the increasing frictional resistance, thus relieving the pressure on the flanges. The resistance may be entirely altered by changing the inclination of the wedges, or the amount of rolling or frictional resistance may be varied at will by screwing up or slackening off on the roller supporting spring nuts, which has the effect of increasing the weight on the roller and decreasing the weight on the friction plates, or vice versa. The total resistance, however, would not be materially altered, unless the incline of the wedges was changed, which may easily be done by raising the boiler at the front, as

the wedges are not cast solid with the top casting, but are held in pockets in it.

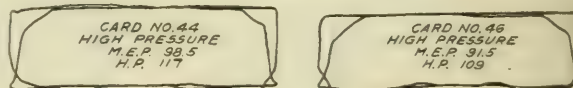
TESTS.

As stated at the beginning of this paper, the locomotive was of an experimental nature, and a number of tests were made to determine if the desired results were being obtained. These tests were not directed towards the amount of coal and water

TEST NO. 1.



TEST NO. 4.



TEST NO. 5.



TEST NO. 6.

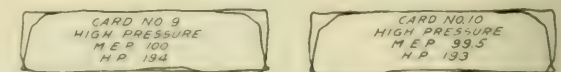


Fig. 8—Typical Indicator Cards.

consumed or the economy of the machine as compared with other heavy road locomotives, but were more as a check on the design in general, to show what changes would be desirable in locomotives of the same type constructed in future.

Special attention was therefore directed towards the following:

1. The receiver and exhaust pipes and their connections.

2. The boiler and machinery require the same sort of sufficient capacity to supply steam to the cylinders and what improvements could be made in the details of the latter.

3. The ability of the locomotive to curve freely, that is, the curves having a radius of 300 ft. or less, as was said it would have to operate, and to do so in ordinary quality, wet, heading and backing on, without difficulty or straining in its cylinder flange wear.

4. The ability of the locomotive to develop its calculated tractive effort.

5. The most satisfactory size of cylinders and arrangement of reheater or superheater, that is, what diameter of cylinder within the limits of 22 in. to 23½ in. on the high pressure and 32½ in. to 34 in. on the low pressure would give the best results, using either reheated steam in the low pressure or superheated in the high pressure.

Of these, 1, 2 and 3 could be settled by observation of the locomotive when pulling the test trains and on a 20-deg. curve, as well as in the regular service later, while Nos. 4 and 5 necessitated the use of the dynamometer car and indicators. The locomotive was particularly adaptable to experiment as to the size of cylinders and arrangement of reheater or superheater. The cylinders had bushings which would permit of varying

total wheel base of 34 ft. 1½ in. the pony truck having a 10 ft. three-point hanger. The amount of flange wear after about 4,000 miles was ½ in. at the point of contact between the rail head and flange on the leading wheel, and ⅜ in. on other wheels, which is satisfactory service, considering the crookedness of the track on which the locomotive is operating, there being a large number of 10-deg. curves. This amount of wear also compares very favorably with that on other locomotives in the same service.

The sizes of the cylinders on the locomotive as first turned out were 22 in. and 32½ in. x 26 in., or a ratio of 2.18, and the exhaust from the high-pressure pair passed through the reheater before entering the low-pressure steam chest. Three other combinations of cylinders and position of reheater or superheater were tried, and altogether six tests were made before the final sizes of the cylinders were determined.

A large number of indicator cards were taken, and those shown in Fig. 8 are fairly representative of each test. In the "Summary of indicator cards" the measure of steam at cut-off is expressed in terms of the following:

"Steam at cut-off = (T.P. per lb. M.E.P. × cut-off, per cent. + T.P. per lb. M.E.P. × clearance, per cent.) × pressure at cut-off + 14.7."

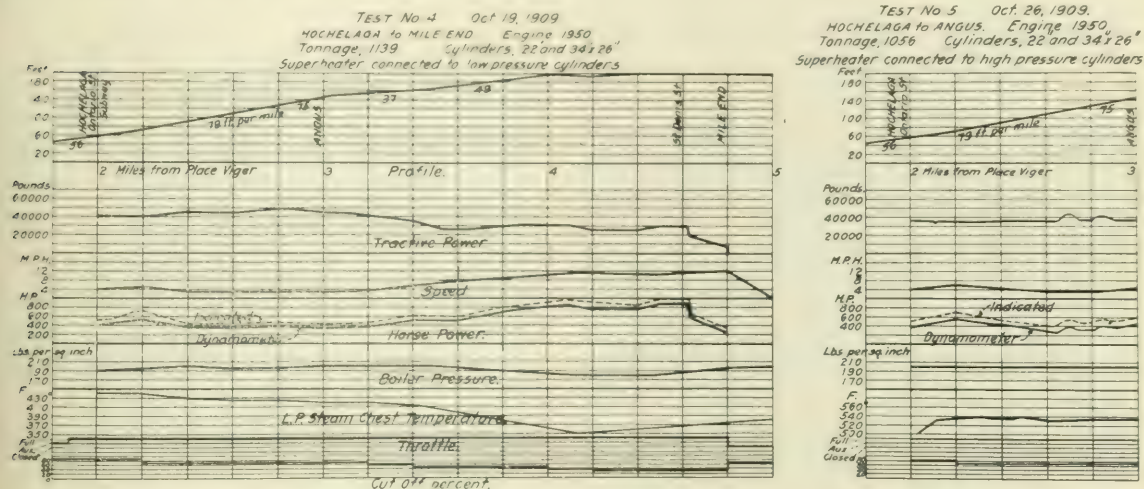


Fig. 9—Dynamometer Car Record.

their diameter and the outside arrangement of steam pipes made possible the use of a reheater for the high pressure exhaust or a superheater in direct communication with the boiler at small cost.

It was apparent from the first that the receiver and exhaust pipes would do what was expected of them, and during the period of about 10 days when the locomotive was under test and 3 weeks' observation subsequently during regular service, no leakage of steam developed, nor was it even necessary to tighten up on the packing gland on the receiver pipe or the bearing plates of the sliding ball rings on the exhaust pipe. Owing to its length, the exhaust pipe has considerable capacity as a receiver, and the exhaust is very mild, but this may be considered as an advantage, as no difficulty is experienced in maintaining full steam pressure. Some leakage developed around the taper bolts which hold the high pressure cylinder saddle to the boiler, and on future locomotives other systems of fastening will be considered.

All curves were traversed freely, both heading and backing on, and, from observations made on a "Y" on which the rails were light and the curvature about 18 deg. at one point, it was proved conclusively that the articulated locomotive did less damage and curved easier than an ordinary 2-8-0 locomotive, weighing 185,000 lbs., with a rigid wheel base of 15 ft. 10 in. and a

Fig. 9 shows the dynamometer car record, indicated and dynamometer horse powers, speed, boiler pressures, etc., for tests 4 and 5. In tests Nos. 1, 2 and 3, which were made under similar conditions, it was found that there were practically equal amounts of steam in each pair of cylinders, and that the low-pressure cylinders were developing considerably greater power than the high pressure. This condition can best be accounted for by the increased volume of steam in the receiver, due to its being reheated and consequently expanded, causing excessive back pressure on the high-pressure pistons, as indicated by the drop in pressure between the back pressure line on the high-pressure cards and the admission line on the low pressure.

To more nearly equalize the power, it was decided to increase the diameter of the low-pressure cylinders to 34 in., or a ratio of 2.38, which would have the effect of emptying the receiver more rapidly, with a consequent decrease in the back pressure and rise in mean effective pressure on the high-pressure pistons without materially changing the amount of work done by the low pressure. The reheater was left connected to the receiver, the lack of condensation at the cylinder cocks being very noticeable, which was a desirable feature. The maximum temperature obtained in the low-pressure steam chest, using reheated steam, was 440 deg., which, with a pressure of 75 lbs., would give 120

deg. superheat. The result of this arrangement is shown by test No. 4, and made considerable improvement in the distribution of power, although the equalization could still be improved.

At the conclusion of this test the reheater pipes were changed to connect to the high-pressure steam chest and the receiver pipe, as shown by Fig. 3, was applied. Superheated steam would thus be used in the high-pressure cylinders and the exhaust would pass direct to the low-pressure steam chest.

SUMMARY OF INDICATOR CARDS.

Test Card No.	M.E.P.	H.P.	Indicated tractive effort.	Steam at cut-off.	Work in cyl. inders. Pr. ct.	Tractive effort. Total.	Horse power Total.
1-5 H.P.	90	164	19,500	37,700	41		
5 L.P.	60	238	28,500	37,600	99%	59	48,000 804
6 H.P.	86	157	18,650	32,800	43		
6 L.P.	52	207	24,700	32,320	96	57	43,350 728
4-44 H.P.	98.5	117	21,300	41,000	45		
44 H.P.	50	142	26,000	38,750	95	55	47,300 518
46 H.P.	91.3	120	19,800	39,050	44		
46 L.P.	48.5	159	25,200	38,600	94	56	45,000 496
5-2 H.P.	111.5	124	24,200	42,500	48		
2 L.P.	50.5	134	26,300	37,300	87½	52	50,500 516
3 H.P.	117.5	116	25,550	44,250	47½		
3 L.P.	54.5	128	28,200	39,100	88	52½	53,750 488
6-9 H.P.	100	194	24,300	48,000	46		
9 L.P.	55	220	28,800	40,100	83½	54	52,900 846
10 H.P.	99.5	193	24,150	47,400	45		
10 L.P.	57	236	29,600	40,750	86	55	53,750 858

For "Steam at Cut-off Per Cent." the largest measure in each pair of cards is taken as 100 per cent.

Test No.	Cylinders	Ratio.	2.18, Reheater connected to L.P.
1	22 in. and 32½ in. x 26 in.	2.18	"
2	" " " " " "	2.18	"
3	" " " " " "	2.18	"
4	" " " " " "	2.38	"
5	" " " " " "	2.38	"
6	" " " " " "	2.14	"

The amount of steam shown by the low-pressure indicator cards in test No. 5 now averaged about 87 per cent. of that shown by the high-pressure cards, and the total amount of power as calculated from the series of indicator cards was approximately the same for the two engines.

It was next decided to try and increase the total power of the locomotive, which could still be done, as the factor of adhesion could be reduced without going below safe limits. The most satisfactory ratio, as indicated by the previous tests, would have been 2.38, as shown by test No. 5, but as the bushing had been removed from the low-pressure cylinder, its diameter could not be further increased, and the high-pressure only were changed, their diameter being increased to 23½ in., or a ratio of 2.14. Although the low-pressure cylinder diameters could not be increased, their cut-off could be lengthened by means of the adjusting arm previously described, without changing the cut-off in the high pressure, which would have a similar effect in reducing the back pressure on the high-pressure pistons.

The results obtained with this arrangement are shown by test No. 6, and, everything considered, it was the most satisfactory which had been tried. The power had been increased, and the amounts developed by each engine were reasonably well balanced. The decrease in the measure of steam in the low-pressure cylinders, due to the position of the superheater, is well illustrated in this test by comparing it with No. 1, in which the amounts are very nearly equal.

As the tests just described indicated that the best results would be obtained with cylinders 23½ in. x 26 in. on the high-pressure engine and 34 in. x 26 in. on the low, and with the high-pressure cylinders taking steam from the superheater, the locomotive was therefore put into regular service in the Rocky mountains, pushing on the grade eastward from Field to Steamboat. The maximum grade is 2.2 per cent. and there are two spiral tunnels 2,800 ft. and 3,200 ft. long, having a radius of 573 ft. The regular locomotives working on this and similar grades in the Rocky mountains have general dimensions as follows:

Type	Consolidation
Cylinders	4
Driving wheels	8
Boiler pressure	200 lbs.
Weight on drivers	168,000 lbs.
Working load	1,000,000 lbs.
Travelling speed	30 m.p.h.
Factor of adhesion	4.0

Their full rating in summer is 424 tons, and on the same basis the Mallet locomotive should handle 660 tons, which it does without trouble, and has also taken up 700 tons, which may be considered the maximum tonnage for this grade. Dominion coal was used on the tests made at Montreal. This is a friable, rather fine coal, and an aerage of the analyses of 25 samples gives the fixed carbon as 55.71 per cent, and the heat value 13,729 B.t.u's. That used in regular service is known as Canmore coal, and is mined in the Rocky mountains. It is much finer than the Dominion coal and very dusty, and must be thoroughly wet down before firing, otherwise a considerable percentage goes up the stack in the form of cinders. It is higher in fixed carbon than the former, but the heat value is about the same. The locomotive steamed as successfully with the Canmore coal as it did with Dominion coal, although adjustments were necessary in the smokebox diaphragm and draft pipes, the diameter of the exhaust nozzle with both coals being 4¼ in.

Fig. 10 is the log of what may be considered a representative trip of the locomotive in regular service on the Field Hill, and is chiefly interesting as proving that the boiler is of ample capacity to supply steam to the cylinders. This also shows the temperatures and pressures in the high and low pressure steam chests. The maximum temperature shown in the high

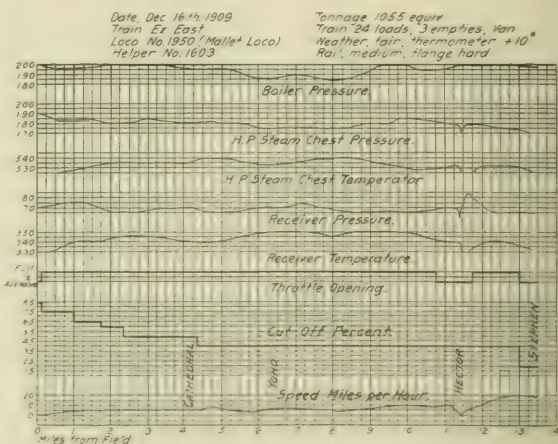


Fig. 10—Log of Steam Pressures and Temperature.

pressure steam chest was 540 deg., or 153 deg. superheat. An average of a number of trips shows a temperature of 535 deg., or 148 deg. of superheat, which is reached soon after a train is started, and remains practically constant, irrespective of boiler pressure, cut-off, throttle position or speed. The maximum temperature shown in the receiver pipe was 350 deg., and the average was about 345 deg. As the pressures ranged from 60 lbs. to 75 lbs., this would give from 38 deg. to 25 deg. superheat in the receiver. The amount of condensation in the low pressure cylinders is very small, and the cylinder cocks are closed after a few revolutions, which, of course, tends to decrease the water consumption.

As the locomotive has not been in service sufficiently long, no figures are available as to cost of maintenance, but it is to be expected that, as there is practically double the amount of machinery, this will be somewhat higher than on the consolidation locomotives in the same service. The operating costs will be slightly higher when considered on a locomotive mile basis. The same crews do the work for the same wages, but more lubricant, waste and sand must of necessity be used, and the cost of watering and cleaning will also be higher. On a ton basis, which is the fairest comparison for operating cost, it will be lower, due to the greater tonnage hauled, which, it is considered, together with the saving in fuel, will show considerable economy in favor of the Mallet locomotive.

General News Section.

Several alleged cases of violation of the state safety laws on the San Antonio & Aransas Pass have been reported to the Interstate Commerce Commission.

According to newspaper despatches, the Southern Pacific has been making successful trial trips out on Sparks, Mo., with the Mallet locomotives which have been in service west of there.

The Atchison, Topeka & Santa Fe lately received an experimental lot of 8,000 ties from Mexico. They are of mahogany, ebony, native cedar and various other woods. The company is also getting some ties from other foreign countries for the same purpose.

The Indiana Railroad Commission, in answering questions as to whether suits for violation of the state safety appliance laws would be dismissed if the defendant companies agreed to remedy safety appliance defects, says that it will insist upon penalties being collected.

The St. Louis Railway Club is offering a scholarship at Washington University, St. Louis, Mo. To enter the university the candidate must have a high school education, and to enter this competition must be the son of a member of the St. Louis Railway Club in good standing. Benefits under this scholarship amount to \$250 a year. Applications must be in the hands of the secretary not later than noon, August 12, 1910.

A series of tests have been made on the testing plant at Purdue University of a Chicago & North Western locomotive equipped with a front end designed to eliminate sparks. Different fuels were used and the locomotive was operated under various conditions. The tests are said to have been satisfactory—so much so that it will probably be possible to burn lignite successfully with the new device. It is expected that the new front end will shortly be thoroughly tried out in road service.

The gas-electric car built by the General Electric Co., Schenectady, N. Y., for the Southern Railway (*Railway Age Gazette*, February 4, 1910, p. 285.) is now in operation on the line of the Southern Railway and the Blue Ridge Railway between Greenville, N. C., and Anderson, the intermediate territory being perhaps the most thickly settled milling section in the south, including the important points, Piedmont, Pelzer, Williamston and Belton. Two round trips a day are made. Though a large number of stops are made, the car has no trouble in making the schedule time. The car now in use is the property of the General Electric Co. and will be used until two cars being built by that company especially for the Southern Railway are delivered. The new cars will provide seats for 57 passengers. The new service is in addition to the steam trains run between Greenville and Anderson.

Pennsylvania Station at New York.

The new Pennsylvania Railroad station at New York was declared officially open on August 1 by President McCrea, who accepted from the Memorial Committee of the Board of Directors a statue of the late president, A. J. Cassatt. Trains will run into the station under the East river on regular schedule, beginning September 8.

Samuel Rea, second vice-president of the Pennsylvania Railroad, opened the exercises, saying: "We are here to-day to honor the memory of the late president of the Pennsylvania Railroad, A. J. Cassatt, and to unveil his statue as a tribute to his genius. Mr. Cuyler, chairman of the Memorial Committee, will now present the statue to the company and Mr. McCrea, president, will, on its behalf, accept the same."

T. De Witt Cuyler said: "We are gathered here to-day to take part in an event which marks one of the most important epochs in the history of the Pennsylvania Railroad. With the unveiling of the statue, before which we stand, it is proposed, sir, that you should officially declare the station open for the purposes for which it was built.

"The occasion calls for no ostentatious ceremonies or elaborate words. These massive walls and columns speak in their severe simplicity and majestic silence with far more eloquence than human tongue could give utterance to, and so, too, this

plendid statue which we are now to look upon in the great mass of the genius and the grandeur of the character of the man, finds a fitting resting place amid these surroundings.

"It has been at once the privilege and duty of the directors to have here placed this portrait of Mr. Cassatt, and how well the artist has done his work, all will attest.

"We ask you, as the head of this great corporation, to take this statue into your keeping and to unveil it to the public eye so that all men may know, as the inscription so aptly tells us, 'whose foresight, courage and ability achieved the extension of the Pennsylvania Railroad system into New York City.'"

President McCrea said: "On behalf of the Board of Directors of the Pennsylvania Railroad, I accept this noble statue of Mr. Cassatt. It is fitting and proper that its unveiling should be coincident with the official opening of the great terminal which the Pennsylvania Railroad has, prompted by his foresight and courage, builded for itself in this, America's greatest city.

"As the years roll around the greater will be the tribute to the genius of Mr. Cassatt, and it is a source of greatest pleasure to those who had the privilege of knowing him, to feel that there has been erected to his memory, in so fitting a place, a statue that will so truly express to those who follow, the manner of man he was.

"As a fitting conclusion to these ceremonies, I now declare this station officially opened."

Grand Trunk Strike Settlement.

The strike of conductors, trainmen and yardmen which began on the Grand Trunk and Central Vermont on July 18 was called off on August 2. Under the terms of the agreement signed by President Hays and the Union officials, the company will put back as soon as possible the men other than those who have been or may be found guilty of acts of violence or disorderly conduct, the understanding being that there is to be no coercion or intimidation used towards the new men. The company will put into effect from May 1, 1910, the rates named in its proposal dated July 18, those rates to be embodied in the present schedules now in effect on this line, it being understood that those rates shall in no instance effect a reduction in any existing rate. The company will on January 1, 1912, make effective in train and yard service on the Grand Trunk the rates of pay and the rules contained in the schedule or agreement on that date in effect on the lines of the Canadian Pacific east of Fort William. The same propositions shall apply also to the Central Vermont Railroad rates to be effective in 1912, in this case, instead of the Canadian Pacific rates.

The men get two concessions over the terms offered by President Hays on the afternoon of the day they struck. First, the standardization of pay and rules with those recently conceded by the Canadian Pacific takes place on January 1, 1912, instead of January 1, 1913, as offered by Mr. Hays, a gain of one year. The Canadian Pacific standard and rules are not quite those of Eastern roads in the United States, which the men demanded from the Grand Trunk, but slightly lower. Secondly, the offer made on July 18 is accepted, to hold until the standardization is adopted on January 1, 1912, but the increased rate of pay made in that offer is made retroactive, dating from May 1 last. The men, therefore, gain two and a half months of the increase, the offer of Mr. Hays being when made only effective from date. However, the men are only to be restored to their former positions "as soon as possible." The company is not under obligation to discharge any of the men it has taken on since the strike was called, nor to reduce them in rank.

Labor Negotiations.

The wages of enginemen on the Chicago, Indianapolis & Louisville have been increased from 10 to 20 per cent., effective July 1. Rioting is reported from Winnipeg, Man., at the Canadian Northern shops, where 500 car men are on strike. Cars were burned and special police are on duty.

The board of arbitration acting under the Erdman act has awarded an increase of 6 per cent. to the Missouri Pacific telegraphers.

An increase of 6 per cent. in wages has been given to employees in the bridge and building department of the New York, New Haven & Hartford.

The Missouri Pacific has made a settlement with its engineers.

The Canadian Pacific has increased the wages of its engineers 10 per cent.

The Pennsylvania Lines East and West of Pittsburgh have come to an agreement with their conductors and trainmen. The new schedules are similar to those on the New York Central, but the rates are understood to be somewhat higher.

Conductors and trainmen on the Ann Arbor Railroad have asked for increases in wages said to vary from 15 per cent. to 42 per cent.

Reports of attempted wrecking of trains by the striking track men on the Delaware & Hudson continue. North of Albany the track is being patrolled by armed guards, and at Carbondale, Pa., where there was rioting last week, additional forces of state troopers and special police are on duty. The mayor of Schenectady, N. Y., has been warned that the company will hold the city responsible, under the state statutes, for all damage to its property by the riot.

Enginemen on 56 roads west of Chicago are said to be formulating demands for increased wages.

The Bureau of Railway Economics.

The following announcement has been made, to correct wrong impressions: "The establishment of this bureau was decided on for the purpose of securing and compiling statistical data with reference to the various branches of the railway service so that the railways themselves may have an avenue of authentic unbiased information concerning the problems confronting them. In other words, an important officer of one railway may know of the workings of his own organization, but he also may be unfamiliar with facts from time to time relating to the general railway situation, and with the idea of furnishing freely data as between railway men the bureau was established.

"After its establishment was decided on, it occurred to the railway men that if they were not able themselves, under the present conditions, to know all the facts concerning other railway organizations, it was difficult to inform the public at large correctly concerning the whole situation. Therefore, it was determined, whenever the public or newspapers sought information pertaining to any particular question, that it should be freely furnished, but it is not intended that the bureau is to engage in a campaign of publicity."

Pennsylvania Railroad Relief Department.

According to the regular monthly report of the relief department of the Pennsylvania Railroad, \$188,110 was paid to the members during June. Of this amount \$137,805 represents the payments made on the Lines East of Pittsburgh and Erie and \$50,305 on the Lines West. Since the establishment of the funds in 1886 a total of \$28,658,001 has been paid out.

On the Lines East of Pittsburgh and Erie in the month of June the payments in benefits to the families of members who died amounted to \$51,522, while to members incapacitated for work they amounted to \$86,283. The total payments on the Lines East of Pittsburgh since the relief fund was established have amounted to \$20,888,917.

In June the relief fund of the Pennsylvania Lines West of Pittsburgh paid out a total of \$50,305, of which \$20,940 was for the families of members who died and \$29,365 for members unable to work. The sum of \$7,769,083 represents the total payments of the relief fund of the Pennsylvania Lines West since its establishment in 1889.

Association of Railway Electrical Engineers.

The annual convention will be held in the La Salle Hotel, Chicago, September 27-30. The exhibits will be located in the large ball room, which affords ample accommodation and a beautiful setting for the exposition exhibits.

Papers pertaining to the various applications of electricity in railway operation, aside from telegraphy and signaling, will be considered at the convention, and it is thought that a large number of railway men will be in attendance.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
 AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; next meeting June 22, 1911; Niagara Falls, N. Y.
 AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn.
 AMERICAN ASSOC. OF LOCAL FREIGHT AGENTS' ASS'N.—G. W. Dennison, Penna. Co., Toledo, Ohio.
 AMERICAN ASS'N. OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew Bldg., Cincinnati, Ohio.
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York.
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 18; Fort Worth, Tex.
 AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASS'N.—E. H. Fritch, Monadnock Bldg., Chicago.
 AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis.
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago.
 AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.
 AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia.
 AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St. N. Y.; 1st and 3d Wed., except July and August; New York.
 AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., N. Y.; 2d Tues.; New York.
 AMERICAN STREET AND INTERURBAN RAILWAY ASS'N.—H. C. Donecker, 29 W. 39th St., New York; Oct. 10; 14 Atlantic City.
 ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago.
 ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A. T. & S. F., Topeka, Kan.
 ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Clegrove, L. C. R.R., Chicago; annual, Sept. 27-30; Chicago.
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston.
 ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Place, New York.
 BUFFALO TRANSPORTATION CLUB.—J. N. Sells, Buffalo.
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
 CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; Thursdays; Montreal.
 CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month; Chicago.
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
 ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.
 ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton Building, Pittsburgh; 1st and 3d Tuesday; Pittsburgh.
 FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R.R., Richmond, Va.
 GENERAL SUPERINTENDENTS' ASS'N. OF CHICAGO.—H. D. Judson, 209 Adams St., Chicago; Wednesday preceding 3d Thursday; Chicago.
 INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
 INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.
 INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.
 INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASS'N.—A. L. Woodworth, Lima, Ohio; Aug. 16-18; Detroit, Mich.
 INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels.
 IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
 MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago.
 NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, ex. June, July, Aug. and Sept.; Boston.
 NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
 NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
 NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, 4th Saturday; Duluth, Minn.
 OMAHA RAILWAY CLUB.—H. Christensen, Bank Bk., Second W. & La Salle, City of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City; 3d Friday in month; Kansas City.
 RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa., 4th Friday in month, except June, July and August; Pittsburgh.
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; annual, Oct. 11; Richmond, Va.
 RAILWAY S'KIPPER'S ASS'N.—J. P. Murphy, Box C, Collinwood, O.
 RICHMOND RAILROAD CLUB.—F. O. Robinson, 24 Mulford, Richmond Roadmasters' and Maintenance of Way Ass'n.—Walter E. Emery, P. & O. Ry., Potomac, Ill.; annual, Sept. 13-16; Chicago.
 ST. LOUIS RAILWAY CLUB.—B. W. Fraughton, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
 SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Niquist, La Salle St. Station, Chicago; Oct. 5 and 26; Hotel Chamberlin, Old Point Comfort, Va.
 SOCIETIES ASSOCIATION OF CAR SERVICE OFFICERS.—F. W. Sandwich, A. & W. R. Ry., Montgomery, Ala.; annual, Oct. 30; Atlanta.
 SOCIETIES ASSOCIATION OF R.R. CLUBS.—J. Mottrell, Presidential Bldg. Atlanta; 2d Thurs., Jan., Mar., July, Sept. and Nov.; Atlanta.
 TRACTOR CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.
 TRAINS DEPARTING ASS'N. OF AMERICA.—J. E. Macle, 7042 Stewart Ave., Chicago.
 TRANSPORTERS' CLUB OF TOLEDO.—L. G. Macomber, Woolson Street, Toledo.
 TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Building, annual meeting, Aug. 16-19, Niagara Falls, N. Y.
 WESTERN CANADA RAILWAY CLUB.—W. H. Rosewater, P. O. Box 120, Winnipeg; 2d Monday, except June, July and August; Winnipeg.
 WESTERN SOCIETY OF ENGINEERS.—J. H. Wampler, Monadnock Bldg., Chicago; Wednesday evening July and August; Chicago.

Traffic News.

Western trunk lines are said to be preparing to make through allowances to terminal and industrial roads in the fall shipment.

The Erie announces that of the 93 fast freight trains operated during June all but four reached their destination in time for the advertised market.

The roads in the Western Passenger Association have agreed to make a round trip rate of a fare and a half for all state fairs held in western territory.

The Interstate Commerce Commission has instituted proceedings against the New York, New Haven & Hartford as to the advances in commutation rates.

The hearing in New York announced for October 15 in the matter of advanced rates in official classification territory will probably be postponed for about a week.

The Commercial Club of Duluth, Minn., proposes to begin action against interested roads for alleged discrimination in rates in favor of the St. Paul and Minneapolis through lake and rail tariffs.

Since the first Western Pacific fruit train, mentioned in this column last week, was run, the road has maintained a schedule of over 30 miles an hour on fruit trains from Sacramento to Chicago. The first train took 106 hours to run from Sacramento to Chicago.

The Illinois Manufacturers' Association will not file any more general protests against increased rates until the Interstate Commerce Commission has decided on issues now before it. It may do so, however, if some rate is the subject of specific complaints by members.

The Harriman lines have established a new through passenger train service from Tacoma and Puget Sound points to Denver and St. Louis, via the Oregon & Washington, the Oregon Railroad & Navigation Company, the Oregon Short Line, the Union Pacific and the Wabash.

It is believed that the Western Pacific is negotiating with the Toy Kisen Kaisha for running Japanese steamers from San Francisco in connection with the Western Pacific. This belief is founded on reports that the relationship between the Japanese line and the Pacific Mail Steamship Company is to be broken off.

An oil manufacturing company of Baltimore, Md., has filed with the Interstate Commerce Commission a complaint against the provision of the new freight classification in southern territory to the effect that benzine, gasoline and naphtha must be shipped in metal drums or barrels; the oil company contends that it will not be able to supply such barrels.

The Railroad Commission of Kansas has complained to the Interstate Commerce Commission against the rates charged by the Pullman Company for upper berths. The Kansas commission wants to have the charge for an upper berth less than for a lower berth. The particular complaint is against charges from points in Kansas to Chicago, St. Louis and Fort Worth.

The Interstate Commerce Commission has suspended until November 26 about 125 tariffs, of which 120 were of the Pennsylvania Railroad on general merchandise to southern and western points. Other tariffs of those originally affected August 1 will be suspended until November, some of them being included in those which the railways have already voluntarily suspended.

A meeting of members of the National Industrial Traffic League and the committee appointed last May was held in Chicago on July 29. A committee of seven was appointed to represent the shippers before the Interstate Commerce Commission at the hearing in Chicago on August 22; two attorneys were also selected. Arrangements were made for a fund to defray expenses. The cities represented at the hearing were Minneapolis, St. Louis, St. Joseph, Kansas City, Chicago, Cincinnati, Rockford, Columbus, Indianapolis, Pittsburg, Buffalo and Dayton.

Arrangements are being made for a land show, to be held October 17 to 28, at Pittsburg, Pa. The object of the exposition is to provide information to the farmer, the home-seeker and investor regarding land openings and developments in all sections of the country, and to show samples of mineral, agricultural, horticultural and botanical products of the soil, and to teach the students and laymen educational facts concerning

land reclamation and irrigation. The exhibits will include those of the United States government, state exhibitors, boards of trade, chambers of commerce, commercial bodies, land and irrigation companies.

On August 1 the Boston & Maine put in effect new rates for carrying milk in Massachusetts. The state legislature this year passed a law to the effect that the same rate apply whether milk was carried in carload lots or in single cans. In complying with this law the Boston & Maine is making a rate lower than those in force in New York state, where this "open car" system has been in use. These rates, while lower than those heretofore charged for small shipments, are higher than the former carload rates. In New York there is also a smaller carload rate for cars shipped from a single station, but such a rate cannot be made under the new Massachusetts law.

The Kansas City Live Stock Exchange has filed with the Interstate Commerce Commission charges against 29 roads carrying live stock eastward from Kansas City, declaring that the rates from Kansas City to East St. Louis and eastern points are unreasonable. Up to April 1 of this year a proportionate rate from Kansas City to East St. Louis was in effect on shipments originating east of Kansas City. On that date they were cancelled and now the full local rate is charged from Kansas City to East St. Louis. It is alleged that the defendants have failed to establish through rates from Kansas City to various eastern points, so that Kansas City shippers have to pay the full local rate to East St. Louis and the separate rate from East St. Louis to eastern points. The complainant asks that the old proportionate rates be put into effect by roads west of the Mississippi and that lines both east and west of the Mississippi make through rates to eastern points.

Condition of the Cotton Crop.

The crop reporting board of the Bureau of Statistics of the United States Department of Agriculture estimates that the average condition of the cotton crop on July 25, 1910, was 75.5 per cent. of a normal, as compared with 80.7 on June 25, 1910; 71.9 on July 25, 1909; 83.0 on July 25, 1908; 75.0 on July 25, 1907, and 79.4 the average of the past ten years on July 25.

Comparison of Conditions by States.

States	July 25, 1910	June 25, 1910	1909	July 25— 1908	10-yr. av.
Alabama	81	81	71	90	81
North Carolina	71	72	71	80	80
South Carolina	74	75	77	84	80
Georgia	70	78	78	85	81
Florida	70	82	84	85	83
Alabama	71	81	68	85	78
Mississippi	71	81	64	86	78
Louisiana	69	77	78	83	78
Texas	82	84	70	82	79
Arkansas	73	77	76	96	80
Tennessee	76	82	80	88	82
Missouri	72	80	85	88	84
Oklahoma	87	88	79	66	81
California	98	96	—	—	—
United States	75.5	80.7	71.9	83.0	79.4

Conference on the New Law.

A three-day conference of legal department officers began at Portsmouth, N. H., on Tuesday of this week. The object of the meeting was to discuss for the guidance of traffic departments the meaning of the revised Interstate Commerce Commission act and also to discuss the question of constitutionality, particularly under the new long and short haul clause. There were 69 delegates in attendance, representing the following companies: The Louisville & Nashville, the Minneapolis, St. Paul & Sault Ste. Marie, the Maine Central, the Bangor & Aroostook, the Missouri Pacific, the Norfolk & Western, the Alabama Great Southern, the Rock Island, the Atlantic Coast Line, the Pennsylvania Railroad, the Southern, the Virginia, the Western of Alabama, the Adams Express Co., the Georgia, Florida & Alabama, the Illinois Central, the Lackawanna, the Boston & Maine, the Carolina, Clinchfield & Ohio, the Union Pacific, the Atlanta, Birmingham & Atlantic, the Iowa Central, the Minneapolis & St. Louis, the Burlington, the Wells-Fargo Express Co., the Seaboard Air Line, the Chesapeake & Ohio, the Mobile & Ohio, the New York Central, the Northern Pacific, the Central of Georgia, the Reading, the Great Northern, the Michigan Ocean Steamship Co., the Erie Railroad and the St. Louis Southwestern.

REVENUES AND EXPENSES OF RAILWAYS.

MINIATURE

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 75-A giving a summary of shortages and surpluses by groups from March 31, 1909, to July 26, 1910, says: "The improved demand for cars, especially coal and empty

By a reference to the graphic chart covering the situation for the past three years, it will be noted that this period is the point at which the surplus began to melt away. In the summer of 1908 the decrease in surplus between July 22 and September 30 was 175,000 cars, and during the same period in 1909 the decrease was 190,000. Last year the reduction in sur-

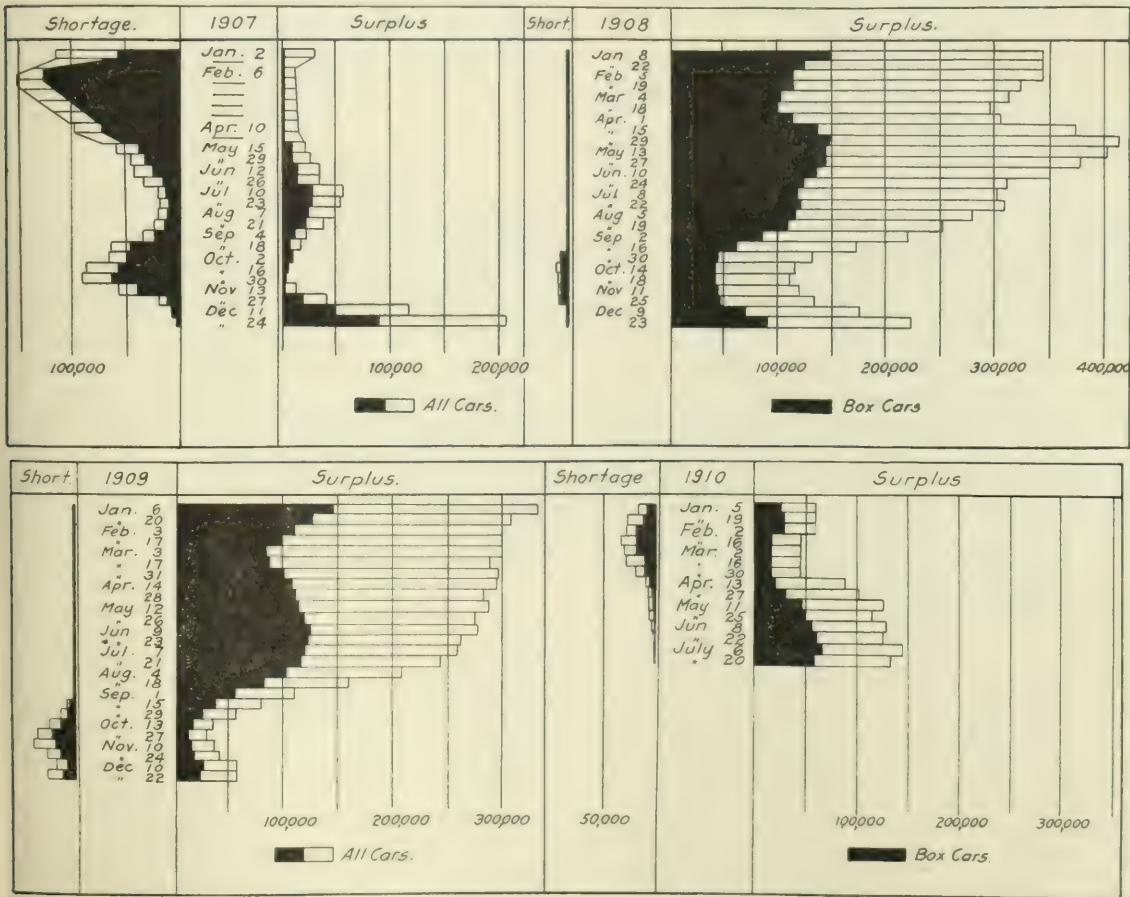
CAR SURPLUSES AND SHORTAGES.

Date.	No. of cars.	Coal.				Shortages.				Total.
		Flat.	Coal.	Other.	Total.	Flat.	Coal.	Other.	Total.	
Group 1, July 20, 1910	8	139	3,06	1,17	4,575	0	0	0	0	295
" 2 " 20, 1910	3	9,32	106	11,189	11,869	4	12	0	5	24
" 3 " 20, 1910	23	11,008	606	9,417	21,031	0	0	0	133	213
" 4 " 20, 1910	11	9,263	118	4,00	3,608	13	100	0	9	299
" 5 " 20, 1910	19	2,161	311	1,317	3,789	15	0	0	0	15
" 6 " 20, 1910	30	3,266	582	3,110	6,958	18	0	0	191	128
" 7 " 20, 1910	3	1,008	117	0	1,124	0	0	0	0	0
" 8 " 20, 1910	11	1,110	300	1,31	2,808	13,654	0	0	0	12
" 9 " 20, 1910	11	2,017	35	1,00	981	3,176	0	0	0	10
" 10 " 20, 1910	19	3,471	600	2,008	6,079	15,00	86	37	0	132
" 11 " 20, 1910	4	1,30	14	10	614	3,10	0	1,4	0	174
Grand total.	182	68,867	3,133	37,219	109,219	396	10	15	394	1,293

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan, and Western Pennsylvania lines; Group 4—West Virginia, Virginia, and North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota, and North and South Dakota lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.

erators, resulted in a decrease of 9,230 from the surplus during two weeks ago, the total for this bulletin being 134,594. The decrease in box cars was 6,211 and in miscellaneous 3,055. "The coal car surplus was about stationary. "There was a slight increase in the shortage, but it is still so scattered and so slight as to lack importance.

plus coal cars between July 21 and August 18 was 36,417, only 802 cars less than the present total surplus of this class." The table gives the surpluses and shortages by groups for the latest period covered by the report, and the charts show the total surpluses and shortages for the years 1907, 1908, 1909 and 1910.



Car Surpluses and Shortages in 1907, 1908, 1909 and 1910.

Earnings of New York City Railways in the Three Months Ended March 31, 1910.

The total operating revenue of the elevated division of the Interborough Rapid Transit amounted to \$3,791,067, and of the subway division to \$3,814,203, a total of \$7,605,270. This compares with a total operating revenue in the corresponding three months of 1909, for both divisions, of \$7,039,526. Operating income, after the deduction of expenses and taxes, amounted to \$1,805,977 for the elevated division and \$2,528,547 for the subway division, a total of \$4,334,524, comparing with a total operating income in the corresponding three months of 1909 of \$3,911,803. The Brooklyn Rapid Transit had total operating revenue amounting to \$4,866,796 in the three months ended March 31, 1910, as against \$4,468,665 in the corresponding three months of 1909. Operating income amounted to \$1,383,818 in 1910 and to \$1,017,354 in 1909. The Hudson & Manhattan, operating the tubes under the Hudson river, had total operating revenue for the three months amounting to \$648,576, as against \$211,743 in 1909; and operating income of \$562,938 in 1910, as against \$202,352 in 1909. The Metropolitan Street Railway system in the three months of 1910 had total operating revenue amounting to \$3,440,880, as against \$3,317,241 in 1909; and operating income of \$582,028, as against \$667,444. The Third Avenue system had operating revenue amounting to \$1,871,934, as against \$1,638,290; and operating income of \$566,199 in 1910 and \$391,280 in 1909.

INTERSTATE COMMERCE COMMISSION.

Complaint Dismissed.

Quammen & Austad Lumber Co. v. Chicago, Milwaukee & St. Paul et al. Opinion by Commissioner Clements.
No witnesses appeared at the hearing and no evidence was produced. (19 I. C. C., 110.)

Lumber Rate Reduced.

Commercial Club of Omaha v. Chicago & North Western et al. Opinion by Commissioner Clark.
Rates on lumber from Omaha to certain points in Colorado, Kansas and Nebraska found to be unreasonable, and lower rates prescribed. (19 I. C. C., 156.)

Box Shooks Rate Reduced.

Sawyer & Austin Lumber Co. v. St. Louis, Iron Mountain & Southern et al. Opinion by Commissioner Harlan.
Any rate on box shooks between the points involved in this proceeding in excess of the current rate on yellow-pine lumber between the same points is unreasonable. (19 I. C. C., 141.)

Unloading Facilities Found Ample.

Reiter, Curtis & Hill v. New York, Susquehanna & Western. Opinion by Commissioner Harlan.
Complaint, demanding refund of demurrage charges that accrued pending negotiations for, and the construction of, private sidings and connections, the work being completed within 30 days after the request for them was made, dismissed as being without merit.

Unloading facilities that are ample to meet the general requirements of a community need not be enlarged by a carrier to meet the special requirements of a single shipper on a given occasion. (19 I. C. C., 296.)

Reparation Denied.

Idaho Lime Co. v. Atchison, Topeka & Santa Fe et al. Opinion by Commissioner Lane.

The charge of misrouting is not sustained. (19 I. C. C., 139.)

W. P. Craig Lumber Co. v. Virginia Railway et al. Opinion by Commissioner Prouty.

Through rate on lumber from Victoria, Va., to Alliance, Ohio, not found unreasonable. (19 I. C. C., 144.)

Billings Chamber of Commerce v. Chicago, Burlington & Quincy. Opinion by Commissioner Clark.

L. c. L. class rates from Billings, Mont., and Sheridan, Wyo., to points in Wyoming on lines of defendant found to be unreasonable, but reparation denied. (19 I. C. C., 71.)

Reparation Awarded.

Menefee Brothers v. Vicksburg, Shreveport & Pacific et al. Opinion by Commissioner Clements.

Charges on carload of shingles from Monroe, La., to Crowell, Tex., found unreasonable. (19 I. C. C., 117.)

William Cameron & Company, Inc. v. Houston, East & West Texas et al. Opinion by Commissioner Prouty.

Rate on shipment of lumber from Davisville, Tex., to Santa Rita, N. Mex., and from Saron, Tex., to Altus, Okla., found unreasonable. (19 I. C. C., 146.)

Gamble-Robinson Commission Co. v. St. Louis & San Francisco et al. Opinion by Chairman Knapp.

Rates collected on shipments of apples from Cedar Gap and Seymour to Minneapolis and St. Paul, to the extent that they exceeded 34 and 34½ cents per 100 lbs., found unreasonable. (19 I. C. C., 114.)

A. H. Millar v. New York Central & Hudson River et al. Opinion by Commissioner Clements.

The fact that the lower rate had been maintained for several years is in the nature of an admission that it was a fair one under the circumstances. *Ocheltree Grain case*, 13 I. C. C., 46, cited and followed. (19 I. C. C., 78.)

Bott Brothers Manufacturing Co. v. Chicago, Burlington & Quincy et al. Opinion by Commissioner Prouty.

Present rates on barrel staves and heading from Malden, Mo., and points in Arkansas, to Alexandria, Mo., found unreasonable, and reasonable rates prescribed for the future. Through route established over certain lines. (19 I. C. C., 136.)

W. W. Rutland and E. L. Rutland, Partners, doing business as The Canadian Valley Grain Co., v. Chicago, Rock Island & Pacific et al. Opinion by Commissioner Harlan.

The record herein brings the complaint within the principle announced in *Kiel Woodenware Co. v. C., M. & St. P.*, 18 I. C. C., 242, where reparation was awarded for the failure of a carrier to post a tariff changing a rate. (19 I. C. C., 108.)

STATE COMMISSIONS.

Wisconsin: Refund Ordered.

J. H. Kaiser Lumber Co. v. Chicago, St. Paul, Minneapolis & Omaha.

Petition alleging exorbitant rates on shipments of logs from Stinson Spur, Wis., to Eau Claire, the rate exacted having been advanced through an error in the published tariff, which error was rectified after the shipments had moved and the rate contended for was re-established.

Wisconsin: Refund Ordered.

Schwoegler & Kelly v. Chicago, Milwaukee & St. Paul and Minneapolis, St. Paul & Sault Ste. Marie.

Petition alleging overcharges on certain shipments of stone from Colfax to Madison, Wis.; also alleging that the rates of 12½ cents per 100 lbs. on stone between the above mentioned points are unreasonably high and praying that a reasonably joint rate be established. The rates complained of are unreasonably high and the establishment of a joint rate of 10 cents is ordered.

Wisconsin: Warehouse Site Furnished.

Roberts Produce Co. v. Chicago, St. Paul, Minneapolis & Omaha.

Petition alleges that respondent company has refused to lease to petitioner a piece of ground on its right of way for an extension of petitioner's warehouse, in violation of Sec. 1802a of the statutes. Within the meaning of the above mentioned statute public interest and the reasonable convenience and necessities of the petitioner require that respondent furnish the site which petitioner asks at a reasonable rental.

Wisconsin: Station Employee Ordered.

E. G. Brown et al. v. Minneapolis, St. Paul & Sault Ste. Marie.

Petition alleging inadequate station facilities and service at Hillsdale. It is ordered that the respondent provide a reason-

an adequate waiting room for passengers and a convenient storage room for freight and baggage; that a capable and competent caretaker, whose duty it shall be to attend and meet the station, give out information with reference to trains and other matters, notify consignees of the arrival of trains, and in general do those things which are customarily performed by the agents of railway companies at stations of this character.

Wisconsin: Close Direct Train Construction Ordered.

C. Knapp v. Illinois Central, Chicago, Milwaukee & St. Paul.

Petition by a hotel keeper alleging inadequate train service, inadequate maintenance of way, unsanitary condition of certain coaches, and unreasonably poor train connections at certain junction points, as well as excessive irregularity in running schedules of trains.

It is ordered that respondent companies establish close direct train connections between designated trains at Dili Station. A report of the condition of the roadway and coaches is introduced, and the various other questions of service held in abeyance, subject to such further orders as circumstances may indicate to be necessary.

Wisconsin: Maintenance of Highway Bridges.

Town of Rhine v. Chicago, Milwaukee & St. Paul.

Petition praying that the respondent be ordered to make necessary alterations or reconstruct two highway bridges on its right of way. The highway existed prior to the construction of the railway and necessary bridges were maintained. In building the railway in 1871 the natural course of the creek was changed, but in order to avoid expensive litigation the town constructed the necessary new bridges and has since maintained them. It is conceded that the bridges are unsafe for public travel.

The bridges in question form a part of the approaches to the crossings over the railway tracks and it is the duty of the respondent to maintain such bridges so that the same will be safe and convenient for public travel.

Wisconsin: Rate Schedule Approved.

Frank B. L. Fullmer v. Wausau Street Railroad.

The testimony on the re-hearing and the investigations of the commission revealed a situation with respect to respondent's business somewhat different from that which was assumed in the first proceeding. Material changes have taken place in the business. The railway system has been extended. An unusual advance in traffic and revenues has resulted, and the annual rate of profits has greatly increased. The rate of profits shown by respondent's reports was higher than the rate found by the commission, on account of the respondent company's former practice of charging numerous items of operation and maintenance to the construction account. This practice has apparently ceased and the company seems to be endeavoring to comply with the uniform accounts required by statute. A new and simpler schedule of rates has been proposed by respondent and put into effect March 10, 1910. This schedule is approved herein, subject to such changes as may be made hereafter in accordance with law. The order reaffirms the original order with respect to combination or joint tickets, with respect to separate accounts showing the operation of the park and also separate accounts for each class of passenger fares.

COURT NEWS.

Judge Martin, of the United States district court, sitting at Windsor, Vt., on July 27 fined the Montpelier & Wells River \$1,000 for discrimination in a shipment of coal.

Judge Hollister, of the United States circuit court at Cincinnati, Ohio, decided in favor of the plaintiff on July 27 in the case of Edwin S. Dickerson v. the Louisville & Nashville. The road, after accepting a shipment, found that the Pittsburgh, Cincinnati, Chicago & St. Louis, the connecting line over which the shipment was to be made, was congested with freight. The shipment was sent by another route, resulting in a higher charge than was originally shown on the bill of lading. The court held that the defendant road could not collect the excess in charges.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Leah Nelson, secretary of the Pennsylvania Railroad, has been appointed a secretary of the Northern Central, succeeding Stephen W. White, and secretary of the West Jersey & Sea Shore, succeeding J. M. Harding, deceased.

E. C. Gordon, assistant general freight agent of the Chicago, St. Paul, Minneapolis & Omaha at Minneapolis, Minn., has been elected secretary, treasurer and general manager of the Williamsville, Greenville & St. Louis, with office at Greenville, Mo.

Stephen William White, secretary of the Northern Central Railway and other subsidiary companies of the Pennsylvania System, has been retired under the pension rules, having reached the age limit of 70 years. Mr. White was born in Philadelphia on July 16, 1840, and at the age of 18 was graduated from the Central High School as Bachelor of Arts, and five years later received from the same school the degree of Master of Arts. He entered the service of the Pennsylvania Railroad System in January, 1875, as assistant secretary of the Northern Central, and was elected secretary of that company in September, 1877, which position he has occupied continuously since that time.

Operating Officers.

J. O. Gordon, superintendent of the Chicago Great Western at Des Moines, Iowa, has been appointed also superintendent of the Leavenworth Terminal & Bridge Company.

F. M. Bowman, assistant to the president of the Gulf, Texas & Western at Jermyn, Tex., has been appointed assistant general manager of the Crosbyton & South Plains, a projected line in Texas.

J. L. Orbison, superintendent of telegraph of the Cincinnati, Hamilton & Dayton, has been granted an indefinite leave of absence on account of ill health. Reports heretofore made to him will be made to the general superintendent.

Guy Adams, supervisor of mails of the Chicago, Rock Island & Pacific, the St. Louis & San Francisco and the Evansville & Terre Haute, has been appointed manager of mail traffic of the Chicago, Rock Island & Pacific, with office at Chicago.

W. H. Gunzleman, chief dispatcher for the Chicago & Alton at Bloomington, Ill., has been appointed trainmaster of the St. Louis division. S. H. A. Henderson, night trainmaster for the Kansas City Southern at Oklahoma City, Okla., succeeds Mr. Gunzleman.

Albert Dabney Shelton, who has been appointed superintendent of the Southern Railway, with office at Greensboro, N. C., was born July 4, 1875, at Chatham, Va. He began railway work in February, 1890, with the Richmond & Danville, and has been in continuous service with that company and its successor, the Southern Railway, up to the present time. During this period he has been consecutively messenger, clerk, operator, agent operator, dispatcher, chief dispatcher and then trainmaster, which position he held at the time of his recent appointment as superintendent.

Traffic Officers.

W. J. Walker has been appointed a commercial agent of the Timpson & Henderson, with office at Timpson, Tex.

S. P. Sanford has been appointed special traffic agent of the Atchison, Topeka & Santa Fe, with office at Los Angeles, Cal.

R. G. Thompson, district passenger agent of the Wabash at Indianapolis, Ind., has been appointed division passenger agent, with office at Chicago.

W. B. Gibbs has been appointed traveling freight and passenger agent of the Chicago & Alton, the Minneapolis & St. Louis and the Iowa Central, with office at Peoria, Ill.

S. V. Derrah, assistant general freight agent of the Denver & Rio Grande, at Salt Lake City, Utah, has been appointed also assistant general freight agent of the Western Pacific.

The jurisdiction of W. E. Lowes, assistant general passenger agent of the Baltimore & Ohio, with office at Baltimore, Md., has been extended over the Baltimore & Ohio Southwestern.

A. H. Rising, chief clerk in the general freight office of the Southern Pacific at San Francisco, Cal., has been appointed an

assistant general freight agent, with office at San Francisco. E. W. Clapp, district freight and passenger agent at Fresno, Cal., succeeds Mr. Rising.

F. W. Robinson, assistant general freight agent of the Oregon Railroad & Navigation Company and the Southern Pacific at Portland, Ore., has been appointed general freight agent, with office at Portland, succeeding W. E. Coman, resigned, to accept service with another company.

H. C. Burnett, general freight agent of the Lehigh Valley, with office at New York, has been appointed assistant traffic manager. F. J. Woulfe, general eastern freight agent, succeeds Mr. Burnett, and C. E. Crane has been appointed general eastern freight agent, with office at New York, succeeding Mr. Woulfe.

J. P. Rogerman, traveling passenger agent of the Baltimore & Ohio Southwestern, at Dallas, Tex., having been promoted to western passenger agent, with office at Kansas City, Mo., W. F. Geisert, traveling passenger agent at St. Louis, Mo., succeeds Mr. Rogerman, with the title southwestern passenger agent. L. G. Paul succeeds Mr. Geisert.

Wm. Fitzgerald, Jr., general freight agent of the Chicago, Cincinnati & Louisville at Chicago, has been appointed assistant general freight agent of the Chesapeake & Ohio of Indiana, with office in Chicago. T. H. Gurney, general passenger agent of the former road at Chicago, has been appointed district passenger agent of the Chesapeake & Ohio of Indiana at Chicago. The jurisdiction of the following officers of the Chesapeake & Ohio has been extended over the Chesapeake & Ohio of Indiana: E. D. Hotchkiss, general freight agent; John D. Potts, general passenger agent; A. P. Gilbert, assistant general freight agent, and C. Lorraine, general baggage agent, all with office at Richmond, Va.

Engineering and Rolling Stock Officers.

O. H. Rehmyer, road foreman of equipment on the Chicago division of the Chicago, Rock Island & Pacific at Chicago, has been appointed road foreman of equipment of the Iowa Central, with office at Oskaloosa, Iowa, succeeding J. L. Brummell, transferred.

George H. Bussing, superintendent motive power of the Evansville & Terre Haute, at Evansville, Ind., has been appointed superintendent motive power of the Buffalo & Susquehanna Railroad and the Buffalo & Susquehanna Railway, with office at Galeton, Pa.

L. R. Byram, formerly signal supervisor on the Iowa division of the Chicago, Rock Island & Pacific, has been appointed signal supervisor on the Chicago Terminal division of that road. H. B. McCallum has been appointed acting supervisor of the Iowa division at Des Moines.

J. D. Lovell has been appointed supervisor of Division No. 21 of the Pennsylvania Railroad, with office at Tyrone, Pa., succeeding L. S. Seymour, transferred, and R. S. Stewart has been appointed assistant supervisor of Division No. 5½, succeeding W. S. Johns, Jr., promoted.

Peter Smith, assistant road foreman of equipment of the Chicago, Rock Island & Pacific at Chicago, has been appointed road foreman of equipment on the Terminal and Illinois divisions, with office at Chicago, succeeding O. H. Rehmyer, resigned to accept service elsewhere.

J. L. Brummell, road foreman of equipment of the Iowa Central at Oskaloosa, Iowa, has been appointed road foreman of engines of the Minneapolis & St. Louis, with office at Minneapolis, Minn. He will have jurisdiction over trainmen, enginemen and all roundhouse foremen on the Eastern division.

Thomas O'Leary, master mechanic on the Tucson division of the Southern Pacific at Tucson, Ariz., has been appointed master mechanic at Los Angeles, Cal., succeeding D. P. Kellagg, whose appointment as shop superintendent of the general shops at Los Angeles has been announced in these columns. W. C. Peterson, roundhouse foreman at Yuma, Ariz., succeeds Mr. O'Leary.

Special Officers.

George McGowan, special officer for the Illinois Central at Champaign, Ill., has been appointed to a position in charge of special agency work on the Memphis division, with office at Carleedah, Miss.

Railway Construction.

New Incorporations, Surveys, Etc.

ARANSAS TERMINAL.—An officer writes that a contract has been given to the Bowers' Southern Dredging Co., Galveston, Tex., for work on the line under construction from Aransas Pass, Tex., southeasterly along the channel of the Aransas Pass & Dock Co. to deepwater, on the east side of Harbor Island. From the shore at Aransas Pass the line will pass over a solid fill, 9,000 ft. long, thence across Stedman Island, about 700 ft. It will then cross the old Corpus Christi channel on a 500-ft. trestle, thence over a fill about 1.5 miles long, crossing an arm of Corpus Christi bay to Harbor Island, continuing on Harbor Island to the east side of the island. C. E. Corrigan, chief engineer, Box 183, Aransas Pass. (April 15, p. 1014.)

ARIZONA, MEXICO & GULF OF CALIFORNIA.—Plans for the water terminal at Port Lobos, Mex., have been completed by the Robbins-Ripley Co., engineers and contractors, New York. The terminal consists of a pier 500 ft. long, to be partially shedded and so located that there will be sufficient depth of water for the largest ocean vessels, with an approach 2,500 ft. long leading in to the shore. As the waters of the Gulf of California are infested with the teredo, some provision had to be made to procure a permanent type of piling, which resulted in the adoption of the Ripley combination piling throughout the entire structure, this type of piling having been successfully used in a large dock built at Port au Prince, Hayti. It is expected that the construction work on the pier and approach will be started at once. (July 22, p. 173.)

BALTIMORE & OHIO.—R. J. Malone, railway contractor, who has a contract for work on the line between McCool, Ind., and Wellsboro, including about 8,000 cu. yds. of grading, to be completed by November 1, has sublet 10 concrete bridges to J. J. O'Heron & Co., Chicago.

BATON ROUGE, HAMMOND & EASTERN.—Improvements, including ballasting and banking, are being carried out on this line from Baton Rouge, La., east to Hammond, 44 miles. This work was made necessary on account of the increased traffic.

BRITISH COLUMBIA & ALASKA.—According to press reports from Seattle, Wash., plans are being made to build from Vancouver, B. C., north via Litton and Fort George, to the northern boundary of British Columbia. The company has under consideration the question of building a line via Telegraph Creek to Skagway, Alaska. J. Wolkenstein, president, Seattle. H. G. Villard is also interested.

CARLTON & COAST.—An officer writes that this company is building a line from Carlton, Ore., northwest to Fairdale. The work, which includes two combination Howe truss bridges, is being done by the company forces. Chas. E. Ladd, president; M. L. Johnson, chief engineer, Concord building, Portland, Ore.

CHARLOTTE HARBOR & NORTHERN RAILWAY.—An officer writes that the extension from Arcadia, Fla., north has been completed for 44 miles to Pierce, and is now in operation. The company is building with its own forces an additional three and a half miles, which will give the company a total of 100.5 miles of line. The extension will be continued further north to Plant City, in all 112 miles. (April 9, p. 820.)

CONCHO, SAN SABA & LLANO VALLEY.—Press reports from Galveston, Tex., say that this line was opened for operation on August 1. (See Atchison, Topeka & Santa Fe, Dec. 17, p. 1213.)

COPPER RIVER & NORTHWESTERN.—Press reports indicate that the four-span bridge across the Copper river between Miles and Childs glaciers in Alaska has been completed, establishing train service to Mile 116. The new town of Chilitina at Mile 138 will probably be reached by September 1. (June 10, p. 1436.)

GREAT NORTHERN.—Plans are said to have been submitted to the Washington Railroad Commission for construction work on a part of the main line west of Wellington, Wash., in the Cascades, including a new tunnel at a lower level than the present tunnel. The work now under way by this company at Wellington and west of that place is expected to be finished by December 1, and will cost about \$1,500,000.

HOUSTON & TEXAS CENTRAL—See Southern Pacific.

JAMES RIVER VALLEY & NORTHWESTERN.—According to earlier reports, the line from Blunt, S. Dak., on the Chicago & North Western, north to Gettysburg, also on the C. & N. W., has been opened to operation. (July 23, 1909, p. 168.)

LARAMIE, HAYDEN'S PEAK & PACIFIC.—An officer is quoted as saying that this road, which is now in operation from Laramie, Wyo., west to Centennial, thence south to Foxpark, 51.6 miles, is to be extended southwest to Steamboat Springs, Colo. It is expected to have the work finished during 1910. (April 16, p. 121.)

MISSOURI, OKLAHOMA & GULF RAILROAD.—An Oklahoma letter has been granted for a company of this name, capitalized at \$2,000,000, to build lines of railway and to acquire any already built, in the state of Oklahoma or elsewhere. The company is also given authority to bridge the Red river at a point in Bryan county. The Missouri, Oklahoma & Gulf Railway was chartered under the laws of Oklahoma territory in October, 1895, to build a north and south line from the Kansas state line to Red river. (July 22, p. 174.)

RED RIVER & GULF.—This is the new name of the Red River Railway, which has recently filed amended articles of incorporation with the Secretary of State of Oklahoma, changing its name. It proposes to build from Oklahoma City south to the Red river near Grady, Jefferson county, 150 miles, and from Oklahoma City, southwest to the Red river in Jackson county, 125 miles. The directors include: Joseph Moore, George Robertson, F. J. Hawk, S. C. Hawk, Oklahoma City, and J. W. Hooker, Purcell.

ST. LOUIS, BROWNSVILLE & MEXICO.—An officer states that work on the Tres Palacios branch to College Port, Tex., in Matagorda county, is nearing completion. About 10 miles of this branch was built some two years ago, and with the extension it will have a total length of about 17 miles. The line is being laid with 65-lb. rail taken from the main line. The company is at present laying 17 miles of 80-lb. rail on the main line, and will probably lay an additional 17 miles this fall. (April 1, p. 918.)

SAN PIERO, LOS ANGELES & SALT LAKE.—An officer writes that the report that a branch is to be built from the main line west to Ely, Nev., is premature. Nothing definite has yet been determined.

SAVANNAH, AUGUSTA & NORTHERN.—An officer writes that a grading contract has been given to C. M. Purdue, Rocky Ford, Ga., for work on an extension of 15 miles. The bridge work and track laying are to be carried out by the company's men. The plans call for a line from Statesboro, Ga., northwest via Colfax, Bland, Portal, Aaron, Miley and Garfield to a point beyond Louisville, of which the first 25 miles is now in operation. Work on the extension will be light. Maximum grade will be 1.0 per cent. and maximum curvature 4 degs. Location work will be started this year for a further extension. (March 25, p. 850.)

SOUTHERN PACIFIC.—According to press reports, the San Joaquin division has been extended from Haiwee, Cal., to Olancho, nine miles. (Feb. 11, p. 329.)

Plans are said to be under consideration for extending the Houston & Texas Central from Llano, Tex., west about 75 miles to a connection with the line of the St. Louis & San Francisco under construction at Menardville. The line may eventually be extended southwest to the Southern Pacific at Sanderson, in Terrell county, in all about 250 miles.

UNION PACIFIC.—According to press reports, work on the Denver-Fort Morgan line in Colorado is to be started in about two weeks. (March 25, p. 850.)

WISCONSIN ROADS.—The Cincinnati Construction Co., which proposes to build a line from Janesville, Wis., northwest to Madison, has filed a certified check for \$5,000 at Edgerton. Plans are being made to begin building operations within 30 days.

Plans are being formulated for building a line from Viroqua, Wis., southwest to West Prairie, 14 miles. It is said that this work will cost \$250,000.

Railway Financial News.

LOUISIANA & MISSISSIPPI TRUST CO.—The Eastern receiver of the Chicago Terminal Transfer Co. and Eastern of this company has filed his final report in the United States circuit court. His receipts were \$13,079,475 and expenditures, \$12,974,341.

BARTLETT-FLORENCE.—S. W. Brown, Georgetown, Tex., has been appointed receiver of this road, which runs from Bartlett to Jarrell, 12 miles.

LOUISIANA & MISSISSIPPI RAILROAD.—The preferred stockholders' committee, J. N. Wallace, chairman, says that a majority of the preferred stock has been deposited under the agreement of May 12, 1910, and the time for the deposit of preferred stock with the Central Trust Co., New York, has been extended to August 8, 1910.

BUFFALO & SUSQUEHANNA RAILWAY.—William Salomon & Co., New York, are offering at par \$383,000 6 per cent. receiver's certificates of July 1, 1910-July 1, 1911. This is part of an authorized issue of \$750,000 receiver's certificates, having a prior lien on all of the property in the hands of the receiver of the Buffalo & Susquehanna Railway, which company leases the property of the Buffalo & Susquehanna Railroad.

CANADIAN NORTHERN.—President Mackenzie is quoted as saying: "We want the Intercolonial, which will be the natural extension of the Canadian Northern from Montreal to the Atlantic seaboard."

CANADIAN NORTHERN ONTARIO.—The Ontario & Ottawa, a Canadian Northern Ontario subsidiary, recently incorporated to build connecting lines in Ontario, is to apply to the Canadian Railway Commission for permission to buy the following roads: Brockville, Westport & Northwestern, Brockville, Ont., to Westport, 45 miles; Irondale, Bancroft & Ottawa, Grand Trunk Junction to Bancroft, 48 miles; Marmora Railway & Mining Co., junction with Central Ontario Railway to iron mines, 10 miles, and Central Ontario Railway, Picton to Maynooth, 132 miles, and branch to Coe Hill iron mines, eight miles.

CHICAGO, KALAMAZOO & MICHIGAN.—See Grand Trunk.

CHICAGO, ROCK ISLAND & PACIFIC.—See editorial note in this issue.

DENVER & RIO GRANDE.—See editorial note in this issue.

GRAND TRUNK.—It is understood that negotiations are under way for a lease of 11 miles of the Chicago, Kalamazoo & Michigan, giving the Grand Trunk entrance into Kalamazoo, Mich., via Pavilion.

GRAND TRUNK PACIFIC.—This company is offering for subscription in London £2,000,000 (\$10,000,000) first mortgage 3 per cent. bonds at 82½.

INTERCOLONIAL.—See Canadian Northern.

LEHIGH VALLEY.—See editorial note in this issue.

MISSOURI PACIFIC.—See editorial note in this issue.

NATIONAL OF MEXICO.—See Southern Pacific.

ONTARIO & OTTAWA.—See Canadian Northern Ontario.

RIO GRANDE RAILROAD.—This property was sold under foreclosure on July 26 to William E. Guy, of St. Louis, Mo., who is said to be acting for the St. Louis & San Francisco. The road runs from Brownsville, Tex., to Point Isabel, 23 miles, and has \$44,000 bonds and \$225,000 stock outstanding.

ST. LOUIS & SAN FRANCISCO.—See Rio Grande Railroad.

SOUTHERN PACIFIC.—An agreement has been made for trackage rights over the National of Mexico tracks from Orendain, on the Southern Pacific of Mexico, to Guadalajara, and for the use of the National of Mexico's terminal facilities at Guadalajara.

THIRD AVENUE (NEW YORK).—The Public Service Commission has disapproved the reorganization plan submitted by the bondholders, but a final decision is withheld until the applicants can amend their petition and submit evidence on certain matters. (Dec. 10, '09, p. 1169.)

WABASH.—See editorial note in this issue.

WESTERN PACIFIC.—See editorial note in this issue.

Supply Trade Section.

The Isthmian Canal Commission will receive bids until August 29 for deformed steel bars. (Cir. No. 599.)

George W. Hutton, age 62 years, a director of McGuire-Cummings Manufacturing Co., Chicago, died July 27.

The Canadian General Development Company has ordered one class 45-16-2½ Atlantic steam shovel from the Atlantic Equipment Co., New York.

The North American Railway Specialties Co., Chicago, has been incorporated with a capital stock of \$20,000. The incorporators are: S. J. Cotsworth, S. P. McGough and E. M. Fry.

The Strohmeyer Brake Shoe Co., Camden, N. J., has recently been incorporated with a capital stock of \$100,000. The incorporators are Julius Strohmeyer, C. A. Harris, Jr., H. S. Peddle and William W. Morton.

The Robbins-Ripley Co., engineers and contractors, New York, have completed plans for a large water terminal at Port Lobos, Mex., for the Arizona, Mexico & Gulf of California. See this company under Railway Construction.

E. R. Hibbard, president of the Grip Nut Company, Chicago, accompanied by his wife and 16-year-old son, left Chicago July 28 on a 10 weeks' trip to the Orient. Mr. Hibbard says "there are still a few heathen not using grip nuts."

The Railway Brake & Shoe Co., Moundville, W. Va., will establish a plant at Moundville, W. Va., for the manufacture of brake shoes. The building will be 80 x 300 ft. and will cost \$10,000. The company will install about \$20,000 worth of equipment.

C. W. Allen, vice-president of the L. J. Bordo Co., Philadelphia, Pa., will sail for Europe August 3 on the S. S. Caronia of the Cunard Line, for a six weeks' trip, combining business and pleasure. Mr. Allen will be accompanied by his son, George K. Allen.

The Bucyrus Company, South Milwaukee, Wis., has secured all the rights to manufacture and sell the Heyworth-Newman drag line excavator, formerly held by James O. Heyworth, of Chicago. A complete line of these excavators will be developed and placed on the market.

The Blue Island Rolling Mill & Car Co., Blue Island, Ill., has leased its property to the Chicago, Rock Island & Pacific. By its terms the Rock Island has rented the property for \$2,500 a month, but has the right to purchase the property prior to October 31, 1910, for \$150,000.

At a meeting of the directors of the Westinghouse Electric & Mfg. Co., Pittsburgh, Pa., last week, Edwin F. Atkins, of Boston, Mass., was elected president, succeeding George Westinghouse, who remains on the board of directors. It is announced that Mr. Atkins will hold the office only temporarily.

The Shepherd Automatic Switch Co., Montgomery, Ala., has been organized with a capital stock of \$700,000 to manufacture railway switches opened or locked from the locomotive or an electric railway car. M. L. Shepherd, president; Nathan Lohman, vice-president; G. E. Kyser, secretary; T. E. Lovejoy, treasurer.

The American Rolled Gold Leaf Company, Providence, R. I., has engaged the services of Charles H. Bowers and T. J. Lawler. Mr. Bowers was, for about 10 years, with the W. H. Coe Mfg. Co., Providence, R. I., and in his new capacity will be railway sales manager. Mr. Lawler was, for about eight years, with Berry Bros., Detroit, Mich. He entered upon his new duties on June 1.

The Frost Johnson Lumber Company, St. Louis, Mo., bidding as August John Mah, submitted the lowest proposal, on July 27, to the Mississippi River Commission for the delivery of piling during the fiscal year ending June 30, 1911. This piling will be used in the improvement of the Mississippi river between Cairo, Ill., and St. Louis. The quantity will aggregate approximately 15,000 sticks, averaging 50 ft. long. This is equal to 1,000 car-loads of rough lumber.

J. D. Keen, formerly chairman of the Order of Railway Conductors, L. & N. system, has been appointed general manager of the Pneumatic Jack Company, Louisville, Ky. This company was incorporated last year with a capital stock of \$150,000 for the purpose of manufacturing and selling pneumatic railway jacks, and plans are now being made for the erection of a factory. The officers are as follows: A. T. MacDonald, president; R. S. Brown, vice-president; J. D. Keen, general manager; A. P. Barnard, treasurer; L. J. Dittmar, secretary.

The American Spark Arrester Company, Indianapolis, Ind., whose incorporation was noted in the *Railway Age Gazette* of July 29, has elected the following officers: President, James W. Sale, Bluffton, Ind.; vice-president, H. N. Knight, Oklahoma City, Okla.; secretary, C. A. McCotter, Indianapolis, Ind.; treasurer, C. F. Remy, Indianapolis, Ind. A series of tests of the spark arrester owned by the company has been made at Purdue University, and additional road tests will be made in the near future. It is expected that its adoption will make possible the successful burning of lignite for locomotive fuel.

June sales of the Western Electric Company, New York, were at a rate which verifies earlier prediction of a \$61,000,000 year. Comparisons of 1910's estimated gross sales with preceding years are as follows:

	Gross Sales.	Increase.
1910	\$61,000,000	\$15,000,000
1909	46,000,000	13,000,000
1908	33,000,000	**20,000,000
1907	33,000,000	**16,000,000
1906	69,000,000	25,000,000
1905	14,000,000	12,000,000
1904	32,000,000	2,000,000
1903	30,000,000	1,000,000
1902	29,000,000	5,000,000
1901	24,000,000	.....
1900	24,000,000	.....

*Estimated. **Decrease.

RAILWAY STRUCTURES.

AVONDALE, ALA.—The Alabama Great Southern will build a brick freight depot to cost about \$15,000.

CHATTANOOGA, TENN.—It is said the Queen & Crescent will build a new drawbridge over the Tennessee river about three miles north of Chattanooga.

CLEVELAND, OHIO.—The Terminal Warehouse Co., Cleveland, Ohio, will build a freight station in Cleveland.

DULUTH, MINN.—The Duluth & Iron Range will build a new passenger station. It will be two stories high and cost about \$7,000.

JAMAICA, N. Y.—Excavation work has been started for the foundations of the new station and office building for the Long Island Railroad at Jamaica. It is the intention of the company to put up at the present time a two-story building capable of extension at a later time to eight-stories. (March 4, p. 464.)

KANSAS CITY, MO.—The Chicago, Rock Island & Pacific will build a fireproof freight house 40 ft. x 545 ft., of which 40 x 200 ft. is two stories high, second story to be used for the offices of all the freight houses. The total cost is to be \$85,000. Geo. B. Swift & Co., Chicago, has been given a contract for the work.

The Missouri Pacific will enlarge its present plant at East Bottoms for the purpose of increasing its capacity. The appropriation for improvements is \$100,000 for the locomotive department and \$120,000 for the car department. The entire plans have not been perfected.

LOUISVILLE, KY.—The Louisville & Jefferson Bridge Company is building a structure which will be used as a direct entrance into their yards for Chesapeake & Ohio trains using the Louisville & Nashville tracks between Lexington and Louisville. It will also be used for the interchange of switching and through business between the Chesapeake & Ohio and Louisville &

Nashville. It will be approximately 2,000 ft. long. The structure was authorized by an ordinance passed in December, 1906. The company will build another structure which will be an extension of the present double-track street car viaduct which leaves their bridge at Fulton street. It will be about 1,600 ft. long. Right-of-way for this structure has been secured and the company has asked the city authorities for an ordinance, and proposes to start work at once. Both structures will be about 2,000 tons of steel.

McCool, ILL.—See Baltimore & Ohio report 110 pages on construction.

MASSON, ILL.—The Erie Port is said to be planning to build a new, large roundhouse.

OMAHA, NEB.—The Union Pacific has given the contract for its new headquarters building to James Stewart & Co.

OTTUMWA, ILL.—It is said the Chicago & Alton will build a new roundhouse.

PARIS, TEXAS.—The St. Louis & San Francisco has given a contract for the building of a union depot to cost about \$30,000.

PEORIA, ILL.—The Galesburg & Peoria has secured an option for a half block of land on which they plan to build a freight depot and sub-passenger station.

PETROLEUM CENTER, PA.—The Pennsylvania will build a two-span, through truss bridge over Oil Creek. The bridge will have two spans, 140 ft. center to center of piers, will be 30 ft. high and will require about 320 tons of steel. The total estimated cost is \$11,000. Contract has been given to the American Bridge Company for fabricating the superstructure.

PORT ARTHUR, ONT.—The Canadian Northern has given a contract, it is said, to S. Brown, Winnipeg, Man., for building a roundhouse at Port Arthur.

PORTLAND, ORE.—It is officially reported that the Great Northern will spend about \$1,000,000 in the construction of concrete and frame snowslides in bringing the Cascade division of the road to meet the requirements of the Interstate Commerce Commission.

RUSSELL, KY.—It is reported that the Chesapeake & Ohio will build a roundhouse.

SACRAMENTO, CAL.—An officer of the Northern Electric Railway writes that bids will be received by General Manager A. D. Schindler, San Francisco, Cal., for the steel drawbridge on concrete piers, to be built over the Sacramento river at Sacramento. The bridge is to have two fixed spans, each 125 ft. long, and a draw span 400 ft. over all. The cost of the work will be \$400,000. (July 8, p. 1071.)

SALT LAKE CITY, UTAH.—The new terminal station of the Denver & Rio Grande and Western Pacific will be opened for business on August 15.

SAN BERNARDINO, CAL.—The Atchison, Topeka & Santa Fe has awarded the contract for the building of the new machine shops. The estimated cost is about \$130,000.

SEATTLE, WASH.—It is said the Grand Trunk Pacific Steamship Co. will build a three-story warehouse to cost about \$175,000 in connection with its new dock now under construction.

SCRANTON, PA.—The Scranton Railway Co. will build a \$50,000 office building on Linden street in Scranton.

SILVER GROVE, KY.—The Chesapeake & Ohio is building a roundhouse and blacksmith shop.

TORONTO, ONT.—Bids will be received by registered post only up to September 6, by G. R. Geary, chairman of the Board of Control, for the construction of a steel viaduct on Queens street in Toronto. The structure is to be built over the river Don, and the roadways on each side and over the tracks of the Canadian Pacific, Canadian Northern and the Grand Trunk.

YOUNGSTOWN, OHIO.—Press reports indicate that the Pittsburgh & Lake Erie will build a new station on the site of the old Lake Shore & Michigan Southern station.

YREKA, CAL.—The Yreka Railroad will build a new depot.

Late News.

The items in this column were received after the classified departments were closed.

It is said that the Elgin Joliet & Eastern will expend \$40,000 in improving its shops at Joliet, Ill.

Michigan railway cars are said to be organizing a private commission to appraise their property for their defense against increase of taxation.

John V. Sevin has been appointed westbound contracting agent of the Traders' Despatch, with office at Pittsburgh, Pa., where he will report to J. J. Lynch, agent.

Washington despatches say that the Interstate Commerce Commission will look into the rates, regulations and practices of express companies when it convenes in the middle of September.

John A. Gill has been appointed a traveling freight and passenger agent of the Southern Pacific, with office at Reno, Nev. He will work in conjunction with A. H. Pett, traveling freight and passenger agent.

W. D. Burr, chief of the tariff bureau of the Chicago, St. Paul, Minneapolis & Omaha at St. Paul, Minn., has been appointed district freight and passenger agent, with office at Duluth, Minn., succeeding A. M. Fenton, promoted.

The Canadian Northern steamfitters, who have been on strike for five weeks, have accepted the company's offer of a five cents an hour increase and increased pay for overtime. The company has declined to negotiate with the striking carmen.

President W. E. Corey, of the United States Steel Corporation, has issued a statement to the effect that the constituent companies of the Corporation have not reduced prices of steel products, nor do they contemplate a reduction. This statement followed reports from Chicago that a cut in prices had been decided upon.

The New York, Westchester & Boston has applied to the Public Service Commission, Second district, for authority to issue \$5,000,000 par value 50-year 5 per cent. first mortgage gold bonds, the proceeds of which are to be used for general expenses of right of way and construction of the branch line extending from Mount Vernon, N. Y., to White Plains.

The Chicago, Terre Haute & Bedford will probably be the name under which the Chicago Southern and the Southern Indiana will be reorganized. The total cash requirements to pay off receivers' certificates, bond interest and other claims amounts to \$2,339,157, which will be met by a sale of \$2,500,000 refunding bonds provided for in the reorganization plan. Holders not yet assenting are given until Sept. 1 to deposit their securities.

About 50 per cent. of the Grand Trunk conductors, trainmen and yardmen have been taken back. In the end, it is said, there will be enough positions for the men taken on during the strike and also the old employees. None of the new men will be discharged, however, and between 20 and 30 per cent. of the strikers will not receive immediate employment. The agreement which ended the strike (see page 255) does not say whether or not the strikers regain their pension rights.

New tariffs have been filed by the St. Louis & San Francisco and the Kansas City Southern, to take effect September 11, which will do away with tap line drawbacks. It is understood that the other roads will act accordingly, and that hereafter no reduction or drawback will be given to industrial concerns which own or operate a tap line. In the case of the Star Grain & Lumber Co. the commission had decided that the tap line practice was unjust and discriminatory, and ordered the practice stopped.

F. P. Zimmerman, traveling freight agent of the Cleveland, Cincinnati, Chicago & St. Louis, at St. Louis, Mo., has been appointed commercial agent of the New York Central lines, with office at East St. Louis, Ill. W. W. Baum, contracting freight agent at Kansas City, Mo., succeeds Mr. Zimmerman, and Harry C. Shaw succeeds Mr. Baum. M. A. Greding has also been appointed a traveling freight agent at St. Louis, and L. P. Hickman has been appointed a contracting freight agent, with office at St. Louis.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Mobile & Ohio is in the market for four consolidation locomotives.

The Illinois Central has ordered 35 consolidation locomotives from the Baldwin Locomotive Works.

The Chicago Southern has ordered five consolidation locomotives from the American Locomotive Co.

The Southern Indiana has ordered five consolidation locomotives from the American Locomotive Company.

The Terminal Railroad Association of St. Louis has ordered 10 switch engines from the American Locomotive Co.

The St. Paul & Des Moines has ordered two consolidation locomotives from the Lima Locomotive & Machine Co.

The Maine Central has ordered two Pacific type, four consolidation and four switch engines from the American Locomotive Co.

The Canadian Pacific will build five Mallet locomotives at its Angus shops, similar to the experimental locomotive which was placed in service last winter.

The Michigan Central has ordered 8 consolidation, 8 Pacific and 5 0-6-0 switching locomotives from the Montreal Locomotive Works for September and October delivery.

The Pittsburgh, Shawmut & Northern, reported in the *Railway Age Gazette* of July 15 as being in the market for two locomotives, has ordered two consolidation locomotives from the Baldwin Locomotive Works.

The Baltimore & Ohio, reported in the *Railway Age Gazette* of July 8 as being in the market for 30 Mallet locomotives, has ordered five 0-8-8-0-C type locomotives from the American Locomotive Co. There are 25 Mallets remaining on inquiry.

CAR BUILDING.

The St. Louis & San Francisco has ordered from the American Car & Foundry Co. 500 box cars in addition to the 500 stock cars and 250 tank cars as reported in the *Railway Age Gazette* of July 29.

MACHINERY AND TOOLS.

The Chicago, Rock Island & Pacific has ordered about \$20,000 worth of tools.

The New York Central Lines have ordered machinery at a cost of \$30,000.

The Delaware, Lackawanna & Western has ordered three cranes from Manning, Maxwell & Moore.

The Vulcan Iron Works has ordered about \$12,000 worth of machinery for its plant at Wilkesbarre, Pa.

The Transcontinental Railway has ordered a number of cranes from the Whiting Foundry & Equipment Co., Harvey, Ill.

The Lake Shore & Michigan Southern has ordered a number of tools for its shops in Elkhart, Ind. The road is also in the market for about 15 cranes.

IRON AND STEEL.

The Missouri Pacific has ordered 1,000 tons of structural steel for the Sedalia, Mo., shops.

The Western Pacific has ordered 630 tons of cast iron bases from the American Bridge Company.

The Mexican Central is said to be in the market for 20,000 tons of steel rails of standard sections.

The Union Pacific has ordered 2,500 tons of structural steel for its headquarters building at Omaha, Neb.

The Missouri, Kansas & Texas has ordered 300 tons of cast iron bases for its freight house in St. Louis, Mo.

The New York Central is figuring on 10,000 tons of structural steel for the New York terminal improvements.

The Oregon Railway & Navigation Co. will build a bridge at Portland, Ore., which will require about 7,000 tons of structural steel.

General Conditions in Steel.—The most important feature of the steel situation is that specifications for finished products are being received to an extent which permits the finishing mills to operate at from 75 to 85 per cent. of capacity, notwithstanding the fact that new business is only at about 60 per cent. of capacity. The unilled tonnage on the books is, of course, supplying the difference. The steel interests in Chicago are reported as expecting a substantial increase in business in the latter part of the year. In structural material, there is reported a good volume of business for this season.

SIGNALING.

The Lake Shore & Michigan Southern put in service about August 1 three new three-arm upper quadrant three-position interlocking signals at the Polk street interlocking plant, Chicago. These signals replace three two-arm lower quadrant signals.

The Chicago, Rock Island & Pacific has nearly completed renewing the pole line between Chicago and Rock Island, on the Illinois division. This work involves new telegraph poles throughout for the accommodation of telegraph, telephone and signal wiring.

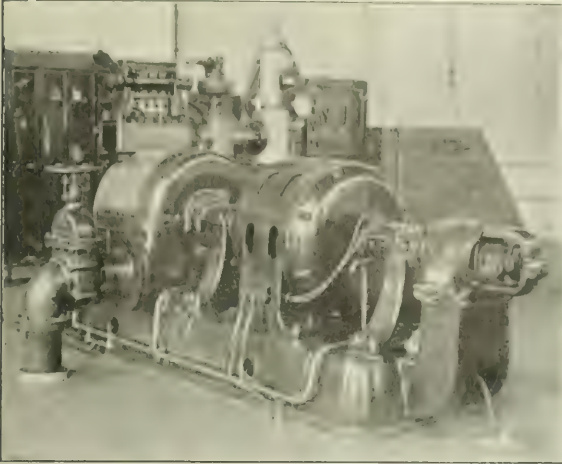
Locomotives for the Prussian State Railways.

Of 900 locomotives to be supplied the Prussian State Railways during the financial year of 1910 not less than 397, or 44.1 per cent., are to be fitted with the Schmidt superheater. The new orders comprise the following: 64 4-4-0 coupled compound express locomotives, with tenders of 21.5 cubic meters water capacity; 127 4-4-0 coupled superheater express locomotives with similar tenders. Of these engines two are to be supplied with continuous current generators on the Stumpf system, and one of these two is to be shown at the forthcoming Brussels Exhibition; 82 4-6-0 coupled superheater express engines, also with tenders of 21.5 cubic meters water capacity. Two of these engines are to be four-cylinder simple locomotives with driving wheels of 6 ft. 5 in., and one of them will also be exhibited at Brussels; 28 2-6-0 coupled passenger tank engines, with Krauss bogie; 60 2-6-0 coupled superheater passenger tanks, with Krauss bogie; 66 2-6-0 compound freight engines, with Adams' axle, and tenders of 12 cubic meters water capacity; 69 0-8-0 coupled compound freight engines, with similar tenders; 91 0-8-0 coupled freight engines with a heating surface of 2,152.86 sq. ft. and tenders of 12 cubic meters water capacity, one of these engines being destined for exhibition at Brussels; 71 0-8-0 coupled superheater freight engines, of which one, with continuous current generator, is also to be sent to Brussels, with tenders of 12 cubic meters water capacity; 31 0-10-0 coupled superheater freight engines, of which one goes to Brussels, with similar tenders; 149 0-6-0 coupled freight tank engines, with Krauss bogie; 35 0-8-0 coupled freight tank engines; 25 0-10-0 coupled superheater freight tank engines; one 4-4-2 coupled four-cylinder compound express engine of the new Hanover type, having Lentz distribution, and a tender of 31.4 cubic meters water capacity, and one 4-6-0 superheater passenger tank engine. Both these two last named locomotives will also be shown at Brussels, so that there will be exhibited there in all seven engines belonging to the Prussian State Railways, while at least a similar number are expected to be shown by other German railway administrations or locomotive builders.

Shop Equipment.

Electrification of Chesapeake & Ohio Shops, Huntington, W. Va.

The Chesapeake & Ohio Shops at Huntington, W. Va., which have been operated from line shafting driven by reciprocating engines, are now electrically driven. There were four independent power stations equipped with locomotive boilers and reciprocating engines belted to line shafts in the different shops,



100-K. W. Curtis Turbine; C. & O. Shops.

and also to one TH arc machine which supplied power to a few open arc lamps about the shops and roundhouse.

The new power station is an all-turbine one, the only reciprocating machinery, save the boiler feed pumps, being two two-stage air compressors built by the Ingersoll-Rand Co., New York, and the Chicago Pneumatic Tool Company, Chicago, which furnish compressed air at 100 lbs. pressure, for the pneumatic drills, hammers and hoists about the shops. Three Curtis steam turbines and one motor generator exciter have been installed. The turbine equipment consists of the following units: One two-bearing, overhung, non-condensing turbine, speed 3,600 r.p.m., connected to a 25-kw., 125-volt, d.c. exciter; one four-bearing, three-unit, 100-kw., set, consisting of one four-stage non-condensing turbine, speed 3,600 r.p.m.; one three-phase, 60-cycle, 480-volt, 100-kw. generator, and one 4-kw., 125-volt, d.c. exciter; one three-bearing four-stage condensing turbine, speed 1,800 r.p.m., connected to a 750-kw., three-phase, 60-cycle generator. All of these turbines are equipped with oil pumps geared direct to the main shaft of the turbine, and the bearings are fitted with oil rings. The 750-kw. and 100-kw. turbines are equipped with cross-head mechanical valve gear driven direct from the main turbine shaft. The 750-kw. turbine is connected to a Westinghouse-Le Blanc jet condenser, the circulating and rotary air pumps of which are driven by a 75-h.p. induction motor. The injection water is cooled by a natural draft cooling tower. This arrangement is very satisfactory as it maintains a vacuum of 27 to 28 in.

The boiler equipment consists of five 275-h.p. Sterling, hand-fired, water tube boilers, equipped with shaking grates. The chimney is of reinforced concrete, 200 ft. high, and is provided with a Bushnell damper regulator. Bituminous coal is used.

The condensing and boiler feed water is supplied from a pumping station located outside of the shops. The feed water is pumped from an open feed water heater to the boilers by two duplex pumps, manufactured by the Platt Iron Works Co. The piping is so arranged that the feed water may be pumped direct from the hot well of the cooling tower. The engine room is spanned by a 7½-ton Harris hand crane.

About 1,000 h.p. of General Electric Co., Schenectady, N. Y., induction motors are distributed throughout the planing mill,

the three pipe shops, the tinne shop, boiler shop and roundhouse, ranging from 15 to 200 h.p. each, and are used to drive the different mills. Most of the motors are belt driven. The large planers, turning lathe, drill press and boring mills are equipped with individual motor drive.

The dismantling shop is spanned by a 100-ton beam hoist, electric crane, manufactured by the Harris Crane Co., and equipped with four variable speed induction motors of the slip ring type.

The buildings are heated by the exhaust steam from the two air compressors, boiler feed pumps, 25-kw. and 100-kw. turbines, and the condensation from the system is pumped into the boiler feed water heater. This arrangement puts a back pressure on the exhaust header of from 1 to 2 lbs.

The changes made in this plant are said to have brought about a saving in coal alone of 50 per cent. They are also said to have effected a saving of 66½ per cent. in the labor required to operate the plant. This is due partly to the improved methods of handling coal and ash and partly to the small number of men required to operate a turbine station. Besides the saving in the cost of coal and labor, the capacity of the shops has been increased. During the month of April this shop turned out 34 locomotives, which was the largest number ever repaired in one month.

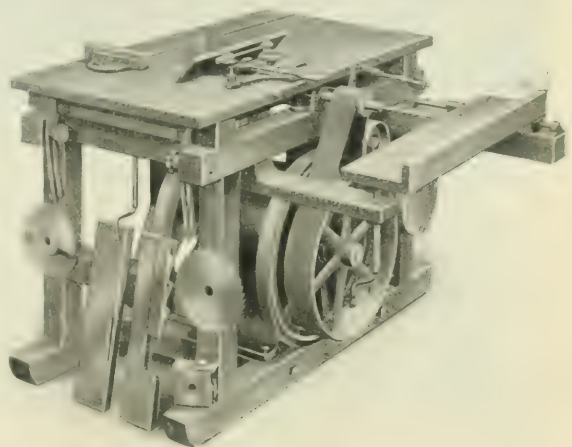
American Contractors Portable Saw Bench.

This machine is particularly adapted to the use of general contractors, concrete workers, contractors and builders and engineers. It is compact, self-contained and very substantially built. It is made portable, being intended to be taken to the job where it will most satisfactorily handle a large variety of light and medium mill work.

It consists of a combined rip and cut-off saw bench with boring attachment, jointer and dado heads, with a gasoline engine mounted on the frame directly under the table and belted direct to the mandrel. A belt tightener is provided with adjustable spring take-up to insure the proper tension on the belt.

The frame and top are made of seasoned hard wood accurately framed and securely bolted together, insuring rigidity and durability. The top is hinged to the rear of the frame, and is readily raised and lowered by the hand screw and held in any position by the clamps on each side. The mandrel is 1½-in. steel, with self-oiling babbitted boxes, yoked together. The end has a ½-in. hole to receive the bit shank, and a hollow safety set screw to hold it securely.

The boring table has a steel slide, a travel of 6 in. in line with the spindle and a vertical adjustment of 3½ in. Adjust-



American Portable Saw Bench.

able ripping and cut-off gages are furnished. The ripping gage is provided with a tilting fence for bevel sawing and has rapid, fine adjustment and may be secured at any point. The cut-off gage slides in an accurately-planed iron groove, the entire length of the table, and can be set to cut square or any angle to 45 degs.

The regular equipment consists of Hooper cooled type engine

with batteries, spark coil and connections; driving belt; rip and cut-off gages; one 12-in. rip saw; one 12-in. cut-off saw; one $\frac{1}{2}$ -in. and one $\frac{3}{4}$ -in. dado head; one jointer head with four 2-in. knives; one $\frac{1}{2}$ -in. and one 1-in. auger bits; one cast iron jointer table with adjustable section for rabbitting; one throat piece for dado head; one throat piece for saws; oil can and wrenches.

This machine may be equipped with electric motor to suit any current or voltage. The floor space required is 54 in. x 54 in. The table of the machine is 54 in. x 30 in. x $1\frac{1}{4}$ in. Total height is 36 in. The weight of the machine as described is 960 lbs., although without the boring attachment it weighs but 900 lbs.

This machine is made by the American Saw Mill Machinery Co., Hackettstown, N. J.

Exhibition of Bolt, Nut and Forging Machinery.

The National Machinery Company, Tiffin, Ohio, will hold an exhibition of bolt, nut and forging machinery at its shops in Tiffin, August 19, 22 and 23.

In 1908 this company remodeled and greatly enlarged its plant, installing a number of electric traveling cranes and adopting electric power throughout its shops. The designs of the former National machines have been greatly improved and

Improved Steel Axles.

The Gould Coupler Company has made several changes in its axle forge at Depew, N. Y., to insure the manufacture of the highest possible grade of steel axles for locomotives and cars. The former practice was to buy the steel billets, which had been rolled at the mills, and reduce and hammer them to shape under helve hammers. Axles made in this way were found to have a good hard surface but the material was not thoroughly worked at the center. An extensive investigation was made as to how this might be overcome, the final conclusion being that the billets, instead of being rolled, should be pressed, insuring the thorough and uniform working of the material throughout the axle, after which they could be finished under the helve hammer, as usual. This decided, the next problem was to find a satisfactory press for doing the work. It must be of high capacity and at the same time quick acting. Such a press, known as a high-speed steam-hydraulic forging press, Davy Brothers Limited, patents, was being used extensively abroad and was about to be introduced in this country by the United Engineering & Foundry Company, Pittsburgh, Pa.; one of 1,200 tons capacity was contracted for and installed at Depew. Following is a comparison of the physical properties of the rolled



Interior of Main Shop; National Machinery Co., Tiffin, Ohio.

will be exhibited along with a number of new designs, especially adapted to railway shop service.

The intention of the company in holding this exhibition is to familiarize railway officers and foremen with these new designs by demonstrating the machines under actual working conditions. Over 50 machines will be shown on the exhibition floor, most of which will be in operation. The exhibition will include forging machines, bolt headers, continuous and automatic rivet machines, several types of semi-automatic machines for tapping and boring hot pressed nuts, vertical roll threaders for handling bolts and long rods, lag and coach screw machines, which handle the screws direct from the header without previous case painting, bolt pointers, die sharpeners, bolt cutters, etc. Many of these machines will be motor-driven to illustrate the mechanical motor applications employed by this company.

An invitation is extended to all railways officers and foremen interested in these machines. The International Railway Master Blacksmiths' Association, which will be in convention at Detroit, August 16-18, will go to Tiffin by special train to attend the exhibition on Friday, August 19. August 22 and 23 will be devoted to the interests of the various other railway officers and the trade in general.

and the new process axles, based on a carbon content of .35 per cent.:

	New process.	Roller
Tensile strength, lbs. per sq. in.	82,000	68,000
Reduction of area, per cent.	24 to 43	14 to 28
Elongation, per cent.	18 to 25	13 to 20

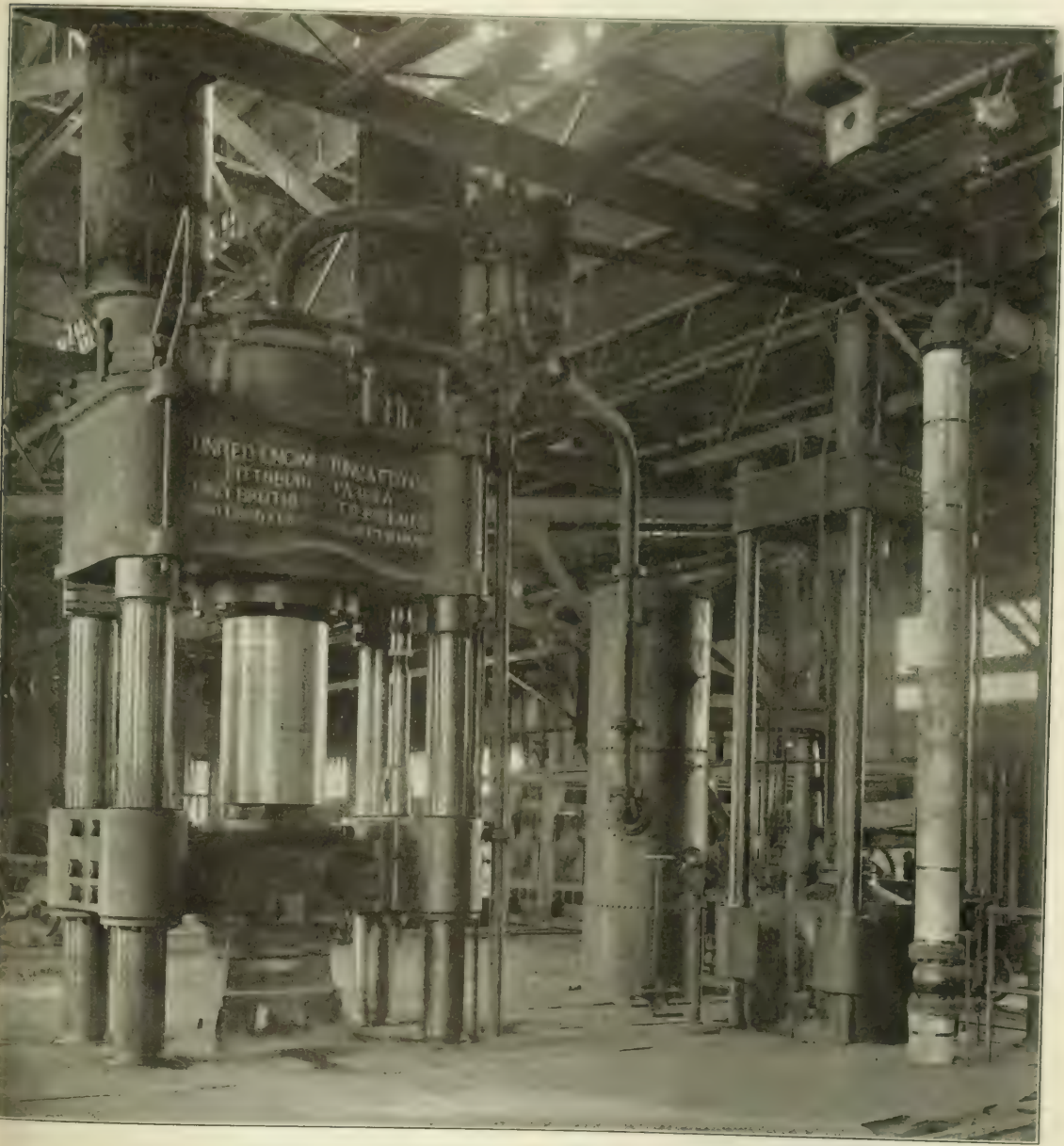
The specific gravity of the pressed axles has been found to be slightly greater than that of the rolled ones, undoubtedly due to the more thorough working. The billets are made at the Gould steel plant at Depew, so that the company controls the material in the axle from start to finish.

The 1,200-ton press is one of a large number of sizes which are being built by the United Engineering & Foundry Company, ranging from 100 to 12,000 tons in capacity and adapted for all classes of forging, shearing and pressing. They are superior to the steam hammer, both as concerns production and the soundness and accuracy of the forgings produced. The blow of the steam hammer is limited to a moderate and chiefly surface action on the steel, reducing the total thickness about $\frac{1}{2}$ in., while the press can make a reduction in thickness of nearly 3 in. in practically the same time, making a stroke four to six times as effective as the blow of a hammer in approximately the same time, and working the metal through its entire

section, tending to solidity and eliminate any loose fitting or defects, the hammer working more on the surface of the metal causes it to overlap and attenuates these defects. Another important advantage is that the high speed hydraulic forging press can be operated with about one-half the steam consumption that a hammer of equal capacity takes. There is also a considerable saving in repairs and upkeep due to the absence of heavy shocks and vibration. By means of a patented single lever controlling

exact stroke in both operations of punching and shearing.

The press consists of the press proper with the main hydraulic cylinder and steam lifting cylinders, and the steam-hydraulic intensifier equipped with the patented single-lever controlling gear, also the air tank or prefiller, with air and water pump to fill the prefiller to a pressure of about 60 lbs. per sq. in. and refill periodically to take care of any leakage that may occur. Its operation is as follows: The total stroke of the



1,200-Ton Press in Gould Axle Forge, Depew, N. Y.

gear, the hydraulic forging press can be operated at a high rate of speed—fully as fast as a steam hammer. By this single-lever control the movement of the presshead exactly follows that of the controlling lever, as regards both speed and length of stroke, so that while the high speed can be obtained for certain classes of work, a slow speed may also be used when forging to

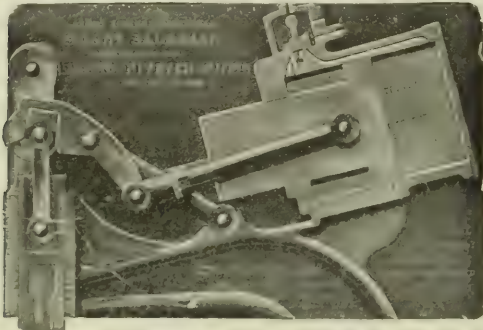
intensify blows to the presshead an active stroke of 6 in. This stroke is ordinarily sufficient for forging and swaging, as well as for finishing, but where a longer stroke is required, it can be obtained by an additional stroke of the operating lever. For lifting the crosshead to its highest position, the operator moves the controlling lever a little backward, and the

crosshead will rise to such a height as may be required, the water in the main cylinder returning into the prefiller. As soon as the operating lever has again moved forward, the water of the prefiller, through the action of the compressed air, will flow back into the main cylinder, making the presshead drop instantly, and the working stroke commences as soon as the die touches the forging. There are two kinds of operations, that of working with short strokes for quick forging, and that of having the press make long strokes, which can be increased up to the maximum stroke of the main cylinder, but both kinds of movements may follow each other instantaneously, following simply the movements of the operating lever. This lever can be moved by the operator without any noticeable effort and its movements are always faithfully followed by corresponding movements of the presshead of the press.

The intensifier and prefiller are separated from the press as shown in the illustration. The hydraulic cylinder of the intensifier is fitted with a patent stuffing box, which allows the packing to be changed in a few minutes, and without disturbing any important part.

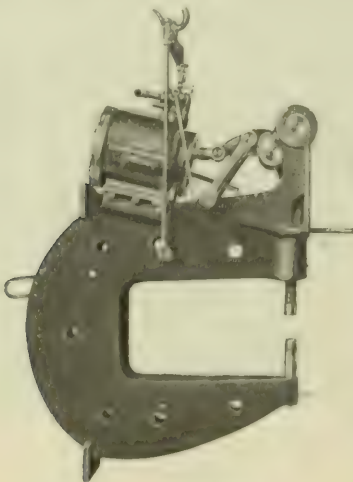
Hanna Pneumatic Riveters.

In the Hanna type of riveter there is a combination, in simple form, of toggles, levers and guide links to give the large opening of the toggie joint movement with a gradually increasing



Cross Section through Cylinder.

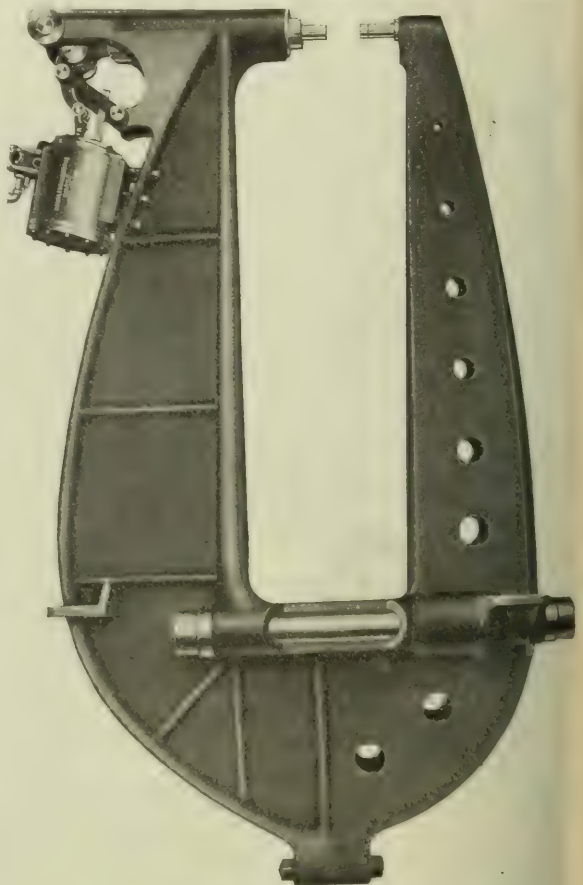
pressure and then a simple lever movement throughout a considerable space under maximum pressure. This space is sufficiently great to assure the proper pressure being applied to



Hanna Riveter.

the rivet, and the machine once adjusted for a certain length of rivet and thickness of plate will require no further adjustment for ordinary variation in those dimensions, thus producing

hydraulic results with a pneumatic riveter. The arrangement of these levers and toggles, and also of the cylinder and valve, is shown in the cross section through the cylinder. The characteristic features of the Hanna type of riveter are as follows: Only one blow is required to a rivet, on account of the considerable distance through which the pressure is exerted; careful adjustment is unnecessary, and it is only required to strike the rivet once. With the adjustment necessary for an ordinary riveter, the Hanna type will accomplish the same result with one-half stroke. For this reason it requires much less air than other types, which often require from two to four strokes to properly drive a rivet. The Hanna type, therefore, saves time and air. The uniformity of the work done by this riveter has often been shown by the most exacting inspection and testing. The construction of the machine and the methods of lubrica-



Hanna Pneumatic Riveter.

Source: *Engineering*, Vol. 21, No. 1, 1900, p. 70.

tion are such as to make the wear and tear of this riveter very slight.

The same firm manufactures a hydro-pneumatic type of riveter, in which the riveting die is connected directly to the hydraulic plunger, which is acted upon by both high and low pressure. The low pressure brings the die up to the rivet, and the high pressure is applied for the final upsetting. The low pressure also returns the die to its original position. The high pressure is produced by an intensifying arrangement composed of an air piston operating a much smaller hydraulic plunger, all self-contained within the riveter. This machine gives results about the same as the plain hydraulic machine without the trouble of conducting water under a very high pressure.

The Hanna Engineering Works, Chicago, manufacture a large line of pneumatic and hydro-pneumatic riveters, both plain and toggle joint.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED WEEKLY, FRIDAY, AUGUST 12, 1919
THE RAILROAD GAZETTE, 115 N. 4TH ST., PHILA., PA.
THE RAILWAY AGE, 115 N. 4TH ST., PHILA., PA.

CHICAGO: Plymouth Bldg. CLEVELAND: Western Bldg.
LONDON: Queen Anne's Gate, W. NEW YORK: 115 N. 4TH ST.

W. H. BOARDMAN, President

E. A. SIMMONS, Vice-President
The address of the company is the address of the publisher.

EDITORS

W. H. BOARDMAN, Editor.	RAY A. WATSON	G. H. AUSTIN
SAMUEL O. DUNN,	LESLIE M. CHURCH	W. J. HOPKINS
Western East Mgr.	G. L. FOWLER	E. L. LITTLE
BRADDOCK BOARDMAN,	WILLIAM T. DAVITT	F. W. KRAEGER
Eastern East Mgr.	S. W. LINSLEY	H. H. STEPHENS
	CLARENCE DUNN	

Subscriptions, including regular weekly issues and special half-yearly issues published from time to time in New York, are in advance, except New York, payable in advance and postage free:

United States and Mexico.....	\$3.00 a year
Canada.....	\$3.00 a year
Foreign Edition (London).....	£1.10, \$18.00 a year
Single Copies.....	10c each

Shop Edition and the eight M. M. and M. C. R. Convention Daily Issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as second-class of the second class.

VOLUME 49. FRIDAY, AUGUST 12, 1919. NUMBER 7.

CONTENTS

EDITORIAL:

Editorial Notes.....	271
The Railway Outlook.....	272
The Charcoal Iron Car Wheel.....	273
New Books.....	274
LETTERS TO THE EDITOR.....	274

ILLUSTRATED:

The Plating Device.....	279
Santa Fe Rail Shims.....	279
Double-Track Railways in Michigan.....	280
Mikado Locomotives for the A. B. & N.....	280
Viaduct and Subway at Pocatello, Idaho.....	283

MISCELLANEOUS:

The Duties of the Chief Train Despatcher.....	274
Accident Bulletin, No. 35.....	276
International Railway Congress.....	279
A Judicial Opinion on the Long and Short Haul Question.....	285
Foreign Railway Notes.....	278

GENERAL NEWS SECTION.....	287
---------------------------	-----

SUPPLY TRADE SECTION.....	290
---------------------------	-----

MORE than 65 delegates, representing nearly all the large and many of the smaller roads of the United States, were at the conference of railway counsels held at Portsmouth, N. H., last week to discuss the legal questions that are presented by the new law to regulate commerce. In some cases the railways were represented by the vice-president at the head of the legal department, and the list of names of those present at the conference forms an imposing array of legal talent. While the constitutionality of some of the provisions of the new law were discussed and questioned, the main object of the conference appears to have been an attempt on the part of the best railway legal talent in the country to formulate some guiding principles in the technical interpretation of the thousand and one little points constantly coming up in the management of a railway, which may be subject to investigation and order from the Inter-

state Commerce Commission under the new law. One of the really important things brought out by the conference is the very wide consensus of opinion that exists in respect to every principle of the new law. This may be accounted for by the fact that the law itself is a compromise of numerous and conflicting considerations on the part of Congressmen, each with his own line to guard. It may also be accounted for by the fact that the railway interests are so varied. An interpretation that might be quite reasonable for one road may well be the most reasonable interpretation for another. Naturally the legal representative of a road is influenced in his choice of alternative interpretations by the interest in the particular road.

WHEN President Hays, of the Grand Trunk, a man of energy and decisiveness, faced and, for a few days, fought, a strike on his road, it seemed likely to be a battle to the finish; and, as the first real strike out of the many lately threatened, the result promised to be instructive. That he assented to a final compromise was very likely due to the peril of "sympathetic" action of labor organizations on the system; and the financial condition of the Grand Trunk, not particularly strong, may have been an accessory cause. The relative gains and losses in the antecedents of the strike, in the strike itself and the compromise reached are somewhat confusing. The earlier governmental "arbitration," so called, was a failure; but, on the other hand, the good offices of the Canadian authorities were potent in bringing the strikers and the company to terms. If not successful arbitration this was probably the next best thing. Where the company at the last appears to have had the whip hand was in the proviso practically leaving it the option in re-employment of strikers, who, moreover, forfeit the benefits of the company's pension system. That the strikers yielded these points suggests, to say the least, their disquietude over their ultimate success. In two other aspects the strike has some significance. One is the comparatively small amount of disorder and law-breaking with which the strike was attended. The other bears on the policy of the Grand Trunk in reference to its proposed New England extensions, after the immediate losses of the strike and the new financial burden to be borne in added operating expense due to increased wages. The company needs the extensions for enlarged revenue, but decreased net earnings will probably make them harder to finance at a time when new railway securities are finding a restricted market both here and abroad.

THE railway men whom we quoted in the editorial in our issue of July 15, entitled "Hopes and Fears of the New Law," referred repeatedly to the large amount of time which government regulation is compelling the higher officers of the roads to devote to the work of protecting their revenues. The tendency of government regulation to force railway executives to apply their time, thought and energies to protecting rather than to improving their properties probably is contributing more to the total cost of government regulation than everything else. Railway managers being human, they cannot do two things at once. The more thought and energy they must give to defending the roads, the less they have left to use in developing traffic and devising improvements for reducing operating expenses. Not only does government regulation as now carried on hinder the higher officers from initiating plans for increasing traffic and improving operation, but it is also interfering with their giving adequate consideration to plans worked out by their subordinates; and, of course, the important schemes of subordinates cannot be carried out until they have been digested and approved by their superiors. We are in a period of transition. Perhaps the demands on railway executives caused by anti-railway agitation and increasing regulation will in course of time grow less. It is probable also there will be developed in railway service a class of specialists in handling public relations, who will relieve the executives of much of the burden they now carry—men who, on the one hand, will so represent the public to the railways with which they are connected as to get needed improvements of service and reforms of abuses

before they arouse hostile public sentiment and become the subject of proceedings before commissions and courts, and who, on the other hand, will so represent the railways to the public and before commissions and courts as to make unfair attacks on them less effective and dangerous. Meantime, the public should be reminded that for whatever reduces the efficiency or increases the cost of railway operation it must, in the long run, foot the bill in the passenger and freight rates that it pays or in the impaired service that it will receive, or in both. The public will be much more apt to get improved service at reasonable rates if it gives the railway managers a chance to devote more time to the administration of their properties than if it continues to compel them to give so much of their time to the defense of them.

“**C**ARLOAD freight roads” are proposed in a work published recently by Dr. Walter Rathenau, an economist, and Prof. William Cauer, an authority on railway transportation, whose works are much studied in Germany. They discuss them as substitutes for canals on routes where the railways are already over-crowded, and, as the result of extended calculations, declare that a double-track line devoted solely to freight, generally in full train loads moved at a uniform speed, would cost less than half as much as a canal, and could be made to pay with rates one-third to one-sixth of the present Prussian railway rates. They have applied their calculations to a line from the coal fields on the Rhine eastward to Berlin, which would take the place of a canal from the Rhine to the Elbe, which has been planned for some years, and their proposition has attracted the attention of experts in transportation. It is now many years since it was proposed to build a railway exclusively for freight from Chicago to New York, over which an almost uninterrupted succession of trains at a uniform and the most economical speed were to roll down to the seaboard, leaving no through freight at all for the lines already built. The promoters of this enterprise were not experts, and they made some serious changes in the geography and orography of the country on the proposed line; but it was easy to figure an extremely low cost, provided freight could be had for something like a hundred train-loads a day, gliding along with no passenger trains to get in their way, and few or no stops on the way to drop local freight. The German plan, however, is seriously made, by men whose calculations deserve attention. They ought to have found material for their studies in this country, where there are several lines or parts of lines which approximate the condition of lines exclusively for freight. To say nothing of the New York Central's long section of four-track road, the Steel Corporation's road from Lake Erie to Pittsburgh is an almost exclusively freight road, and shows, when traffic is heavy, an enviably low cost of transportation; and parts of the Pennsylvania's freight lines planned in Pennsylvania will be still nearer what the Germans propose. But this exceptionally low cost, or rather low price, is one of the objections raised against the German project. To have freight rates on a route between the Rhine and Berlin very much lower than on any other route would result, it is said, in the concentration on this route of all industries using large quantities of coal and iron, to the very great detriment of other places. This, however, is an argument against a canal as well. We are told that the enlarged canal between Buffalo and Troy will so nearly abolish the cost of transportation that the industries of America will be largely concentrated in the state of New York, while the interior of Pennsylvania, etc., may devote itself to rural pursuits.

THE RAILWAY OUTLOOK.

AS the current returns of earnings of American railways are scrutinized one fact stands out with increasing prominence. Gross earnings, as compared with last year, continue to show but increases, especially when it is considered that comparison is now made with the months of 1909 when there was

a sharp rebound from the losses of the post-panic year 1908. Based on gross earnings alone there would be nothing in the situation to complain of and much to afford substantial comfort alike to railway managers and investors. And this in spite of somewhat ominous crop reports from the West and of some industrial curtailments, notably in textiles. What may be called natural conditions, apart from the crops, signify sound financial health in the railway business, with only here and there an exception, and that exception not affecting the leading railway systems as a whole. If the railways had been let alone after their stressful experiences following the panic of October, 1907, and extending through the calendar year following, there would be now something like a boom period of railway interests. This would be the case, also, were the railways given even a year or two longer in which to recuperate.

But it is just here that the prominent fact referred to has intervened. The railways have not been let alone. The time and opportunity for full convalescence has been denied them and a series of artificial conditions have been imposed. Their dawn of reviving prosperity has been obscured by new clouds. In the front has been the successful demand for increased wages, emphasized by the perils and losses by threatened strikes. Cost of supplies has increased rather than diminished; and the heavy hand of federal authority and, what is more irritating if not more serious, the incessant governmental nagging are still in vivid evidence. The logical results have come. While gross earnings increase net is not maintained. New financing is complicated not perhaps so much by positively lowered credit as by the lowered market value of new railway securities owing partly to extraneous causes. Listings of railway and traction securities have fallen off some \$200,000,000 during the first six months of the calendar year. And, finally, the effort of the railways to make good by readjusting rates upward are meeting with hot opposition from several directions at once—popular, commercial and official. Nor should it escape attention that to the increased charges for conducting transportation are added the increased charges for maintenance, to say nothing of taxes. Maintenance, which was reduced to its lowest figures during the panic period, is asserting its requirements. In June of this year the maintenance increase was nearly \$3,000,000 on ten systems only, not including some of the largest.

That such a situation should have followed what seemed a year ago the dawn of railway prosperity is a disappointment. Particularly so is the official resistance to the endeavor of the railways to meet by increased rates—almost their only relief—the waxing costs of operation. But there are some encouraging features. Governmental intervention, while still active, does not take on the aggressive, not to say hostile, character of an earlier administration which went so far as to intimidate during the after-panic time that a railway strike following any decrease of wages would have federal sympathy. It is rather in the nature of a call for an official inquiry into “reasonable” rates and the continuance of the old rate meantime on interstate traffic. The delay, of course, is vexatious, but it has its limits. In the case of the demands of organized railway labor, serious though they are in the resulting financial burdens, there are two favorable signs. One is the increasing tendency toward arbitration, not only averting strikes but looking toward final abatement of what the labor organizations ask. If the ultimate outcome is compulsory arbitration rooted in law the results may be better still—particularly if they can be freed from the sinister influence of politics. But the great hope of emergence from hard conditions rests on the fundamental status of the railways themselves as an integral factor in local as well as national welfare. No vast interest of the kind can ever be unduly and unjustly assailed without reaction in a corresponding scale on the prosperity of the whole land. What becomes of public convenience, not to say necessity, if railway service is much curtailed? What follows to general business if the railway investor finds dividends reduced or his bonds in default? And where does the wage earner himself come out in the contraction of an employment fund resting on private railway investment? These are direc-

tions in which political economy, without the aid of such a well-looked-down-to-the-point, follows naturally.

But we look for no such drastic solution of the railway problems. In labor readjustments one may expect concession on both sides, with arbitration as a final expedient in avoidance of extremes. In the rate question and in relations with federal authority we need not only a declare but a good interpretation of the term "reasonable" under the law; and the courts will protect, in the last appeal, the right of the stockholder to a fair return on his investment. And, in general policy as regards operation, new financing, maintenance and improvements would naturally be somewhat of that system of conservatism that was compelled in 1908. Uncertainty in so many quarters as at the present time calls for a waiting policy and for restraint rather than for assertiveness.

THE CHARCOAL IRON CAR WHEEL.

EVER since 1875, and possibly even before that time, it has been asserted by those who have been troubled with wheel failures that "cast iron wheels are not as good as they used to be," but any definite information as to how good they used to be is practically impossible to obtain. It certainly is not fair to judge the wheel of to-day in comparison with the one of even 1875, on the basis of its failures, for the services rendered by the two differ greatly. It is also almost impossible to make the comparison on a purely metallurgical basis, because of a lack of data regarding the old wheels. The chemist and the refinements of the modern blast furnace were unknown and any judgment that is passed must be based upon a knowledge of general rather than specific conditions.

We simply know that cold-blast charcoal iron was used and that every attempt was made to secure the highest quality of metal obtainable for the car wheel. For example, away back in the fifties, probably about 1855, an order for the wheels of 500 freight cars for the Pennsylvania Railroad was filled at the Fort Pitt foundry in Pittsburgh. At that time cannon were being made for the government at this foundry under the direction of the late Gen. Rodman and Admiral Dahlgren. The iron used in the manufacture of the car wheels, for the order referred to, was of the same quality of pig iron as that used in the cannon. It came from the cold-blast charcoal furnaces of Bloomfield and Greenwood, located in central Pennsylvania, and from those near Hanging Rock on the Ohio river, where the Etna and Hecla brands were made.

These cold-blast charcoal furnaces had an output of but from 10 to 15 tons a day, and, owing to the slowness of the process, the ores and molten metal were brought into intimate contact with the fuel, taking up a high percentage of the carbon and thus becoming a high chilling metal due to the combined carbon thus acquired. The Greenwood iron, for instance, carried 2.83 per cent. of combined carbon out of a total of 4.14 per cent., while the silicon had been burned down to .43 per cent. The tensile strength of this pig was about 22,000 lbs. per sq. in.; a strength that was raised, by remelting the iron in an air furnace, to about 33,000 lbs.

The wheels were cast against an iron chill quite in accord with present practice, and were piled, while still hot, in the Whitney annealing pits, which had been previously heated to the temperature of the wheels, where they were allowed to cool.

As to the service which these wheels rendered there are no records. None were kept because there was no realization of the necessity for or desirability of such records and because it was generally expected that, under the light total loads of about 40,000 lbs. on eight wheels, they would outlast the car. It would be a safe guess, then, to assume their life at from 12 to 20 years. It is needless to say that such a life is unknown under present day conditions. The point is what would the same wheel do now? Pure cold-blast charcoal iron is but a memory because it gave way long ago to the warm-blast product, which is to-day its most nearly related survivor. There are still a few wheels made of a warm-blast charcoal iron, where the blast

runs from 120 to 200 deg. Fahr., and the furnace output still ranges from 15 to 25 tons a day. This condition has not changed for 50 years. Made from a broken hematite ore, melted in a charcoal furnace with a fuel consumption of 1 to 2 on one, the pig probably varies but little from that used in making the good old wheels of the past. The ore runs about 50 per cent. of iron, and the product possesses the high chilling qualities needed for car wheel metal.

Based on past practice which was so satisfactory for the wheels of light cars, the mixture still consists of 40 per cent. of this warm-blast pig with a balance of car wheel scrap. The only change lies in the weight of the wheel, which has increased from 450 to 700 lbs. But these wheels are put under cars weighing 40,000 lbs. with a capacity of 100,000 lbs., instead of those weighing 18,000 lbs. and carrying a load of 20,000 lbs. Speeds are not only higher but the average daily mileage is probably greater, so that the stresses imposed are undoubtedly much more severe than the mere difference of loads would indicate.

From the reports of a road using these wheels, it is learned that where the removals are for purely wheel defects such as worn through the tread, shelling out, seamy treads and the like, the life ranges from 10 to 38 months, with an average of between 29 and 30 months for all wheels removed. If this life is considered on the basis of the probable ton mileage carried, and this is put at the low figure of four times that of the wheels under the light 10-ton cars, we find that the actual work done will correspond to about 10 years of service under the old conditions.

This undoubtedly falls short of what was actually done under the light cars, but is enough to indicate that the charcoal iron wheel is probably quite as good, metallurgically, to-day as it ever was.

The point is, is it good enough or can it be improved? Undoubtedly brake action and the heat resulting therefrom is responsible for much of the excessive stress put upon a wheel, and the inference to be drawn from a pamphlet issued by the Association of Manufacturers of Chilled Car Wheels is that an increase in the thickness of the plate will go far towards relieving the strains so set up and in dissipating the heat. But of the wheels removed, to which allusion has been made, it is not brake action but legitimate wear that is responsible for the major portion, so that, basing the statement upon the assertion of the manufacturer that no change has been made in methods, from the mining of the ore to the delivery of the wheel, in 30 years, it is not in a reversion to the good wheels of the past that we must look for the betterment of the cast iron wheel of to-day, but to an improvement of the present methods of manufacture and possibly in the quality of the metals used in the mixtures, though it may be said that these wheels do seem to be giving better results than others that are made under the more modern conditions of a greater tonnage all along the line from the furnace to the annealing pit. But this is another story that will be dealt with in detail at some other time.

NEW BOOK.

Railway Special Work. By Walter E. Silsbee and Percy E. Blood. McGraw-Hill Book Company, New York. 116 pages; 7 in. x 4 1/4 in.; leather. Price, \$2.

As stated in the preface, "The object of this work is to cover a field not before set forth in any book to the knowledge of the writers, namely, the calculation of frog-work and special curves for use in the shop."

The work has been well performed and the little book should be useful to many engineers, especially those engaged on electric railway work. Nothing better has appeared for the use of designers for special crossings, cross-overs, switch work, etc. An excellent introduction on the use of slide rule might have been improved by using a cut to make the description plainer. A treatment of transition curves is given, accompanied by use-

ful tables, which, while simple, is too brief and requires supplementary study for a thorough understanding.

Letters to the Editor.

CAN POLITENESS BE TAUGHT?

Albany, N. Y., August 8, 1919.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The publication of Mr. Bohon's communication in your issue of August 5 will probably deluge you with protests from superintendents and others.

I am not familiar with the situation west of Chicago, but, as a representative of one of the principal eastern railways, I wish to take exception to some of the statements made by Mr. Bohon. I do not believe there is a superintendent, trainmaster or any official responsible for the hiring and discipline of employees on this road who does not make a specialty of the subject of politeness to patrons. When, early in 1908, the superintendents produced a new book of rules, the vice-president and general manager, head of the operating department, dictated into the book the following rule:

"The good will and friendship of the communities served by this company are its most valuable assets; and the strongest recommendation for promotion an employee in any department can possibly have is the fact that by uniform courtesy and kindly accommodation of patrons he has secured for himself and for the railway the good will and friendship of the community in which he is located."

I venture to say that there is not an employee in train or station service on the railway who has not passed a written examination on this rule, and but few in train service who have not passed an oral examination on it a number of times.

Further than this, on April 15, 1909, the president issued a placard reading as follows:

"Co-operation between every department of this system is essential to its success. This means not only sincere, heartfelt interest in the welfare of the system as a whole, but personal friendship for the officers and employees of other departments, and an eagerness to assist all departments, so far as possible, in order that the best results for the entire system may be accomplished.

"It should be remembered, at all times, that the pay of every man in the employ of the company comes from the same source, and that only by serving the best interests of the whole system can any department serve its own best interests.

"In other words, in order to secure the most effective results for the company, and likewise for every individual in the service, it is of the utmost importance that the entire staff should work together as one harmonious family, and it is the earnest request of the management that this spirit shall prevail in all departments.

"This spirit of co-operation should extend to the relation of the road and its employees to the public. The railway cannot prosper unless the co-operation of service for passengers."

"The public judges the railway very largely by the attitude of the representative with whom they come in immediate contact. Kindly courtesy upon the part of subordinate officials and employees costs nothing to the employees, but to the railway it is an asset of very great value.

"For this reason, employees are very earnestly urged to extend to patrons of the road every possible courtesy, and to bear in mind the fact that the whole purpose of the railway is to furnish to the public the highest class of service possible, and that the character of the service—its acceptability to the public—depends in great measure upon the spirit in which it is rendered."

This placard is conspicuously posted in the office of every superintendent, assistant superintendent, trainmaster, assistant trainmaster, chief train despatcher and yardmaster and in most of the stations. So much for the rules, indicating the attitude of the management. In the actual operation there is courtesy and co-operation, as between departments, and a constant effort to promote courtesy by employees to the public. An official who fails to co-operate or who antagonizes the public does not last long, and an employee who habitually fails to "hit the ball" in these respects has short shift. Nor do I believe this is an exception. Could we have a census or some statistics on courtesy, I think Mr. Bohon might be convicted of acute peccancy. He should look at the placard, and not at the hole.

MUELLER, JR.,

Superintendent, N. Y. & N. H. R.

THE DUTIES OF THE CHIEF DESPATCHER.

BY A TRAIN DESPATCHER.

I have often wondered just what really constitutes the good chief despatcher. (Now that expression is a misnomer, for there are no good chief despatchers; they are all bad; the official transportation scapegoat.) I myself have been in the business of despatching trains for 25 years, much of that time as chief, and if I was really responsible for one-third of all that has been laid at my door, I surely must have been a bad one. I have long since concluded that I know mighty little about the job, yet I cannot but feel that the importance of the position and the requirements thereof have, in a great measure, been overlooked.

The chief despatcher is the superintendent's right bower, for through his hands must of a necessity pass not only all important transportation matters but other equally important division matters upon which immediate action must be taken; consequently the man occupying that position must be cool and level-headed and equal to any emergency that may arise. Naturally his duties compel him to assume great responsibilities at times, yet if he be a man of experience and possessed of the confidence of his superintendent, he will, in a majority of cases, handle the matter with credit to himself and his superiors. If, however, as is the case in many places, he is expected to assume such responsibilities and, in case things do not pan out as anticipated, is called on to "explain why," and then "more fully" and again "we do not understand, please advise further," and on and on until the transaction becomes almost an endless chain, he soon loses confidence in his own judgment, and in the absence of any specific instructions is always at sea, so that his usefulness soon becomes impaired.

The superintendent and his chief despatcher should be very close together at all times, and the latter should feel free not only frequently to seek his superior's advice, but also to offer suggestions on all matters pertaining to his department. It is certainly to be regretted that the attitude of some superintendents make this impossible. I believe one of the greatest mistakes any official can make is to make himself unapproachable, for he thereby loses the most valuable assets of his subordinates. Many a chief despatcher when called to the office of his superior feels as if summoned before the Inquisition. He knows that the verdict will be "Guilty," and he can only wait and hope for a light sentence.

Now the conditions which bring this about are all wrong. How much better it would be if, instead of being taken to task for every little delinquency, the chief be frequently consulted in matters concerning his department, and his opinion and views solicited by his superiors. I know from experience that this method will not only inspire confidence in the chief, but bring out the very best that there is in him. If the chief despatcher does not fill his niche, then the organization is weak, no matter how strong in all other departments. Such being the case, care should first be exercised in selecting the man, then greater care taken not to destroy his usefulness by too tight a reign, or through burdening him with useless and time-killing duties.

It seems strange to me that officials so seldom recognize the extravagance in requiring a hundred and sixty dollar man to utilize time, that could so profitably be used otherwise, in compiling statements and reports, etc., which could as satisfactorily be taken care of by a much less expensive man. If these statements and reports are necessary about many of which I have my doubts, then sufficient force should be supplied to not only compile them, but assume the responsibility for their accuracy, etc., making unnecessary any supervision on the part of the chief despatcher. A large volume of correspondence is another bane of the existence of the chief despatcher. Of course it is so much easier to write the chief for information desired rather than to dig it from the records that it is no wonder that our chief clerks take it for granted that that is the legitimate way to secure it. To my mind, the chief despatcher's time should be

given entirely to transportation matters, leaving him fairly clear. When you cover him up with such matters as mentioned above, you are simply putting him in the way of such called machinery.

Perhaps no particular official is preferable for present conditions for we have simply been drifting this way for years; finally the chiefship has become the only thing against the setting post against which land practically all complaints and kicks, no matter how high up they originate, or how strong, come they gather in the way down the line. "Well, what is to be done?" I shall set forth as clearly as possible what I think should be expected of him; and if these duties are well performed, the chief will be a mighty busy man.

The handling of power should be his first and most important duty. In this alone he can, by close supervision and careful manipulation, earn for his company his salary many times over. It should be his aim to secure from his power its full earning capacity, in so far as conditions and the volume of business permit. Care should be taken, however, not to become an "extremist" in this direction, for overloading engines more often reduces than increases their capacity. Too much tonnage on a weak engine is not only a handicap to the prompt movement of freight but results in an increased cost for both running and back-shop repairs, as well as hastening the back-shipping of the engine. I am a believer in a systematic scaled rating for all engines. By that I mean a rating which will fit the engine's condition. After an engine has made a reasonable percentage of her mileage, she should not be asked to perform the same service as a brand new engine of the same class, or one right out of the back-shop. She should be favored with periodical reductions in rating until she has reached her limit and is again ready for overhauling. It seems rather unjust to charge the transportation department with tonnage which the engines are incapable of handling. However, where the conditions are such, the chief should keep in close touch with the mechanical department, and favor the weak ones to the extent of his authority. He may be taken to task by the superintendent of transportation for light tonnage, but he will be in a position to explain readily, and will not only save himself grief but make money for the company.

Handling traffic is the chief's next important duty. It is so closely interwoven with the handling of power that it is a difficult matter to separate the two. The chief's first consideration in this direction is to keep his stuff moving. He should secure advice from connecting divisions of anticipated deliveries, 10 to 12 hours in advance, and see to it that power is available to move it out without delay. If his power is insufficient to handle the business, he should not fail to bring the matter to the attention of his superiors, for blocked terminals reflect little credit on the chief, or in fact any division official, and he should always be able to show that conditions were not due to failure on his part to exact all that was due from his available power. Another important feature in the handling of traffic is the close supervision necessary to prevent the accumulation of old loads. At intermediate points, and particularly filling out points, conductors are apt to grab what tonnage they need from the loads most convenient, and the agents, in their desire to be good fellows, do not always insist on the old loads going first. Consequently if no attention is given to the matter serious and unnecessary delay occurs. By carefully scanning the daily car reports the chief can reduce such cases to a minimum.

The handling and distribution of equipment is of but little importance than the duties heretofore mentioned. Some roads employ a car distributor, but in a majority of places this duty falls on the chief despatcher. I believe the latter is the more satisfactory arrangement. One of the greatest evils in the handling of equipment is the cross-haul. This will frequently happen unless carefully watched. Empty car mileage is expensive mileage and every mile saved is money saved.

Another great saving can be made in the release of loaded cars and the prompt loading of empties. The saving of 24 hours

in either or these cases cannot be given a satisfactory estimate, but in the former it may be well assuming to be considerable. It gives proper attention to both points of origin and destination. In meeting the cars on report, which chiefly be required to meet them at yards, and which should show all cars in road, time and date received, whether loaded or empty, since empty empty, whether loading or unloading, etc., the chief is in position to keep right in behind delays of this character and compel the agents to do his duty.

It frequently happens, in case of car shortage, that agents in order to move their stuff and satisfy patrons make requisition for more cars than they can possibly load in the 24 hour period. This, however, can be easily regulated if a check is kept on the business originating on the division, and cars furnished according to the loading capacity.

On the tonnage handled depends largely the showing of the division in monthly and yearly operating sheets, and this matter should be given very careful attention by the chief despatcher. On a majority of roads, tonnage seldom equalizes itself and the direction of heavy traffic fluctuates so frequently that if matter is not closely watched light power, or rather light tonnage, will be moving in the wrong direction. Where there is a one-way tonnage handled it is of course impossible to make as good a tonnage showing as where the movement is equal or heavy both ways. Therefore it behooves the chief to exact from his power every pound of tonnage due, in the ruling direction. One source of tonnage loss, so small that it is scarcely noticeable in the 24-hour period, yet which amounts to considerable in the course of a month or a year, is the custom of letting trains out of terminals with all the way from five to 15 tons under rating. As a rule, train and enginemen kick on over-tonnage no matter how small the excess, and the yardmaster, rather than listen to their howling, lets them out without the extra car which would mean 10 to 20 tons over rating. Now it is seldom that tonnage can be figured to the exact rating, yet I take it for granted that engines are so rated that this additional 10 or 20 tons is no imposition and therefore the chief should insist on the additional car if necessary to make the full rating. The handling of short loads is also rather a difficult tonnage proposition and sometimes requires considerable scheming to avoid loss of ton mileage. Where this traffic is too heavy for locals, a short load train should be run daily and given the overflow of short loads and filled with through stuff, being made to pick up through loads wherever short loads are set out, provided there are any to move, thus bringing the tonnage up to as near rating as possible. In connection with the tonnage question, advantage should be taken wherever practicable of the different grades on one division, and tonnage increased accordingly.

The chief despatcher must of a necessity be a veritable bureau of information, and he should therefore see that records of his office are kept in a complete and thorough manner. Not the least important of his duties is keeping his superiors advised as to conditions and what is happening on the division, of which it is to their interest to have immediate knowledge. Many things come under his personal observation which require a remedy, and he should not hesitate to call attention to them for the good of the service.

The chief should not exact too much of his trick men. On heavy tricks, where the despatcher's hands are full all the time, too much detail work spoils a good despatcher and reflects in the character of work accomplished. Of course much must necessarily be required of trick men during the absence of the chief, yet the latter should at least outline in advance to his terminals just what he desires done in the succeeding 12 hours and furnish his despatchers with an outline program, that they may know what is wanted and see that it is carried out as near as circumstances will permit.

One of the most important qualifications of the successful chief is a thorough knowledge of the numerous schedules, rates of pay, etc. He should know just how much every move made is costing the company, and should always take into consideration the most economical method of handling all situations. In

fact, he should study economy in all its different phases and make it the basis for action in all cases in so far as possible without becoming penny wise and pound foolish.

No one employee has greater need of a general all-around railway knowledge than the chief dispatcher, and it has always been a mystery to me why he is so lightly considered. If there is one employee more deserving of promotion than another, it is the chief dispatcher, and I cannot understand why so few of them are advanced to higher official positions. Surely the experience gained in this position qualifies him for something better, and I firmly believe he makes as good, if not a better, official than those from other departments. While he may not be able to run an engine or train, or chain up a car, yet he has a pretty good idea how it should be done. His experience as chief has not only given him a practical insight into all departments of the road, but has also taught him how to handle and deal with men.

It is not very encouraging, to say the least, to the chief dispatcher who, having followed the law set down by Confucius to "Work much, eat little, sleep less," finds himself overlooked when a vacancy occurs, and it is not surprising that so many of them drop back to trick work, where eight hours constitutes a day's labor and where some comfort and pleasure can be extracted from life.

ACCIDENT BULLETIN NO. 35.

The Interstate Commerce Commission has issued accident bulletin No. 35, showing the record of railway accidents in the United States during the three months ending March 31, 1910. The number of persons killed in train accidents was 352, and of injured, 3,717. Accidents of other kinds bring the total number of casualties up to 22,332 (1,100 killed and 21,232 injured).^{*} These reports deal only with employees on duty and passengers. The casualties to passengers also include passengers traveling on freight trains, postal clerks, express messengers, employees on Pullman cars, etc.

TABLE No. 1.—Casualties to Persons.

Causes	Passen- gers.		Em- ployees.		Total persons	
	Killed.	Inj'd.	Killed.	Inj'd.	Killed.	Inj'd.
Collisions	11	922	103	1,004	114	1,926
Derailments	47	765	83	524	130	1,289
Miscellaneous train accidents	52	42	56	460	108	502
Total train accidents	110	1,729	242	1,988	352	3,717
Coupling or uncoupling			57	818	57	818
Other work about trains or switches			41	4,930	41	4,930
In contact with bridges, etc.			2	397	2	397
Falling or while getting on or off	27	521	121	3,665	148	4,186
Other causes	18	684	446	6,503	464	7,187
Total (other than train accidents)	45	1,207	703	16,308	748	17,515
Total all classes	155	2,936	945	18,296	1,100	21,232

The total number of casualties to passengers in this quarter is swelled by two great disasters, an avalanche in the state of Washington and a derailment in Iowa, both in the month of March. The circumstances of these accidents are briefly summarized, following Table 2A. In other respects the present record shows no remarkable differences as compared with the preceding quarter or with the corresponding quarter one year ago (Bulletin 31), bearing in mind the fact that Bulletin 31 represents a time when there was still an abnormally low volume of traffic on many roads. The principally comparisons follow:

TABLE No. 2.—Comparison of Personal Items with Last Bulletin and Last One Year Back.

Causes	Bulletin		
	No. 35	No. 34	No. 31
1. Passengers killed in train accidents	110	109	37
2. Passengers killed in other accidents	45	105	80
3. Total passengers killed in train accidents	155	214	117
4. Passengers killed in other accidents	45	105	80
5. Total passengers killed, all causes	200	319	197
6. Total passengers killed, all causes	200	319	197

The total number of collisions and derailments in the quarter now under review was 3,163 (1,581 collisions and 1,582 derailments), of which 218 collisions and 185 derailments affected

passenger trains. The damage to cars, engines and roadway by these accidents amounted to \$2,607,553. Given more in detail, these facts appear as below (collisions and derailments which cause no death or personal injury and which cause not over \$150 damage to the property of the railway are not reported):

TABLE No. 2.—Collisions and Derailments.

Collisions, rear	No.		Killed.	Inj'd.
	Collisions	Loss.		
" butting	183	\$470,488	36	650
" train separating	98	29,826	2	36
" miscellaneous	894	\$77,818	23	610
Total	1,175	\$1,258,706	114	1,296
Derailments due to:				
Defects of roadway, etc.	318	\$215,421	8	40
Defects of equipment	711	599,590	15	204
Negligence, trainmen, signalmen, etc.	78	54,185	1	52
Unforeseen obstruction of track, etc.	126	163,868	14	245
Malicious obstruction of track, etc.	17	31,531	1	22
Miscellaneous causes	332	284,352	91	361
Total	1,582	\$1,348,847	130	1,289
Total collisions and derailments	3,163	\$2,607,553	244	3,215
Total for same quarter of 1909	2,284	1,847,202	163	2,315
" " " " 1908	2,632	1,977,419	114	2,455
" " " " 1907	3,991	3,536,110	355	4,459

Following is the usual list of Class A train accidents—all in which the damage is reported at \$10,000 or over, notable cases in which passengers are killed, and those doing damage less than \$10,000 and down to \$2,000, wherever the circumstances or the cause may be of particular interest:

TABLE No. 2A.—Causes of 42 Prominent Train Accidents.

[NOTE.—R stands for rear collision; B, butting collision; M, miscellaneous collisions; D, derailment; P, passenger train; F, freight and miscellaneous trains.]

No.	Class.	Kind of train.	Killed.	Injured.	Damage to engines, cars & roadways.	Reference to record.	Cause.
1.	R.	F. & F.	2	5	\$1,000	7	Failure to heed automatic block signal; also failure of flagman to go back with flag; brakemen's experience, 4 months. (2 drivers killed.)
2.	B.	P. & F.	1	7	2,000	13	Engineman of light engine forgot passenger train, although dispatcher had had occasion, in conversation with him, to mention this particular train; this engine ran his engine into that of the opposing train, yet never saw it, although collision occurred in broad daylight; after crash engine man supposed that it was due to the explosion of boiler of his own engine.
3.	B.	F. & F.	2	3	2,642	74	Operator wrote wrong station name in order; 2 operators at other stations testify that name was correctly sent by dispatcher, and that in repetition of order also the name was correctly transmitted by station operator.
4.	B.	P. & F.	0	3	5,131	11	Misreading of order by engine man. (See note in text below.)
5.	R.	P. & F.	1	16	5,420	2	Passenger train ran past automatic block signal; engine man and fireman were working on injector; engine man's experience, 41 years.
6.	B.	P. & F.	2	8	8,600	9	Collision at meeting point 2 a.m.; westbound train continued on main track contrary to its meeting order, which said it must enter sidetrack; engine man misread order.
7.	B.	P. & F.	3	9	8,651	15	Collision occurred in yard; passenger train moving backward, as is customary; an engine without train moving in opposite direction was traveling on wrong track. On rear end of passenger train the leading car as it was moving a passenger standing on car platform was killed.
8.	B.	F. & F.	1	1	2,000	6	Engine man of engine without train forgot an order. This engine man de-camped. The fireman was killed.
9.	B.	P. & F.	2	4	10,170	70	Extra train obstructed emergency on time of regular westbound.
10.	R.	P. & F.	2	4	10,000	5	Conductor and two engine men disregarded an order to wait at B till 2:40 a.m.; left before that time; did not look at their watches.
11.	B.	P. & F.	3	5	10,921	2	Operator neglected to deliver order. (See note in text below.)
12.	R.	P. & F.	1	2	11,200	64	Excessive speed in fog 3 a.m.; passed automatic block signal without seeing it.
13.	R.	P. & F.	0	2	11,640	1	Train standing at station not properly protected by flag; following train approaching station not under proper control.
14.	B.	P. & F.	0	6	14,000	13	Ran past station 1,000 ft., meeting order forgotten.
15.	B.	P. & F.	0	23	15,000	12	Man in charge of freight train waiting on side track failed to identify passing trains. (See note in text below.)

*The accidents here given are those of the standard railways, for convenience of comparison with the statistics of the same kind. The accidents of the independent lines, and of the street railways, are not included, and are, therefore, not included in the total accident law, are summarized in the last paragraph.

16.	R. F. & F.	1	0	11,000	0	Derailed at night at derailing switch. The distant signal approaching this derail indicated clear wrongly, the crew of engine 11,000, however, was at stop, and the engineman is held at fault for not heeding this signal. The cowcatcher of engine 11,000, however, was at stop, and the engineman is held at fault for not heeding this signal.	
17.	R. F. & F.	0	2	11,000	66	Derailed at night at derailing switch. The distant signal approaching this derail indicated clear wrongly, the crew of engine 11,000, however, was at stop, and the engineman is held at fault for not heeding this signal. The cowcatcher of engine 11,000, however, was at stop, and the engineman is held at fault for not heeding this signal.	
18.	R. F. & F.	1	3	11,100	17	Derailed at night at derailing switch. The distant signal approaching this derail indicated clear wrongly, the crew of engine 11,100, however, was at stop, and the engineman is held at fault for not heeding this signal. The cowcatcher of engine 11,100, however, was at stop, and the engineman is held at fault for not heeding this signal.	
19.	R. F. & F.	0	11	20,000	10	Second train derailed at night under power.	
20.	R. F. & F.	8	30	30,200	14	Collision at night at crossing. Both engines derailed. Engineman looked meeting order; both men experienced. Engineman was killed.	
Total		30	149	\$225,007			
1.	D.	P.	0	0	\$2,610	57	Derailed at night at derailing switch. The distant signal approaching this derail indicated clear wrongly, the crew of engine 2,610, however, was at stop, and the engineman is held at fault for not heeding this signal. The cowcatcher of engine 2,610, however, was at stop, and the engineman is held at fault for not heeding this signal.
2.	D.	P.	0	24	3,200	55	Metal brake-beam of tender dropped on track; had become detached by loosening of bracket at coupling.
3.	D.	F.	4	2	3,300	80	Cowcatcher of engine became loose and dropped so as to catch in a switch. A short time before this accident the cowcatcher, having been found loose, had been put in shape by the men in charge of the train, but they did not secure it adequately. The failure to discover the subsequent loosening was due principally to severe cold weather and snow.
4.	D.	P.	0	6	5,300	56	Arch-bar of truck of tender broke. Speed of train 60 miles an hour; engine and all cars derailed, yet all of personal injuries were slight.
5.	D.	F.	0	0	5,700	89	Accidental obstruction. (See note in text.)
6.	D.	F.	2	1	5,500	89a	Excessive speed. (See note in text.)
7.	D.	P.	2	10	5,700	83	Excessive speed (60 miles an hour) through crossover track. Engineman and fireman killed. The crossover was suitably signaled with home and distant signals.
8.	D.	F.	0	0	9,477	81	Brake-beam fell on track. Wreck partly destroyed by fire from stoves used in freight cars to keep merchandise from freezing.
9.	D.	F.	0	0	9,600	58	Derailing switch approached at excessive speed. (See note in text.)
10.	D.	F.	1	3	9,876	50	Snowdrift.
11.	D.	P.	5	0	10,000	85	Excessive speed. Engineman and fireman killed. Conductor and engineman were men of 16 years' experience.
12.	D.	F.	0	0	10,053	54	Broken wheel. (See note in text.)
13.	D.	F.	0	0	10,200	28	Broken flange.
14.	D.	F.	0	0	10,295	83	Broken wheel; chill crack in tread.
15.	D.	F.	0	0	10,897	61	Broken rail.
16.	D.	F.	2	2	12,000	85	Driving-wheel brake rigging caught on stiffener rail at entrance to side track.
17.	D.	D.	0	0	12,000	86	Failure of bridge. The bridge in question was known to have been weakened by a flood and orders had been issued forbidding its use by engines of a certain weight. Disobedience of this order is given as the cause of the accident.
18.	D.	P.	51	44	12,558	90	Unknown. (See note in text.)
19.	D.	F.	3	2	13,000	36	Runaway train on 3 per cent. descending grade; supposed bad management of air brakes. Fireman killed; engineman badly injured.
20.	D.	F.	0	0	14,422	27	Undiscovered.
21.	D.	F.	0	0	15,260	32	Broken rail. Wreck partly destroyed by fire from stove and by explosion of 1 car of powder and 2 cars of oil.
22.	D.	P.	1	51	31,523	87	Rock slide.
Total		71	145	\$221,477			
Grand total		101	294	\$447,381			

The worst railway accident in the present record is classed as neither a collision nor a derailment. A passenger train and a mail train halted at a station because of snow blockades along the line, were swept down the side of a mountain by an avalanche, and 90 persons were killed and 16 injured. These casualties are classified as follows: Passengers, killed 51, injured 7; mail clerks and persons carried on contract, killed 13, injured 2; trainmen, killed 22, injured 6; other employees, killed 4; in-

April 1. The disaster occurred in the state of Washington on April 1, at a point where no serious accidents had occurred before since the settlement of that region.

Another disaster, belonging in the same class with this, but of a different kind, occurred in Nevada, January 1, when a freight train of 26 cars, having been stopped because of difficulty in the track ahead of it, was swept away by a great flood. This train had been proceeding slowly, all bridges being examined before crossing, on account of high water, when a wash-out was encountered. The train was stopped and the conductor went ahead afoot to the next telegraph station to report. While the train was standing a flood arose, the force of which was sufficient to turn the engine over on its side and to wash 28 loaded and 2 empty cars down the stream.

The most disastrous derailment in the quarter under review was that entered in the table as No. 18, in which 45 passengers, 5 trainmen and 1 other employee were killed, and 33 passengers and 3 employees were injured. It is reported by the railway company as having been due to some cause not discovered. Two trains, Nos. 19 and 21, of the Chicago, Rock Island & Pacific were being run over the Chicago Great Western because of a blockade on the Rock Island road. The combined train consisted of 2 engines and 10 cars, the engines moving tender first. The derailment occurred between Green Mountain and Gladbrook, Iowa, March 21. It happened in a cut where the ground at the side of the track was soft, so that the tender of the leading engine, when it jumped the rails, was embedded in the earth so as to make an almost impassable obstacle, against which the rest of the train was forced with undiminished momentum, the engineman having had no time to apply the brakes.

The trains in question were run over the Chicago & North-Western from Cedar Rapids to Marshalltown, and were delivered to the Chicago Great Western at Marshalltown. Being headed west, it was necessary to detach the engine from the west end of the train and attach them to the east end to proceed eastward over the Chicago Great Western. The man assigned by the Chicago Great Western as pilot called upon the dispatcher at Des Moines, Iowa, for orders. The Chicago Great Western had no table upon which to turn the engines at Marshalltown, but had a Y there. The pilot, however, reported to the dispatcher that he did not believe he could turn the engines on this Y because, as he believed, the curvature was too sharp. After some minor conversation the dispatcher told him that if he could not turn the engines to move them backward. They were switched around the train and started for Waterloo, running tender first. Between Green Mountain and Gladbrook, while running at a speed of probably 22 miles an hour—witnesses varying in their statements, giving the speed from 20 to 25 miles—the leading engine, without warning, left the track in a cut and plunged into the bank, being followed by the second engine. The engines were both in first-class condition, having been duly inspected before leaving Cedar Rapids, and the cars were all in good condition.

It appears that in this cut the track (roadbed) was somewhat soft and spongy, and it may have been this condition of the track that caused the tender of the leading engine to run off. Next to the engines was a Pullman sleeping car and next to this two Chicago, Burlington & Quincy day coaches. Following these was the baggage car and then the cars from train No. 19—baggage car, mail car, coaches and sleepers. The Chicago, Burlington & Quincy car next to the Pullman car was completely telescoped and the one next to this was telescoped about one-half to two-thirds of its length. In these cars occurred all the loss of life, except two passengers who were in the sleeper, one end of which was badly damaged. Outside of these cars there was no loss of life and but little injury, except to the men on the engines. Both firemen, one engineer and the pilot were killed or died from injuries.

The conductors and enginemen of the Rock Island trains were employees of long experience. The pilot of the Chicago Great Western was a freight conductor of that road. He had

been in the train service of the road about eight years and a conductor six months.

As before stated, the railway company reports the cause of this derailment as not ascertained. The case was investigated by the board of railway commissioners of Iowa, and in a report issued by that board the conclusion is reached that "though the cause of the wreck can never be known with absolute certainty, it is indisputable that the track * * * was in a dangerous condition. It lay upon a bed of clay which was wet and springy on account of improper drainage. * * * If there be a primary cause of this wreck, in our judgment it was the soft track resulting from the season and lack of proper drainage." The commissioners believe that engines should be run backward only in the rarest cases of absolute necessity and "then at a much lower rate of speed than 25 miles an hour." They say also that if the two day coaches (next behind the Pullman car) had been in the rear of the train there would have been no such appalling loss of life. "When trains are made up the lighter cars should be in the rear."

The accident reported as derailment No. 6 was the derailment of an engine running without train, and both engineman and fireman were killed, so that the evidence as to the cause is wholly circumstantial. The superintendent concludes that the engine was running at a dangerous speed, but there was no reason for special haste and no conjecture is offered as to why the engineman was running at an unsafe rate. This engine was ditched, but its tender remained standing on the roadbed, and it was the cause of the derailment of a following train (No. 5 in the table). The engineman of the following train is not held at fault, as the road at the point of derailment is on a sharp curve, and it was impossible for him to see more than a short distance ahead. The track at this point is equipped with track-circuit automatic block signals, but the derailed tender was wholly off the rails, and, as the track had not been broken by the first derailment, the automatic signal continued to indicate safety. The freight train had been following the light engine at an interval of about twenty minutes.

Deraiment No. 12 was due to a fault in a wheel of the tender of the leading engine of a double-header freight train, and the damage as reported (\$10,054) includes \$10,000 as the estimated damage to the rails in the track by the founding of the broken wheel before the train was brought to a stop. The train was running about 20 miles an hour when a piece was broken out of the tread of the wheel, leaving a flat spot, so that it pounded and marked the rails at every revolution, and these violent shocks were sufficient in many cases to cause the rails to crack; and about 800 tons of rails were used to replace those which were found broken or defective, the train having run a considerable distance before the tender jumped the track. The damage to the engine and to the track at the point of derailment was slight. The engineman is held at fault for the damage, because his attention had been called to the noisy pounding of the wheel in ample time to prevent damage, but he continued with unabated speed. This was a cast-iron wheel, 33 in. in diameter, made June 20, 1906. The estimated weight of the tender resting on the truck in which this wheel broke was 30 tons.

Deraiment No. 9, in which an eastbound freight ran off a derailling switch at considerable speed and fouled the track of another railway company, is reported as due wholly or mainly to the mistake of an engineman concerning a red light. The derailment occurred about 5 a.m., when there was a dense fog, and the engineman failed to stop the train before passing the signal which guarded the approach to the crossing of the other road, because, on sighting the red light of the stop signal, he assumed that the light was one used by an electric railway company at a point about one mile back. The engineman had passed the electric crossing without being aware of it, the light at that point being at that time extinguished. This light of the electric road is used by the men in charge of cars on that road when such cars have to cross the track of the steam railway. Since this accident this light has been made white instead of red. The engineman who thus mistook the location of signals had not worked

long on this line. He had made six round trips over the line between December 14 and the date of the accident (February 22), five of them being made eastward at night. He had also worked on a yard engine in this region for eleven days in 1907.

Collision No. 4, between a westbound freight train and an eastbound passenger train, occurred about 4 o'clock in the morning, and was due to the mistake of the engineman of the freight in reading an order and to the neglect of the conductor of the freight. The order, which was on Form 19, stated that the passenger train would wait at Y until 4:35 a.m. for the freight, but the freight engineman, in some way unexplained, got the impression that the passenger train would wait at Z, which was 6 miles farther on. The order had been delivered to the freight train (one copy to the engineman and one to the conductor) at L, while the train passed without stopping, so that the conductor and the engineman had not read it in each other's presence. The engineman had neglected to show the order to the fireman, as the rule requires. The conductor was asleep when the train approached and passed Y, and therefore took no measures to bring the train to a stop; and he had neglected to show the order to the rear brakeman, as the rule requires.

Collision No. 11, between a northbound and a southbound freight train, was due to the failure of a station telegrapher to deliver a meeting order. The northbound train was running from A to B, C, D, etc., and the meeting point was to be at C. The order for the northbound train was sent to the telegrapher at C, but in some manner he allowed it to be hidden from view by other papers on his desk, and he gave the train a signal that he had no orders for it. The report says that the dispatcher is censured because he might just as well have sent the order to B or to A. Where a meeting order is so sent that it must be delivered to one or both of the trains at the station which is appointed for the meeting, the rule requires special precautions. The telegrapher must display a red flag (or light) in addition to the regular train-order signal, and he must put torpedoes on the track. In this case these precautions were not taken, and the dispatcher is censured for not having required the operator to take them. The operator is held at fault for this and also for not keeping the order properly before him, and for failing to use a special lock on the train-order lever in his office, as is required of operators when they have an order for an approaching train. Both dispatcher and operator have had several years' experience and had been on duty only a few hours.

Collision No. 15 was due to the failure of men in charge of a northbound freight train, while standing on a side track, to identify southbound passenger trains. The freight arrived at P about 4 a.m. to wait for three southbound passenger trains. The first of these passenger trains was behind time and the second and third preceded it. The freight started north immediately after the passage of the third passenger train, the train which should have been first being still due. It is the opinion of the investigating officers that all of the men on the freight train had been asleep while waiting on the side track (their train having been held there about two hours), and that they assumed that all three of the passenger trains had passed. It was this late passenger train with which the freight a few minutes after leaving P collided. The men in charge of the freight declare that they had not been asleep. They had been on duty 11 hours and 19 minutes and off duty before beginning that tour 29 hours and 30 minutes.

ELECTRIC RAILWAYS

On electric railways there were reported 35 collisions and 17 derailments, in which the total damage to rolling stock and roadway was \$37,087. In train accidents two passengers and three employees were killed, and 319 passengers and 34 employees injured. Accidents of other kinds bring the total casualties up to 19 persons killed and 609 injured.

The time of the through trains between Moscow and Vladivostok, over the Siberian Railway, has been reduced 24 hours. Passengers leaving London on Monday may now reach Yokohama in 14 days and Shanghai in 16.

TIE PLATING DEVICE.

We are indebted to F. M. Graham, division engineer of the Pennsylvania Lines West at Fort Wayne, Ill., for the following description of a device for applying tie plates before the ties are put in track. The forged template, shown beneath,

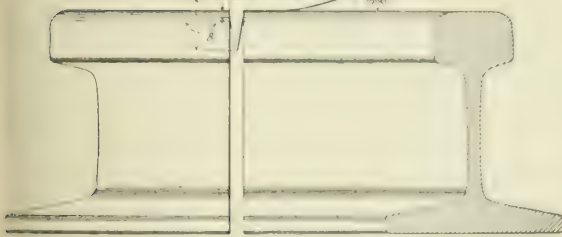
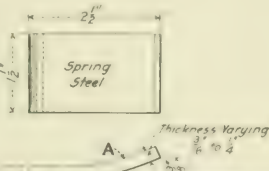


Elevation of Template for Seating Tie Plates.

designed to fit accurately the top of the tie plate, and especially the shoulder. By means of a wooden maul, weighing 20 lb., exclusive of handle, both plates are driven into the tie. In this way the plates are fully seated to precise gauge without becoming twisted, as is often the case when seated by trains.

SANTA FE RAIL SHIMS.

A new rail shim has been developed by G. E. Acert, superintendent of the Middle division of the Atchison, Topeka & Santa Fe. This shim is shown in the accompanying illustration. It is made of spring steel in such shape that after the splice has



Rail Expansion Shim.

been fully bolted, a slight blow on the end of the device forces the wedge from the joint. The shim is made in several sizes varying in thickness from $\frac{1}{8}$ in. to $\frac{1}{4}$ in. When laying rail the ease with which this shim is removed from the joint, especially in hot weather, should show marked superiority over the shim in ordinary use.

INTERNATIONAL RAILWAY CONGRESS.

SWITCHES AND SIGNALS.

Attention has been directed in previous issues to some of the main subjects which came up for discussion at the Berne congress. Several well-known authorities contributed to the group of reports dealing with the operation of switches and signals, including L. Weissenbruch, secretary of the permanent association of the congress; L. H. N. Dufour, E. C. Carter, chief engineer of the Chicago & North Western, and Professor Ulbricht. The latter's was a very comprehensive report dealing with signaling practice in Austria, Hungary, Bulgaria, Denmark, Germany, Sweden, Russia, Switzerland, Turkey and other countries. The reporter, who sent out a comprehensive list of questions to the various managements, in a summary of conclusions held that the newer developments in the methods of operating switches from a distance had extended more particularly in the direction of double wire transmissions, and had resulted in appliances giving results which were satisfactory from the point of view of safety. The operation of switches by means of rod

transmission was preferred to a smaller extent, and such transmissions were less liable to fracture, the main disadvantage being that such fracture was not controlled automatically as easily as in the case of double wire transmission. Double wire transmission was used exclusively for the operation of signals at a distance. In all the countries reported on it was recognized that the fracture of the signal wire transmission should result in the signal being placed at danger. Electric signal arm interlocking had proved a valuable auxiliary in the case of mechanical installations. Dealing with power operation, Dr. Ulbricht found that only electricity and compressed air with electrical control had given promising results as sources of power for the operation of large installations. It was noted, however, that up to the present time the number of failures was greater in the case of power-operated installations than in that of hand-operated installations. Against this had to be set the fact that with power installations a large amount of traffic could be dealt with more quickly than with hand installations, and their further extension was contemplated by those managements who had tried them on a large scale.

The report of Mr. Dufour, engineer to the company for working the Netherlands State Railways, dealt exclusively with practice in Holland. The safety appliances in the Netherlands resemble in many respects the types of appliances in use in Germany and Austria. The Holland Railway Company, by adopting candelabra semaphores in several stations, had attempted to indicate the route to be taken. With regard to power installations, Mr. Dufour said that the Stahmer electro-pneumatic appliances had not shown the disadvantages often attributed to them. The cost of such installations and of electric plant was generally higher than that of the double-wire mechanical plant, and the electro-pneumatic system was for a small number of levers more costly to install than the all-electric.

Mr. Carter dealt very briefly with the position in the United States, the main points brought out being that the application of power interlocking was rapidly increasing, and that the electro-pneumatic and all-electric systems as in other countries were beginning to supersede all other forms of power interlocking.

INFLUENCE OF WATERWAYS ON RAILWAYS.

This was the subject of several reports. G. R. Jebb, who is associated with the Birmingham Canal Navigations and the Shropshire Union Railway & Canal Company, reported for Great Britain. He showed that the canal mileage in that country is 4,763, and the chief centers of competition with railways were the Midland counties and for traffic between London, Liverpool, Leeds, Bristol and Goole. He agreed that railway companies had their rates influenced by waterways competition, but apparently the relations of railways and waterways remain more or less unchanged. Reference was naturally made by Mr. Jebb to the suggestion to put forward to construct four new main canal routes from the Midlands to the rivers Severn, Thames, Mersey and Humber. Mr. Jebb apparently regards this as a Utopian scheme, and he expressed the opinion that no fair return could be expected on the large capital outlay involved. With few exceptions, the biggest load which would be carried on the bulk of the English canals was 25 tons. Continental waterways were discussed in a voluminous report by Messrs. Colson & Marlio, and it will be interesting for those interested to compare this very complete report with that of Mr. Jebb, and note the much more important part played by waterways on the Continent.

In America apparently waterways traffic is declining to zero, canals which originally cost more than \$80,000,000 having been abandoned. Even the Erie canal, on which it was proposed to spend a large sum, had practically no effect on rates. Conditions were somewhat different on the Great Lakes, where the routes were longer, but as indicating the supersession of canals and waterways by railways it was pointed out that only 5 per cent of the Lakes traffic was carried to its destination by water after reaching a point where rail facilities were provided. William F. Hoyt, who made the report, added some figures which clearly explain the reason why the great waterways of the United States have become almost silent highways. Mr. Hoyt made an interesting comparison of European freight rates on railways

paralleling water routes in comparison with those on roads in the United States which were working under similar conditions. It was shown that not only were these rates lower in the United States, but that railway rates in the United States compared very favorably with European rates for water-borne traffic. After making allowance for the fact that waterways were generally longer than competing railways, it was shown that while the United States average rail rate was 7.54 mills per ton-mile, the average water rate in Germany was about 6.5 mills, and in France and Belgium 8 mills. These are significant figures.

ELECTRIC TRACTION.

Dr. W. Wyssling reported on this subject for Switzerland, for Great Britain and for several other countries. His report was mainly concerned with the Swiss electrically-operated lines, some of which were described in detail. Reference was also made to the experimental work being carried out in view of the contemplated conversion of some of the international lines to electric traction. It would seem to be probable that in future installations the single-phase system would be adopted.

A report by Dr. Arthur Hruschka dealt with the position in Austria and Hungary. At the end of 1909, the only electric railways in operation in these countries were secondary local railways, but two sections of standard gage railways, with a total length of 87 miles, have now been converted. Two of the existing lines were operated on the single-phase system at 2,500 and 550 volts, respectively, while the others were worked with continuous current.

Some details were given of the work of the special department of the Austrian State Railways formed to study the technical and economic aspects of electric traction on a network of 2,697 miles within the range of the available water powers. The total energy required had been calculated and it was now possible to indicate which of the large sources of water power would be required in future for railway purposes and which could be left absolutely for industrial purposes. Plans were now being prepared for lines aggregating 621 miles and for special reasons it was probable that the first lines to be converted would be the Trieste-Opcina line and the Arlberg Railway. An investigation has also been put in hand by the Hungarian State Railway and the Southern company, and the latter was contemplating the early conversion of a long main line in a mountainous district. There seemed every reason to believe that the Austrian railway authorities would probably decide in favor of single-phase current at 10,000 volts line pressure at 15 to 16 cycles per second, this choice being governed by considerations of simple overhead construction, elastic speed regulation and low installation costs.

George Gibb presented a report on the position in America with regard to electric traction, but he confined his statements to American practice in electric traction under steam railway conditions. In a brief historical survey he reminded the congress that the first example of electric traction for main line express service was the Camden to Atlantic City line, converted in 1906, while the first heavy trunk line terminal electric operation for all passenger trains was on the New York Central & Hudson River, which is to be extended to electric haulage of all trains within a 30 mile zone. Electric traction for cross country freight haulage was inaugurated in 1907 on the Spokane & Inland. In 1908 the Grand Trunk's tunnel line under the Detroit river was converted, while the main line traffic of the Pennsylvania Railroad into New York City under the Hudson and the East River was about to be handled electrically. It would thus be evident that in the United States the new method of traction had been applied to a great variety of conditions met with on steam railways. It was impossible to make any general statement as to first cost of electrification which could safely be applied to individual cases, but generally speaking the cost of converting a steam road was very high under American conditions. He was able to submit figures with regard to the cost of operation. The Lake Shore in 1908 operated its electric mileage at a cost of 19.86 cents per car-mile, while the steam car mileage cost 27.95 cents. Of the total cost per car-mile, one-third was the cost of supplying power to the car, including maintenance, and of this third about one-half was the cost of the power alone. As, how-

ever, the low conditions of the power-houses were not favorable, the item for cost of power should decrease as the magnitude of the operation was extended. In general, electric traction methods in America tended to the use of multiple-unit trains for all short runs and local services. Electric locomotives were employed only where necessary, that was for long express runs outside the electric zone, for special freight service, and for terminal switching. The high acceleration possible by electrical operation on the multiple-unit system was a consideration of importance to a railway in holding a large class of traffic and in fostering its growth. Electric locomotives for heavy service were still in the experimental stage, and much remained to be done towards perfecting their design. As at present designed, electric locomotives of a given total weight and individual wheel weight were more destructive to track than the same weight distributed as in steam locomotives. Experiments carried out by the Pennsylvania Railroad showed the desirability of imitating the wheel arrangements of the steam locomotive. Attention was now being paid to the advantage of the single-phase system, and he believed that the total operating cost figure would, as experience accumulated, be found to be in favor of that system owing to its higher average efficiency and the lower operating cost of sub-stations.

The discussion which followed the presentation of these reports showed that there were still differences of opinion, one speaker claiming that continuous-current working was to be preferred for dense traffic conditions, while more than one authority deprecated the promulgation by the congress of an opinion as to the superiority of any particular system. It was urged that it was far too early a date in the history of electric traction to arrive at any sweeping conclusion of that kind.

BRIDGE RECONSTRUCTION.

On the subject of bridge reconstruction the conclusions reached by the various reporters were fairly unanimous, and they were admirably summed up in the report of Eugene Randich, engineer of the maintenance department of the Italian State Railways. This authority expressed the opinion that one could not consider the strengthening of railway bridges advantageous from the economic point of view unless the estimate for the work was appreciably lower than the cost of a new bridge put in place, and when there was likely to be a reduction rather than an increase in the cost of maintenance. In view of the advantages presented by masonry and concrete structures and the successful applications which had been made of these materials even in the case of bridges of fairly large span, it was advisable to extend their use. The use of ingot iron in the strengthening of wrought-iron bridges was of current practice. The experience gained had shown that the use of wrought iron and mild steel for strengthening purposes gave satisfactory results. Several of the reporters drew attention to the advisability of taking sufficiently into consideration the future increase in rolling loads. The average cost per ton of strengthening works was estimated by J. Schroeder von der Kolk, the reporter for Spain and Portugal, at twice the ordinary cost of new bridges.

OTHER REPORTS.

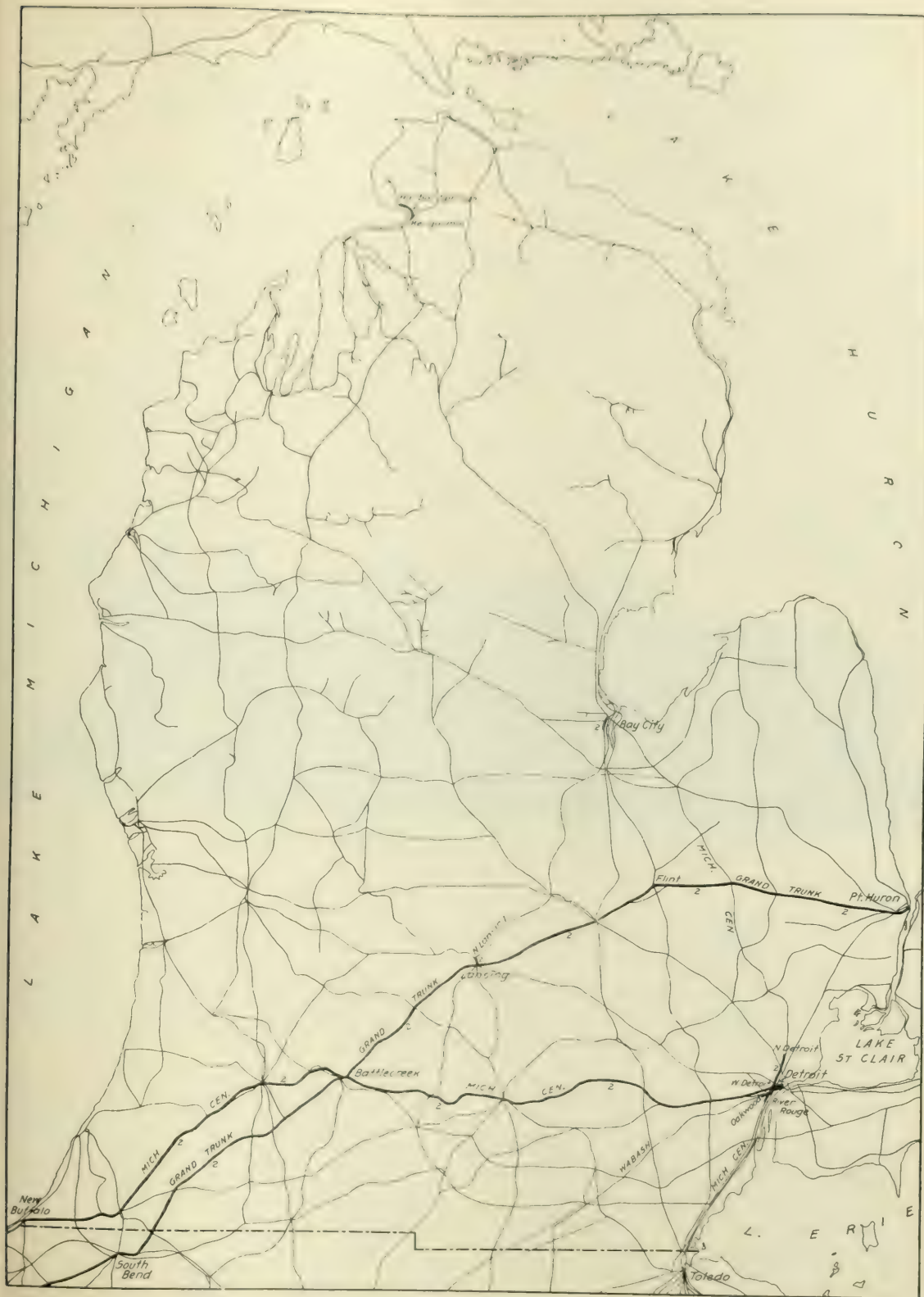
The reports abstracted in this and previous issues of the *Railway Age Gazette* are those which received particular attention at the congress. The other subjects include: large stations, road motors, rail motors, two reports on steam locomotives for very high speeds, reports on light railways, rolling stock for narrow-gage railways, transshipment, passenger tickets, and one or two other subjects.

DOUBLE TRACK RAILWAYS IN MICHIGAN.

The railways in the lower peninsula in Michigan on which there are two or more main tracks are shown in the accompanying map. On the Michigan Central there is one short stretch of four-track line.

The upper peninsula of Michigan will be shown in connection with the map of Wisconsin.

The number of tracks is indicated in the map by the thick-



Double Track Railways in Michigan.

ness of the lines in the drawing. The termini of the sections having more than one main track are as follows:

	No. tracks.	Approx. miles.
MICHIGAN.		
Marquette to Ishpeming <i>Grand Rapids & Indiana.</i>	2	19
Harbor Springs to Keweenaw <i>Grand Trunk.</i>	2	5
Port Huron to Chicago, Ill. <i>Wabash.</i>	2	230
Detroit to Osgood <i>Michigan Central.</i>	2	6
Detroit to West Detroit	4	3
West Detroit to Michigan City, Ind.	2	125
Bay City Junction to North Detroit	2	..
West Detroit to River Rouge	2	3
Lansing to North Lansing	2	2
At West Bay City	2	3

MIKADO LOCOMOTIVE FOR THE ATLANTA, BIRMINGHAM & ATLANTIC.

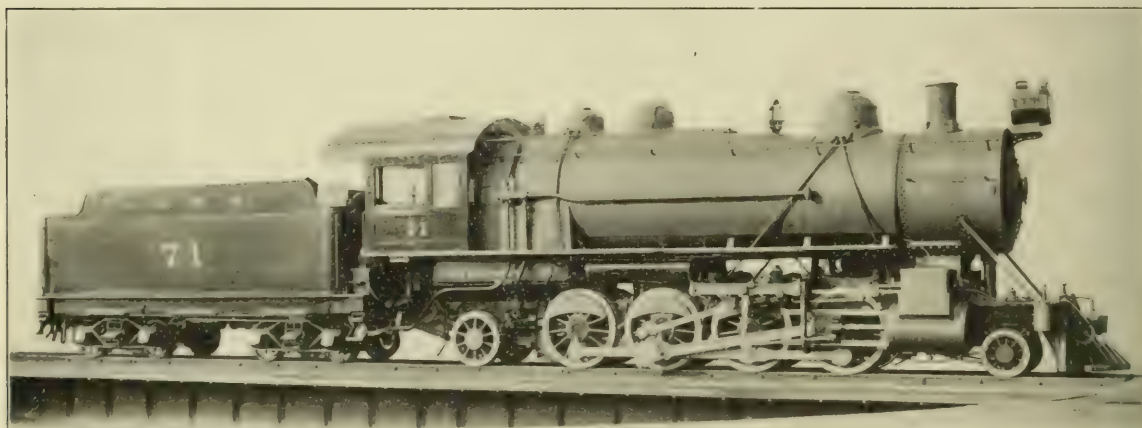
Two heavy Mikado (2-8-2) locomotives have recently been built for the Atlanta, Birmingham & Atlantic by the Baldwin Locomotive Works. They have a total weight of 260,000 lbs., of which 200,000 lbs. is on the driving wheels, and, with cylinders 25 in. diameter and 32 in. stroke exert a tractive effort of 50,800 lbs.

A conspicuous feature is the large boiler capacity provided, and the moderate pressure carried. The safety valves are set

back head slopes forward, while the throat is vertical. A total of 376 "Breakless" stays are placed in the breakage zones in the sides, throat and back, while the front end of the crown is supported on two **1** bars hung on expansion links. The longitudinal barrel seams are butt-jointed and welded at the ends. The ash pan has double hoppers with sliding bottoms. The front end is arranged with a high single nozzle and adjustable petticoat pipe. The diaphragm plate is of cast iron, 18 in. in diameter.

The steam distribution is controlled by balanced slide valves operated by Baker-Pilliod gear. The steam chest centers are placed 3 in. outside the cylinder centers, this plan making possible a more convenient arrangement of the motion work. The various parts of the gear are supported by a cast steel cradle placed outside the second pair of drivers. The valves are set with a maximum travel of 5½ in. and a constant lead of ¼ in. The outside lap is 1½ in. and the inside lap zero.

The main frames are of cast steel, and are 5 in. wide narrowed to 4 in. back of the rear driving pedestals. Each frame is in one piece, except for the double front rails, which are iron forgings. The equalization system divides between the second and third pairs of driving wheels; the front truck is of the usual center bearing, swing bolster type, while the trailing truck is of the Rushton type, with inside journals. The frames are



Mikado Type Locomotive for the Atlanta, Birmingham & Atlantic.

at 170 lbs.—a lower pressure than is usually carried on large engines using saturated steam. The cylinder volume is 18.1 cu. ft., and with a total heating surface of 5,365 sq. ft., there are provided 296 sq. ft. of heating surface for each cu. ft. of cylinder volume. The ratio of grate area to heating surface is as 1 to 91.7, which is very much greater than the most liberal practice of a few years ago. In this connection the evaporative work of engines with this large ratio will be of interest and value. In the report on the Economics of Railway Location to the Maintenance of Way Association, the committee stated that the highest rate of evaporation per sq. ft. of heating surface was when the ratio to grate area was as 50 to 1. This tallies with the empirical data of the small engines of two decades or more ago, but that more because of physical limitations than any thing else. The biggest possible grate had but one-fiftieth the area of the largest possible heating surface. Now we have a ratio of nearly double this old one, and the point is, whether the additional steam production corresponds with the added cost and at what point this increase of ratio will cease to be profitable. The lowered steam pressure, too, is a matter of interest. It corresponds very closely with Prof. Coors' point of maximum efficiency, and it would be of great value if this matter could be tested to a finish.

The boiler is of the radial stay, wagon-top type, with a wide truss placed over the rear drivers and trailing truck. The

supported on leaf springs back of the trailing truck. Cast steel is used for various details, including driving wheel centers, driving boxes and guide bearers. The driving wheel centers have brass hub liners.

This locomotive is provided with electric headlight equipment, also with two sand-boxes for sanding, ahead of the leading drivers when running in either direction. The tender frame is composed of 12-in. channels, and it supports a straight top tank with gravity slides in the fuel space. The trucks are of the arch-bar type, with cast steel bolsters and Standard rolled steel wheels.

These engines carry a weight of approximately 50,000 lbs. on each pair of driving wheels. In this respect they are comparable to many consolidation type locomotives now in service, but the use of trailing trucks has made possible a material increase in boiler capacity. This feature should enable them to develop greater horse-power, and hence maintain a higher speed, than a locomotive with the same tractive effort and wheel loading, but having a smaller boiler. The rear truck is also of value when backing into curves and switches.

Following are the principal dimensions and data of these locomotives.

		Ratio.
Weight on drivers	total weight	76.92*
Weight on drivers	tractive effort	3.93
*Percent.		

Total weight, tractive effort	10
Tractive effort, draw bar	10
Heating surface, grate area	400
Weight on drivers, on total, on drivers	200,000
Displacement of 2 cylinders	24,000
Total heating surface, grate area	400
Grate area, displacement	400

* Per cent

Tractive effort	10
Wheel base, rigid	16 ft.
" " " " " " "	16 ft.
Weight, on drivers	200,000 lbs.
front track	94,000 "
back track	106,000 "
total engine	200,000 "
engine and tender	100,000 "

Diameter	11
Piston, stroke	11

Wheels, diameter, drivers	30
" " " " " " "	30
" " " " " " "	30
" " " " " " "	30
Journals, driving, drivers	11
" " " " " " "	11
" " " " " " "	11
" " " " " " "	11

Boiler.

Boiler, diameter	78 in.
Boiler, thickness sheets	1/2 in.
Steam pressure	100 psi.
Firebox, length	108 in.
" width	78 in.
" depth front	80 in.
" thickness, sides, back, crown	3/8 in.
" thickness, tubesheet	1/2 in.
Water space, front	100 in.
Water space, sides and back	100 in.
Tubes, material	Steel
thickness	No. 11
number	400
length	19 ft.
diameter	2 1/4 in.
Heating surface, firebox	200 sq. ft.
" " " " " " "	400 "
" " " " " " "	300 "
Grate area	285 sq. ft.

Tender.

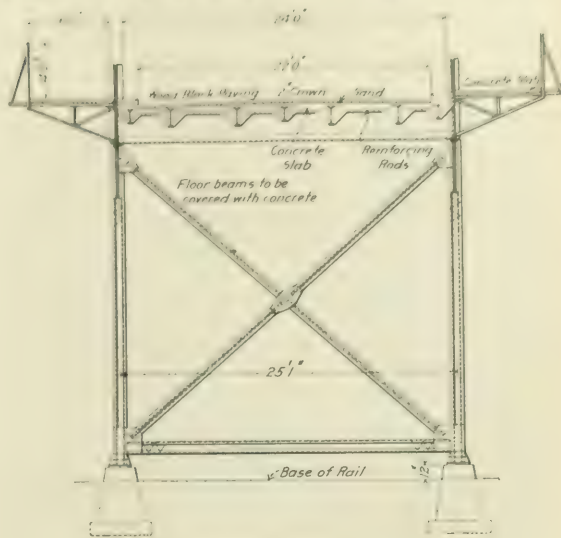
Tank, capacity, water	7,000 gals.
Tank, capacity, coal	14 tons

VIADUCT AND SUBWAY AT POCATELLO, IDAHO.

On June 6, 1910, the city council of Pocatello, Idaho, accepted the plans prepared by the Oregon Short Line for a viaduct over the yards of the company, on the line of Center street and a subway under the yards of the company on the line of Halliday street. These plans are shown in the accompanying illustrations.

The viaduct will be of steel and reinforced concrete with a

span of 20 ft. wide and 6 ft. sides. The north approach will be straight, starting inside the right of way line of the highway, and will consist of retaining walls on a 7.9 per cent. grade to attain a height of about 19 ft. above the general ground level. From that point a reinforced concrete viaduct of arched bents will be used until the first track in the main yard is reached. From this point to the north right of way line of the railway, the viaduct will consist of 11 spans of through plate girders on steel bents, carrying in length from 3 ft. 6 in. to 29 ft., making the total length of steel 307 ft.

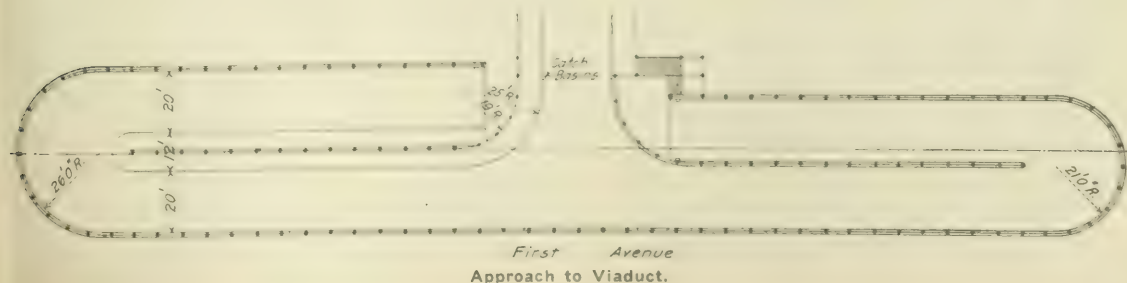


Typical Transverse Section of Viaduct.

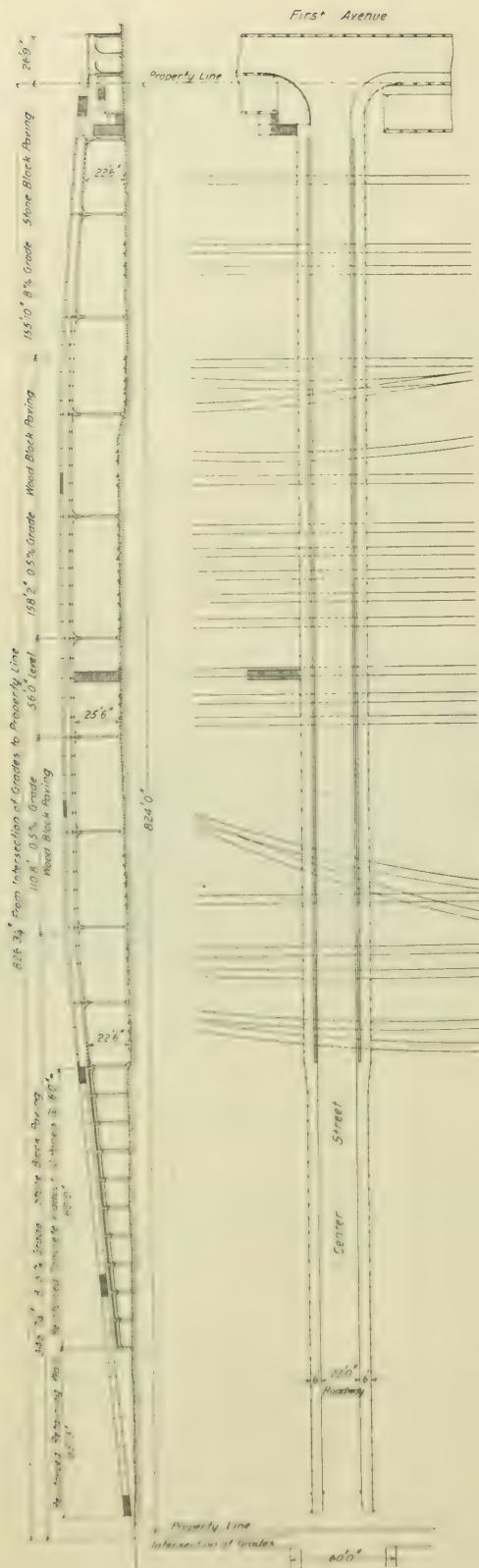
9 in. The north approach will be in the form of two loops, of similar construction to that to be used in the south approach.

The grades of approaches will not exceed 8.25 per cent. and the main portion of the viaduct will be on a 0.5 per cent. grade, with a maximum height of 28 ft. 9 in. from base of rail to crown of roadway. The level portion of the viaduct will be paved with wood blocks, while on grades the paving will be of stone blocks. The approximate tonnage of steel required is 275 tons, and the total estimated cost is \$125,000.

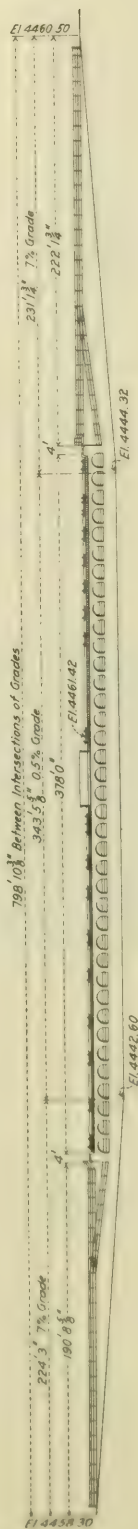
The subway will be 799 ft. long, with a covered length of 386 ft. The approaches will be straight and on 7 per cent.



First Avenue Approach to Viaduct.



Plan and Longitudina Section of Viaduct.



Plan and Longitudinal Section of Subway at Pocatello; Oregon Short Line.

grades, with two 12 ft. roadways and two 6 ft. sidewalks. The roof of the subway will consist partly of steel beams in concrete and partly of reinforced concrete supported by a series of arches between sidewalks and roadways. Passing through



Transverse Section of Subway.

out will be of stone blocks. The total estimated cost is \$96,000. No contracts have been let, the present intention being to do the work with company forces.

A JUDICIAL OPINION ON THE LONG AND SHORT HAUL QUESTION.

The following abstract is taken from a dissenting opinion by Judge A. M. Woodson of the Supreme Court of Missouri, in the case of *J. C. McGrew v. Missouri Pacific*. The Missouri law provides:

"Sec. 1126. No railway corporation organized or doing business in this state, under any act of incorporation or general law of this state now in force, or which may be hereafter enacted, shall directly or indirectly charge or collect for the transportation of goods, merchandise, or property on its roads for any distance, any larger or greater amount, as toll or compensation, than is charged or collected for the transportation of similar quantities of the same class of goods, merchandise or property over a greater distance upon the same road, nor shall such corporation charge different rates for receiving, handling or delivering freight at different points on its road or roads connected therewith, which it has a right to use, nor shall any such railway corporation charge or collect for the transportation of goods, merchandise or property over any portion of its road a greater amount as toll or compensation than shall be charged or collected by it for the transportation of similar quantities of the same class of goods, merchandise or property over any other portion of its road of equal distance; and all such rules, regulations or by-laws of any railway corporation, as fix, prescribe, or establish any greater toll or compensation than is hereinbefore prescribed, are hereby declared to be void."

"Sec. 1160. Any railway corporation which shall fix, demand, take or receive from any person or persons any greater toll or compensation for the transportation, receipt, handling or delivery of goods or merchandise, in violation of the provisions of this article, shall forfeit and pay for any such offense any sum not exceeding one thousand dollars, and costs of suit, including a reasonable attorney's fee, to be taxed by any court where the same is heard by appeal or otherwise, to be recovered by civil action by the party aggrieved, in any court having jurisdiction thereof; and any officer, agent or employee of any such railroad corporation who shall knowingly or wilfully violate the provisions of this article shall be liable to the penalties prescribed in this section."

The appellant assails the constitutionality of those statutes for the reason that they were not enacted in accordance with the requirements of section 32, Article 4 of the Constitution of 1865. That section reads as follows: "No law enacted by the general assembly shall relate to more than one subject, and that shall be expressed in the title; but if any subject embraced in an act be not expressed in the title, such act shall be void only as to so much thereof as is not so expressed."

The title to the act of 1872 is as follows: "An Act to prevent unjust discrimination and extortion in the rates to be charged by the different railways in this state, for the transportation of freight on and over."

The appellant contends that the title of the act is directed against *unjust discriminations*, while the act itself prohibits *all* discrimination, whether just or unjust.

The appellant asserts that if the validity of that act is tested by the constitutional provision before quoted, then that portion of the act which prohibits *all* discrimination is void and inoperative, for the reason that it is not mentioned in the title of the act.

The title of the act of 1872 does not purport to prohibit *all* discrimination in the transportation of freight, but in express terms directs its inhibition against *unjust* discrimination only. The principle of *mentio unius exclusio alterius* applies here, and there is no possibility of escape from the conclusion that all discrimination is not embraced in the title of the act of 1872. Having shown that the title of the act in question does not prohibit *all* discrimination by railways in the shipment of freight, it would seem to be useless to cite authorities to sustain the proposition that such portion of the act which attempts to do so, is, in the language of the constitution, "void" and inoperative; but since the majority of the court entertained different views regarding the legal questions involved in this case will continue.

In brevity, I do not believe it was the intention of the legislature, by the act of 1872, to prohibit *either just or unjust discrimination* in the transportation of freight over railways, for the reason that there is *nothing in the body of the act which refers even remotely to that subject*: * * *

I have two criticisms to suggest regarding that clause of the opinion of my learned associate. First, that while section 1 of the act of 1872 was properly re-enacted in 1879 and is now section 1126 Rev. Stat. of 1899, and upon which this suit is based, was repealed by an act of 1887. Second, that said section 12 and 14 of the Constitution are not self-enforcing, and there is no statute or common law in force which prohibits reasonable and just discrimination by railway companies in the transportation of freight and passengers over their roads under the direction and approval of the Board of Railroad and Warehouse Commissioners; but on the other hand, the act of 1887 expressly authorizes them to do so.

I will discuss these propositions in the order stated, but before doing so I wish to state in the first place that I am at a perfect loss to understand the motive which induced the plaintiff to institute and prosecute this suit, for the reason, as shown by the freight schedules, made and promulgated by the State Board of Railroad and Warehouse Commissioners (which are public records and of which we have the right to take judicial notice), that the rates with which he was charged were, in every instance, so far as I have been able to ascertain, less than the legal rates, and were evidently made for the purpose, among others, of enabling him to sell his coal in competition with the coal of mines located on other roads and in other states. If the reduced rates of which he complains had not been made by defendant he would not have been able to have marketed his coal, mentioned in this suit, in competition with coal from other mines, and would therefore have lost that trade, as will be presently shown. The defendant was also benefited by said reduced rates or it would not have made them, for the reason that it was thereby enabled to secure transportation of said coal which it otherwise would not have been able to have done on account of the competition of other mines located on other and shorter roads. Clearly, this was the case at Boonville, where coal was going there from Lowery City and Brownington over other roads; at Sweet Springs, where coal was going from Higginsville; and Joplin, where coal was going from various mines located in the state of Kansas. If the defendant company had not made the reduced rates complained of it would have meant that the mines located on other roads and in different states would have monopolized the coal business at the point to which the reduced rates were

made, and that of course would have worked injury in those communities as well as upon the plaintiff by limiting his mine output, and upon the defendant by depriving it of the transportation of the coal, about which this suit was brought.

We know from common knowledge that the cost of mining coal in this state far exceeds the cost of mining it in the state of Illinois, and if Missouri coal mines are not given reduced rates to Boonville and other competing points, Illinois coal will surely supply their needs. This great difference in the price of mining coal in Illinois as compared with mining it in Missouri enables the former with much higher railway rates to sell its products in this state even against the legal freight rates made from the Missouri mines. The Missouri mines, therefore, in order to be enabled to do any business in many towns of this state competing with the Illinois coal, it is necessary for the railways to make them a lower rate than the legal rate; for instance, by an examination of the state and interstate rates it appears that the rate from the Illinois coal fields to Boonville is \$1.95 per ton and to Marshall \$2.10 per ton. Still this record shows that defendant has made a rate of forty cents per ton on coal from Myrick to Boonville, presumably in order to enable it to haul some of the coal that is consumed at the latter place. Otherwise, the Illinois mine would supply that city's entire demand.

Of course, it goes without argument that the defendant like other railway companies is desirous of getting as high freight rates as it possibly can. Self interest prompts it to do so, and when a railway, therefore, voluntarily reduces the rates prescribed for it by statute or by the railway commissioners, it must mean that it cannot otherwise procure the freight for transportation. Railway companies understand the commercial conditions governing the situation and that those conditions will not admit of transportation by them unless at reduced rates. Besides that, they understand that the communities they serve will be deprived of the advantages which flow from the successful operations of their industries. By making special or such reduced rates to meet those commercial conditions, the competition of other markets and of like or other commodities, they are conferring substantial benefits on those communities. If such reduced rates are not made, in all probability the business will not be forthcoming. Under such circumstances, it seems to me that carriers are justified in making such rates as will enable those communities to do business in competitive markets, provided there is no loss to them in the transaction; and it can be readily understood that if such reduced rates do not affect or influence upon other existing traffic, they can sometimes and under certain conditions be made very low before a loss will result therefrom.

Where a railway plant and all facilities are already ample and sufficient to enable it to transport such freight without further expenditures then it will be seen that the expense incurred in this particular transportation would not be in proportion to that of its regularly established business. The difference in the rail carriers' rates can sometimes be very great, and it cannot be justly said that some are unreasonably high, or that others are unreasonably low, for the reason that the expense which a traffic under certain conditions adds to the already existing expense may be covered by very low rates without injury to any locality or community, and yet the rates which it may be necessary to charge upon other traffic must of necessity be higher so that the entire cost may be covered and the property be safely and successfully operated.

It is a common complaint made by the ordinary uninformed man, that the reduced competitive rates on the through rates which may be lower for a longer than for a shorter haul produce a loss to the railway which they have to recoup or make back by charging higher rates for shorter hauls; that is to say, that they do the business in such cases for less than they can afford to do it for were they not able to make an unreasonably high profit from their local business. That is an erroneous idea. If the railway did not take the competitive business at the low rates, it would mean they would not procure any of the business, and consequently they would lose just so much revenue as would be derived from its transportation had they procured it. For in-

stance, suppose a competitive through business was offered at ten cents a hundred and that the same carrier was charging twenty cents a hundred for the short haul or intermediate points. Under such conditions it must take the through competitive business at ten cents or not take it at all, for the reason that other roads which have shorter routes would take the business for ten cents, which would be their legal local rate. The intermediate stations do not complain of the reasonableness of their rates, because the longer competing line does not take the through freight, yet they do not see that by doing so it would enable it to carry local shipments at a lower rate. By taking the business at the ten-cent rate there may not be as much profit to the longer road as there would be if it charged and could receive the local higher rates, but by reason of the fact that there is some profit in the business at the ten cents or competitive rate, it can be justly said that such business adds to the receipts of the company more than to its expenses, and for that reason it is justified in engaging in said through business, provided by so doing it does not injure or affect the intermediate shipper or his business upon which the higher rates are charged. By reason of there being some profit in the business, if profit it may be called, it makes the cost of the entire business of the company less per unit and it is thereby better able to give lower rates to the intermediate points than it otherwise would be.

I gather from the reports of the Interstate Commerce Commission that approximately the following divisions may be made of the entire expense of maintaining and operating the railways of the United States: One-third to pay interest on stocks and bonds; another third to be expended in maintaining stations and station grounds, salaries of the general officers, legal officers, division officers, station agents, clerks, telegraph operators, bridge men, section men, and all other classes which it may be necessary to retain whether the competitive through business is taken or not.

These two-thirds of the expense, which might be called a fixed expense, goes on whether the railway hauls ten million or thirty million tons of freight. The remaining third of the expense might be termed the movement expense, which consists of the wages of engineers, firemen, conductors and brakemen, locomotive and car repairers, fuel, oil, waste, water, the wear and tear of rails, decay of ties, etc. As the competitive through traffic is offered at certain specified rates made by influences beyond the control of the carrier change or effect, the question to be first determined is—will it pay this so-called movement question? The other two-thirds of the expense, of course, goes on whether the through traffic is taken or not. Any sum received in excess of this movement expense is just so much more than can be applied toward meeting the fixed two-thirds expense, and the road is thereby enabled to make the burden lighter for the local or non-competitive traffic.

The movement expense of such traffic might be decreased materially according to the different conditions or exigencies that might arise. For instance, if the traffic was offered at a time when empty cars had to be returned, which at certain seasons of the year amounts to thousands, the items of wages, fuel and other supplies, together with repairs of locomotives and cars, would not properly enter into the cost. The expense incident to these would be largely incurred with the movement of empty cars as well as with the loaded ones. Again, if the preponderance of tonnage was in the direction opposite to that which the competitive business was destined and such business enabled the carrier to load trains that would otherwise be hauled light or empty, the expense of the new competitive business would be inappreciable. For would this competitive business entail a proportionate share of the large expense of maintaining the track, bridges and culverts, which constitute a large part of this third of the movement expense?

Bearing in mind those many influences, it will be observed that many of the items comprising the movement expense already incurred by the then existing business would not be changed by the addition of the new competitive traffic, and that the entire expense of its carriage would in many cases be inappreciable.

General News Section.

Washouts are reported on the Southern Pacific of Mexico south of Villa Verde, near the northern border of Mexico.

Severe floods are reported in Japan, principally on the eastern coast. There have been several derailments resulting from washouts.

The system of train auditors established some time ago on the National of Mexico has been extended to the Mexican International.

The Interstate Commerce Commission has called a hearing for September 29 in the matter of compliance with the provisions of the revised Safety Appliance act.

The International & Great Northern has closed down its car repair shops at Palestine for the month of August. All other departments of the shops are operating.

The Society for the Protection of New Hampshire's Forests will ask the state legislature next session to enact a law making the use of oil fuel on locomotives compulsory.

The Atchison, Topeka & Santa Fe, in giving deeds to property in the new town of River Bank, Cal., which is to be a division point, has put in such restrictions as permanently to exclude saloons from the town.

A fast fruit train on the Erie, while going at high speed, struck a landslide in a deep cut a mile and a half west of Howells, N. Y., on August 5. The locomotive and 10 cars were wrecked and the engineman, the fireman and a brakeman were killed.

The floor of one of the new steel dining cars of the Pennsylvania is being covered with cork slabs compressed from an original thickness of 14 in. to less than $\frac{1}{2}$ in. The material gives a sure but silent foothold, and if its use proves satisfactory all of the company's steel diners may be so equipped.

The Grand Trunk, according to press despatches, will hereafter require passenger train conductors and trainmen to pay more attention to their personal appearance and dress. The superintendent of the Ottawa division is quoted as saying that the company will expect an improvement since the increased scale of wages has gone into force.

On August 5 a Delaware, Lackawanna & Western freight train, made up of 62 cars, got away on the steep grade about four miles north of Stroudsburg, Pa., and was derailed. The rear part of the train seems to have left the track first, breaking away from the front part, which was piled up half a mile further on. The engineman and a brakeman were killed.

A head-on collision on August 8 between a passenger train and a work train on the Northwestern Pacific, two miles south of Ignacio, Cal., killed 13 persons. The passenger train met the work train, consisting of a caboose and two flat cars, on a curve. The baggage car and smoker were telescoped, but the other cars were not damaged. The conductor on the work train is held responsible, having received orders to wait in the Ignacio yards until the passenger train had passed.

The advisory board of railway superintendents, appointed at the last state railway convention to confer with the Indiana Railway Commission concerning the operation of trains and the prevention of accidents, held a meeting on August 1. Accidents during the first half of this year were discussed and topics for discussion at the next annual convention, to be held November 1, were submitted for consideration of the programme committee, which has been called to meet with the advisory board and the railway commission September 29 to arrange a programme.

The Pennsylvania Railway's 18-hour New York-Chicago train went off the track at two o'clock in the morning on August 7 at Canton, Ohio, while running at high speed. According to the despatches, a brake beam under the tender dropped and derailed the tender, which ran over the ties for 100 yards until it struck a switch. Then the rest of the cars were derailed. The train broke in two between the second and third cars. When the first two cars stopped they were standing across the track, but

no car was turned over. The engine stayed on the rails. No one was hurt.

The attorney general of Texas has prepared an opinion for the state railway commission, holding that the legislature cannot constitutionally enact a law giving the commission power to require railway companies to build sidings or spur tracks to private industries which do not touch the right-of-way of the railway but are situated near-by and to apportion the expense between the railway company and the industries benefited. The attorney-general says that one of the main purposes of the creation of the commission was to prevent unjust railway discriminations and that such a law as that proposed would authorize the commission to determine where spur tracks should be built, and thereby to discriminate itself.

The Michigan Central has published a leaflet showing the records of the special train run for the Brotherhood of Locomotive Engineers from Windsor, Ont., to Falls View, Niagara Falls, on May 21. As stated at the time, the records show that the run of 224 miles was made in 217 minutes, without a stop. The time of passing each station, both going and returning, is shown in the record, and the miles between stations are given. The record shows that the highest speed for the first train was 80 miles an hour, made for three minutes between Fletcher and Buxton. The second train made the run between Essex and Woodsley in four minutes, at the rate of 83 miles per hour. Returning, the highest speed recorded was from Ridgetown to Fargo, made in seven minutes, at the rate of 93 miles an hour.

Drafting Employers' Liability Act in Illinois.

The state employers' liability commission of Illinois has prepared a tentative plan for an employers' liability act. This plan is expected to be embodied in a bill to be reported to Gov. Deneen before Sept. 15. A scale of compensation for injuries received in industrial accidents is a part of the plan of the proposed law. Present methods of settling claims for personal injury are unsatisfactory because of the questions of negligence or fault which are all important in actions at law. The proposed law is to be "compulsory in form but elective in fact." The employer shall pay the compensation provided in the act, but neither employer nor employee loses any common law remedies. To refuse to compensate the employee for permanent or temporary disability would subject the employer to liability for suit in which damages would be apportioned according to the relative degree of negligence and the burden of proof would be on the employer. Acceptance of compensation for the hurt by the employee under the plan would bar him, from beginning action at common law.

Charles Piez of Chicago, president of the Link-Belt Company, was elected chairman of the commission to succeed the late Ira G. Rawn. Gov. Deneen appointed W. J. Jackson, general manager of the Chicago & Eastern Illinois, to membership on the commission to fill the vacancy caused by the death of Mr. Rawn.

Novel Entertainment by Union Pacific and McKeen Motor Car Co.

The Union Pacific and the McKeen Motor Car Company gave a novel entertainment at Omaha on July 30. The Union Pacific's principal shops are located at Omaha and the McKeen company's plant is within the same enclosure. The two companies on this date threw their works open to the citizens of the city and invited all who wished to inspect them. There was a constant stream of visitors from 9 a. m. until evening. All the shops were in operation. The employees were permitted to lay down their tools at 11 a. m. and the Union Pacific band then gave a brief concert at the shop of the motor company, after which George Brophy, one of the old employees of the Union Pacific, made an address in which he welcomed the visitors. In the course of his remarks Mr. Brophy deprecated anti-railway legislation and agitation. The Omaha newspapers gave full accounts of this unusual entertainment, the *Bee* saying in part:

"Having decided to entertain every person in Omaha anxious to see and learn, the officials of the two companies went about the business in proper form. Alert, well-informed guides met

all visitors at the main gate and escorted them in groups through the office building, the storehouse, oil house, power house, machine shop, blacksmith shop, boiler shop, pattern shop, car shop, paint and wheel shop and the motor car shops.

"Conversation of a polite, well-modulated, social character was not very popular in most of the shops and could only be conducted with difficulty; but there were sights to see and lessons to be learned at every step. Much eagerness was evinced to learn all the guides had to tell, and it is safe to say the people of Omaha, to a very large number, are much better informed on and have a higher conception of the vast growth and importance of the Union Pacific industrial plant here than they ever had before."

Labor Negotiations.

The Grand Trunk announced, after the strike settlement had been effected, that the men who struck have forfeited their claims to the pension fund. The rules under which the fund is maintained expressly provide the annulment of pensions to all strikers. It does not appear that the company has been taking back the strikers in as large numbers as the men expected.

After the meeting of railway trainmen at St. Louis adjourned on August 7, it was announced that conductors and trainmen would, within the next 10 or 15 days, be given the opportunity to vote on propositions for demanding an eight-hour day for freight conductors and trainmen and the mileage basis for passenger train crews. If the vote is carried, the matter will be taken up with the officers of western roads within 30 or 40 days.

The Brotherhood of Locomotive Engineers has decided to demand a flat wage increase of from 15 to 18 per cent. on roads west of Chicago.

The strike of Canadian Northern steamfitters at Winnipeg, Man., has been settled. The men accepted the company's offer of five cents an hour increase and increased pay for overtime.

The Louisville & Nashville has made an agreement with its enginemen, who are understood to get a substantial increase. The agreement provides for the following scale per 100 miles: Local freight, \$5; through freight, \$4.90; through passenger, \$3.95; branch passenger, \$3.80. The men have heretofore been paid by the day.

Master Car and Locomotive Painters' Association of United States and Canada.

The forty-first annual convention will be held in St. Louis, Mo., September 13-16, 1910.

American Street and Interurban Railway Association.

The exhibit committee of the American Street & Interurban Railway Manufacturers' Association has made a number of changes in the exhibit space arrangement on the Million Dollar Pier at Atlantic City, N. J., for the 1910 convention, to be held October 10-14. These changes have been found necessary on account of the G. A. R. convention to be held in Atlantic City during the latter part of September, at which time the pier will be used for entertainment purposes. The Manufacturers' Association has prepared a new diagram of the exhibit space, a copy of which will be mailed to all exhibitors who are affected by the changes in the diagram.

There is no change in Machinery Hall and in Building No. 3, but there is some change in the general arrangement of Building No. 2 and considerable change in the front spaces of Building No. 1. These changes have necessitated the postponement of the final assignment of the exhibition space, which will probably be made on August 12. The alterations make it very necessary that every exhibitor should give the weight and dimensions of the apparatus he expects to exhibit.

The total exhibit space will be approximately 78,000 sq. ft., which is more than this convention has ever before required. In 1908, 65,000 sq. ft. were used. The applications to date call for about 52,000 sq. ft. There has been an enormous growth of the American Street & Interurban Railway Association, taking in several steam roads which have electrified track, and a general marked increase in interest on the part of steam roads is being manifested.

Exhibit space may be had at 30 cents per sq. ft. and the cost of handling freight will be \$5 per ton.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 58 State St., Boston, Mass.
 AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; next meeting June 22, 1911; Niagara Falls, N. Y.
 AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn.
 AMERICAN ASS'N OF LOCAL FREIGHT AGENTS' ASS'N.—G. W. Dennison, Penna. Co., Toledo, Ohio.
 AMERICAN ASS'N OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew Bldg., Cincinnati, Ohio; Sept. 16; St. Louis.
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York; semi-annual, Nov. 16; St. Louis.
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 18; Fort Worth, Tex.
 AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASS'N.—E. H. Fritch, Monadnock Bldg., Chicago; March 21-23, 1911; Chicago.
 AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago.
 AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.
 AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia.
 AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed. except July and Aug. annual, Jan. 13-19.
 AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., N. Y.; annual, Dec. 6-9; New York.
 AMERICAN STREET AND INTERURBAN RAILWAY ASS'N.—H. C. Donecker, 29 W. 39th St., New York; Oct. 10-14; Atlantic City.
 ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; April 26, 1911; New Orleans, La.
 ASSOCIATION OF RAILWAY CLAIM AGENTS.—E. H. Hemus, A. T. & S. F., Topeka, Kan.
 ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Colegrove, I. C. R.R., Chicago; annual, Sept. 27-30; Chicago.
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 185 Adams St., Chicago; June 19, 1911; Boston.
 ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Place, New York.
 RAILFALO TRANSPORTATION CLUB.—J. N. Sells, Buffalo.
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
 CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, Montreal, Que.; Thursdays, Montreal.
 CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month; Chicago.
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in January, March, May, Sept. and Nov.; Buffalo.
 ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.
 ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton Building, Pittsburgh; 1st and 3d Tuesdays; Pittsburgh.
 FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R.R., Richmond, Va.; 20th annual, June 21, 1911; St. Paul, Minn.
 GENERAL SUPERINTENDENTS' ASS'N OF CHICAGO.—H. D. Judson, 300 Adams St., Chicago; Wednesday preceding 3d Thursday; Chicago.
 INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; next convention, Omaha, Neb.
 INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago.
 INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.
 INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASS'N.—A. L. Woodworth, Lima, Ohio; Aug. 18-19; Detroit, Mich.
 INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels.
 IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 3d Friday in month, except July and August; Des Moines.
 MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony; Chicago.
 MASTER CAR AND LOCO. PAINTERS' ASS'N OF U. S. AND CANADA.—A. P. Debie, D. & M., Reading, Pa.; annual, St. Louis, Sept. 13-16.
 NEW ENGLAND RAILROAD CLUB.—C. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, ex. June, July, Aug. and Sept.; Boston.
 NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
 NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 3d. Mon., ex. June, July, August; St. Paul and Minn.
 NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. & M. & St. P., Duluth; 4th Saturday; Duluth, Minn.
 OMAHA RAILWAY CLUB.—A. H. Christensen, Barker Bldg.; Second Wed. RAILWAY CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City; 3d Friday in month; Kansas City.
 RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 19 North Linden St., Bethlehem, Pa.; annual, Oct. 11-13; Richmond, Va.
 RAILWAY S'KEEPERS' ASS'N.—J. P. Murphy, Box C, Collinwood, O.
 RICHMOND RAILROAD CLUB.—F. O. Robinson; 3d Monday; Richmond.
 ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; annual, Sept. 18-19; Chicago.
 ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
 SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago; Oct. 25 and 26; Hotel Chamberlin, Old Point Comfort, Va.
 SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—F. W. Sandwich, A. & W. R. Ry., Montgomery, Ala.; annual, Oct. 30; Atlanta.
 SOUTHERN & SOUTHWESTERN R.R. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., Mar., July, Sept. and Nov.; Atlanta.
 TRAFFIC CLUB OF NEW YORK.—C. A. Swabe, 200 Broadway, New York; last Tuesday in month, except June, July and August; New York.
 TRAIN DISPATCHERS' ASS'N OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago.
 TRANSPORTATION CLUB OF TOLEDO.—L. G. Macomber, Woolson Spice Co., Toledo.
 TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo; annual meeting; Aug. 16-19; Niagara Falls, Ont.
 WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg; 2d Monday, except June, July and August; Winnipeg.
 WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago; Wednesdays, except July and August, Chicago.

Traffic News.

The Mallory Steamship Company has announced an increase of 2 cents in its cotton rate from Baltimore to New York, effective September 10. The new rate is 20 cents per 100 lbs.

The Southwestern Tariff Committee has passed a formal order notifying all trunk lines that division rates with tap lines must cease. The tap lines affected by the discontinuance of the divisions by trunk lines number 34.

The Chicago & Western Indiana has restored the advertised service which was taken off its lines when Benjamin Flinn was its president. Beginning last Sunday it runs five trains each way as far south as Dolton, Ill., and South Holland.

Last week we noted that all but four of the Erie Railroad's fast freight trains operated during June had reached their destination in time for advertised markets. The total number of these fast freight trains was 295, and not 95, as published.

What is said to be the largest amount of ore ever received in any one month at any port of the Great Lakes was docked at Ashtabula during July for distribution among the iron and steel industries of the Mahoning and Shenango valleys. It is said that the total was 1,607,534 tons.

The order of the Interstate Commerce Commission that the freight rate on lemons from California to the Atlantic coast should be reduced from \$1.15 per hundred pounds to \$1, which was to have become effective September 1, has been suspended, to become effective November 1.

For the convenience of visitors to the thirty-first triennial convocation of Knights Templar, which is being held in Chicago this week, the Rock Island lines not only established a separate office at the LaSalle street station for the validation of tickets, but also maintained a special information bureau.

According to the *Houston Post*, it has been estimated that the cost of operation of the agricultural educational train, which is being run over the Houston & Texas Central, will be about \$5,700. There are 13 lecturers on the train. The schedule calls for lectures beginning August 2 and extending to August 10.

The Union Pacific has sent a party into the Greeley-Poudre irrigation district to take photographs of the March and McGrew reservoirs, the Wellington cut and other mountain ditches and reservoirs. A description of the irrigation system will be written, and together with the photographs, will be issued in pamphlet form.

The attorney-general of Iowa has sent to the Interstate Commerce Commission a complaint against the railways of Iowa, attacking proportional class rates, commodity rates and the rates on local shipments. The complaint says that Iowa is discriminated against because through rates from points in Illinois and the East are higher than the aggregate of the intermediate rates.

The Interstate Commerce Commission has sent notifications to the railways operating in official classification territory, saying that the commission will begin holding hearings August 15 in the Custom House building at New York, on the proposed increases in freight rates. The commission has been informally told that the railways will ask for a postponement of the hearing until about September 1.

The proposed increase in rates on live stock between Missouri river and Mississippi river points has been suspended at the request of the Interstate Commerce Commission. Existing rates are 14½ cents per 100 lbs., and it was proposed to increase them to 17 cents, effective August 15. There is a complaint pending against the present rates which went into effect July 1. Prior to that date the rate was 13 cents.

The National Industrial Traffic League has asked that the railways do nothing in the way of altering or abolishing the present rules for storing and reconsigning goods in transit until a conference between the shippers and the railways can be arranged. This does not refer to the milling in transit privilege. A committee has been appointed, of which T. C. Bradford, of the International Harvester Co., Chicago, is chairman.

The Oklahoma Oil and Gas Producers' Association has filed a complaint with the Oklahoma corporation commission against

11 Oklahoma roads, seeking reductions in the present rates on crude petroleum and fuel oil. The rates on these commodities were advanced by the roads after the federal court issued an injunction restraining the corporation commission from enforcing rates previously fixed by it. The complainant alleges that if the present rates are kept in effect shipments of crude petroleum and fuel oil will be prevented.

The Virginia Fruit Growers' Exchange has filed a complaint with the Interstate Commerce Commission against the Baltimore & Ohio, Norfolk & Western, Western Maryland and Cumberland Valley asking the commission to suspend increased rates on fruit pending investigation. The complaint says that the railways have increased the rate on fruit by about 20 per cent. The complaint says that the Georgia fruit crop this season is greatly in excess of the average and that the members of the exchange are experiencing great difficulty in marketing their fruit in eastern seaboard cities.

The Toyo Kisen Kaisha, which operates steamers between Japan and the United States, and has for a number of years had traffic agreements with the Southern Pacific has given up these arrangements and has made an agreement with the Western Pacific, effective Jan. 26. The traffic for Pacific coast export on the Union Pacific and Southern Pacific forms only a very small percentage of the total traffic and no great efforts were made on the part of the Southern Pacific to continue its agreement with the Japanese line. The Harriman lines control the Pacific Mail S. S. Co., so that they have a line of their own to Japan.

The Northwestern Association of Railroad Commissioners at a meeting in Chicago last week decided to ask the lines in eastern territory to add two classes to the Official Classification. It is stated that if the roads refuse a petition will be presented to the Interstate Commerce Commission. Representatives of the commissions of Wisconsin, Michigan, Illinois, Ohio and Indiana attended the meeting. A committee composed of W. J. Wood of the Indiana Commission, O. P. Gothlin of the Ohio Commission and C. L. Glasgow of the Michigan Commission was appointed to collect data in support of the proposition. The members of these commissions believe that there are defects in the existing Official Classification which can be cured only by adding two classes to it.

What are known as the back haul tariffs from Portland, Seattle and Tacoma to points in the state of Washington have been suspended by the Interstate Commerce Commission pending an inquiry into their reasonableness. The tariffs were to have become effective August 1 on the Northern Pacific, but the action of the commission restrained the line from putting them into effect. The proposed advance in the back haul rates were made by the Northern Pacific in the face of a decision of the commission that the rates ought to be reduced 20 per cent. In the hearing of the back haul case last autumn by the full commission it was agreed by the railways that a reduction of 16½ per cent. probably would be fair. The hearing in the matter will be held in Chicago August 29 by George N. Brown, chief examiner for the commission.

July Anthracite Coal Shipments.

There was a decrease in the shipments of anthracite coal in July as compared with June, 1910, of 1,196,064 tons, the July output being 4,202,059 tons as against 5,398,126 tons in June. Notwithstanding this decrease the shipments in July were 181,294 tons more than in July, 1909. The output for July bears a better relation to the demand than that of any other month this year, and there is evidence that the restriction in tonnage will continue throughout this month and September.

The total shipments by the leading companies and the percentages of each to the total shipments were as follows, in July, in tons:

Route	1910		1909	
	Tons	Per cent.	Tons	Per cent.
Phila. & Read.....	673,703	16.03	604,312	15.08
Lehigh Valley.....	359,426	13.07	695,179	17.29
Central of N. J.....	585,050	13.45	493,502	12.27
Del., Lack & West..	672,844	16.01	757,388	18.84
Del. & Hud.....	396,334	9.44	409,755	10.19
Penna. R.R.....	309,601	7.37	365,707	9.10
.....	567,539	14.23	461,219	11.47
N. Y., O. & W.....	227,362	5.41	233,087	5.81
Totals	4,202,059		4,020,765	

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF JUNE. 1910.

See also issue of August 6)

[illegible]

Crop Conditions.

The crop reporting board of the Department of Agriculture estimates that the average condition of crops on August 1 was 79.3, as compared with 85.4 last month, 84.4 on August 1, 1909, and 82.1 the average on August 1 for the past 10 years.

Comparisons for important corn states follow:

States	Per cent of U. S. acres in state	Condition				
		Aug. 1, 1910	July 1, 1910	Aug. 1, 1909	Aug. 1, 1908	10-yr. average
Illinois	9.3	84	84	91	84	84
Iowa	8	80	81	81	73	81
Texas	2.9	88	87	90	73	85
Kansas	1.8	60	80	90	76	76
Missouri	2.3	82	82	80	80	80
Nebraska	1.3	60	80	80	82	82
Oklahoma	1.1	82	82	80	88	88
Indiana	1	80	81	81	80	80
Georgia	1.0	80	80	80	80	80
Ohio	1	80	80	80	80	80
Tennessee	1	80	80	80	80	80
Kentucky	1	80	80	80	80	80
Alabama	1	80	80	80	80	80
Mississippi	1.8	91	90	89	80	80
North Carolina	1	80	80	80	80	80
Arkansas	1	80	80	80	80	80
Louisiana	1	80	80	80	80	80
South Carolina	1	80	80	80	80	80
Virginia	1.8	80	80	80	80	80
Michigan	1.8	76	78	85	82	82
Minnesota	1.5	82	87	91	83	83
Pennsylvania	1.1	88	88	80	80	80
Wisconsin	1.4	70	83	82	83	83
United States	100.0	79.3	84.4	84.4	82.1	82.1

Preliminary returns indicate a winter wheat yield of about 15.8 bushels per acre, or a total of about 458,294,000 bushels, as compared with 15.8 and 446,366,000 bushels, respectively, as finally estimated last year. The average quality of the crop is 92.6, against 90.3 last year.

Comparisons for important winter wheat states follow:

States	1910, preliminary				1909			
	Yield, pr. acre, bush.	Production, bush.	Quality, per ct.	Yield, pr. acre, bush.	Production, bush.	Quality, per ct.	Yield, pr. acre, bush.	Quality, per ct.
Kansas	14.5	58,392,000	92	14.5	85,478,000	88	14.5	85,478,000
Indiana	15.6	40,981,000	91	15.3	33,124,000	92	15.3	33,124,000
Illinois	15.0	32,085,000	92	17.4	81,494,000	91	17.4	81,494,000
Nebraska	16.3	33,230,000	95	19.4	45,590,000	95	19.4	45,590,000
Ohio	16.2	31,493,000	91	15.9	23,532,000	86	15.9	23,532,000
Missouri	13.8	25,130,000	91	14.7	28,562,000	92	14.7	28,562,000
Pennsylvania	17.8	27,697,000	94	17.0	26,265,000	93	17.0	26,265,000
Oklahoma	16.0	24,896,000	96	12.8	16,680,000	94	12.8	16,680,000
Texas	15.0	18,780,000	95	9.1	6,050,000	87	9.1	6,050,000
California	17.5	19,040,000	91	14.0	11,550,000	92	14.0	11,550,000
Tennessee	11.5	10,200,000	89	10.4	8,330,000	85	10.4	8,330,000
Michigan	17.7	15,381,000	93	18.8	14,570,000	94	18.8	14,570,000
Virginia	12.8	10,048,000	93	11.2	8,848,000	86	11.2	8,848,000
Maryland	17.4	13,816,000	95	14.5	11,165,000	83	14.5	11,165,000
Kentucky	12.8	9,357,000	88	11.8	7,906,000	81	11.8	7,906,000
Washington	20.5	13,585,000	90	25.6	20,124,000	98	25.6	20,124,000
United States	15.8	458,294,000	92.6	15.8	446,366,000	90.3	15.8	446,366,000

The average condition of spring wheat on August 1 was 61.0, as compared with 61.6 last month, 91.6 on August 1, 1909, and 81.9 the 10-year average on August 1. Comparisons for important spring wheat states follow:

States	Per cent of U. S. acres in state	Condition				
		Aug. 1, 1910	July 1, 1910	Aug. 1, 1909	Aug. 1, 1908	10-yr. average
North Dakota	36.6	31	43	93	70	70
Minnesota	29.8	77	73	92	83	83
South Dakota	18.5	70	64	97	85	85
Washington	4.2	62	68	90	85	85
United States	100.0	61.0	61.6	91.6	81.9	81.9

The average condition of the oat crop on August 1 was 81.5, as compared with 82.2 last month, 85.5 on August 1, 1909; 76.8 on August 1, 1908, and 82.6 the 10-year average on August 1.

The proportion of last year's oat crop in farmers' hands on August 1 was about 6.3 per cent., or 63,249,000 bushels, as compared with 3.3 per cent. (26,323,000 bushels) of the 1908 crop on hand August 1, 1909, and 5.8 per cent. (50,394,000 bushels) the average proportion on hand for the past 10 years on August 1.

The average condition of barley on August 1 was 70.0 as compared with 73.7 last month, 85.4 on August 1, 1909; 83.1 on August 1, 1908, and 85.3 the 10-year average on August 1. About 7,263,000 bushels, or 4.3 per cent., of the 1909 crop was on farms August 1.

The preliminary estimate of the area of rye harvested is 1.7 per cent. less than last year. The preliminary estimate of yield per acre is 16.3 against 16.1 bushels last year, 16.4 bushels in 1908, and a 10-year average of 16.0 bushels. The indicated total

production is 27,082,000 bushels, against 22,779,000 finally estimated in 1909 and 31,851,000 bushels in 1908. The quality of the crop is 92.7 against 92.9 last year.

Date of Hearing on Western Freight Rate Increases.

Committee representing the legal, traffic, accounting and operating departments have been appointed by the western railways to prepare and present their cases for an advance in freight rates to the Interstate Commerce Commission. The committees are now at work gathering and compiling data and holding conferences. The commission will hold its first hearing on the question of an advance in freight rates in the west at Chicago on August 22. The committees are composed of the following:

Legal.—T. J. Norton, general attorney Atchison, Topeka & Santa Fe; William Ellis, commerce attorney Chicago, Milwaukee & St. Paul; W. F. Dickinson, general attorney Chicago, Rock Island & Pacific.

Traffic.—E. B. Boyd, assistant to the vice-president Missouri Pacific; F. B. Bowes, general traffic manager Illinois Central; Frank P. Eymann, assistant freight traffic manager Chicago & North Western.

Accounting.—C. I. Sturgis, general auditor Chicago, Burlington & Quincy; W. E. Bailey, general auditor Atchison, Topeka & Santa Fe; J. W. Newlean, auditor Chicago Great Western.

Operating.—Frank E. Ward, general manager Chicago, Burlington & Quincy; W. J. Jackson, vice-president and general manager Chicago & Eastern Illinois; William D. Cantillon, assistant general manager Chicago & North Western.

Holding Trains for Connections.

Operating officers of the Delaware & Hudson said before the New York Public Service Commission, Second district, that the holding of 90 passengers in train No. 338 on July 23 at Plattsburg and Bluff Point from 5:30 until 9:30 p.m. was faulty railway operation.

Superintendent Benjamin stated that the train was held to await the arrival of passengers from New York City in through sleepers destined to Lake Placid. He added that if these passengers from New York City were unable to make connection on train No. 338 they would be compelled to remain over night in Plattsburg. Answering an inquiry of Chairman Stevens, Mr. Benjamin said that no steps were taken to ascertain how many of such passengers there were.

Commissioner Olmsted queried him as to the costs of making up an additional train for the convenience of these passengers to their destination and the hauling of train No. 338 through to Lake Placid without waiting for the connection from the south. Mr. Benjamin said that this could have been done, and that possibly the only motive which prevented the company from making up the additional train was the item of expense.

Asked as to his idea of what would be a reasonable maximum time for the holding of train No. 338 at Plattsburg Mr. Benjamin said, that in view of the light traffic on the Chateaugay division he believed an hour should be allowed. As to this, however, he adopted the suggestion of the commission that he confer with his superiors.

He also agreed to the suggestion of Chairman Stevens that some inquiry should be made to ascertain the number of passengers on the trains from the south who intend to board No. 338.

W. C. Brown on Crop Prospects.

W. C. Brown, president of the New York Central lines, before sailing for a five weeks' trip abroad, said to *The Wall Street Journal*:

"Notwithstanding the government crop report of Monday, with the conditions of which I am entirely familiar, from reports received by me up to last evening, I believe a larger number of bushels of corn will be harvested this year than last. A telegram from Kansas stated that they had twelve hours of steady rain in Barton, Rena, Chase and Macpherson counties, and that large areas where the crop had been given up as an almost total failure will produce nearly one-half of the normal crop. I believe there will be enough instances of this kind to bring the total corn crop above 3,000,000,000 bushels."

Continuing his expressions of opinion on the crop situation and his reasons therefor, Mr. Brown said: "The result of the threshing of small grain in Oklahoma, Kansas, Nebraska and

Iowa, shows an exceptionally good quality and considerable increase in quantity over the yield that was expected at harvest time. The best evidence of the prospect of a reasonably abundant harvest is the freedom with which farmers are selling their wheat which is coming into western markets in larger quantities than at this time of the year for several years past. The promise of normal crops, which is fast becoming a reality, to my mind insures prosperous conditions during the coming year."

In reply to a question regarding the number of stored freight cars, Mr. Brown said: "The number of stored or idle freight cars is decreasing very rapidly. I am of the opinion that in less than two months from now most of the railways, especially in the agricultural sections, will experience a heavy shortage of cars."

"As proof of my optimism," said Mr. Brown, "I have left instructions to arrange for contracts for 260 locomotives for delivery during the last two months of this year and in the early months of 1911. These orders have been held until a reasonably definite line could be had on the crops for another year, and I am so well assured that the result is going to be satisfactory that instructions have been given to place orders for these engines." In reply to a question, Mr. Brown said that the new locomotives were needed mainly in the freight department.

"I am more than conservatively optimistic; I am exceedingly hopeful of a fine year's business, trade, commerce and all that goes to make for the prosperity of a country like this. I think conditions point to a great revival of trade, and again I repeat I place more confidence in the private reports sent to me from all sections of the country than I do in the official government report on crop conditions."

Building of Spur Tracks by Commission Order.

In an opinion furnished to W. D. Williams, of the Texas state railway commission, the attorney-general's department held that the legislature is not competent to enact a law giving the commission the power to require railway companies in Texas to construct sidings or spur tracks to private industries which do not touch the right of way of the railway but are situated reasonably near by, and to apportion the expenses of constructing such sidings or spur tracks between the railways and the owners of industries to which the same are constructed. The department further advises Commissioner Williams that it is doubtful if such an act would be valid or constitutional, as it would give the railways the right to condemn private property for such purposes. Continuing, the opinion says: "One of the main purposes for the creation of the railway commission by the legislature was to prevent unjust discriminations on the part of the railways. We do not think it would be disputed that an act of the legislature requiring the railway commission or giving authority to the railway commission to itself discriminate in favor of any particular persons or industries would be invalid."

"Unless the act proposed required railway companies to build spur tracks or gave the commission authority to require railway companies to construct spur tracks to all private industries which might make demand for such construction, the question would arise as to whether industries to which spur tracks were not for one reason or another constructed were not discriminated against by the order of the commission requiring a company to build spur tracks to competing industries, although such competing industry might be more favorably situated in reference to easy connection with the railway."

Rate Increases in Pennsylvania.

Following the action of the Pennsylvania Railroad in raising most of its one-way passenger rates in the state of Pennsylvania from 2 cents to 2½ cents a mile, the Philadelphia, Baltimore & Washington and the Northern Central, both subsidiaries of the Pennsylvania, have raised their passenger rates to the 2½ cents a mile basis. This does not, of course, affect commutation rates. On August 8 the passenger rates on the Erie between points in Pennsylvania were raised from 2 cents to 2½ cents a mile.

The Corn Belt Route.

Advertising matter of the Chicago Great Western shows that this road will be known hereafter as the Corn Belt Route. It was formerly known as the Maple Leaf Route.

Through Passenger Service on the Western Pacific.

The first train in the regular through passenger service on the Western Pacific leaves Salt Lake City at 11:30 p.m. August 22 and is due in San Francisco at 12 noon on August 24. The first eastbound train leaves San Francisco at 6 p.m. on August 22 and is due at Salt Lake at 8 a.m. August 24. For the present one passenger train a day each way will be run and will make connections at Salt Lake with the Denver & Rio Grande train Nos. 3 and 6. A special train is to be run from San Francisco, arriving at Salt Lake August 19, carrying railway officers and newspaper men.

INTERSTATE COMMERCE COMMISSION.

Discrimination in Express Rules.

August H. Strauss v. American Express Co. et al. Opinion by Commissioner Clements.

Defendants' refusal to gather and deliver interstate express packages to patrons on Green Bay avenue, in Milwaukee, north of Hadley street, while extending that service to other sections referred to, results in unjust discrimination. (19 I. C. C., 112.)

Rate on Oil Reasonable.

Record Oil Refining Co. et al. v. Midland Valley Railroad et al. Opinion by Commissioner Clements.

Rate on oil from Muskogee, Okla., to New Orleans, La., of 17½ cents per 100 lbs., carloads, not found to be unreasonable. Complaint dismissed. Any unjust relation of rates outbound from the refineries at Baton Rouge and New Orleans not within the scope of the pleadings in this case. (19 I. C. C., 132.)

No Jurisdiction in Alaska.

Lieboldt Steamship Co. v. White Pass & Yukon Route et al. Opinion by Chairman Knapp.

Following the decision in the *Matter of Jurisdiction over Rail and Water Carriers Operating in Alaska*, 19 I. C. C., 81, complaint asking for establishment of through routes and joint rates from Seattle, Wash., to points in Alaska dismissed because the commission is without jurisdiction over carriers operating in Alaska. (19 I. C. C., 105.)

Advance in Flour Rate Permitted.

Banner Milling Company v. New York Central & Hudson River et al. Opinion by Commissioner Prouty.

In the rehearing of these cases, along with the *Jennison case*, 18 I. C. C., 113, it appeared that either the commission must allow an advance in the rates on flour and other grain products from Buffalo to New York and New England points, or it must, in substance, require a reduction from all territory west of Buffalo. In view of the whole situation, it seems to the commission the wisest course to permit the advance from Buffalo. The order in No. 1197 has already expired by its own limitation; but the order in No. 1535, having still a short time to run, will be rescinded. (19 I. C. C., 128.)

Railway Held Liable for Misrouting.

Willson Brothers Lumber Co. v. Norfolk Southern et al. Opinion by Commissioner Harlan.

In accepting a shipment at a point in North Carolina for carriage to a point in the state of Ohio, the initial carrier assumed the burden of giving the shipper the advantage of the cheapest reasonably direct route; but not being well advised of the available routes, it neither asked instructions of the shipper nor made inquiry of connecting lines. It is held that it is liable to the shipper for the excess charge resulting from its mistake in delivering the shipment to the wrong connection. (19 I. C. C., 293.)

Alpha Portland Cement Co. v. Delaware, Lackawanna & Western et al. Opinion by Commissioner Harlan.

The consignor noted on the bill of lading a route and also a rate which was legally in force only over another route. Held that the initial carrier ought to have forwarded the shipment by the route over which the specified rate applied instead of by the named route which carried a higher rate. (19 I. C. C., 297.)

STATE COMMISSIONS.

The Railroad Commission of Louisiana finds that the practice of charging a lower rate on coal wood during the summer months than is charged during the winter is reasonable. The commission holds that this lower summer rate induces this low grade traffic to move at a time when cars are more plentiful than they are in winter and that therefore the discrimination is a reasonable one.

The Railroad Commission of Louisiana has ordered certain railways to carry passengers on freight trains. It finds that many railways in Louisiana are carrying passengers on freight trains and that schedules of passenger trains on certain railways, or on parts of certain lines, are such that trains run at night, making it extremely inconvenient for passengers to use the regular passenger trains. The commission says that many of the larger railways in the state are furnishing a splendid passenger service, operating trains frequently, and on convenient schedules. A general order, therefore, requiring all railways to carry passengers on freight trains is not made but the order is confined to certain lines.

The Railroad Commission of Louisiana has decided that its proposed order requiring the railways of Louisiana to keep on sale at all agency stations interline tickets or blank forms to be sold to any points on a connecting line, could not reasonably be put in force, and the proceedings in this proposed order have been discontinued. The commission, in its opinion, says that the expense of printing the supply of tickets necessary to supply each agency station would be enormous and the skeleton form of ticket appears to be undesirable in the hands of the average agent at the small country stations, as it requires the utmost care and some degree of training and experience to fill out such a ticket correctly. Errors only annoy passengers and subject them to delays and often additional expense.

COURT NEWS.

The Lake Shore & Michigan Southern, lessee of the Jamestown, Franklin & Clearfield, has filed a bill in equity against the county of Mercer to restrain the county officers from collecting the penalty of \$1,000 in each case where the plaintiff has charged more than 2 cents a mile in its passenger tariffs.

Judge J. E. Sater, of the United States district court, in the case of Ralph E. Westfall v. Hocking Valley and Chesapeake & Ohio has sustained the decision of Judge E. B. Kinkead, of the Ohio court, in his refusal to permit the Chesapeake & Ohio to vote the stock of the Hocking Valley. The injunction against voting the stock was sought on the ground that the state laws of Ohio provided that one railway, whether incorporated in Ohio or in another state, cannot own and vote stock in another domestic company.

The Louisville & Nashville has lost a suit in the Federal Circuit Court at Cincinnati in which the plaintiff, Edward S. Dickinson, a commission broker, sought to recover \$154,081 excess freight charges which accrued through the railway company changing the routing he had named for a shipment of phosphate rock. The defense set up was that the route named by the shipper was congested with freight and to have held the cars in its yards would have caused a like condition. The court held that neither the route nor the rate could be changed by the carrier without the consent of the shipper and this not having been done it was liable for the amount claimed.

Suit has been filed in the United States District Court by John H. Jordan, United States District Attorney, against the Baltimore & Ohio for the recovery of penalties aggregating \$2,000 on four alleged violations of the "hours of service" act of 1908. The action was brought at the request of the Interstate Commerce Commission, who furnished the information on which the suit is based. It is charged the railway required and permitted certain of its employees engaged in moving interstate traffic to remain on duty for a period longer than sixteen consecutive hours, and that the employees again went on duty without having remained away from their employment for at least ten consecutive hours.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

W. A. Blasing has been appointed acting auditor of the Gulf, Texas & Western, with office at Jermyn, Tex.

E. M. Calhoun, chief clerk to the president of the Kansas City Southern at Kansas City, Mo., has been appointed assistant to the president.

O. O. Axley has been appointed treasurer of the Warren & Ouachita Valley Railway, succeeding N. H. Clapp, Jr., deceased, with office at Warren, Ark.

George T. Cutts has been appointed comptroller of the Missouri, Kansas & Texas, with office at St. Louis, Mo., succeeding Robert W. Maguire, resigned on account of ill health.

Newman Erb, chairman of the board of directors of the Ann Arbor, has been elected president of the Chattanooga Southern. Henry W. de Forest has been elected vice-president, and H. B. Blanchard, secretary of the Ann Arbor, has been elected secretary and treasurer.

Operating Officers.

G. H. Waldo, superintendent of car service of the Cincinnati, Hamilton & Dayton, with office at Cincinnati, Ohio, has resigned.

A. R. Duncan has been appointed superintendent of car service of the Cincinnati, Hamilton & Dayton, with office at Cincinnati, Ohio, succeeding G. H. Waldo, resigned.

M. W. Jones, secretary to the vice-president of the Guayaquil & Quito Railway, has been appointed chief despatcher, with headquarters at Huigra, Ecuador, succeeding G. C. Wendorf.

T. H. Hayden, trainmaster of the Kentucky & Indiana Bridge & Railroad Company at Louisville, Ky., has been appointed superintendent, with office at Louisville, and the office of trainmaster has been abolished.

F. J. Bechely has been appointed general superintendent of the Gulf, Texas & Western, with office at Jermyn, Tex. The duties of the general superintendent have recently been performed by the assistant to the president.

H. G. Sleight, car accountant of the Vandalia at Terre Haute, Ind., has been retired on a pension. Mr. Sleight has held the position of car accountant for 30 years, and has been in the service of the Vandalia for 36 years.

The following officers of the Denver, Northwestern & Pacific have resigned: W. A. Duell, general manager; G. R. Simmons, assistant general manager and purchasing agent, and C. A. Parker, superintendent of telegraph, all with offices at Denver, Colo.

T. G. Akers has been appointed trainmaster of the 25th and 26th districts of the Grand Trunk, with office at Battle Creek, Mich., succeeding as trainmaster of the 26th district H. W. Matthews, assigned to other duties. F. G. Bement, trainmaster at Battle Creek, has been transferred as trainmaster to Durand, succeeding O. F. Clark, transferred as trainmaster to Pontiac.

Traffic Officers.

D. B. Aungst has been appointed commercial agent of the Erie Despatch, with office at Akron, Ohio.

Owing to prolonged illness, J. S. Wood, assistant general freight agent of the Lehigh Valley, has resigned.

M. N. Betzner has been appointed a general agent of the Chicago & North Western, with office at Sioux City, Iowa.

William Hess has been appointed an assistant claim agent of the Chicago, Indianapolis & Louisville, with office at Chicago.

James Donohue has been appointed a traveling freight agent of the St. Louis & San Francisco, with office at Oklahoma City, Okla.

H. D. Dutton has been appointed general agent in the passenger department of the Kansas City, Mexico & Orient, with office at Kansas City, Mo.

L. O. Scoville, traveling freight agent of the Kansas City Southern at Joplin, Mo., has been appointed a traveling freight

agent, with office at Kansas City, Mo. W. D. Riley succeeds Mr. Scoville.

George L. Williams, commercial agent of the Chicago, Milwaukee & St. Paul, at Cincinnati, Ohio, has resigned, effective September 1, to engage in other business.

A. K. Helton has been appointed a commercial agent of the New York Central lines and agent of the Blue line, with office at Indianapolis, Ind., succeeding C. R. Watson, retired.

W. H. Amerine, soliciting freight agent of the Atlanta & West Point at New Orleans, has been appointed commercial agent, with office at Augusta, Ga. W. B. Terhune, commercial agent at Cincinnati, succeeds Mr. Amerine.

E. A. Donnelly, traveling freight agent of the Chicago, St. Paul, Minneapolis & Omaha, at Grand Forks, N. Dak., has been appointed commercial agent at Minneapolis, Minn., succeeding E. E. Jones, resigned. A. R. Witherspoon, traveling agent, succeeds Mr. Donnelly.

Charles J. Kays, city passenger agent of the Chicago & Alton and the Iowa Central, at Peoria, Ill., has been appointed general agent, passenger department, of the Chicago & Alton, with office at Denver, Colo., succeeding A. D. Perry, retired. E. D. Lappin succeeds Mr. Kays.

William Bremer has been appointed a traveling freight and passenger agent of the Denver & Rio Grande and the Western Pacific, with office at Cincinnati, Ohio. R. P. Ober has been appointed a traveling freight agent of the Western Pacific, with office at San Francisco, Cal.

R. C. Nichols, general agent of the Denver & Rio Grande at Chicago, has been appointed general agent of the Denver & Rio Grande, and the Western Pacific at New York. H. E. Tupper, general Eastern passenger agent at New York, has been appointed city passenger agent at New York.

G. H. Westcott, traveling freight agent of the Chicago, Milwaukee & St. Paul, at Duluth, Minn., has been appointed commercial agent, with office at Buffalo, N. Y., succeeding J. H. Skillen, whose appointment as New England freight and passenger agent has been announced in these columns.

Stanley R. Heer, freight solicitor in connection with the St. Paul agency of the Union Line, Pennsylvania Lines West of Pittsburgh, has been appointed traveling freight solicitor, in connection with the Denver agency, succeeding S. J. Alexander, whose appointment as agent at Omaha, Neb., has been announced in these columns. Walter M. Walker succeeds Mr. Heer.

Engineering and Rolling Stock Officers.

H. A. Sumner, chief engineer of the Denver, Northwestern & Pacific at Denver, Colo., has resigned.

G. I. Evans, chief draftsman of the Canadian Pacific, at Montreal, Que., has been appointed mechanical engineer.

H. L. Jace has been appointed master mechanic of the South Dakota Central, with offices at Sioux Falls, S. D., succeeding C. A. Swan, resigned.

C. H. Hogan, division superintendent motive power of the New York Central & Hudson River at Depew, N. Y., has been appointed assistant superintendent motive power, with office at Albany, N. Y.

L. L. Wood has been appointed acting superintendent of motive power and machinery of the Evansville & Terre Haute, with office at Evansville, Ind., succeeding G. H. Bussing, resigned to go with another company.

Incident to the taking over of the Chicago, Cincinnati & Louisville by the Chesapeake & Ohio, L. N. Jackson has been appointed engineer of maintenance of way of the Chesapeake & Ohio of Indiana, succeeding G. S. Foster.

J. B. Canfield, master mechanic of the Boston division of the Boston & Albany, has been appointed master mechanic of the Albany division, with office at West Springfield, Mass., succeeding A. J. Fries, promoted. F. A. Butler succeeds Mr. Canfield, with office at Beacon park, Allston, Mass.

Purchasing Officers.

J. B. Frank has been appointed purchasing agent of the Macon, Dublin & Savannah, with office at Macon, Ga.

E. B. Sebastian, acting fuel agent of the Chicago, Rock Island & Pacific, has been appointed fuel agent, with headquarters at Chicago.

Railway Construction.

New Incorporations, Surveys, Etc.

ALBERTA & GREAT WATERWAYS.—This company, which was organized to build from Edmonton, Alb., north to McMurray, on the Athabasca river, with a number of branch lines, in all about 350 miles, has failed to meet the first instalment of interest on its bonds. The province of Alberta has met the obligations and is now in possession of the charter. It is thought that the line will be built as a government enterprise. (April 8, p. 969.)

ATCHISON, TOPEKA & SANTA FE.—The railroad commission of Texas has been notified that the new branch line from San Angelo, Texas, northwest to Stirling City, 42 miles, is practically finished and ready for operation.

CHICAGO, MILWAUKEE & PUGET SOUND.—The Isabel branch, extending from Mobridge, S. Dak., west of Isabel, 59 miles, has been opened for business. A new branch of the Columbia division, extending from St. Maries, Idaho, west to Purdue, 50 miles, thence over the tracks of the Washington, Idaho & Montana to Bovill, two miles, has been opened for business.

COLORADO & SOUTHERN.—Press reports indicate that this company will build a connecting link from Wellington, Colo., north to Cheyenne, Wyo. This will connect the northern end of the system with the at present separated line running from Cheyenne north to Orin Junction.

CRYSTAL CITY & UVALDE.—This road has been extended from Crystal City, Tex., south to Carrizo Springs, 112 miles. (Nov. 26, 1909, p. 1036.)

FRANKLIN & ABBEVILLE.—The extension from New Iberia, La., northwest to Milton, 12.7 miles, has been opened for business. (March 25, p. 850.)

MANISTEE & NORTHEASTERN.—The Manistee River branch has been extended from Sigma, Mich., east to Grayling, 17 miles.

MIDLAND-PENNSYLVANIA.—This company has entered a mortgage for \$2,000,000 to secure a bond issue in like amount for the construction of this line from Millersburg, Pa., northeast via Gratz, to Ashland, about 43 miles. (July 15, p. 142.)

MISSOURI PACIFIC.—The Kiowa branch of the Wichita division has been extended from Kiowa, Kan., west to Hardtner, 10.4 miles.

NATIONAL RAILWAYS OF MEXICO.—It is reported that this company will soon place an order for about 25,000 tons of rails in Europe, and that about 15,000 tons will be ordered from Belgium mills and the remainder probably in Spain. These rails are to be used in relaying the track on the various lines of the government railway system. The large steel and iron works at Monterrey, Mex., is said to be operating its rail department at full capacity but that the output is inadequate. It is announced that the 56-lb. rails, now in track on the branch lines, are to be replaced with new 75-lb. sections.

An officer writes that construction work is under way by Cia Baueorio de Fomento y Bienes Raicas, Mexico City, and Juan Phillips, Durango, Mex., on 65 miles of line on the extension from Durango southwest towards Mazatlan. The maximum grade westward will be 2 per cent. and eastward 1.5 per cent. There will be one 709-ft. cantilever bridge, a number of stone culverts and one tunnel 722 ft. long.

PITTSBURGH & SHAWMUT.—See Pittsburgh, Shawmut & Northern.

PITTSBURGH, SHAWMUT & NORTHERN.—Press reports indicate that about two-thirds of the grading on this line from Knoxdale, Pa., to Freeport, has been completed. (May 27, p. 1325.)

ST. LOUIS, FORT SMITH & DALLAS.—An officer writes that this company has been organized to build from Arkoma, Okla., just across the state line from Ft. Smith, Ark., southwest to Wiburton, about 70 miles. Active work has not yet commenced, but very probably will be by October. The engineers may be put in the field before this time.

WICHITA FALLS & NORTHWESTERN. The new line from Altus, Okla., west to Hollis, 35 miles, has been opened for business.

WICHITA, McPHERSON & GULF.—Chartered in Kansas, with \$2,500,000 capital, to build a north and south line from Aransas City, Kan., northwest through Wichita and Newton to McPherson. W. C. Edwards, Wichita, is interested.

Railway Financial News.

BOSTON & ALBANY.—N. W. Harris & Co., New York, and Bond & Goodwin, Boston, have bought \$2,000,000 5 per cent. bonds of the Boston & Albany and are offering these bonds at 97, yielding about 4.20 per cent.

BRISCON RAILWAY.—This company, which took over the old Savannah Valley Railroad, has issued \$750,000 7 per cent. cumulative preferred stock to retire \$750,000 Savannah Valley Railroad bonds which are callable at par. Wm. Morris Indane & Co., New York, and the National City Bank have bought \$420,000 first mortgage 5 per cent. bonds of 1910-1935, and, having sold the greater part of these bonds, are offering the balance at 96, yielding about 5.50 per cent. on the investment. The bonds are secured by a first mortgage on the total 72 miles of road running from Millhaven, Ga., to Savannah.

BUFFALO & SUSQUEHANNA.—H. I. Miller, receiver of the Buffalo & Susquehanna Railway, has been made also receiver of the Buffalo & Susquehanna Railroad. The railway company, which owns from Buffalo, N. Y., to Wellsville, 86 miles, leased the line of the railroad company, which runs from Wellsville to Sagamore, Pa., and has a total mileage of 270. Interest on bonds of the railroad was defaulted on July 1, which broke the lease.

CANADIAN PACIFIC.—The directors have declared a semi-annual dividend of 3½ per cent. and an extra dividend of ½ per cent. from the proceeds of land sales. This places the common stock on a 7 per cent. annual basis, as compared with 6 per cent. previously paid annually. The ½ per cent. paid from the proceeds of land sales is the same as was paid six months ago.

CENTRAL OF GEORGIA.—The directors have decided not to pay any dividends on the three series of income bonds. The directors report each year by September 1 to the trustees of the income mortgage as to whether or not interest has been earned on these bonds. Suits are now pending in the courts looking toward an order compelling the directors to declare dividends on the income bonds for 1907, and if these suits are successful, it is planned to bring similar suits for dividends in 1908 and 1909.

CHATTANOOGA SOUTHERN.—The securities of this company, which were sold at auction, were bought by Newman Erb and associates for \$50,000. There are further claims to be settled before the receiver can be discharged.

CHESAPEAKE & OHIO.—See an item in regard to this company in Court News.

DUNKIRK, ALLEGHENY VALLEY & PITTSBURGH.—Stockholders have authorized a new first mortgage to secure \$5,000,000 40 per cent. bonds of 1910-1960, of which \$2,900,000 bonds are to be issued at once to retire a like amount of 7 per cent. bonds. Stockholders also voted to approve the modification of the lease to the property of the New York Central & Hudson River so as to provide for payment of interest by the New York Central on the new bonds in addition to the annual dividend of 1½ per cent. on the \$1,300,000 stock.

HOCKING VALLEY.—See an item in regard to this company in Court News.

MISSOURI, KANSAS & TEXAS.—Stockholders have authorized a new mortgage securing \$125,000,000 bonds.

NEW YORK, WESTCHESTER & BOSTON.—This subsidiary of the New York, New Haven & Hartford has asked the New York Public Service Commission, Second district, for permission to issue \$5,000,000 first mortgage 5 per cent. bonds of 1910-1960. Of these bonds \$953,446 are to be issued to repay money advanced by the City & County Contract Co. in connection with the building of the branch line from Mt. Vernon, N. Y., to White Plains. The remaining bonds are to be issued to meet the cost, estimated at \$4,294,549, of completing and electrifying this branch.

NORTHERN CENTRAL.—The directors of the Pennsylvania Railroad have approved the release of the Northern Central for 999 years on the basis of a 40 per cent. stock dividend, a cash

dividend of 10 per cent. and a guaranteed dividend of 8 per cent. Stockholders of the Northern Central will act on the matter about October 11.

PITTSBURGH, CHICAGO & ST. LOUIS.—The New York Stock Exchange has listed \$4,000,000 additional consolidated mortgage 4 per cent. bonds, due 1957, guaranteed principal and interest, by the Pennsylvania Company. These bonds were issued to refund second mortgage 7 per cent. bonds of the Jeffersonville, Madison & Indiana, which matured July 1, 1910, and to pay for construction work already undertaken.

QUEBEC & LAKE ST. JOHN.—Bondholders met in London August 8 to consider an amended offer made by the Canadian Northern. The offer provides for the exchange of first mortgage bonds of the Quebec & Lake St. John for new stock, on the basis of £100 (\$500) bonds for £70 (\$350) new stock. The old income bonds are to be exchanged on the basis of £100 bonds for £13 (\$65) new stock. All unredeemed coupons are to be surrendered except the coupon due April 1, 1910, on the prior lien bonds.

ST. LOUIS & SAN FRANCISCO.—Speyer & Co., New York, have bought \$1,450,000 five per cent. equipment notes, Series Q, secured by equipment costing about \$1,617,000. The equipment consists of 250 steel under frame freight cars, 53 locomotives, 11 passenger train cars and six electric motor cars.

SEABOARD COMPANY.—The directors of this holding company for the Seaboard Air Line Railway have declared a semi-annual dividend of 2½ per cent. on the first preferred stock. This is the first dividend on the holding company's stock paid since the reorganization of the Seaboard Air Line. There was paid dividends of 2½ per cent. semi-annually from July 15, 1906, to July 15, 1907.

SOUTHERN INDIANA.—The Reorganizing Committee has issued a plan for the reorganization of the Southern Indiana and Chicago Southern, and this plan has been approved by the various protective committees with which all classes of securities have been deposited. The plan provides for the organization of a new company, the Chicago, Terre Haute & Bedford, which is to take over the property of the Southern Indiana and the Chicago Southern and probably the Bedford Belt railway. The new company is to authorize \$20,000,000 first and refunding mortgage 50-year bonds to bear interest not higher than 5 per cent.; \$6,500,000 fifty-year income bonds to bear interest at 4 per cent. for the first two years and 5 per cent. thereafter, interest to be cumulative after two years. The holders of income bonds are to have the right at stockholders' meetings to vote on the basis of one vote for each \$100 bonds held. There is to be issued also \$5,500,000 common stock and the \$7,587,000 first mortgage 4 per cent. bonds of the Southern Indiana are to remain undisturbed. The following table shows the basis of exchange of old securities for securities of the new company:

Holders of securities and schedule, if deposits:	Will receive in exchange				First and ref. 5s
	P.ct.	Inc. bonds.	P.ct.	\$	
S. Ind. gen. mfg.	\$3,212,000	85	\$2,730,200	40	\$1,284,800
S. Ind. 1st m. bds.	3,285,000	70	2,299,500	40	1,311,000
S. Ind. 2d m. bds.	715,000	70	500,500	40	280,000
Syndicate certif.	1,902,500	42	799,050	58	1,103,450
Sou. Ind. stock...	11,000,000	..	..	..	..
Chic. Sou. stock...	1,500,000	..	..	..	..
Settlements, &c.	..	..	170,750	..	\$2,500,000
Total	\$21,614,500	..	\$6,500,000	..	\$5,500,000

*Settlements, contingencies, miscellaneous requirements of reorganization (including the sale or pledge of a portion thereof in connection with the sale of "first and refunding" bonds) not to exceed.

No allowance will be made to present holders of stock of either railway company and the Chicago Southern. See Southern Indiana.

THIRD AVENUE (NEW YORK).—The New York Public Service Commission, First district, has refused to approve the reorganization plan because, in the opinion of the commission, the value of the property does not justify the proposed capitalization, and because the probable earning capacity of the system, as estimated by the commission, for 1909 barely met the interest, \$831,600, on the 4 per cent. refunding bonds, and in 1910 and 1911 would be only 2 or 3 per cent. on the income bonds with no evidence that the stock would receive even a small dividend for many years to come.

Supply Trade Section.

The Vulcan Steam Shovel Company, Toledo, Ohio, will build a plant at Evansville, Ind., to cost \$200,000.

The Universal Car Seal & Appliance Co., Albany, N. Y., has been incorporated with a capital of \$60,000. The incorporators are: Howard Van Rensselaer, William C. Martineau, Clarence R. Martineau.

Emil Pollak, president of the Block-Pollak Iron Co., Cincinnati, Ohio, is making his usual yearly trip abroad. He is touring Germany and France in his automobile and expects to return about October 1.

The Williams All-Service Car Door Company, Clinton, Ill., has been incorporated with a capital stock of \$600,000. The incorporators are Walter Scott Williams, Charles R. Westcott and William H. H. Hastings.

Clapp, Norstrom & Riley, general sales agents of the Western Wheeled Scraper Co., Aurora, Ill., and Davenport Locomotive Works, Davenport, Iowa, have purchased a tract of land at Clyde, Ill., where they will build a shop, 60 ft. x 100 ft., to be used for handling stock implements.

The Baldwin Locomotive Works have filed papers with the secretary of state of Pennsylvania providing for an issue of \$10,000,000 first mortgage 30-year bonds to bear interest at 5 per cent. Kuhn, Loeb & Co., New York, and Brown Brothers & Co., Philadelphia, have concluded negotiations for the disposal of the entire bond issue. Brown Bros. & Co. recently underwrote a \$3,000,000 bond issue for the Standard Steel Works Co., Philadelphia.

Oswald F. Jordan, born in Berwick on Tweed, England, died Aug. 1, 1910, aged 57 years. He came to this country in his early youth and started in railroading. Six years ago he resigned as division superintendent of the Michigan Central, organizing the O. F. Jordan Company, of which he was president, manufacturing and dealing in railway construction and maintenance equipment, the principal output of the company being the Jordan spreader. The O. F. Jordan Company will continue to do business under the same name and management.

TRADE PUBLICATIONS.

Railway Car Lighting.—The Commercial Acetylene Company, New York, has issued booklet "C," describing the Commercial acetylene car lighting equipment.

Iron and Steel Stock List.—Joseph T. Ryerson & Son, New York, have issued their monthly journal and stock list for August, which contains, in addition to tabulated lists of iron and steel for machinery, etc., a number of interesting reading articles.

Electric Headlights.—R. G. Peters Manufacturing Company, Grand Rapids, Mich., has issued Bulletin No. 101 descriptive of the Premier electric headlight equipment for locomotives. The bulletin describes the complete plant and is illustrated with several engravings.

Rail, Equipment and Machinery Offerings.—Bulletin No. 111 from the Walter A. Zelnicker Supply Company, St. Louis, Mo., gives a long list of rails, track supplies, locomotives, cars, machinery and equipment which it is prepared to furnish for immediate shipment.

Locomotive Headlights.—Booklet H from The Commercial Acetylene Company, New York, illustrates and describes the standard locomotive headlight equipment made by that company. Its advantages are briefly but clearly put forth. The new trade mark adopted for this system is used for the first time in this bulletin.

Central Battery Switchboards.—The Western Electric Co., New York, has put out its bulletin No. 1001 describing central battery, non-multiple switchboards, with lamp signals, recommended for installation where the ultimate number of subscribers' lines will not exceed 500, and a central battery system is required with or without magnetic toll or rural line connections.

Brake Beams.—The Chicago Railway Equipment Company, Chicago, has issued a handsome 6-in. by 9-in. portfolio of dimensioned mechanical drawings and halftones, illustrating standards of various types of brake beams, bolsters, side bearings, slack adjusters, journal boxes, etc. It is believed the detailed information contained in this portfolio will assist users in making satisfactory selections for all requirements and conditions of service.

Reinforced Steel Bars.—The William B. Hough Company, Monadnock block, Chicago, has issued a catalogue entitled "The Bar That Never Failed," which is descriptive of the cold twisted steel bars sold by the company. The book contains 30 pages and is illustrated with cuts of buildings in which these bars have been used. A number of useful and valuable tables are presented for the reinforced concrete designer, together with a discussion on the mechanics of reinforced concrete with standard formulas.

Electrical Apparatus.—The following bulletins have been received from the General Electric Company, Schenectady, N. Y. No. 4753 describes the G-E Mazda 400 and 500-watt incandescent lamps for standard lighting service and gives data as to the cost of the lamps and service at various voltages. Bulletin No. 4743 is devoted to intensified arc lamps. These have been designed for general illuminating purposes on direct-current multiple circuits from 100 to 125 volts, and are notable because of their high efficiency and the daylight quality of their light. A color chart shows the illuminating values of various forms of lighting as compared to daylight. Bulletin No. 475 describes different types of polyphase induction motors. The advantages of this type are its simplicity, high efficiency, the small amount of attention which it requires, the ability to carry large overloads for considerable periods without overheating, the entire absence of sparking, and quick and certain starting. Bulletin No. 4756 considers the ventilation of horizontal steam turbine alternators.

Gould Products.—An attractively printed and well arranged general catalogue, bound in substantial loose leaf covers so that supplementary sheets may be added, has been issued by the Gould Coupler Company, New York. The plants at Depew, N. Y., have steadily grown so that to-day the steel foundry has a capacity of 250 tons per day, the malleable iron plant 100 tons per day and the axle forge 200 axles per day. The capacity of the storage battery plant is said to be unlimited. There is also an electrical plant for manufacturing axle-driven dynamos for car lighting. The catalogue contains illustrations and brief descriptions of these plants followed by illustrations of the different Gould specialties, with the parts numbered for convenience in ordering, and accompanied by brief but clear cut descriptions of each device and its advantages, and lists of parts and their numbers. Wherever necessary, as for instance in the case of various sizes and designs of coupler shanks, dimensioned drawings are given, each one numbered to facilitate ordering accurately. Under the head of *freight equipment* the various types of Gould couplers and attachments are described; also the Gould friction draft gear for freight and locomotive equipment, metal draft beams, cast steel body and truck bolsters, cast steel end sills with self-contained friction buffer, friction buffers, cast steel truck side frames, Hartman ball-bearing center plates and side bearings, journal boxes, inset journal box lids, dust guards, extended metal draft beams, uncoupling brackets and axles. Under *passenger equipment* are found the different types of passenger couplers, friction draft gear, friction buffer, steel platforms with friction buffer and friction draft gear, friction buffer for stub end cars, steel draft frame for blind end cars, cast steel platform end sills, steel platforms of various types, vestibules, coupler centering device and axles. Under *locomotive equipment* is included tender couplers, spring tender buffers, pilot couplers, vestibule for tenders with friction buffer and friction draft gear and axles. Under *electric traction devices* are side operated couplers, and the radial buffer and swing coupler. Several sheets are included describing the *car lighting sets* manufactured by the Gould Storage Battery Company.

RAILWAY STRUCTURES.

AVONDALE, ALA.—The Alabama Great Southern it is reported, will build a two-story brick and concrete depot at cost about \$15,000.

DECATUR, ILL.—The Chicago & North Western has awarded a contract to J. J. Jobst, Peoria, Ill., to build a power house, 100 ft. x 110 ft., which will be equipped with five electric boilers.

BLOOMINGTON, ILL.—The Chicago & North Western has given a contract to Westinghouse, Church, Kerr & Co., New York, to enlarge the shops and build a new \$25,000 depot. (June 17, p. 1572.)

CHADRON, NEB.—Press reports indicate that the 20-stall roundhouse and machine shops of the Chicago & North Western were burned on the night of August 2 and that 15 locomotives were badly damaged.

CHICAGO.—The Chicago, Milwaukee & St. Paul will build a brick addition containing 20 stalls to its roundhouse at Chicago avenue. It will cost about \$17,500. G. A. Johnson & Son, Chicago, are building a one-story machine shop 200 ft. x 300 ft. for the Chicago & North Western.

COLUMBIA, MISS.—The New Orleans Great Northern will, it is said, build a \$10,000 depot.

DULUTH, MINN.—The Duluth & Iron Range has given a contract to George H. Spurbuck, Two Harbors, Minn., to build a new station at Allen Junction. The building will be two stories high, the main part being 71 ft. x 24 ft., with one wing 16 ft. x 32 ft. The second story will be 24 x 42 ft. (Aug. 5, p. 264.)

ELM GROVE, W. VA.—The Baltimore & Ohio has given a contract to Dudley & Edie, Wheeling, W. Va., for building a brick and stone passenger station, to cost about \$12,000.

EL PASO, TEX.—It is reported that the El Paso & Southwestern is having plans prepared for an addition to the freight depot, to cost about \$15,000.

FORT STOCKTON, TEX.—It is said that the Kansas City, Mexico & Orient is building a \$15,000 station at this point.

HANOVER, PA.—The Western Maryland is said to have accepted the Merchants' Association's offer of a tract of land in the eastern end of the town, to be used as a site for new shops and a roundhouse.

JACKSON, GA.—Press reports indicate that the Southern Railway will erect a depot at this point.

MILWAUKEE, WIS.—The Chicago & North Western has let a contract to Pruitt & Moore, Chicago, to build a one-story brick passenger station, to cost about \$25,000.

MONTREAL, QUE.—The Canadian Pacific has given a contract to C. E. Deakin to build the new annex to its Windsor street station. The cost will be about \$1,000,000.

PITTSBURGH, PA.—The Huntington & Broadtop Railroad Company has bought an acre of land along its tracks at the south side of the Juniata river bridge, on which it will build a local freight depot, coal wharf and offices.

SUNBURY, PA.—The contract for the new county bridge over the Susquehanna river, to be used also by the Sunbury & Northumberland (Electric), was let to the York Bridge Company for a six-span bridge, the contract price being \$84,300. (July 1, p. 57.)

TAMPA, FLA.—Bids will be opened about September 1 for the erection of the new union station. This will be a one and two-story brick and stone building, the two-story portion being 80 ft. x 130 ft. and the one-story portion 60 ft. x 200 ft. (April 15, p. 1020.)

TITUSVILLE, PA.—The Titusville Electric Traction Company, it is reported, is contemplating the early building of an overhead bridge at Hydettown.

WAYNESBORO, MISS.—It is said that plans have been prepared by the Mobile & Ohio for a new depot.

WICHITA, KAN.—It is said the Wichita Terminal Association, Atchison, Topeka & Santa Fe and Chicago, Rock Island & Pacific will build a brick freight house to cost \$75,000.

Late News.

The items in this column were received after the classified department had been closed.

John F. Stevens, president of the Oregon Trunk Railway, says that the road will be extended across the Cascade mountains to Medford.

A steamship departed from Santiago, Chile, August 10, reporting that the Strait of Magellan Railway blocked by snow. The routes between New York and Coney Island are all open.

J. P. Knight has been appointed general Eastern agent of the Kansas City Southern, with office at New York, N. Y., succeeding C. E. Crane, resigned to go with another company.

The United States Steel Corporation reports its unfilled orders on hand on July 31, 1910, as 3,970,931 tons. This is a decrease of 286,863 tons from the June 30, 1910, unfilled tonnage, which was 4,257,794 tons.

Rates on cypress lumber from Gleason, Ark., to all points reached by the Missouri Pacific system are found unreasonable in a decision of the Interstate Commerce Commission. Reasonable rates for the future are prescribed.

* As a means of relieving the congestion of traffic, a problem of constantly increasing difficulty, the government of France has decided to electrify the belt railway of Paris and the railway service out of St. Lazare station. The estimated expenditure involved is \$40,000,000.

Edward B. Smith & Co., Philadelphia, have bought \$2,000,000 of the new first mortgage 5 per cent bonds of the Philadelphia & Western, the proceeds of which will be used to build an extension of the road from its present line to Norristown. These bonds are part of an issue of \$4,000,000, the mortgage for which to the Philadelphia Trust Safe Deposit & Insurance Co. trustee, has just been recorded at the same time an old mortgage for \$20,000,000 to the Trust Co. of America was canceled.

It is reported that the Denver & Rio Grande has decided to begin at once extensive improvements on the line between Pueblo, Colo., and Colorado Springs. These will include building of concrete bridges over streams and arroyos, the widening of all dry gulches, heavy ballasting of the track and a general strengthening of the line. Widening of arroyos under the tracks will very largely relieve the terrific force of flood waters and it is aimed to make the concrete arches strong enough to resist floods even in very narrow channels. In the lowlands the track will be heavily ballasted with slag. This portion of the line is frequently submerged by flood water.

Darius Miller, president of the Chicago, Burlington & Quincy, made the following statement in answer to the charges recently made that the railways were padding their expense accounts, in order to help along the fight for higher freight rates: "The report from Washington printed in Sunday morning papers to the effect that the railways have been padding their expense accounts to make their profits seem small is so false and misleading that it requires unqualified denial. It is true that operating expenses, as reported for the ten months ended April 30, are much larger than those reported for the corresponding ten months of the year previous, but this is not due to the fact that the accounts are padded. It is due to the fact that we are actually spending more money on the maintenance of the properties. The report from Washington calls particular attention to the increase in the maintenance of way and structure figures. If the figures of 1909 had been compared with those for 1907, or even with those for the panic year 1908, they would have looked quite different." Mr. Miller then gives figures to bear out his statements: "The criticisms of the railways' methods of keeping their accounts is peculiarly wide of the mark, as they are being kept according to rules prescribed by the Interstate Commerce Commission itself, and it is certain that no management is now spending more on its road than is necessary to get and keep it in good condition. Surely nobody will criticize the management for spending enough money to keep the roads in shape to give good and safe service."

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The *Baltimore & Ohio* has ordered five Mallet locomotives from the Baldwin Locomotive Works.

The *Guantanamo & Western* has ordered three 10-wheel locomotives from the American Locomotive Company.

The *New York Central Lines* have decided upon purchasing 260 locomotives, orders for about 200 of which will probably not be placed for several months. It is reported that orders for 60 of these engines have been placed, but confirmation has been impossible. It is thought that the 21 freight locomotives ordered for the Michigan Central, as reported in the *Railway Age Gazette* of August 5, are a part of the 60 reported placed.

The *St. Paul & Des Moines*, as reported in the *Railway Age Gazette* of August 5, has ordered two consolidation locomotives from the Lima Locomotive & Machine Co., for delivery in October.

General Dimensions.

Weight on drivers	155,000 lbs.
Weight, total	175,000 lbs.
Cylinders	20 in. x 28 in.
Diameter of drivers	36 "
Boiler diameter	67 1/2 in. x 75 1/2 "
type	Extended wagon top
working steam pressure	200 lbs.
Firebox	96 in. x 72 in.
Tubes, number	308
" diameter	2 in.
" length	14 ft.
Heating surface, tubes	2,244 sq. ft.
" firebox	156 "
" total	2,400 "
Water capacity	7,000 gals.
Coal capacity	12 tons

Special Equipment.

Valve gear	Walschaert
Air brakes	Westinghouse No. 6, E. T.
Draft gear	Westinghouse friction
Couplers	Simplex
Packing	U. S. Metallic
Lubricators	Ohio
Sanders	Detroit
Gauges	Leach air
Safety valves	Ashcroft
Tires	Kunkle
Wheel center	Midvale
	Cast steel

CAR BUILDING.

The *Chicago & Alton* is asking prices on 3,000 fifty-ton steel hopper cars.

The *Dairy Shippers Despatch* is again asking for figures for 100 refrigerator cars.

The *New England Coal & Gas Co.*, Shawmut Bank building, Boston, Mass., is asking prices on 300 hopper cars.

The *Nevada Northern* is said to be in the market for a number of freight cars. This item is not confirmed.

The *Havana Central* is making inquiries for 100 thirty-ton flat cars and from 50 to 150 thirty-ton box cars. All of this equipment is to have steel underframes.

The *New York Central Lines* have been figuring on new box, gondola and hopper cars, about 8,000 in all, but definite action will probably not be taken before January 1.

The *Illinois Central*, reported in the *Railway Age Gazette* of June 24 as being in the market for two observation-parlor, two passenger-baggage, two cafe-parlor and two cafe-coach cars, has placed this order with the Pullman Company.

MACHINERY AND TOOLS.

The *Western & Lake Erie* has ordered most of the machinery and tools as reported in the *Railway Age Gazette* of July 8.

The *Lake Shore & Michigan Southern*, reported in the *Railway Age Gazette* of August 5 as being in the market for 15 cranes, has placed this order with Manning, Maxwell & Moore, New York. The order amounts to two 150-ton, three 40-ton, nine 10-ton and one five-ton electric traveler of the Shaw type.

IRON AND STEEL.

The *Wabash* has ordered 1,500 kegs of spikes.

The *Baltimore & Ohio* has ordered 2,000 kegs of spikes.

The *Midland Railway* will soon be in the market for rails.

The *Sind Light Railway* is in the market for 2,200 tons of rails.

The *Queensland Railway* is in the market for 11,000 tons of rails.

The *East Indian Railway* has ordered 2,000 tons of fish plates from Dorman, Long & Company.

The *Denver & Rio Grande* has ordered 700 tons of structural steel from the American Bridge Co.

The *Oregon Railway & Navigation Co.* has ordered 400 tons of structural steel from Milliken Bros.

The *Cincinnati, Hamilton & Dayton* has ordered 350 tons of bridge steel from the King Bridge Co., Cleveland, Ohio.

The *Great Northern* has ordered 900 tons of structural steel for ore spouts at Allouez Bay, Wis., from the Minneapolis Steel & Machinery Co.

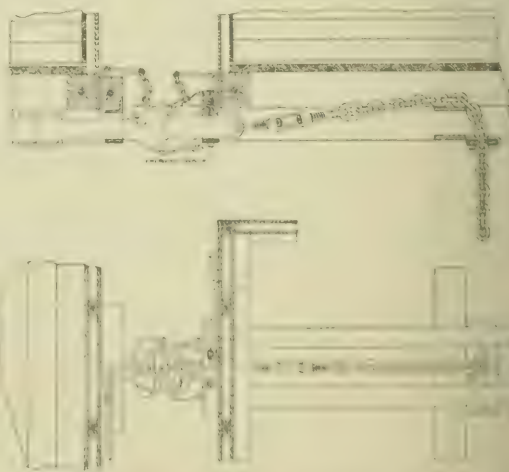
The *Canadian Pacific* has ordered the structural steel for the new annex to its Windsor street station, Montreal, from the Dominion Bridge Company.

The *Chicago, Weatherford & Brazos Valley* is in the market for 60-lb. rails to be used in relaying 40 miles of its line. Rails sufficient for the work on 10 miles must be delivered within 45 days.

General Conditions in Steel.—There seems every reason to believe that the reported cut to \$26.50 per ton on a lot of rails recently sold by the Illinois Steel Co. is not based on facts. The steel company and the Corporation are both emphatic in their denials. The report probably grew out of a quotation for an export order, in which concessions are usually made.

New Emergency Coupling Device.

Occasionally drawbar attachments on old cars of wooden construction are pulled out. This makes necessary heavy repairs which mean delay and consequent damage to car lading. Until the repairs, however, can be made, when time is an important item, the cars are often chained together. This is always dangerous and never satisfactory. The Spencer-Otis Company is putting on the market the economy emergency coupling device, of which over 500 have been sold to one large western railway system. The device consists of a M. C. B. coupler of approved



Application of Economy Emergency Coupler.

design, with a special shank. Attached to this is a chain with turn buckle having a yoke forging in which one end of the chain is locked. This yoke forging is put under the intermediate sills of the lock and the chain is locked into the slot in the yoke. Then, by means of the turn buckle the coupler is pulled tightly into place when the car is ready to proceed in the train to destination. The utility of such a device is evident and it seems that in a very short time every wrecking train will carry a number of them and every freight train should have one or more in the caboose.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY AND MONDAY

THE RAILROAD GAZETTE, NEW YORK

CHICAGO, Plymouth Bldg. CLEVELAND, W. B. Bldg.
LONDON, Queen Alice St. and 10, Wellington St.

W. H. BOARDMAN, President

E. A. SIMMONS, Vice President
The address of the company is the address of the office.

EDITORS

W. H. BOARDMAN, Editor,	RAY V. WHEELER	B. B. YEAM
SAMUEL O. DUNN,	ERNEST McCULLOUGH	W. T. HENDER
Western Edit. Mgr.	G. L. FOWLER	F. J. LORR
BRADFORD BOARDMAN,	WILLIAM F. RYAN	I. W. BRADLEY
Eastern Edit. Mgr.	S. W. DUNNING	H. H. SIMMONS
	CLARENCE DEMING	

Subscriptions, including regular weekly issues and special trade editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada.....	\$6.00 a year.
Foreign Edition (London).....	£1.00 (\$8.00) a year.
Single Copies.....	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Conventions Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49. FRIDAY, AUGUST 19, 1910. NUMBER 8.

CONTENTS

EDITORIAL:

Editorial Notes.....	299
The Hearings on Advances in Rates.....	300
The Lehigh Valley.....	301

LETTERS TO THE EDITOR:

How to Deal With Failures of Automatic Block Signals.....	303
Terminal Controversy at St. Louis.....	303

ILLUSTRATED:

Double-Track Railways in Virginia.....	310
A Machine Shop on Wheels.....	312
Mission Bay Viaduct, Southern Pacific.....	314
The Cambria Steel Works.....	316

MISCELLANEOUS:

Vanadium in Cast Iron Locomotive Cylinders.....	312
Train Accidents in July.....	313
Crude Oil Treatment of Ties.....	305
Tie Spacer.....	309
Clearances and Grade Separation.....	309

GENERAL NEWS SECTION.....

321

SUPPLY TRADE SECTION.....

335

TWO phases, seemingly inconsistent with each other, of state control of railways in Europe are worth attention from the viewpoint of this side of the Atlantic. In Austria, after a trial of government operation of the railways, there is now a sentiment back toward private ownership. There has been in their management an evolution downward into all the ills of state control—lack of enterprise, bad service, financial loss and pernicious political activity among the railway servants. *Per contra*, a railway commission of high character has reported in favor of the amalgamation of the railways of Ireland and a majority of the commission favors government ownership and control, for substantially three of the economic reasons which are compelling Austrian sentiment in the opposite direction. What calls for careful attention in this case is the fact

that a political and civic divergence, probably, extending to a large degree, the economic inconsistency. England, rightly to her credit and by virtue of her merit system, has developed her functional public service from political and partisanship as well as her municipal service. In Ireland's case her experts, with the political ingredient excluded, more readily take the optimistic view of government railway ownership even though it differs from the private ownership system of England and Scotland. But Austria—much scored, it will be recalled, by Gladstone for her unprogressiveness—has allowed the political and partisan impulse full play on her railways, and, presumptively, this accounts also for their economic failure. The object lesson for our own land is an impressive one. We have the merit system in our federal service as yet only on a minor scale. Until it becomes firm, dominant and pervasive both in letter and spirit, where would we find ourselves politically and economically with many hundreds of thousands of railway voters on the federal payroll? May there not be also a further lesson bearing on our own governmental tendencies in this development of politics on the Austrian railways under an imperial and centralized national administration?

THE Interstate Commerce Commission has sent out the blanks on which the railways are to report accidents under the revised law, which went into effect July 6. (The commission recommends that the new forms be used for the whole of the month of July, thus obviating the necessity of making two reports.) As the reader will recall, the principal change which has been made in the law is that requiring reports to be made monthly, in detail, of accidents to persons other than passengers and employees, such as deaths and injuries of wayfarers at highway crossings; of persons other than passengers at stations, and of trespassers stealing rides on freight trains or walking along the tracks. By requiring these additions to the monthly reports the commission is enabled to relieve the railways of making any report whatever of accidents in connection with their annual financial reports. The quarterly bulletins will be the only accident records published. The instructions sent out with the new blanks indicate that, so far as reporting *causes* is concerned, the commission itself has made a change which is of more consequence than that prescribed by Congress; it has authorized the omission of detailed reports of practically all accidents to employees which do not occur in connection with the movement of cars or engines. These are to be reported only in the totals. This will reduce the number of individual reports to be sent in by the roads each month by several thousand—by enough, perhaps, to offset the increase in the number of reports due to the addition of the trespassers and the highway crossing accidents. (Where the cause is reported, a separate sheet has to be sent for each accident.) Those accidents for which causes are not to be reported are embraced in the following five items in each monthly summary:

"Industrial accidents" to employees:
While working on tracks or bridges.
At stations, freight houses, engine houses, coaling stations, water stations, etc., where no moving railway car or engine is involved.
In and around shops.
On boats and wharves.
At other places.

Of these five items, the third and fourth represent accidents which have not heretofore appeared in the monthly reports. They have been published only in the annual statistical report of the commission. These will now appear in the monthly totals, but no causes are to be given. The first, second and fifth items have heretofore appeared in Table 1 of the quarterly bulletin, mostly in the last item of that table ("other causes"). Under the new arrangement an accident to a track laborer occurring in connection with the movement of a train—as, for example, when he is struck or run over by a locomotive—will appear in the same place in the table as heretofore; but such an accident as injury by the fall of a derrick or the dropping of a rail on the foot will appear only in the totals. The changes which have been made in the regulations will abolish the de-

tailed classification of employees which has heretofore been given in the annual statistical reports of the commission (pages 104-118 of the volume for the year 1908).

THE changes here outlined are all in the direction of simplicity and economy. The absurd retention of the accident records in the annual financial reports after monthly reports were required were necessitated by the careless language of the accident law of 1901, which omitted certain classes. After nine years this error is now corrected. The separation of "industrial" accidents from the others will be entirely proper, for the federal government has no legitimate function to perform concerning these classes. In gathering the total numbers of such accidents—a mere taking of a census—the commission aids students in getting a view of the facts in the country as a whole, and the report therefore will be a convenience; and that is enough. The prevention of accidents comes within the police power, and that rests primarily with the individual states. The federal government is justified in going into details in this matter only where the states have neglected to act, or where it is plain that they cannot do so efficiently. This is the case in reference to deaths and injuries due to collisions, derailments and boiler explosions, while in the matter of shop accidents and such like it is not. Work in shops has only an indirect connection with interstate commerce and it is doubtful whether the federal government ought to worry itself over those accidents, anyway; while in the case of the ordinary accidents happening to men engaged in track work, bridge work, etc., the government probably could not do anything helpful, however hard it might try. In the prevention of train accidents the federal government has a useful function for the reason—one among others—that the lessons of the worst accidents seem to have no influence on the minds of the public—or even, in many cases, the minds of railway officers—except as the facts for the whole country are massed in a single impressive presentation. We have all become so hardened that no one state has enough big wrecks to stir our sensibilities. The changes now made will make it impossible to compare the future with the past except by making certain allowances and groupings in the figures, and the establishment of a new class, "industrial accidents," is likely to puzzle superintendents sometimes in deciding what really is a railway accident. But the comparisons will afford all necessary lessons, for railway officers know well enough, already, what should be done in the way of prevention; while any doubts as to classification may be safely settled by adverting to the rules which have heretofore been followed in making up the classification for the annual report. Moreover, the requirements imposed in connection with the reports which have to be made by most roads in the individual states can be used as a check to prevent the omission of any case that really ought to be included.

A PRESS despatch in the daily papers says that the Baltimore & Ohio Southwestern has made a record in the installation of block signals, having put in 183 miles in 6½ days. The haste was due to a recent trip over the road by President Willard, who was amazed at the traffic conditions on this part of the system. The Indiana division has the greatest density of traffic of the entire system and owing to the lack of safety devices freight trains were unable to get over the road with sufficient speed to keep the line clear. In the 6½ days (beginning July 15) three ordinary gangs of men strung 183 miles of block wire. This was from Storrs to the Wabash river at Vincennes, and from North Vernon to New Albany. In this time 62 offices were equipped with batteries and instruments and put in operation. This statement is noteworthy as illustrating the difference of opinion between President Willard and those railway officers, evidently shortsighted, who expatiate on the great reduction in the capacity of a road which must result from the use of the block system. The statement about excessive traffic density may be due to a reporter's inaccuracy, but, whatever

the density, we have the statement that the block system is being introduced for the purpose of expediting trains. And the blocks are not short; 62 in 183 miles makes an average length of three miles. This statement is noteworthy also as demolishing the bugbear that it is possible to introduce the block system only by slow degrees. This journal has for years advocated the introduction of the block system on the assumption that it could be adopted anywhere in the space of a few months; but those railways which have taken no action have seemed to discredit this assumption. The bill which has been before Congress for the past five years allows three years—a much longer time than is necessary. With a decently adequate force of telegraphers the introduction of the block system has never necessarily involved on any road any greater task than the instruction of those telegraphers in a new system, which would be simpler than the old; and with the telephone available everywhere, as it now is, the old excuse that operators for the additional stations could not be quickly gathered is done away with. It is true that to secure both safety and celerity most roads, in adopting the block system, will find it necessary to shorten the distances between stations; but there is little difficulty in adopting the system with any length of block. It can then be used for passenger trains, and for all trains in case of need, while still allowing the superintendent to facilitate the movement of freight trains, when conditions are favorable, by suspending the system; that is, by employing permissive blocking. In connection with this action of the Baltimore & Ohio Southwestern it is to be observed that though several railways in Indiana have made pleas for delay in complying with the compulsory law of that state, they have not based their arguments on physical inability to make the change, but rather on the ground that they did not deem the improvement necessary. The old, uncertain time-interval and flagging system, supplemented by dispatchers' orders, torpedoes and fuses, was safe enough for them.

THE HEARINGS ON ADVANCES IN RATES.

LAST Monday in New York the Interstate Commerce Commission began the first of a series of hearings on the question whether the railways are entitled to raise their freight rates. We are making history these days, and these hearings and their results will occupy no unimportant place in the history of transportation and government regulation of railways in the United States. The fact that they will decide whether shippers in the immediate future must pay, and railways shall receive, higher rates is of consequence. But it is of secondary importance as compared with the precedent that will be established by this first exercise by the commission of its new power to permit or forbid increases in freight rates. If the commission conducts the hearings wisely and fairly and renders decisions just in themselves and based on sound principles, it will establish a precedent that will contribute much to making government regulation successful. In so far as it falls short of this it will establish a precedent that will tend to make government regulation a failure and increase the danger of government ownership. The movement for more and more drastic regulation of railways is a part of a much wider movement in the direction of state socialism. That this is true, every clear-sighted and candid man must see and admit, whether he is in sympathy with or antagonistic to the tendency. The commission, by dealing with the railways on commonsense, commercial principles and giving solid, convincing reasons for doing so can help to check this tendency. If it deals with the roads according to the principles which have been growing more and more dominant in our political and industrial life ever since the Populist party sprang into existence 20 years ago, it will help to bring state socialism nearer.

In order that a question may be intelligently discussed and wisely settled it is necessary that those who discuss and decide it shall clearly understand what is the real issue involved. The discussions of the question of an advance in freight rates indicate that many of those who have been talking about it have

not got clearly in mind just what is the issue to be determined by the commission. Many of the spokesmen for the railways have presented data in speeches, pamphlets, etc., showing conclusively that the unit costs of railway labor and material have increased, and have stopped there, coming to think that this demonstrated that the roads are entitled to higher rates. In reply, many shippers have presented data showing not conclusively that the net earnings of the railways have largely increased since 10 or 15 years ago, and have stopped there, assuming apparently that this demonstrated that rates ought not to be increased. Both these arguments are most faulty. The Mann-Elkins act, under which the commission is conducting these hearings, authorizes it to inquire into the "propriety" of any new rates, and "after full hearing * * * to make such order in reference to such rate * * * as would be proper in a proceeding initiated after the rate * * * had become effective." It provides further that "at any hearing involving a rate increased after January 1, 1910, * * * the burden of proof to show that the increased rate or proposed increased rate is just and reasonable shall be upon the common carrier." The real question, therefore, which the commission has to determine is whether the new rates which the roads propose to make would be just and reasonable. All data regarding increases in the cost of railway labor and supplies, and regarding increases in railway earnings is valueless except as they throw light upon this point.

In determining whether rates already in effect are, or proposed rates will be, reasonable, the commissions and courts must give primary consideration to the effect they have or probably will have on the movement of traffic. It is a well-established legal principle that a common carrier cannot charge a rate that is unfairly discriminatory or that is extortionate—in other words, one that exceeds the value of the service rendered—even if otherwise the carrier cannot make any profit at all. It is an equally well-established legal principle that, as long as its rates are not discriminatory or extortionate, the carrier has a right to make them high enough to earn at least a "fair return." In the determination of the questions whether proposed rates would be unreasonable per se, and whether proposed advances are necessary to enable the roads, or any of them, to earn a "fair return," the commission will perform a quasi-judicial function. Whether without proof that the proposed rates will be unreasonable per se, the commission can forbid the roads to put them into effect because it may think that they will enable the roads to earn more than a "fair return"; in other words, because it may think they will enable the roads to earn more than the minimum to which the courts have held they may be restricted—is a disputable point. In any event, it is certain that the commission may, if it sees fit, let the roads charge rates which will enable them to earn more than the minimum to which the courts have said they may constitutionally be held down. For it performs legislative as well as judicial functions. Its power to fix rates for the future is purely a legislative function delegated to it by Congress. In performing a duty delegated by Congress it ought to proceed as Congress ought to proceed if Congress performed the function itself. Now, Congress, in passing laws, does not impose on those affected the heaviest burdens or restrict them within the narrowest limits that it constitutionally can. Its taxing power, for example, is practically unlimited, but it does not therefore impose the highest taxes it can. Congress does not consider merely what it is constitutional to do, but it gives preponderant consideration to what it is in the interest of public expediency to do. Similarly, in exercising its legislative function of fixing rates, the commission ought to seek, not to limit the railways to the least to which they can constitutionally be restricted, but to make those rates which will be most conducive to the public welfare. And the rates which will be most conducive to the public welfare are neither the highest that shippers can possibly afford to pay nor the lowest on which railways possibly can continue to do business, but a mean between these extremes.

In determining the most expedient rates to make, the commission cannot fix its gaze exclusively on the railway business. It must consider it in relation to other businesses. The welfare of all other industries demands that transportation facilities be improved and increased. In order that they may be improved and increased, the railways must get their reasonable share of new capital. When they go into the market for new capital they meet bidders representing other lines of business. If their earnings are not as large in proportion as those of other businesses, they cannot bid as much for capital as other businesses. And if they cannot bid as much for it they will not get as much of it as not only their own interests but those of other businesses require that they shall get. So, the question which the commission ought to consider is not merely whether the railways must have higher rates in order to escape bankruptcy, but whether they must have higher rates in order to enable them to hold their own against other bidders in the money market, and thereby to get enough capital adequately to improve and develop their facilities.

In performing its legislative function of determining and deciding what in the interest of public expediency shall be done about railway rates, the commission will have as hard a task as ever was imposed on any public body. In too many instances the lawyers who conduct rate cases have darkened council with legal technicalities instead of illuminating it with economic facts and considerations. No doubt the commission often has felt like the old darky who, being caught in a violent thunderstorm, prayed to the Lord for less noise and more light. The mighty preparations that both the shippers and the railways have been making for the hearings on advances in freight rates give ground for the hope that on this occasion if there is much noise there will also be much light, and that the light will be so turned on as to help the commission not only in the performance of its quasi-judicial function but also in the performance of its legislative function. The courts can ascertain better than the commission what the legal rights of railways and shippers are. The commission's great task, especially since the commerce court law was enacted, is to pass not on legal questions but on the much bigger and much more important question of public expediency involved. May it prove equal to carrying its heavy burden of duty and responsibility!

THE LEHIGH VALLEY.

THE question whether a given annual report of a large railway company indicates a general change for the better in business conditions, or whether the improvement shown in the report is the result of an improvement in individual management, is always an interesting question; it is especially so in the case of the first report received each year.

The showing made by the Lehigh Valley for the fiscal year ended June 30, 1910, is surprisingly good. The total operating revenues amounted to \$36,200,000, an increase of \$3,000,000 over 1909, or a gain of over 9 per cent. Operating expenses amounted to \$21,700,000, an increase of about \$1,100,000. Income other than operating earnings also increased, amounting in 1910 to \$1,100,000. The net income, therefore, after the deduction of interest on funded debt and \$840,000 for additions and betterments, amounted to \$7,200,000 in 1910. In 1909 about \$580,000 was charged to income for additions and betterments, and the net income amounted to \$5,260,000.

The Lehigh Valley is, next to the Delaware, Lackawanna & Western, the most important hard coal road in the country. It operated in 1910 1,440 miles of line. The main line runs from Jersey City, N. J., to Buffalo, N. Y. The main line is all double track and runs through the anthracite coal region around Wilkes-barre and Pittston. Of the total tonnage carried by the road 52 per cent. was coal. This compares with 53 per cent. furnished by coal in 1909. The revenue from this coal tonnage amounts to \$15,800,000, an increase of \$990,000 in 1909. The revenue from merchandise freight amounted last year to \$14,800,000, an increase of \$1,500,000. As the passenger business of

the Lehigh Valley from the point of view of revenue is comparatively unimportant, it will be seen that the gain made in 1910 over 1909 was due principally to the increased earnings from merchandise freight tonnage.

The revenues and expenses given monthly show that the increased gain in revenue came in the last few months of the fiscal year, though it has been the generally accepted opinion that business was not better in these months than it was earlier in the year. One is forced to the conclusion, therefore, that the good results obtained by the Lehigh last year were the outcome of good management, rather than a generally improved business situation. President Thomas ascribes it in part to a more efficient traffic department but more fully to the improved service which the Lehigh Valley is giving to its patrons. He lays stress on the economies and improvements in operation that have been forced on the railways by the necessity of keeping up their earnings in the face of high operating costs, and the 1910 report of his company gives witness that the management of the Lehigh has been able to live up to these requirements.

As we have said, operating expenses amounted to \$21,700,000 in 1910, as compared with \$20,600,000 in 1909. Of the total increase of \$1,100,000, \$600,000 was in the expense of conducting transportation and \$100,000 in the expenses incident to soliciting traffic. Maintenance of way and structures cost \$3,500,000 last year, an increase of \$190,000 over the year before. Maintenance of equipment cost \$5,996,000 in 1910, an increase of \$160,000 over 1909. It might be incidentally mentioned that the accusation recently made that the railways were concealing profits through excessive charges to maintenance is effectively disproved, at least in the case of the Lehigh Valley, by the detailed statement of operating expenses in the Lehigh's annual report. The increase in expenses for maintenance of way show the natural fluctuations between various items that are shown between normal years in the report to any railway. For instance, the amount spent on ballast amounted to \$54,600 in 1910, as against \$11,800 in 1909. The amount spent for ties was \$413,000 in 1910, as against \$514,000 in 1909. Under maintenance of equipment, the entire increase in expenses is accounted for by an increase of \$310,000 in the cost of repairs of freight train cars, which amounted as a whole to \$2,400,000 last year. This increase is accounted for by the increase in traffic moved and the resulting greater car mileage. The following table shows the unit costs of maintenance in the form that we have used in reviewing previous reports:

	1910	1909
*Maintenance of way, per mile	\$1,268	\$1,233
†Repairs per locomotive	2,185	2,258
“ passenger train car	499	510
“ freight train car	53	48

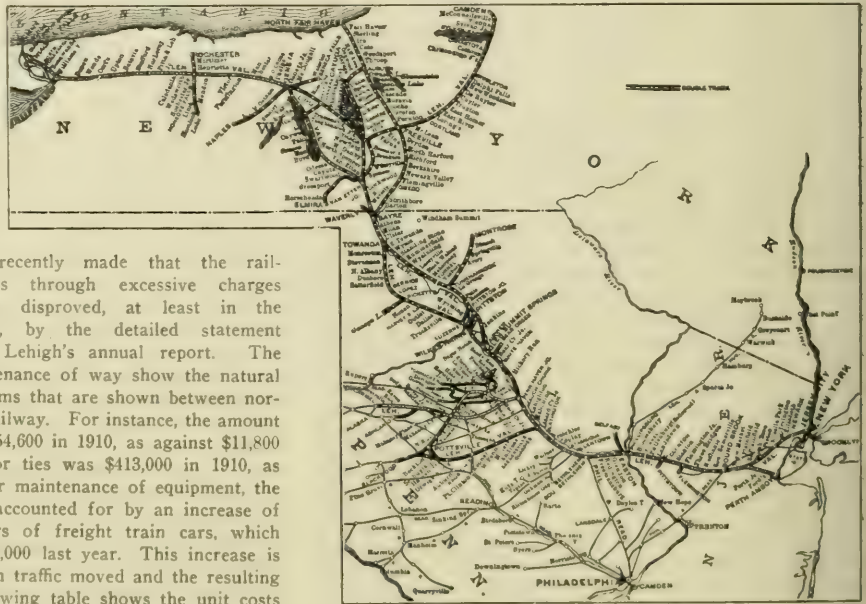
*Per mile of first, second, third, etc., main line and branches. The maintenance of two miles of sidings and switch track being counted equal to the maintenance of one mile of main line.

†This is cost of repairs only and does not include cost of renewals or depreciation.

Under transportation expenses most of the accounts show increased cost. This increased cost is due, in the case of such items as fuel for road locomotives, to the increase in traffic and consequently greater train movement. The balance of the increased cost of transportation is caused by the higher wages paid. The increase in wages began to affect the Lehigh in January, 1910, so that the last six months of the fiscal year show the effects of the new wage scale. In 1910, \$13,900,000 was paid directly to labor, as compared with \$12,300,000 paid directly to labor in 1909. There were, however, 22,439 employees in 1910, as compared with 20,731 the year before. Assuming that the entire increase in wages per employee came in the last half year the average individual raise in pay was about 10 per cent.

It has been the policy of the Lehigh in the past to spend very large sums from income for the improvement of its property. There are comparatively few roads in the East that have had to be so thoroughly rebuilt, during the last 10 or 15 years, as has the Lehigh. Last year \$5,200,000 was spent for additions and betterments, of which \$840,000 was deducted from income. The important work was the extension of third and fourth track and the improvement to property of subsidiary companies. The company was reimbursed for money advanced to these subsidiary companies by the issue of 50-year 5 per cent. debenture bonds so that the balance sheet of the company does not, on its face, show how much has been spent for additions and betterments; that is, the item, additions and betterments since 1907, does not show it, but this is shown in the profit and loss account.

The balance sheet is prepared in accordance with the rules laid down by the Interstate Commerce Commission and shows a number of changes both from previous balance sheets of the Lehigh and from what might be called standard accounting practice of American railways. President Thomas points out that under the ruling of the Interstate Commerce Commission the management was forced to show a paper profit greater by a con-



The Lehigh Valley Railroad.

siderable amount than the management thought proper. This is shown in a credit item of \$3,440,000 in the profit and loss account, representing expenditures for additions and betterments during the fiscal years, 1908, 1909 and 1910, transferred to road and equipment and to advances to subsidiary companies. The balance sheet of the company for June 30, 1910, shows it in a very strong position as regards current assets and liabilities. The company had \$10,900,000 cash in hand, comparing with \$7,200,000 in 1909. It is probable that if the balance sheet of 1909 were to be recast to conform with that of 1910, the actual difference in cash on hand would not be quite as great as here shown. In any case, \$11,000,000 is more than an ample working capital for the Lehigh Valley. Working liabilities amounted to \$3,800,000 in 1910. This compares roughly with the total current liabilities shown on the 1909 balance sheet amounting to \$3,850,000.

In June the directors decided to increase the authorized capital stock of the company from \$40,334,800 to \$80,000,000 and the stockholders approved the sale of \$20,220,550 stock to stockholders at par. The price of Lehigh Valley stock is about 72½ per

\$50 share. The sale at par, therefore, of one share of new stock for every two shares of old stock owned by its holders, was in reality a very considerable extra dividend. The proceeds of the sale of this stock will be used to pay, at maturity on September 1, \$6,000,000 second mortgage 6 per cent bonds. The retirement of these bonds, together with the retirement of other securities during the past year, will effect an annual saving of \$505,000 in fixed charges. At the present dividend rate of 6 per cent on the common stock, the new stock issue will call for \$1,200,000 annually. Deducting the amount saved in fixed charges, there will be only a net increase of \$700,000 in interest requirements. The surplus, after the payment of dividends last year, amounted to \$1,860,000.

It is rather interesting to compare, or, if you like, contrast, certain traffic statistics of the Lehigh Valley and the Delaware, Lackawanna & Western. The Lackawanna operates 957 miles of road, as against the 1,441 miles of the Lehigh. The freight density of the Lackawanna in the calendar year 1909 was 3,455,117 tons carried one mile per mile of road, and the Lehigh's freight density for the fiscal year, ended June 30, 1910, was 3,288,705 tons. The total number of tons of all-revenue freight carried one mile was 4,736,557,964 for the Lehigh and 3,306,546,605 for the Lackawanna. The average receipts per ton per mile of all freight on the Lehigh Valley was 6.46 mills. The Lehigh does not give separately its receipts per ton per mile on coal traffic and on merchandise traffic. The Lackawanna gives these figures separately. The average receipts per ton per mile on merchandise traffic on the Lackawanna was seven mills, and on coal traffic it was 8.61 mills. The train load on the Lehigh Valley was 542 tons in 1910 and on the Lackawanna 521 tons. The percentage of increase in train load in the last year reported by the Lackawanna was a little less than 8 per cent, and on the Lehigh a little more than 7 per cent. The average haul for coal and coke on the Lehigh was 154 miles, as against 186 on the Lackawanna.

President Thomas sums up his view of the present conditions and future prospects of railways as follows:

"The conditions now surrounding the railway operations in this country present an element of uncertainty and apprehension that should receive the sober and earnest reflection of investors generally. Time and experience alone will demonstrate the benefit or harm attending the methods employed by federal and state authorities in the regulation and control of the vast industries of this country. The greater difficulties now encountered in corporate management are apparent to all. The problem of offsetting the increase in rates of wages paid employees and in all of those costs entering into the expense of operating must be met. The logical and businesslike solution in this, as in any other occupation, would be an advance in the rates for service performed. If for any reason, however, the gross revenues cannot be so increased, the constantly increasing cost of this service will diminish the net revenue of the company, and it becomes, therefore, of the utmost necessity to effect the greatest possible economies in operation."

The following table shows the results of operation in 1909 and 1910:

	1910.	1909
Average mileage operated	1,441	1,441
Coal freight revenue	\$15,821,798	\$14,881,651
Merchandise freight revenue	14,762,799	13,291,801
Passenger revenue	4,330,172	3,905,063
Total operating revenue	36,167,398	33,137,833
Maintenance of way	3,492,693	3,273,639
Maintenance of equipment	5,995,810	5,832,430
Traffic	918,720	810,293
Transportation	10,593,563	9,949,910
Total operating expenses	21,684,147	20,575,736
Taxes	1,196,732	1,029,376
Operating income	13,376,439	11,482,720
Gross corporate income	14,494,124	12,187,300
Additions and betterments	841,827	801,643
Net corporate income	13,652,297	11,385,657
Dividends	2,439,718	2,439,718
Surplus	11,212,579	8,945,939

Tellers to the Editor.

HOW TO DEAL WITH FAILURES OF AUTOMATIC BLOCK SIGNALS.

Baltimore, July 22, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The article in this week's issue (page 147) of your paper, on automatic block signal performance, is interesting and to the point.

On the B. & O. we hold meetings each month of signal supervisors, and in turn the signal supervisors hold frequent meetings, attended by the men reporting to them, and in each case these men are invited to open their hearts and tell us all about the occurrences of the previous month and especially those which inadvertently slipped through without report.

One of the principal items of discussion at our meetings is the "clear failure," although, of course, we also discuss all other failures. We have for some two years followed this practice, and notes are recorded of our discussions; the minutes of the meetings are printed each month and distributed among those persons interested. We have found that incalculable good is derived from such meetings, and the questions discussed are afterward gone over by the supervisors at the meetings with their men.

Our policy is to encourage our men to better their conditions, and only when failures occur for which they are responsible, are they criticised; they know fully that failures occurring over which they have no control will not be held against their record.

With a view to educating our men, we issue from time to time printed bulletins of various signal appliances, explaining the details of mechanisms and wiring, which is giving us the results we want, namely, loyal, intelligent and energetic workers.

Our promotions are made on the basis of merit, and every man we employ knows that his chance of promotion is good if he attends strictly to the duties required of him.

Repairmen make daily reports of all failures to signal supervisors, and they, in turn, each ten days, send a report to the division engineer. A copy of this is forwarded the signal engineer. Special instructions that clear failures shall be reported immediately to all concerned. Committees of signal supervisors are appointed to investigate clear failures, and I am pleased to state that their services in this particular are required very seldom; but when such a failure is reported we leave nothing unturned to arrive at the cause of the trouble.

We have for years made a special point, in all cases, to invite criticism of trainmen as to the performance of all signals, so as to obtain as many checks as possible against their improper operation.

Records are kept in the signal engineer's office of the failures of each signal, so that reference may be made at any time to past performances.

F. F. PATENALL,
Signal Engineer.

TERMINAL CONTROVERSY AT ST. LOUIS.

The *Railway Age Gazette* in its issue of June 24, 1910, page 1781, published an article entitled "The Terminal Controversy at St. Louis." W. E. Been, secretary of the Arbitrary Abolition Committee, a committee representing the municipal assembly and the shippers of St. Louis, which was appointed to secure the abolition of the bridge differentials at St. Louis, has written an open letter criticizing the article referred to, and Samuel O. Dunn, the author of the article in question, has written a reply to Mr. Been's letter. Mr. Been's and Mr. Dunn's letters are given below.

St. Louis, Mo., July 26, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Several references recently have attracted my attention to your Mr. Dunn's article in your issue of June 24 setting forth the terminal railway situation at St. Louis, and, while he has gone into detail as to conditions, etc., I do not think he has presented the layman's view of the situation as it appears to exist from

that standpoint; and why should not Mr. Jones have a clear, logical view of the situation, as he pays the freight?

First, I want to say that, in my opinion, a union terminal system is a good thing, both for the transportation lines and the shippers, provided it is handled in the right way, otherwise it is a temporary advantage to one, a detriment to the other, finally resulting in a dissolution of the cause of the trouble.

In reference to his statements as to the Terminal Railroad Association not being a monopoly, I cannot agree on that point—else why has it purchased at prices stated to be far above the real value, properties such as the so-called Conologue Railroad Interstate Car Transfer Co., the St. Louis Belt & Terminal Railway, the Alton Bridge, etc., as it was not necessary to control these in order to do the business required of it, and, while it is not the sentiment of the people of St. Louis to impede the progress and enlargement of the Terminal Railroad Association so long as it shows a disposition to share with them the economy of a union terminal system. However, they do not care to draw the cord tighter around their own necks by granting franchises upon which bonds may be later issued and their commerce levied upon heavier to pay the interest thereon.

The municipal government, in refusing to pass the proposed ordinances, felt that the terminal was now in a position to give the shippers of St. Louis a complete abolition of the differentials on all commodities between both sides of the river in return for the valuable grants which they asked, for this reason: The 14 proprietary lines of the terminal are enjoying switching facilities in the Terminal Railroad Association at the price of one—or, in other words, if all the proprietary lines would seek to each have the individual facilities they now enjoy, it would cost them 14 times as much. Now, why should they not, if they want to co-operate with the shipping trade, say, "We will reduce it down to 7 per cent. of what it now is." This is on the assumption that the 14 lines have their own money invested in the terminal, each one sharing his proportion of the cost of the entire system. On referring to an agreement signed by the 14 roads you will find a clause providing that tolls upon the traffic shall be fixed so as to provide a sufficient sum each year to pay the fixed charges of the Terminal Association, which include rent, assessments, interest, dividends on preferred stock, taxes and maintenance charges. By referring to Poor's Manual we find the Terminal Railroad Association capitalized at \$50,000,000. Taking the statement of the thirty-fourth annual report issued in 1909 of the Missouri Railroad & Warehouse Commissioners on the terminal, I quote in part:

Capital stock outstanding	\$2,882,000.00
Unpaid debt on mortgage bonds amounting to	32,064,000.00
Total surplus for year ending June 30, 1909	4,263,431.50

From which a layman deducts the following:

The 14 proprietary lines have invested an average of \$205,857 in capital stock, assuming that each road has shared alike, while the dear public hold \$32,064,000 in bonds, with a surplus of \$4,263,431.50. A dividend would give each road \$304,531.10, or \$98,674.07 more than the individual roads have invested in the system, and this amount no doubt will be apportioned to the benefits of the roads before the Cotton Belt is admitted into the fold.

From the above figures, which I understand are given to the Railroad and Warehouse Commission by an officer of the association, signed before a notary public, it is not hard to understand why the shipping public demand of the terminal, which is not a feature of the 14 roads, a complete wiping out of the additional charges to and from East St. Louis, both east and west of the Mississippi river.

A comparison with other cities fails to reveal the fact that the terminal charges are as high as at St. Louis, even though they have not the economical advantage of union terminals, neither are they being charged more because millions are being invested in terminals by individual roads. Take, for instance, Chicago: How much more will the Chicago & Northwestern charge for switching after it has invested \$80,000,000 in terminals, or the Pennsylvania Railroad at New York city? The Baltimore

& Ohio and the Pennsylvania Railroad have bridges at Pittsburgh. Do they charge differentials over Allegheny or Alleghany over Pittsburgh? There are three bridges over the Mississippi river at St. Paul, which is ten miles from Minneapolis, yet both towns are on a parity to all points. Perhaps the bridge at Davenport, Ia., cost almost as much as our Merchants' bridge, yet do they exact a toll on the commerce of Rock Island and Davenport?

The reason the joint conference committee, composed of representatives of the municipal assembly and the commercial interests, refused to recognize the independent lines in the meeting with the terminals' interests was because it was not treating about individual rates, such as the coal roads charged, but was handling it as a general proposition; and the independent lines would have nothing whatever to say to the terminal in their final decision, though they, no doubt, would have been consulted with reference to rates on commodities which they transport.

When the question was asked of the railway representatives why the 10 cents per ton on coal was absorbed after being delivered to the western lines by the terminal, they were told by F. B. Bowes, general traffic manager of the Illinois Central, that it was because of competition; and it is the opinion of the writer that the reason of all the differentials not being absorbed is because no competition exists across the Mississippi river at St. Louis, but the continued practice of the imposing this evil on our commerce will bring competition—in fact, it is on the way. It seems that the representatives of the lines of the terminals are not alive to their opportunity of co-operating with the people, and I believe I would not be misstating a fact when I say that just such methods of this kind on the part of some of the railways of this country are what caused the people to put the management of them into the hands of a government commission.

W. E. BEEN.

Chicago, August 17, 1910.

To W. E. Been, Esq.,

Traf. Mgr., Brown Shoe Company,
1610 Washington Ave., St. Louis, Mo.:

I have read with much interest your letter of July 26, which you addressed to W. H. Boardman, president and editor of the *Railway Age Gazette*, and which was in reply to the article by me published in the *Railway Age Gazette* of June 24, entitled "The Terminal Controversy at St. Louis."

You ask, "Why should not Mr. Jones have a clear, logical view of the situation, as he pays the freight?" I assume you mean that the matter should be clearly presented from the shipper's standpoint and that you intended to do this. What the shipper is interested in securing is *good service at reasonable rates*. I undertook to show in my article that the shipper at St. Louis was being given both. You do not controvert this. On the contrary, you evade discussion both of the question of the reasonableness of the rates charged by the Terminal Association and of the question whether those services are worth what Mr. Jones pays for them.

You state that I said that the Terminal Railroad Association is not a monopoly. I said nothing whatever about whether the Terminal Association is or is not a monopoly. The question whether it is an unlawful monopoly is now under determination by the federal courts, which are competent to settle the matter.

You say that all the "fourteen proprietary lines of the Terminal are enjoying switching facilities in the Terminal Association at the price of one," and ask, "Now, why should they not, if they want to co-operate with the shipping public, say 'We will reduce it (that is, the cost of switching) down to 7 per cent. of what it now is'?" A little reflection will show that your assumption that if the proprietary lines did not jointly use the facilities of the Terminal Association each of them would have to provide as large facilities as it now has, is incorrect. No one road for the handling of its own traffic at St. Louis would require anything like as large facilities as those of the Terminal Association. It is quite true, however, that if each had to provide its own facilities the aggregate amount invested in bel- lines by them at St. Louis would be larger. But do you think

it entirely reasonable to contend that the roads, in order to be able to co-operate with the shipping public, must give it all the benefit arising from economical methods of operation. Are the roads entitled to none of the benefit of their own good management? You state that in your opinion "a union terminal system" is a good thing both for the transportation lines and the shippers, provided it is handled in the right way. The union terminal system at St. Louis is giving the shippers of your city as good service as is rendered at any terminal in the country, and better service than is rendered at a great majority of terminals. Ought not shippers to give that fact weight in considering whether its rates are fair?

You make an erroneous statement regarding the Terminal Association's capitalization. You say that by reference to Poor's Manual we find its capitalization is \$50,000,000. What Poor's Manual does show is that the stockholders have authorized its directors to issue \$50,000,000 of stock, but that the amount that actually has been issued is only \$2,882,000, and that the amount of funded debt is \$31,800,000, making a total capitalization, as stated in my article, of \$34,682,000.

You assert that other cities situated similarly to St. Louis are given better rates. Most of the examples that you cite are not apropos, as the conditions at the cities mentioned are not similar to those at St. Louis. The one point among them whose situation is most similar to St. Louis is Davenport, Iowa. Your language implies that no bridge differential is charged there. In this you are wrong. The chief complaint made against the rate adjustment at St. Louis is that the rate on coal to St. Louis from points in Illinois within 100 miles is 20 cents higher than it is to East St. Louis. Now, the fact is that the rates on coal from Illinois mines to Davenport are 5 cents per ton higher than they are to Rock Island, Ill. You will perhaps reply that the differential at St. Louis should be no higher at St. Louis than it is at Davenport. But while the differential of 20 cents against St. Louis applies only on coal originating within a radius of 100 miles, the differential against Davenport applies on coal originating at mines as much as 400 miles distant. The following are the rates on steam coal from a number of Illinois coal fields to Rock Island and Davenport: From the Cable field, 26 miles, to Rock Island, 50 cents; to Davenport, 55 cents. From the Peoria district, 90 miles, to Rock Island, 70 cents; to Davenport, 75 cents. From the Springfield district, 150 miles, to Rock Island, 82½ cents; to Davenport, 87½ cents. From southern Illinois, distances of 290 miles to 375 miles, to Rock Island, \$1.15; to Davenport, \$1.20. This differential in coal rates at Rock Island and Davenport is due to the fact that the coal must be hauled across a bridge before it can be got to Davenport. You say that "Perhaps the bridge at Davenport, Iowa, cost almost as much as our Merchant's bridge." Now, the fact is that the Eads bridge at St. Louis cost \$6,800,000 and the Merchants' bridge \$3,700,000, while the Chicago, Rock Island & Pacific's bridge across the Mississippi at Rock Island-Davenport cost \$1,100,000, of which amount one-half was paid by the federal government. Furthermore, while the average distance the Terminal Association hauls coal moving from St. Louis is about 12 miles, the average distance that coal moves in going from Rock Island, Ill., to points on railway tracks in Davenport, Iowa, is about 2 miles, the maximum haul being about 3 miles. You express the opinion that the reason why all differentials across the Mississippi river at St. Louis are not being absorbed is lack of competition between the carriers there. Why, then, has not the differential on coal been abolished at Davenport, where there is no "terminal monopoly" to complain about, but there is active competition?

You will note that the lowest rate applied on coal moving to Davenport is 55 cents, which is charged for a haul of 26 miles. Now, as you are aware, a flat rate of 52 cents is made to St. Louis for all distances up to 80 miles. On the whole, the adjustment of rates is fully as favorable—if not more favorable—to St. Louis as it is to Davenport.

You remark, "It seems that representatives of the lines in the

Terminal Association are not able to their appointment to co-operating with the people, and I believe I would not be overstating a fact when I say that just such methods of the kind on the part of some of the railways of this country are what caused the people to put the management of them into the hands of a government commission. One would think I am reading this that you were unaware that the municipal assembly of St. Louis created a bridge and terminals commission; that as a result of the co-operation of the railways with this commission reductions in rates amounting to millions of dollars per annum were granted to the shippers of St. Louis, and that the commission resigned because after the railways had done everything it believed they reasonably could be asked to do the city refused to grant them the franchises to which the commission believed they were reasonably entitled. Your reference to the government commission suggests a renewal of the query made by me in the article which you criticized, as to why, if those who complain about the present adjustment of rates are sure of their ground, they do not appeal to this commission.

SAMUEL O. DENNIS.

CRUDE OIL TREATMENT OF TIES.

By E. O. FAULKNER,

Manager Tie and Timber Department, Atchison, Topeka & Santa Fe BAKERSFIELD OIL TIES.

A few Texas, Mexico and Arizona pine trees treated with Bakersfield crude oil in a small experimental plant at our Topeka shops in February, 1902, were placed in track, situated between Cleveland, Tex., and Pelican on the Beaumont division of the Gulf, Colorado & Santa Fe, where, under conditions at that time, untreated loblolly pine ties would not last much over 18 months, nor longleaf much over two years. The ties and treatments were as follows:

For Seasoned Ties, Treated with Bakersfield Crude Oil at Topeka, August, 1901, and Inserted in Texas Experimental Track in February, 1902. No Steaming or Vacuum Absorb of Oil Impregnations.

Tie No.	Timber.	Pressure.		Gain, lbs.	Per cent. oil used.	Temp. of oil used.
		Lbs.	Hours.			
139	Arizona, sawn.....	150	6	28	32.4	
140	New Mexico, hewn.....	150	6	66½	49.3	204° F.*
141	Texas, hewn.....	150	6	17½	23.0	
168	Arizona, sawn.....	160	6	26½	25.8	209° F.*
169	New Mexico, hewn.....	160	6	8½	10.2	
170	Texas gum.....	160	6	30	26.3	210° F.*
171	Texas, hewn.....	155	5	62½	59.0	
172	Texas, hewn.....	155	5	62	70.0	
173	Texas, sawn.....	155	5	13	13.8	
174	Texas, sawn.....	155	5	29½	34.7	190° F.*
175	Texas, sawn.....	160	3½	21	21.1	
176	Texas, sawn.....	160	3½	46	48.7	
177	Texas, hewn.....	160	3½	51	60.0	
178	Texas, hewn.....	160	3½	82½	86.0	

*Taken out for test.

Examinations and reports of these ties have been made from time to time, the last a few weeks ago, when all were found in excellent condition, with no signs of decay; in fact, they are likely to come out for mechanical wear (rail cutting) before they do for decay. They have now been in the track eight years and three months, and are in apparent better condition than a number of the other treated ties alongside them. Nos. 140, 169 and 175 were taken out for testing purposes, being sawn in the middle and again under each rail base to examine the interior of the wood, which, in every case, was found perfectly sound. No. 169 took only 8½ lbs., but it was a heart tie; those taking the smaller quantities in each case were ties with large heart sections, the others being either hewn loblolly or New Mexico pines. These ties have already lasted more than four times the life of untreated ones, and the end it not yet. The exposed portion of each tie is completely enveloped in a coating of asphaltum, which seems impervious to air and moisture; it is not so hard as to break off, but when pierced seems to close up again like rubber. When sawn, the sap wood has been found filled with the oil, and the heart wood apparently as sound as when treated; spikes seem to hold well, and on being drawn were bright in color and clean.

At the same time there were treated at Somerville 100 longleaf and 90 loblolly pine ties, first, with 2 per cent. solution of zinc-chloride, followed by a dipping for twenty-four hours in Beau-

mont crude oil. An average of 3.49 lbs. of oil per tie in the longleaf and 3.15 lbs. per tie in the loblolly was taken up in each case, about 1 lb. to the cu. ft., the ties, in other words, only painted with oil. The longleaf, at the last examination (September, 1909), were all in track, but 10 showed decay, and all the loblolly were also in track, but 11 showed decay. In addition to these, 100 longleaf and 42 loblolly pine ties were dipped for twenty-four hours in Beaumont crude oil, without other treatment, by which the longleaf showed 5.67 lbs. and the loblolly 4.24 increase in weight per tie. Of these 70 longleaf were taken out in 1906 for decay, and at the September (1909) examination only three were found sound and 27 more or less decayed, while of the loblolly 40 were taken out in 1904 and the remaining two since then on account of decay; in other words, they lasted somewhat longer than untreated ties would have done. These cases are mentioned because they have been quoted as instances of ties treated with crude oil giving poor results, whereas they were only painted and could not in any sense be termed treated ties. To make it worse, the loblolly were only partially seasoned when dipped.

A number of untreated white oaks, red oaks and other kinds of ties were placed in the same track, and the result is here given. These were put in for comparison between the life of untreated ties and those of the different treatments, under similar conditions of service, etc.:

Untreated Ties Laid in Texas Experimental Track, April, 1902, for Comparative Purposes.

196 White oak, 147 removed by 1908, rotten; only 13 sound ties now in track.
177 Red oak, and ties of that family; all out in 1905-6-7 and 9, for decay.
49 Tamarack, all out in 1905, decay.
100 Beech, all out in 1905 and 6, decay.
101 Hemlock, all out in 1904, decay.
100 Shortleaf, all out in 1904-5-6 and in 1910 (1), decay.
100 Loblolly, all out in 1904, decay.
93 Longleaf, 86 out in 1904 and in 1908, for decay; only 6 left, and these are decayed and will come out soon.

In 1906 the result of the crude oil test was so encouraging as to warrant others on a larger scale, so a number of ties were treated in our experimental plant at Somerville with the Bakersfield oil and 200 were sent to the Tampico Branch of the Mexican Central Railway, where untreated Mexican pine ties would have to be taken out for decay in about 12 months. These were placed in the track in June, 1907, and when I saw them last (February, 1910) they were all in excellent condition, looking fully as well as when laid. The ties sent and the treatment of each is as follows:

	Absorbed average, Lbs.
100 Texas sawn pine.....	25.6
40 Texas hewn pine.....	51.0
10 Texas sawn gum.....	18.7
10 Texas hewn gum.....	37.5
10 Texas red oak.....	19.2
10 Oregon fir.....	4.7
10 Beech.....	22.7
5 New Mexico sawn pine.....	24.2
5 New Mexico sawn pine.....	33.1

290

It is the intention to make an inspection of these once each year. Of those treated at the same time a number were placed in our own track on the Beaumont Division, which are still there.

EBANO OIL TESTS.

As the distance is too great to bring any large quantity of oil from Bakersfield, and a similar quality is found at Ebano, near Tampico, a carload was imported in 1908 and a number of Texas pine and gum ties were treated in various ways and with different pressures. While this oil is reasonably similar in its analysis to the Bakersfield oil, we were not able to get as good penetration with it. This became more noticeable later on in the experiments on account of having to keep the small quantity of oil at high temperature for each treatment (the lighter oils presumably going over in the meantime). The same heating seems to a lesser extent, however, in using other oils, and the thickening of the Ebano oil might not be so noticeable when largely used, as the larger supply on the average tank would be kept at lower temperatures than that in the working tank; it would, however, be hard to handle in two pipe lines. In any event, there does not appear to be much

prospect of getting a supply for general use, as the oil company has placed its entire output for the present, and in its other field the oils are said to be of a lighter gravity.

When it became difficult to handle successfully we tried to reduce the viscosity by mixing it with Texas fuel oil, but the two did not combine. A mixture was then tried of two parts oil and one part creosote, with excellent results, the two assimilating very well, and with this mixture the difference in penetration was clearly apparent. Later on a mixture of three parts Ebano and one of creosote was tried, but the result was not so good, and we had to go back again to the two and one part mixture. To show the difference in the handling of these oils the relative viscosity is here given of each at 200° F., using water as a basis and calling it 100. Beaumont crude oil would be about the same as creosote, being a trifle less viscous than residuum No. 1.

Water.....	100 (60 F.)
Creosote.....	100 (200 F.)
Residuum No. 1.....	82 "
Bakersfield.....	25 "
Ebano.....	10 "

There are 463 ties treated with Ebano oil alone, and 160 more with the oil and creosote mixture; marked with special nails, identifying each tie and treatment in the experimental track. It should be several years before anything is heard from them, although they will be inspected from time to time, and as anything worthy of note shows up a report will be made. There seems no reason why Ebano should not be as good for preservative purposes as Bakersfield oil if the viscosity can be reduced somewhat. When it becomes apparent that a regular supply can be obtained at a satisfactory price, we can consider its use on a large scale. The National of Mexico is now using it exclusively in its plant at Aguas Calientes.

The following is a detailed analysis of the three oils made by our chief chemist, which shows that while there is not much difference in the distillation fractions, yet the viscosity tests are widely apart. It follows, therefore, that we can get almost as good penetration with the Residuum No. 1 as with creosote, and a better one with the Bakersfield than with the Ebano:

	field.	Ebano.	Residuum No. 1.
Flashes in closed tester, degrees F.....	256	175	186
Flashes in open tester, degrees F.....	268	190	210
Burns in open tester, degrees F.....	300	230	286
Degree Baume at 60° F.....	11.9	12.1	20.3
Specific gravity at 60° F.....	.9867	.9849	.8959
Distilling tests using retort:			
From 0° C to 100° C, per cent.....	...	...	...
From 100° C to 150° C, per cent.....	...	2.0	Trace.
From 150° C to 300° C, per cent.....	15.0	20.1	24.1
Evaporation tests in open dishes placed in air oven:			
At 140° to 150° F, and oil 1/4-in. deep:		Per cents. evaporated.	
In 24 hours.....		2.8	6.8
In 96 hours.....		4.6	9.4
At 200° to 210° F, and oil 1 in. deep:			
In 24 hours.....		4.8	9.8
In 96 hours.....		11.5	11.4

Viscosity tests using Scott's viscometer in which 900 c.c. oil is put in the viscometer and the number of seconds required to deliver 50 c.c. through a small orifice is recorded. Standard for this machine is 11 seconds for 50 c.c. distilled water at 60° F:

	Seconds per 50 c.c.			
	Creosote.	Bakersfield.	Ebano.	Residuum No. 1.
At 100° F.....	1,365	3,000	37.5	
At 150° F.....	298	339	17.0	
At 200° F.....	11.0	44.5	11.0	13.5
At 220° F.....		31.5	7.0	12.5
At 250° F.....		22	49.5	11.5

Viscosity of oils after approximately 10 per cent. was volatilized:

	Seconds per 50 c.c.			
	Creosote.	Bakersfield.	Ebano.	Residuum No. 1.
At 100° F.....	368	1,800	22	
At 150° F.....	11.0	104	132	15
At 200° F.....		60	200	14
At 250° F.....		34	125	12

Residuum No. 1 is made from an asphalt base crude oil from which only the illuminating oils are taken off, while other refineries having this same grade of oil, after taking off the lighter ones, generally heat the residuum to a higher temperature in order to get a lubricating oil. In doing so a part of the remaining residuum is converted into free carbon, which prevents its being used for preservative purposes, on account of choking up the wood cells.

CRUDE OIL AT ALBUQUERQUE

As a result of the 1901 test with Bakersfield crude oil, when the Albuquerque Treating Plant was finished in March, 1908,

we started treating with it by the full cell process, but could not get satisfactory penetration in the case of red spruce. These are the most durable and lasting ties we get in the Rocky Mountain district, and we thought it best to take no chances with a light treatment of crude oil until we knew more of the results from actual use, and since then have been treating them by the Rueping process, leaving in about the same amount of creosote per cu. ft. as in Texas longleaf. We have treated all other hewn and floated sawn ties with crude oil, and they are beginning to make their appearance very generally in the track, being usually recognized by the asphalt coating over the exposed portion of the tie. The sawn pine ties treated with crude oil include a number of those from the Santa Barbara grant, which are floated down the Rio Grande; their soaking a few weeks in the water making an appreciable difference in oil absorption, once the ties are again seasoned.

Other sawn ties, from Arizona, have a variable quantity of sap, and some exposed heart on one or more sides, the sap in many cases being close grained on account of slow growth. As the oil goes very little into the heart wood, it seemed as though we were not getting as deep penetration or treatment as we should, and in some of the ties an additional safeguard was deemed advisable to supplement the crude oil. As a result of tests, it was proven that creosote and this crude oil, although of different specific gravities, would stay perfectly mixed in bulk a sufficiently long time for all practical purposes, so we used a mixed treatment with this class of tie, using 30 per cent. creosote and 70 per cent. crude oil. This has given good results and in addition helps to keep down the temperature of the crude oil, which needs to be heated higher than creosote in order to increase its fluidity for penetrative purposes. Dry heat seems to affect the wood at certain temperatures more than steam heat does at higher ones, and the wood being thoroughly air seasoned prior to treatment, I believe the temperature of the oil used should be less than 200° F., as otherwise the exposed portions of the ties are likely to become brittle and susceptible to rail cutting.

Prior to treatment, the ties at this plant have been sorted over and those which it was believed could be satisfactorily treated with crude oil were handled in that way, while those which could not were given either the mixed treatment or the Rueping, the object being to get the best results in the end.

From March, 1908, to December, 1909, inclusive, we treated at the Albuquerque plant the following ties:

By crude oil treatment.....	801,399 or 85.8 per cent.
By Rueping creosote treatment.....	109,850 " 11.5 "
By mixed.....	23,147 " 2.5 "
Total	934,496

*30 per cent. creosote, 70 per cent. crude oil.

And for the fifteen months ending March, 1910, the average absorption and cost under the various treatments was as follows:

Pine Ties and Crude Oil Treatment Process.

No.	Class of tie.	Cu. ft. per tie.	Oil, per tie, lbs.	Total cost of treatment, per tie.	Cost, per cu. ft., cts.
No. 1	hewn.....	4 to 4½	56	14½ cts.	3.6
" 2	".....	3	46	11½ "	3.9
" 1	sawn.....	3½	54	12½ "	4.0
" 2	".....	3	36	11½ "	3.8

Red Spruce Pine Ties—Mixed Treatment Process.

No. 1	hewn.....	4	18.6	26 cts.	6.5
" 2	hewn.....	3	15	21½ "	6.0
" 1	sawn.....	3½	16.8	18½ "	5.2

Pine Ties Mixed—30 Per Cent. Creosote and 70 Per Cent. Crude Oil—Full Cell Process.

No. 1	sawn.....	3	46	16 cts.	5.3
-------	-----------	---	----	---------	-----

Prices are based on creosote at 8¼ cents per gallon and crude oil at 1½ cents per gallon. The cost per cu. ft. is shown on account of the variable average size of ties in order to give a fair comparison. The cost of No. 2 hewn Rueping ties is a little over the average on account of excess creosote oil left in ties in some of the months.

In the full cell process we fill the cylinder with ties, close doors and admit oil until cylinder is completely filled; adequate pressure is then applied until the necessary absorption is obtained, after which the oil is let out of the cylinder and a

vacuum applied to stop the drip before the ties are drawn out of the cylinder.

In the Rueping process the cylinder is filled with ties, doors closed, and air pressure applied varying with the class of ties, the same pressure being placed on the oil in an elevated tank connected with the impregnating cylinder. Oil is then transferred from the elevated tank to the impregnating cylinder, and when the latter is full, valve is closed and pressure applied to fill the tie with oil. The pressure is then released and oil withdrawn, the air plug in wood cells expanding, which forces surplus creosote out of the cells, a vacuum being applied to aid in this work.

In the mixed process, the creosote and crude oil, both well heated, are put in same tanks and kept thoroughly mixed, especially before commencing treatment, the work then following the full cell process. Our crude oil ties are reasonably clean after treatment, and no complaints are made by the men in handling them.

The quality and viscosity of this oil as compared with the others is shown in the analysis above. We obtained a tank car for testing, and as may be gathered from the analysis report, obtain excellent penetration, practically as good as could be obtained with creosote. It is unfortunate, however, that the supply is small.

The tests were all by the full cell process, with various pressures and times, on about 400 ties, which, except for a few kept out for weighing tests, are in the experimental track properly marked for identification. We also have a second tank car load now at Somerville with which to continue certain other tests.

We do not claim crude oil to be an antiseptic like creosote, its value as a preservative so far as at present known being the extent to which it permanently and effectually fills the wood cells, and prevents moisture entering, in contact with air and heat. To determine to what extent this was the case we took some loblolly and long-leaf air-seasoned pine ties, which in each case were given the usual treatment of the class, and not specially prepared in any way, carefully selected for uniform size, sap wood, etc., so that when cut each piece would be similar as far as possible for purpose of comparison. The following tests were then made:

TO DETERMINE WATER ABSORPTION IMMEDIATELY AFTER TREATMENT.

Hewn ties, air seasoned, cut in pieces, then each weighed and treated with oil as noted; after weighing, each piece was soaked in water for 120 days, then weighed to determine the extent of water absorption through the treatment; the ties treated with crude oil being in each case by the full cell process, and the Rueping with creosote approximating 4.8 lbs. to the cubic foot.

Texas Long Leaf Pine.

	Oil taken up, lbs.	Per cent. inc. in weight.	Water taken up, lbs.	Per cent. inc. in weight.
Residuum No. 1.....	8.5	44.7	2.0	7.3
Bakersfield oil.....	7.5	38.5	4.0	14.8
Ebano oil.....	7.0	60.7	2.5	8.9
Rueping creosote.....	8.0	14.3	3.0	12.5
Untreated.....			10.5	51.2

Texas Loblolly Pine.

	Oil taken up, lbs.	Per cent. inc. in weight.	Water taken up, lbs.	Per cent. inc. in weight.
Residuum No. 1.....	12.5	62.5	2.0	6.2
Bakersfield oil.....	15.0	77.0	3.5	10.1
Ebano oil.....	15.5	77.5	2.0	5.6
Rueping creosote.....	8.0	14.3	9.5	39.6
Untreated.....			18.5	86.0

In the Rueping treatment, by coincidence, the pieces of long-leaf and loblolly each weighed the same before and after treatment, thus taking the same quantity of oil in each case, but in the soaking the longleaf piece increased only 12½ per cent. in weight as against 39.6 per cent. in the loblolly, due, of course, to the difference in sap wood.

In order to determine the influence the quantity of oil absorbed by the tie had in preventing water penetration afterward, two loblolly air-seasoned ties were cut in four equal pieces, weighed, and then treated with each kind of crude oil, one set being given a heavy treatment of oil and the other set a light one, weighed and soaked in water as before, and at the end

of the period noted, weighed each one again, with the result here shown:

	Oil absorbed, lbs.	Per cent. gain after treatment.	Soaked No. days.	Gain in weight, lbs.	Per cent. of gain.
Loblolly tie.					
Full cell—Light	15.5	18.7	120	10.5	30.0
Full cell—Heavy	15.5	60.0	120	2.5	5.3
Beaumont—Light	6.0	18.9	130	13.0	34.4
Beaumont—Heavy	18.0	47.9	130	3.5	7.3
Residuum, No. 1—Light	6.0	14.6	133	6.0	12.8
Residuum, No. 1—Heavy	15.5	44.2	133	5.0	9.9

In order to determine the effect of time and evaporation in proving the value of each oil as a means of keeping air and moisture out of the timber, one longleaf and one loblolly pine tie, each well air seasoned, was cut into five pieces and treated as shown, then air dried for 168 days, after which they were soaked in water for 112 days, then taken out, weighed and put back again for a period, making the entire soaking one year and twenty-four days:

	Initial weight, lbs.	Oil absorbed, lbs. per tie.	Loss of weight, lbs. per tie.	Gain in weight by soaking, lbs. per tie.	112 days, lbs. per tie.	24 days, lbs. per tie.
Rup. Creo.	24.5	2.5	10.2	1.5	5.6	4.5
Full cell:						
No. 1 Res.	27.5	8.0	29.1	1.0	2.8	2.5
Ebano	22.0	3.0	13.3	3.0	12.0	5.5
Bkfd.	25.0	5.5	22.0	3.0	9.8	5.0
Untreated	23.0			7.0	30.5	9.5
Rup. Creo.	19.0	4.5	26.7	0.2	8.0	34.8
Full cell:						
No. 1 Res.	21.0	11.0	52.4	1.5	4.7	3.0
Ebano	19.5	17.5	89.1	3.0	8.1	3.5
Bkfd.	20.0	14.5	72.5	0.5	0.1	3.0
Untreated	30.5			5.5	18.0	8.0

It must be admitted that these tests were extremely severe and under conditions not to be found in ordinary service, yet the three crude oils show up remarkably well. The Rueping being a "cell wall" treatment, it must be expected that the evaporation and absorption of water would be heavier than where the wood cells were filled.

The second test proves the advisability, so far as we know at present, of using a heavy treatment to fill or close the wood cells as far as possible. It may, of course, turn out that a "cell wall" process, leaving at the same time an ample supply of oil in the wood, will prevent decay to an equal extent with a "cell wall" creosote treatment, but this has yet to be proven and I think it would be unwise to do more than test the matter at this time, then watch developments. The Mexican Central a year or so ago, as a result of our experience, abandoned the Wellhouse process and started treatment with Ebano crude oil. For a short time they used a Rueping treatment with about 6 lbs. to the cu. ft., but since then have dropped this and are now using the full cell, with an absorption approximating our own.

We expect to continue our experiments with these crude oils mixed with different proportions of creosote, giving a heavy cell wall treatment, try more air and soaking tests and also treat some ties by the "cell wall" process with crude oil only and put them in the track alongside the others, also place some of them in a fungus pit, to judge by the results. I should be slow in advocating the adoption of any light crude oil treatment until conclusive proof is obtained of its value, the difference in the cost of a light and a heavy absorption, as compared with the value of the tie in the track, being too small to run any risk.

In the third test there is evidently an error in the initial weight of the loblolly Rueping piece, as it would certainly lose more in the seasoning than is shown. There may also be a slight error in the Ebano, as 3 lbs. is more than might be expected, with other experiences of this oil in mind. In every case the loss by evaporation of these asphalt base oils has been small, this feature adding to their value for our purposes, as it materially helps in preventing the entrance into the wood of what otherwise might start decay. The gain in weight in the 112 day soaking period was practically alike with each crude oil, and even with the thirteen month test in the loblolly tie there is not an excessive difference. In the longleaf, No. 1 Residuum shows up the best, followed by the Bakersfield.

Some time ago we gave an order for some Oregon pine creosoted ties to the Creosoting Company at Seattle, the com-

tract requiring them to show an average actual penetration of creosote, five-eighths of an inch deep on the four sides, midway between ends. They were for testing purposes and, as it must be remembered, these ties are all heartwood, a penetration equal to that obtained in sap ties could not be expected, and further, that under the rail base where the wear and spiking comes, the depth of oil would be greater by reason of penetration from the ends. When in Seattle a month ago I suggested to the treating company that they get some Bakersfield crude oil and try a mixture such as we use at Albuquerque, say one of creosote to three of crude oil, in order to reduce the cost and viscosity, and increase the penetration. They since write me they have had excellent success with their tests and have already gotten an increased penetration, so that I hope they will soon be able to guarantee us an inch between the ends, which is as much as one could expect with these ties, and the cost of such a treatment with creosote alone would be too great for ties with cut spikes.

So far as our experience at present goes, this mixture is economical as against the Rueping (cell wall), where the price of creosote is high and crude oil low, taking the quantity absorbed and the character of the timber into consideration. It will be all right on the Pacific Coast, or in New Mexico, but not in Texas until it has been proven that a full cell treatment is not necessary, and I am not ready now to suggest an adulteration of our creosote under the Rueping method. We expect still to continue our tests, but no change will be recommended until we are sure of our conclusions. If the Rueping gives us the life claimed for it we will have received good value for its cost.

The tests with Residuum No. 1 and Ebano showed an average absorption with the full cell process on loblolly ties of:

Residuum No. 1.....	56.1 lbs. per tie = 7½ gallons.
Ebano	10.2 lbs. per tie = 1 gallon.

After the success with Residuum No. 1, which, although almost as fluid as water, yet remained in the wood and stood all other tests equally as well, if not better than the others, we made a number of tests with ordinary Beaumont fuel oil and some with another residuum, called No. 2. The thorough mixture of these with creosote for a time much beyond our extreme period of treatment was complete, several analyses made before treatment, in the middle of it and at the end showing no perceptible difference over possible errors in the making. Their analysis, as compared with Residuum No. 1, considered a first class oil for our use and with creosote which we know all about, is as follows:

	German creosote.	Residuum No. 1.	Residuum No. 2.	Beaumont oil.
Sp. gravity at 15° C.	1.071	0.889	0.885	0.891
Up to 210° C., per cent.	4.9	0.0	6.2	4.3
210 to 235° C.	23.3	0.0	6.2	5.3
235 to 315° C.	51.0	6.5	29.1	35.2
Residue	21.2	93.5	58.1	55.1
Total	100.4	100.0	99.6	100.1

We have a number of ties treated with each of the last two oils mixed, some three to one, and some two to one, of creosote, and it might be expected that, being as liquid as water, the penetration was complete. The cost, however, of using them this way by the full cell process is out of the question until we have had more experience in the result obtained in service, the three of Beaumont oil to one of creosote costing 50 per cent. more than for the Rueping treatment on same class of ties.

The average absorption of the mixed treatment with Beaumont crude oil was as follows:

Loblolly pine, average per tie, full cell process	66 lbs.
Shortleaf	49
Longleaf	38

Cost, therefore, of treating (oil only) with one part creosote and three parts Beaumont crude, in mixture, as compared with crude oil alone would be:

	With the mixture, lbs. cost in cents.	With crude oil alone, lbs. cost in cents.
Loblolly	66	66
Shortleaf	49	49
Longleaf	38	38

On Texas pine ties (31 cu. ft.) average, of Loblolly 60 per cent., Shortleaf 28 per cent. and Longleaf 12 per cent., and our Rueping average creosote treatment for pine ties, 1909, was

16.07 lbs. to the tie, therefore the cost and comparison of the two treatments would be:

Resurfacing for oil and creosote.

Mixed treatment, as above.

Resurfacing of alone, as above.

Above cost is based on creosote 88 lbs. to gallon at 7 1/4 cents and crude oil 7 1/2 lbs. to gallon at 2 1/4 cents. Of course, the first is only a "cell wall" treatment, while the others fill the tie entirely so that all moisture, etc., is kept out, but the actual value of each in the track has yet to be determined.

After laying the ties treated with this mixture in the sun for five months to determine any loss in weight from evaporation, the result was surprising and compares very favorably with the other oils so far considered much its superior. The Beaumont oil is generally termed a light oil and subject to heavy loss by evaporation, yet the loss in using it in a mixture of two to one was only 1.93 lbs. per tie, or 4 per cent.; with three to one 2.8 lbs. per tie, or 5 per cent.; and with Residuum No. 2 (two to one) 2.3 lbs. per tie, or 4 per cent. We expect to make a number of further tests with these oils, at same time using the fungus pit to get an idea of the relative protection in each case, and while this must not always be taken as conclusive, yet it furnishes some indication of what we may expect in the track after years of service and exposure, allowing, of course, for certain conditions not found in either case.

When we started issuing crude oil ties the superintendents and roadmasters were quite nervous about fire risk, but it is never mentioned now and the records show no greater loss by fire than before. In my opinion, there is less danger with crude oil than with creosote, and with this latter it has been proven that once the tie becomes well dried out, the untreated wood will burn easier and quicker. In the crude oil used there is usually so little illuminating oil it quickly goes off, probably in the heating, and leaves only the asphalt base. I recently learned that one of our superintendents made a test to satisfy himself on this point when he first began receiving crude oil ties, by having a mountain freight engine's fires cleaned where there were some crude oil, creosoted and untreated ties lying alongside each other in the track; the result was that the crude oil ties were only scorched, the creosoted ones to a heavier extent, while the untreated ones would have been destroyed had the men not put out the fire.

Shortly after the crude oil ties went into use we had complaints about their rail cutting and not holding spikes. It must be expected that if ties completely filled with oil are laid in the track as soon as they come out of the plant, there will be some trouble of this kind, just the same as though the tie was soaked with water. If the treating is properly done, the temperatures kept within reasonable bounds and the ties not put into use until after they are seasoned, there should be no cause for criticism. All that we ask is that the treatment be given a fair show.

In some tests made on our crude oil ties by the government engineers, they claimed a heavy difference in compression against the grain, as compared with untreated wood, but on investigation I learned that in order to get the thick Ebano oil into the wood towards the close of the treatment and before we reduced the viscosity by mixing it with creosote, our Somerville people treated these test ties under a temperature of 210°F. for some hours, which, in the case of seasoned wood and of soft pines, is too high for good work, as at Albuquerque we do not use over 192°F. Even with full cell creosote treatment, a reduction in strength is noted. Further tests will be made with crude oil ties treated at the usual temperatures, and those in the track watched for results as compared with other treatments generally used.

TIE SPACER.

BY F. B. TAPLEY,

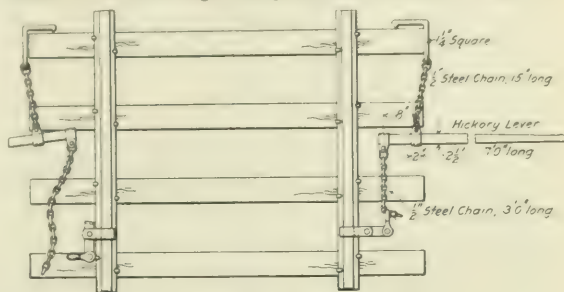
Resident Engineer, Canadian Pacific, District No. 1, Atlantic Division.

In relaying rail on maintenance of way work it is often necessary to respace the ties at the joints and shoulders, especially where rails of light section in 30-ft. lengths are being replaced by heavier ones in 33-ft. lengths, and particularly in localities

where rails have a tendency to creep. Where creeping occurs to any marked degree the ties are generally pretty well equal to the track. The usual method in respacing ties is to use lining bars, digging the ballast out in front of the ties and shoving them forward with the bar.

This method is not only slow and expensive but has the disadvantage of leaving the ties slack in the ballast, so that low spots in the surface occur and make rough riding track. It is often necessary to go over track two or three times, where the ties have been spaced in this manner, tamping up and resurfacing before a solid roadbed and smooth riding track is obtained.

To overcome this one of the roadmasters on this division, J. A. Miller, worked out and built the tie spacer illustrated herewith. The drawing shows the spacer set up on the rails. The clamp is fitted over the head of the rail, the jaw grasping the web as the chains are tightened. The hooks are placed in the tie to be spaced and the chains set up taut in the grab-hooks. Two men are put on each lever and the tie is pulled along the bottom of the rail flange and spaced to the required distance.



Miller Tie Spacer.

It is sometimes necessary, when the ties are badly bunched, to dig out one tie in each rail length to start the machine, but under ordinary conditions it is not necessary to do so. This machine not only pulls the tie along the bottom of the tie without disturbing the solid ballast underneath, but it lifts it about 1/2 in., leaving the track a trifle high to be put down to place by the first train and making resurfacing unnecessary.

The drawing shows the rail clamp built to work on top of the rail. It can be built to work on the bottom, but this is not so handy and requires longer chains, making the machine more burdensome to move. This machine is an inexpensive one to build and is a great time saver. It requires four men and a foreman to run it.

Where the gravel is not too coarse or where cinder ballast is used the machine is an efficient worker. Where gravel containing large stones is met with the spacer does not work so well, as these large stones have a tendency to make the ties cant or roll over when being spaced. The machine has never been tried in broken stone ballast, and it is doubtful if it would work satisfactorily in such ballast.

CLEARANCES AND GRADE SEPARATION.*

BY W. H. BREITHAUP,†

Member Canadian Society Civil Engineers.

The physical laws for grade separation are two:

1. The structure carrying the upper line of traffic must be sufficiently high above the lower traffic way to clear all objects passing on the latter.
2. The grade on either traffic way, approaching the crossing, must be practicable for the traffic thereon.

The maximum height of loaded vehicles and any objects thereon on city streets or country highways has been accepted as 14 ft. This height is also sufficient to clear regular street rail-

*From a paper read before the Canadian Society of Civil Engineers in March, 1910.

†Official Railway Equipment Register

way traffic. While higher objects are moved along roads occasionally, it is properly not considered necessary to endanger the practicability of crossings under railways to accommodate them.

The vertical clearance, top of rail to bridge, required over railway tracks is in most cases much higher than over roads, and this constitutes, in the great majority of cases, the insurmountable obstacle to grade separation. There are, at the present time, on the railways of standard gage in the United States, Canada and Mexico, about 2,377,282 freight cars of all kinds. They classify as to height, rail to running board, as follows:

Under 12 ft., including flat, gondola and tank cars.....	63.1	per cent.
12 ft. to 13 ft.....	23.4	"
13 ft. to 13 ft. 6 in., inclusive.....	11.9	"
13 ft. 6 in. to 14 ft.....	0.65	"
Over 14 ft.....	0.95	"

Of the total number of freight cars 98.4 per cent. are 13½ ft. high or under, and only 1.6 per cent. are higher than 13½ ft.; and less than 1 per cent. higher than 14 ft.

Considering the largest lines, the Pennsylvania Railroad, the Baltimore & Ohio, the Erie, the Lehigh Valley, the Great Northern, and a number of others, i. e., as far as known, with a small percentage of cars having dimensions not ascertained, among the latter the Grand Trunk and the Canadian Pacific, have either none or less than one-quarter of 1 per cent. of freight cars over 13½ ft. to running board.

The Master Car Builders' Association has not fixed a standard for box car dimensions, but adopted in 1904, as recommended practice, a height of 12 ft. ¾ in. to eaves, equivalent to less than 13 ft. height to running board. High standard cars are such as the Grand Trunk Pacific Series 300000—310824, 13 ft. 4 in., and the Canadian Pacific new steel frame box car Series 130000—132998, 13 ft. 4¾ in. The highest regular Canadian Pacific freight cars are 13 ft. 6 in. to running board, and this may be said of most of the main trunk lines of railways. The highest Pennsylvania Railroad freight cars are 13 ft. 4 in.

Limits of car dimensions are fixed by clearance outlines on the various railways. A composite clearance limit diagram for ninety railways,* including all Canadian trunk lines, has a height of 14 ft. 6 in., limiting "over all" height of cars to this figure and practically limiting height of top of running board of freight cars to 14 ft. In the St. Clair tunnel of the Grand Trunk the clearance height at width of 3 ft. is 14 ft. It is true that on many divisions or branches of the lines considered the clearance is somewhat greater than shown in the composite diagram referred to, while on the other hand, it is less on a number of main lines and on many branch lines.

An empty freight car 14 ft. high on a 5 ft. transverse base (out to out of rails) will not resist a 30-lb. wind pressure when standing alone.

The limit of grade, approaching crossings, can for railways be taken as between 0.5 of 1 per cent and 1 per cent. For city streets a grade of 5 per cent. is in most cases extreme and it should be so for main country highways. A preferable maximum grade for roads is 4 per cent., and 3 per cent. is materially better. This works out as follows:

Five per cent. grade $20 \times 2 = 40$ ft. length of approaches for every vertical foot of clearance.

Four per cent. grade $25 \times 2 = 50$ ft. length of approaches for every vertical foot of clearance.

Three per cent. grade $33 \frac{1}{3} \times 2 = 66 \frac{2}{3}$ ft. 8 in. length of approaches for every vertical foot of clearance.

Any gain, by curtailment of vertical clearance requirement, or by change of railway grade, or by both, means corresponding shortening of road approaches at the high ends. Such a gain of 1 ft. in grade reduces the cost of a given grade separation, making it practicable when it would not otherwise be so. A vertical gain of 2 ft. would mean a very large addition to the number of practicable grade separations.

The extreme allowance that should be made for brakemen on a car must not exceed 7 ft.; 6 ft. 6 in. will clear any brakeman unless he should be over 6 ft. tall, and 6-ft. brakemen are not

common, to say the least. What is to be said for the contention, seriously made, that the brakeman on the running board of highest known car should be allowed room to swing his lantern over his head? The necessity for brakemen on the tops of cars is becoming less and less, and has in many cases disappeared, rules and regulations of railway companies to the contrary notwithstanding. The air brake is now universally used in main control trunk line railways in the older parts of the United States.

The Pennsylvania Railroad makes it a rule to avoid all grade crossings on new work, and has within the last nine or ten years eliminated over 50 per cent. of all its grade crossings on main lines. To do this clearance must be made as low as possible. Overhead bridges are as low as 16 ft. 6 in. above top of rail, while many are 18 ft. 6 in. and less. Twenty-one ft., the standard for signal bridges, is recognized as the highest clearance for which there can be any need. In New York state many overhead bridges are only 18 ft. above the top of rail, and this is the case also in Massachusetts and in other states. The New York Central & Hudson River has asked for 16 ft. or 16½ ft. clearance for all overhead bridges within the electric zone, extending 16 miles from the Grand Central Station in the city of New York.

It is submitted that with conditions as they are and more so with regard to the future, 20 ft. (13½ ft. for car and 6½ ft. for man) is a reasonable vertical clearance. It has been shown that 13½ ft. covers the height to running board of all but a very small percentage of freight cars now in use, and that cars higher than 14 ft. to running board, i. e., higher than 14 ft. 6 in. "over all," or to top of brake rod, can only to a limited extent traverse beyond their home railways. That higher cars will be economical or practicable is as little probable as that the gage of railways will be widened or their entire structure changed. For a vertical clearance requirement greater than 21 ft. (14 ft. plus 7 ft.) there can, in any event, be no conceivable rational need.

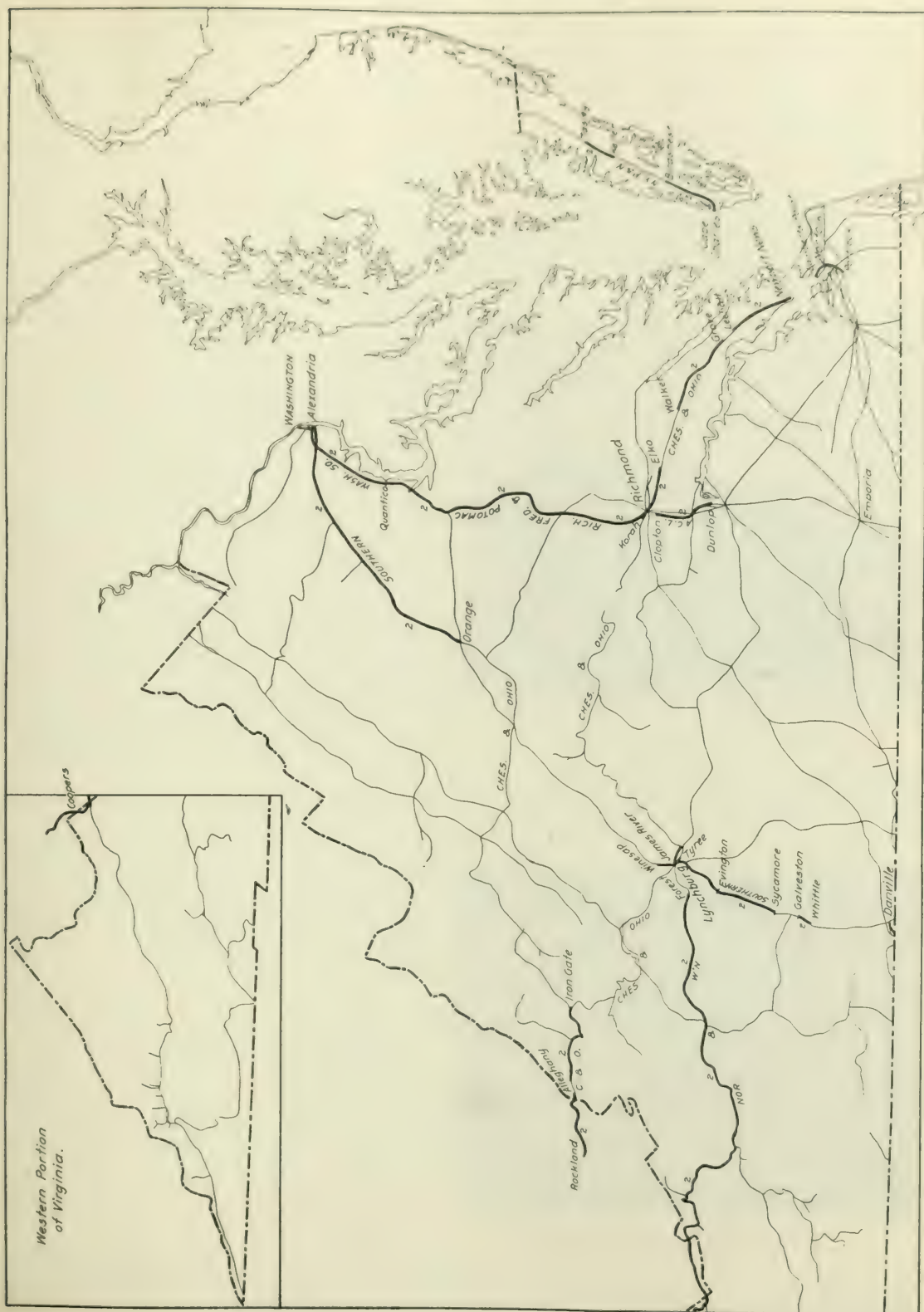
In the United States there is no federal law fixing vertical clearance for bridges over railways. A number of states deal with the question. In Massachusetts there is a special grade crossing commission. The minimum clearance required by this commission is, in general, 18 ft. Connecticut and Rhode Island also specify 18 ft. In New York the Public Service Commission has charge of grade crossing regulations. While this commission requires 21 ft. clearance where practicable, many lower bridges are built throughout the state; some, as already stated, are as low as 16½ ft. New Hampshire, Ohio and Indiana require 21 ft. The only states requiring more are Illinois and Vermont, where 22 ft. is specified, but exception is made where this height is not practicable. In all other states there is no statute or regulation, as far as has been ascertained, and heights of overhead bridges vary from 16 or 18 ft. to 22 ft.

In Canada the Dominion Railway Act of 1904 specifies a minimum clearance of 22 ft. 6 in. above rail level (allowed to mean base of rail) for bridges over railways, with no deviation except by leave of the Board of Railway Commissioners; and this board has hitherto not allowed a deviation in any case.

DOUBLE TRACK RAILWAYS IN VIRGINIA.

The map given herewith shows all railways in the state of Virginia on which there are two or more main tracks. The termini of the sections having more than one track are as follows:

VIRGINIA.		No. tracks.	Approx. miles.
Choptank to Dunlop	Potomac & East Line	2	16
Newport News to Lee Hall	Chesapeake & Ohio	2	18
Grove to Walker		2	23
Elko to Korah		2	18
Lytle to Southern Railway crossing		2	2
Iron Gate to Lewis tunnel		2	32
Allegheny to Rockland, W. Va.		2	20
Lambert's Point to Portlick	Norfolk & Western	2	20
James River bridge to Lynchburg		2	5
Forest to Cooper, W. Va.		2	160
Richmond, Fredericksburg & Potomac			
Quantico to Richmond		2	79



Double Track Railways in Virginia.

	No. tracks.	Approx. miles.
<i>Southern.</i>		
Newark to Orange	1	78
Lyonsburg to Evansville	1	17
Danville to Pelham, N. C.	1	9
Washington to Spanglers	1	39
Washington to Whittier	1	2
Washington to Quantico	1	34
Washington to Philadelphia	1	8
Takoma to Keller	1	16
Baltimore to Cape Charles	1	16

A MACHINE SHOP ON WHEELS.

The North Coast Railroad, which is being built in Washington, is using a traveling machine shop car for making repairs to locomotives and other equipment, until such time as a permanent shop can be located and erected. Exterior and interior views



Machine Car; North Coast Railroad.

of the car are shown in the accompanying illustrations. The machine tool equipment consists of a 23-in. engine lathe, 16-in. shaper, 1½-in. bolt cutter, 16-in. pipe threading machine, 22-in. vertical drill and an emery wheel. The inside dimensions of the



Interior of North Coast Machine Car.

axles. The car does all necessary switching and travels along the line at 8 to 10 miles an hour. The engine has been in daily use for nine months with no expense for repairs. It consumed 4 gals. of gasoline in a 12¼-hr. run, with two men working in the car and using such of the tools as they required on the work they were doing.

VANADIUM IN CAST IRON LOCOMOTIVE CYLINDERS.*

BY GEORGE L. NORRIS.

Vanadium is probably the most powerful metal for alloying with steel. One or two-tenths of 1 per cent. raises the elastic limit of mild carbon steel about 50 per cent., or more in some cases, without impairing the ductility. Vanadium steels have a very high dynamic strength, sustaining repeated vibrations better than any other steels. The greatest application of vanadium will doubtless continue to be in combination with steel, as here all its wonderful effects and qualities can be fully developed.

Cast iron may be regarded as a more or less impure steel, containing, in addition to the usual elements present in steel, a comparatively large quantity of carbon in the form of graphite interspersed throughout its structure in the form of granules, flecks or flakes. The graphite destroys the continuity of the metal. In consequence the limit of strength of cast iron is low as compared with steel, and it also follows that any improvement conferred upon cast iron by an alloy must necessarily not be as great as in the case of more homogeneous steel. In cast iron, also, we have a metal that is subjected to no work or heat treatment to develop latent qualities.

Nevertheless the benefits which accrue from the incorporation of small percentages of vanadium with cast iron, especially in chill and cylinder castings, are very great, even if they are not so spectacular in their nature as those obtained in steel. Vanadium not only cleanses the cast iron from oxides and nitrides, but also exercises a very strong fining effect on the grain of the iron, with the result that porosity is eliminated and sound castings are produced. Strength, resistance to wear and rigidity are all increased by the addition of vanadium to gray cast iron, while the vanadium martensites are much tougher than ordinary martensites. In the case of chilled cast iron, vanadium produces a deeper, stronger chill, and one less liable to spall or flake.

As a result of two years' test on a pair of cast iron cylinders made of vanadium cast iron, the New York Central specified vanadium cast iron for the cylinders of 183 new locomotives built during the past eight months. The pair of cylinders under test gave upward of 200,000 miles, with only microscopical wear, whereas ordinary locomotive cylinders will show about ½ in. wear per 100,000 miles. These locomotives were built by the American Locomotive Company and comparative tests have been made between the iron containing vanadium and that to which no vanadium was added. The averages of 10 consecutive comparative tests are as follows:

	STRENGTH	
	Transverse	Tensile
Plain cast iron	1,130 lbs.	24,295 lbs.
Vanadium cast iron	2,318 lbs.	28,728 lbs.

The transverse tests were made on 1-in. square bars, 12 in. between supports; the bars were machined all over and consequently were absolutely comparable, as is not the case with bars tested as they are cast. The tensile tests were also of machined bars. In machining the vanadium cast iron cylinders, the effect of the vanadium was noticed in the machining qualities of the iron; the chips were not so short, were tougher and showed considerable springiness. The use of vanadium in cast iron will doubtless find its greatest field in engine cylinders, both gas and steam, where it will be of great value in increasing the life of the cylinder through its effect on the wearing qualities of the iron.

Tests of vanadium in malleable cast iron have been reported as satisfactory in every way, the fiber of the iron showing

*From a paper read at the May meeting of the New England Foundrymen's Association, at Hartford, Conn. Mr. Norris represents the American Vanadium Company, Pittsburgh, Pa.

car is 29 ft. 10 in. long, 9 ft. 6 in. wide, 9 ft. 10 in. high, and is powered by a 12-hp. 1-cylinder Morse vertical gasoline engine, air cooled. This engine also drives the car, being connected by a friction clutch and sprockets and chain to one of the

much cleaner and the tensile strength being improved about 12 per cent. The castings were also very much better than ordinary malleable castings.

Method of adding vanadium.—In applying vanadium to cast iron, it must be remembered that nothing like the heat of molten steel is at hand, consequently one should use a finely crushed or powdered alloy of a low melting point. As the melting point depends directly upon the percentage of vanadium contained in the alloy, a ferro-vanadium containing under 35 per cent. vanadium should be used. If the iron to be vanadized is melted in the air furnace, the procedure is a very simple one: After the charge is melted and 15 to 20 minutes before tapping, the ferro-vanadium is added and the bath well stirred or rabbled.

Where the iron is melted in the cupola it is necessary to add the vanadium to the ladle, and, as the amount of heat available for dissolving the ferro-vanadium is limited, the iron should be tapped out as hot as possible and a ladle used that has just been emptied in order to conserve as much heat as is practicable. After the bottom of the ladle is covered with a few inches of iron, the finely crushed or powdered ferro-vanadium is added by sprinkling it on the stream of iron as it flows down the spout to the ladle. In this way advantage is taken of all the available heat, and there is also the mixing effect of the stream as it strikes the iron in the ladle. After the vanadium is added the contents of the ladle should be well rabbled and allowed to stand a few moments before pouring in order to insure thorough incorporation and complete reaction.

In the case of cupola iron, with its limited available heat, it has been found that the addition of 0.10 to 0.12 per cent. vanadium is all that should be attempted ordinarily; while in the case of high grade air furnace iron, with its reserve of available furnace heat, the addition of 0.18 per cent. to 0.20 per cent. is advisable and readily made.

The analyses of a great many tests show that about 70 to 80 per cent. of the vanadium alloys with the iron, the remainder being used up in cleansing the iron from oxides and nitrides. In remelting cast iron which has been vanadized, most of the vanadium is necessarily lost, owing to the very strong oxidizing conditions under which the iron is melted. The effect, however, of the small amount of vanadium remaining in the remelted iron is apparent in the texture of the grain and its consequent freedom from porosity.

TRAIN ACCIDENTS IN JULY*

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of July, 1910. This record is intended to include usually only those accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. It is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation:

Derailments.				No. persons reported—	
Date.	Road.	Place.	Cause of dermt.	Kind of train.	Kil'd. Inj'd.
*1.	Wabash	Montgomery City, Ind.	Pass.	Pass.	4
1.	At., Top. & S. F.	Cedar Pt., Kan.	ms.	Pass.	2 1
1.	Seaboard Air L.	Marietta, Ga.	over.	Pass.	2 0
6.	Colt. C. & S. E.	Somerville, Ind.	ans	Fr.	1 0
6.	Boston & Albany	Coltsville, Pa.	d switch	Pass.	1 0
7.	Tenn. Central	Algood, Tenn.	rick	Fr.	2 0
8.	Chic. R. I. & Pac.	Adona, Ark.	d rail	Pass.	0 5
11.	N. Y. Central	Newton Hook, N. Y.	acc obst	Pass.	3 0
11.	Seaboard Air L.	Thomas, Ga.	slide	Fr.	2 0
12.	Southern Pacific	Mt. Cal., Tex.	unx.	Pass.	1 9
13.	Southern	Prosser, Ind.	sand	Pass.	1 12
13.	Northern Pacific	Belmore, Wash.	b. rail	Pass.	0 5
18.	Pennsylvania	E. Palestine, Pa.	unx.	Pass.	0 0
17.	Pennsylvania	Watts, Pa.	d track	Fr.	2 2

*Abbreviations and marks used in Accident List:
 ac. Rear collision—bc. Butting collision—xc. other collisions—b. Broken—d. Defective—unf. Unforeseen obstruction—unx. unexplained—derail. Open derailing switch—ms. Misplaced switch—acc. obst. Accidental obstruction—malice. Malicious obstruction of track, etc.—boiler. Explosion of locomotive on road—fire. Cars burned while running—P. or Pass. Passenger train—F. or Fr. Freight train (including empty engines, work trains, etc.)—Asterisk. Wreck wholly or partly destroyed by fire—Dagger. One or more passengers killed.

Derailments.

Date.	Place.	Train.	Cause of dermt.	Kind of train.	No. persons reported—	Kil'd. Inj'd.
1.	Chic. & N. Y.	Pass.	Fr.	Pass.	1 4	1
1.	Chic. & N. Y.	Pass.	Fr.	Pass.	1 4	1
24.	Chic. & N. Y.	Pass.	Fr.	Pass.	9 4	1
24.	Chic. & N. Y.	Pass.	Fr.	Pass.	2 16	1
31.	Chic. & N. Y.	Pass.	Fr.	Pass.	1 4	1

Collisions.

Date.	Place.	Train.	Cause of dermt.	Kind of train.	No. persons reported—	Kil'd. Inj'd.
4.	Chic. & N. Y.	Pass.	Fr.	Pass.	1 4	1
20.	N. Y. C. & St. L.	Chicag.	Fr.	Pass.	2 4	1
21.	Chic. & N. Y.	Pass.	Fr.	Pass.	2 4	1
21.	Chic. & N. Y.	Pass.	Fr.	Pass.	9 12	1

The butting collision at Middletown, Ohio, on the 4th was between a south-bound passenger train of the Cleveland, Cincinnati, Chicago & St. Louis and a north-bound freight of the Cincinnati, Hamilton & Dayton; and 22 passengers and one trainman were killed, and 35 passengers and three trainmen were injured. The passenger train was running over the line of the C., H & D. because of a blockade on its own road, and was in charge of a pilot. The freight train was preparing to enter a side track and had nearly or quite stopped, but the passenger train was running at 50 miles an hour or faster; and the engines and first two or three cars in both trains were completely wrecked. The leading car in the passenger train was crushed by coming in contact with a steel gondola car of the freight, while the next passenger car was crushed by heavy timbers, which had constituted the load of the second car in the freight train. The original order issued for the meeting of these two trains required the passenger train to wait for the freight at Poasttown, three miles north of Middletown, but later this order was annulled or modified, and the passenger train was allowed to pass Poasttown some minutes ahead of the time to which it had been required to wait, but this modification was not delivered to the freight. It is said that the order (the one first issued) gave the freight until 1.07 to reach Poasttown, whereas the collision at, or near, Middletown occurred at 1.03. The dispatcher was dismissed. According to the newspapers he neglected to send the second order first to the freight.

The derailment at Newton Hook, N. Y., on the 11th, occurred about 3 a.m., a fast northbound express train running over a car door, which, evidently, had fallen from a car in a south-bound freight.

The derailment at Woodlawn, S. C., on the 31st, was due to a burning trestle bridge on which passenger train No. 2 ran without warning. The engineman and the fireman were killed. The injuries to the passengers were mostly slight. According to the press despatches, the conductor and the baggageman saw the smoke from the burning bridge when they were still a mile distant, and they applied the brakes. Why they did not succeed in stopping the train is not explained. The engine broke through the bridge and, with the tender and baggage car, fell to the creek below. The wreck took fire and was quickly burned up.

The derailment of the 20th occurred on the trestle across Great Salt Lake. A large rock fell from a car in a gravel train, derailing several cars and precipitating many workmen into the lake.

Of the 13 accidents on electric railways reported in the newspapers as occurring in the United States in the month of July, two were attended with fatal results: a derailment in Brooklyn, N. Y., on the 8th, in which one person was killed and 18 injured, and a butting collision near Ortonville, Mich., on the 12th, in which one person was killed and 45 were injured, six of the latter being reported as fatally injured. In this case a work train collided with a passenger car. It is said that the men in charge of the work train, ordered to wait on a side track for three special cars, went out after the passage of the second car, and collided with the third. A third accident in this list was that on the monorail line in New York City, on the 17th, in which about 20 persons were injured. This accident has already been reported.

A disastrous derailment occurred in Russia, July 31, and a collision in Ireland on the 19th. The derailment was at Kislarwat,

on the Transcaspian Railway, killing 19 and injuring 31. The collision was on the Great Southern Railway, at Roscrea, in the northwestern part of Tipperary County. An excursion train broke away from the locomotive and ran back down a grade into the head of a following passenger train—an accident apparently quite similar to that at Armagh, Ireland, in 1889, when 80 passengers were killed and 262 injured. In the present case 100 passengers were injured, but most of the injuries were slight. Many persons jumped from the runaway cars and tumbled down a bank. At Winnipeg, Man., July 8, a locomotive ran into a street car on a crossing, killing three persons and injuring many. The engineman said that the flagman had given him the signal to go ahead, and the flagman was arrested.

MISSION BAY VIADUCT; SOUTHERN PACIFIC.

The recently completed Mission Bay viaduct of the Southern Pacific in San Francisco, Cal., has a total length, including approaches, of 3,680 ft. and contains 5,300,000 lbs. of steel.

The viaduct is of the through-plate girder type, the girders on the main portion being 10 ft. $\frac{1}{2}$ in. high with 36-ft. roadway between and a 10-ft. sidewalk on the property sides. The tops of the girders are about 6 ft. above the level of the roadway, thus forming an efficient protection for the traffic on the street side and to pedestrians on the sidewalks. The main girders vary in length from 36 ft. to 88 ft. The photographs show the method used for erecting short girders by a traveling derrick on a completed portion of the viaduct; the erection of a long girder by using the derrick on the viaduct and another on a car on the underneath tracks, and the erection of a column between yard tracks.

Floor beams are built up, and stringers throughout the structure are rolled I-sections. The average depth of floor beams from back to back of angles is 3 ft., the stringers varying in depth from 15 in. to 24 in. The roadway and sidewalks are of concrete reinforced with corrugated bars, the roadway reinforcement consisting of $\frac{5}{8}$ -in. bars, continuous top and bottom. On the roadway is a 2-in. sand cushion under a basalt block pavement. Roadway slabs are designed for Cooper's Class A highway loading and the sidewalks for 10 lbs. per sq. ft. live load.

The construction of the roadway floor and the traveler used for placing the concrete is shown in the photograph of the reinforced concrete floor construction.

Difficulty is always experienced in finishing large areas of concrete sidewalk because of the necessity of keeping men off the fresh work. How this was avoided in the sidewalks of this viaduct is shown by the photograph of the traveler that enables the finishers to do their part of the work in a comfortable and satis-



Lining Surface of Sidewalk.

factory manner. Concrete abutments of U type filled with earth are used on those portions of the approaches which intersect with street grades. The remaining portions of the approaches are of the regular stringer and floor beam construction supported by a three-column bent at intervals of 25 ft.

We are indebted to William Hood, chief engineer of the Southern Pacific, for the description of this viaduct and the photographs illustrating the construction work.



Construction of Reinforced Concrete Floor.



Erection of 88-Ft. Girders.



Erection of 60-Ft. Girders Across Tracks with Freight Train Passing.



Erection of a Column Between Yard Tracks.

THE CAMBRIA STEEL WORKS.

The Cambria Steel Works holds a unique position in the history of the iron and steel industry. It is the oldest steel works in the United States which has mined and worked its own fuel and ore from the beginning of its operations. It has grown so slowly and steadily to its present immense proportions from the most insignificant of beginnings and without any startling events to mark its history, that its development has hardly attracted attention.

The local manufacture dates back about a century to a charcoal blast furnace built in 1808, on Shade creek, and a forge below the mouth of Shade creek, built in 1811. A forge built at Johnstown in 1809 was operated to 1822. The Cambria furnace, in the Laurel Run, was built in 1841, and with other local blast furnaces, all charcoal, became part of the Cambria Works, built in 1853, at which date the rolling mill was commenced and four coke blast furnaces were started. These furnaces all used the local ore, a carbonate of iron and with lime sufficient to make it self-fluxing. This made a hard white phosphoric pig and when put into the heads of rails gave the Cambria iron rails output a high repute.

The completion of the Pennsylvania State Canal & Railroad through Johnstown in 1834 gave the transportation, and the occurrence of this iron carbonate ore and coking coal at Johnstown gave birth to the Cambria Works. The Pennsylvania Railroad, built in 1854, gave additional outlet and market for the rail product.

It was a long story of financial and metallurgical vicissitudes, the upbuilding of this concern, and involves the whole of the development of the iron industry of the United States. As one of the pioneers, located in the heart of the coal producing district, it was inevitable that when once firmly established on a large scale it should be a prominent factor in such improvements as might be made in the manufacture, first of iron and then of steel.

DEVELOPMENT OF THE BESSEMER PROCESS.

It was while chief engineer at Cambria, in 1858, that John Fritz invented and built the three high rolling mill, the introduction of which he so graphically described at the banquet on his eightieth birthday in 1902. And it was here, too, at about the same time, that William Kelly made his experiments with a converter, antedating the work of Sir Henry Bessemer with preventing the latter from obtaining American patents on the process, which would have thrown the full control of this branch of the steel industry of the United States into English hands. It was a curious tri-partite affair that, of the Kelly-Bessemer-Mushet patents, which resulted in the development of the Bessemer process in this country under the skilful management of A. L. Holley. It was in 1857 that Mr. Kelly went to Johnstown and started his experiments at the Cambria works, where he finally developed the "pneumatic" process, as it was called. Here, with a small converter of 1,000 lbs. capacity, he succeeded in blowing cast iron into an almost pure wrought iron. He worked for a long time without making any attempt to protect himself by United States patents, and it was only when he learned that Bessemer was about to make such an application that he stepped in and blocked the way.

Meanwhile in England Bessemer had carried his experiments on along the same line, and had reached the same results. He could blow down to a comparatively pure iron, but did not produce a steel. Then Robert F. Mushet "took out a patent for his process of adding to melted cast iron, which had been decarbonized and desiliconized by a pneumatic blast, a melted triple compound of iron, carbon and manganese, of which compound spiegel Eisen was the cheapest and most convenient form. The addition of from one to five per cent. of this compound to the cast iron mentioned at once overcame the obstacle which had been fatal to the success of Bessemer's invention. Besse-

mer had decarbonized and desiliconized melted cast iron, but had not been able to retain or restore the small quantity of carbon that was necessary to produce steel and in the oxygen of his powerful blast had given to the contents of his converter an element that prevented the production of even good iron. Mushet's invention regulated the supply of carbon and eliminated the oxygen."

The situation, then, in this country, would have lain between Kelly and Mushet had it not been that Bessemer had brought the machinery of the converter and the application of the blast to a high state of perfection. The result was that no one of the three could do anything without the co-operation of the other two. A combination of all interests was, therefore, effected by the formation of the Pneumatic Steel Association, wherein Daniel J. Morrell, general manager of the Cambria Iron Works, held a three-tenths interest in trust for the Kelly Process Co. From this it will be seen how closely these works were identified with the inception and development of what is known as the Bessemer process.

The English Bessemer process was at first conducted by melting the pig in a reverberatory furnace preparatory to the conversion, but the English soon learned to take metal directly from the blast furnace. The Americans melted the pig in cupolas and mixed it in a large iron ladle to secure uniformity of iron. The



Kelly Converter.

direct process was discussed but not used until later, and some works, like the Troy and the Edgar Thomson, were built without blast furnaces near by. It was only when large blast furnace plants were built that the direct process was introduced and finally perfected by the addition of a mixing reservoir to supply iron to the converters.

COFFIN PROCESS.

Another method of steel treatment which has been developed at Cambria is the Coffin process. This is farther down the line than the blast furnace and converter and deals only with the finished or nearly finished products.

The company is very proud of its record of Coffin process axles. This process has been in use at the Cambria plant for about 20 years, and all axles produced by this company are treated by the Coffin toughening process, whether so specified or not. The company is a pioneer in heat-treated axles, and firmly believes in the necessity of thoroughly annealing forgings after they come from the hammer. The justification of this opinion lies in the fact that it has had reports of only 20 failures of car axles in as many years. Eight of these were on one road, and were due to improper design, the wheel fit being $\frac{1}{8}$ inch under the M.C.B. standard dimension. The road having these failures admitted that this was the cause of the trouble, as the axles when chemically analyzed and tested showed a very high

standard of product. The axles are made in the open hearth department, which insures freedom from piping and scale accumulation, the bloom is taken to the axle department, charged in a large continuous furnace, the charging end of which is at a very low temperature, the blooms being pushed by hydraulic pressure to the drawing end of the furnace. The heating is thus very gradual, insuring a thoroughly uniform heat throughout the billet, and in this way preventing many strains which would otherwise result in hammering a billet which was not uniformly heated, as is usually the case when blooms are thrown direct into a high temperature. After coming from the hammer the axle is permitted to entirely cool, and is then again heated in a smaller continuous furnace, in which the same care is exercised to get uniformity, and after passing recalcenscent or critical temperature in the steel, thus eliminating any possible strains which may have been introduced in the forging process, it is treated to the Coffin toughening process, which gives a remarkable increase in elastic properties and makes the steel very ductile, the elongation being increased to a very marked degree.

RESOURCES OF THE COMPANY.

So much for the past work at the Cambria and some of the results obtained. At present the plant stands as an exemplification of the impossibility of making steel on a small scale. It shows how essential a large plant and large resources are to successful competition in the markets of the world under modern conditions. To meet these requirements the company owns its own mines and quarries, and is sufficient unto itself, from mining its own coal and ore to turning out steel cars and bridges.

ORE RESOURCES.

The ore used in the furnaces at Johnstown is mined in northern Michigan and in Minnesota. In the latter State it owns the well-known Mahoning mine on the Mesabe range, considered to be one of the best developed mines in the world when regarded from an engineering standpoint. The mine is an open one and the ore is a soft brown hematite that can be moved by steam shovel, and is thus loaded direct on the cars by which it is hauled to the shipping point. The second property is the Vulcan, on the Menominee range, whose point of shipment is Escanaba, on Lake Superior. This is also a red hematite. The third is the Republic mine on the Marquette range in northern Michigan. It is a specular ore and is shipped from Marquette, Mich. The total annual output of these three properties is 2,200,000 tons, distributed as follows: Mahoning, 1,500,000 tons; Vulcan, 500,000 tons, and Republic, 200,000 tons.

The ore is handled by lake vessels from the point of shipment to Cleveland or Ashtabula, with some small shipments to Erie and Conneaut. For this traffic the company owns a fleet of five vessels, whose tonnage ranges from 8,000 to 12,500. They are of the type used almost exclusively on the Great Lakes for coal and ore. The engines are set well aft, and the whole deck from the engine and cabin forward to the fore-castle is furnished with hatches that can be removed for rapid loading and unloading.

From the port of entry the ore is hauled to the works and there unloaded by a car dumping machine, and again handled and stacked by a traveling gantry. From the stock pile it is brought back to special bin cars that are run into the charging house, where they take the place of the usual bins and discharge into hoppers that empty into the loading skips, which are hoisted to the charging door at the top of the furnace.

The reason for using these Lake Superior ores rather than those found in the hills in the immediate neighborhood of Johnstown is that the latter are not only poorly adapted to steel making, because of their high sulphur and phosphorus contents, but because of the low percentage of iron which they contain, the thinness of the seam, and the consequent expense of mining. These are spathic ores, however, containing so much carbonate of lime that they are self-fluxing. The iron content in the ore is but 30 per cent., necessitating roasting before charging into the furnace. In the early days this was done, the iron content being

raised to 40 per cent. or more. In contrast to this, the Lake Superior ores have an iron content of from 40 to 50 per cent., and require no roasting, besides existing in such quantities that economical mining is possible.

COAL RESOURCES.

The coal used is, for the most part, from the company's mines, which are located in Fayette, Cambria, Blair and Bedford counties, in addition to which it owns some gas coal property in Westmoreland county. The coal belongs to the lower productive measures, and the mines are mostly self-draining. In analysis it runs about 18 per cent. volatile matter, 70 per cent. fixed carbon and 12 per cent. ash. It is all washed before using, and the ash is thus reduced to about 9.5 per cent. While the coal can be coked in the beehive oven, it does not lend itself readily to this method of treatment. Far better results are obtained from the by-product ovens. Accordingly, all of the coke used in the furnaces and elsewhere about the plant is made in the Otto-Hoffmann ovens, of which there are 372 installed. These ovens take a charge of 5.13 gross tons of coal and make about 3.8 gross tons of coke. The by-products are tar, ammoniacal liquor and sulphate of ammonia. The coke produced is exceedingly hard, an excellent burden bearer and a good melter, though requiring a somewhat higher blast than the Connellsville coke. This is from 12 to 18 lbs. per square inch in the furnaces in use, of which there are eight, running from 85 ft. to 96 ft. high and from 18 ft. to 21 ft. in diameter at the bosh.

The total output of the Johnstown mines, all of which is consumed by the company, is about 132,000 gross tons per month, from which, in addition to the direct coal consumption, 47,000 tons of coke are made.

LIMESTONE.

The company owns its own limestone quarries in Blair and Mifflin counties, which yield an excellent stone. There are four properties in all.

BLAST FURNACE PRACTICE.

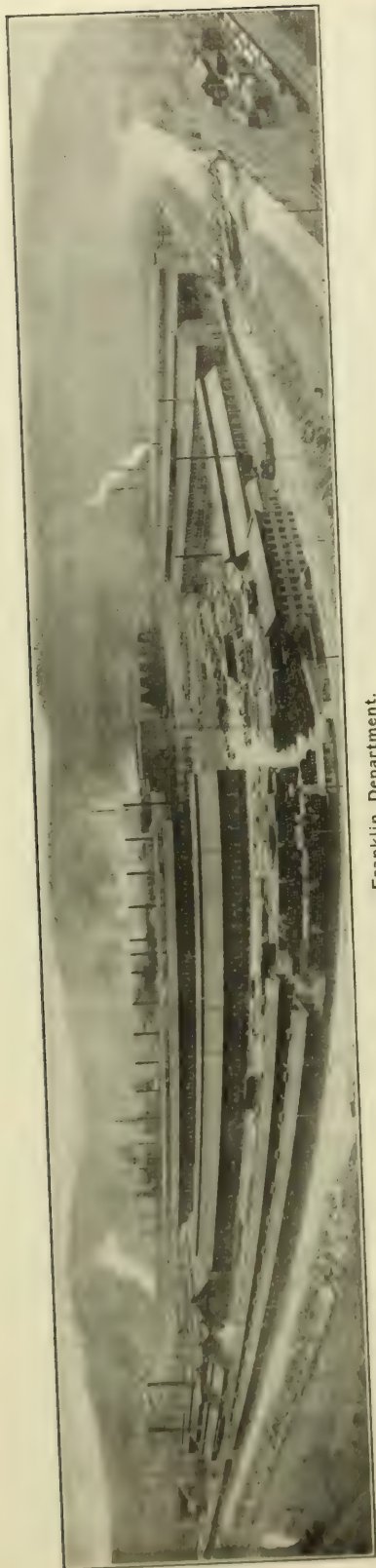
The blast furnace practice does not differ essentially from that elsewhere. The ratio of coke to ore is about as one to two, and the quality of metal produced is low phosphorus Bessemer, or medium phosphorus basic.

The furnaces are equipped with the latest appliances for handling the output. The major portion is taken by a hot metal route to the Bessemer converters, or open hearth furnaces, while that which is cast into pigs is run into a casting machine that receives the metal which, after being cooled by a submergence in a tank of water, is dropped into a bin for storage or directly into dump cars for transportation. There is thus no casting floor similar to that in use with the old style furnaces, and there is no hand manipulation of the metal at all. The total daily output of the eight furnaces in pig and hot metal delivered to the converters is about 3,000 tons.

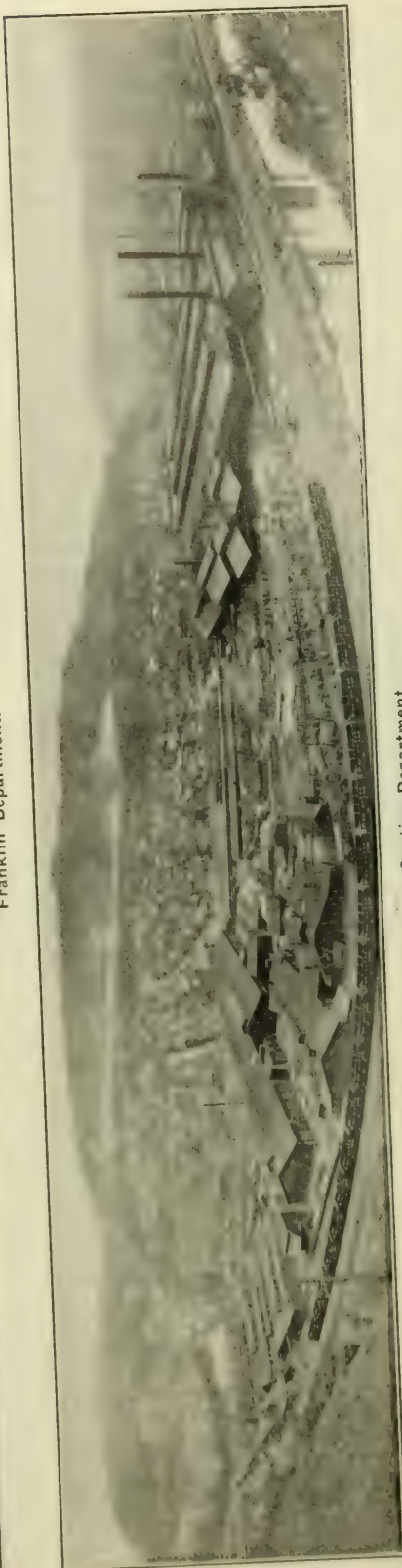
One familiar blot on the landscape of the usual blast furnace, that is conspicuous by its absence from the Cambria works, is the slag pile. Instead of proving a nuisance and a bugbear to the management the slag from all of the furnaces is converted into a by-product that is a source of profit. After tapping the furnace the slag is drawn off and discharged into the traveling hoppers of a conveyor. These are in the form of shallow pans, which catch the molten slag and carry it out beneath showers of water. This sudden cooling breaks the material into fine pieces, and it is discharged in this condition from the end of the conveyor into cars to be carried away and used in concrete or as railway ballast. So well adapted is it for the purpose that the total output is taken in this way, and, even then, there is not enough made to supply the demand, and what was once worse than a waste has now become a source of revenue.

Six of these furnaces are at what is known as the Cambria and two at the Franklin plant. The total capacity is about 90,000 gross tons per month.

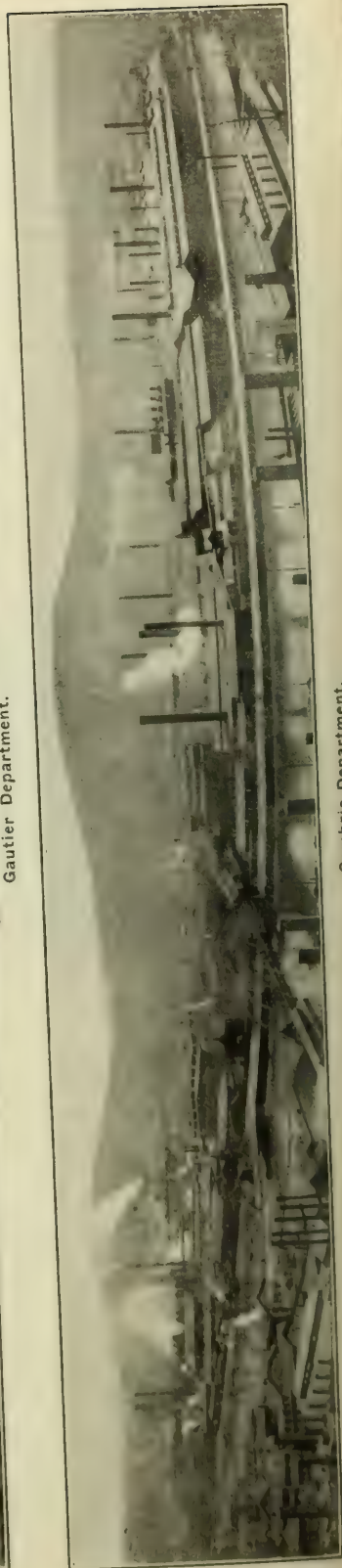
The Bessemer converters are at the Cambria works and are



Franklin Department.



Gautier Department.



Cambria Department.

four in number with a capacity of about 1,000 tons each, giving an average monthly output of about 60,000 tons.

THE PLANTS

There are three distinct plants at Johnstown, all under one management, and to an extent, interdependent and yet entirely separated in their departmental management. The old or Cambria plant, known as the lower mills, is situated at the lower end of the town, while the Franklin plant is at the upper end, three miles from the former. It is between these two that the hot metal route is established. Between them, but nearer the Franklin plant, is the Gautier plant. There are rolling mills in all three plants, but each is devoted to a different class output. There are no open hearth furnaces at Gautier, but there are at each of the other plants. At the Franklin works there are 17 furnaces of 50 tons capacity each. At the Cambria works there are eight open hearth furnaces, four of 50 tons and four of 25 tons capacity each. Ingots weighing as much as 24,000 lbs. are cast at the Franklin works, while at the Cambria works the ingots are lighter, usually running about 6,000 lbs. The heavy slabbing and blooming mills, as well as the plate mill, are at the Franklin works and the heavy blooms are rolled there. The rail mill is at Cambria, as well as the mills for structural shapes; the billets for the lighter work at the Gautier plant are also made here and at Franklin.

There is nothing about the general work of either of these plants that differentiates them from other steel works, except for occasional details of practice that are always of interest and value, but which are too numerous to be considered in an article of this kind.

MISCELLANEOUS WORK AT GAUTIER WORKS.

For miscellaneous items and for a class of work that is not only unusual in itself, but quite at variance from the general conception of that done by the Cambria Steel Co., we must turn to the Gautier works. They are located at the upper end of the city of Johnstown proper and between the other two plants. Here a multiplicity of articles are made and a degree of fine rolling attained that puts it in the realm of the arts. The Gautier mills have established a reputation for a high standard of quality and of accuracy of rolling, so those wanting more delicately drawn or rolled shapes apply to Johnstown. The output of the Gautier mills, consisting of these high-class specialties, agricultural implement and merchant bar steels, amounts to between 20,000 and 30,000 tons per month. For the most part the billets and bars from which this work is made are rolled at the lower or Cambria mills, while the plates come from the Franklin plant. The stock is reheated at Gautier and rolled, pressed or drawn into shape. Here the various forms of tire rims for automobile wheels are rolled; sections whose several parts must fit into each other with an accuracy that would only be attainable in machine tool work at great expense, and whose multiplicity of forms cover not only the wheel rims but the whole wide range of this class of work. Then there are hundreds of small sections rolled for almost every conceivable use, where the variations from standard dimensions are limited to the thousandth of an inch. There is also a wide range of product for agricultural machinery. The output in harrow discs, for example, is about 3,000,000 pieces per year and the stamped and pressed seats for harrows, rakes, mowing machines and harvesters rises to 300,000 pieces, and these are but two of the specialties produced. In addition to these there are finger plates for mowing machines that are cold rolled to great accuracy, the fingers for tedders, cultivators and hay rakes, to which may be added a long list of other minor parts that to catalogue would be to list all of the principal detail features of agricultural machinery.

There is a department of rod and bar work that closely resembles wire drawing in its methods and rivals it in the accuracy of its products. Round, square, hexagonal and other shapes of bars are rolled at the Cambria mills to within $\frac{1}{2}$ in.

of the desired finished dimensions and are then taken to Gautier where they are drawn through dies exactly like wire, to dimensions that must not vary more than one-thousandth of an inch from the standard dimensions, and where they are given the usual polished surface of wire drawing. Shafting is also manufactured in large quantities. The regular cold rolling process has been abandoned and in its stead the shafting is turned to approximate size, possibly one-thousandth of an inch large and is then polished by cold rolling down to size. These rolls are set at an angle with the axis of the shaft and draw it in exactly the same manner that the roller is used on the journal of an axle to polish and finish its surface.

Accustomed as most engineers are to associate Cambria with rails and structural shapes, with perhaps a faint idea that merchant bar is also a part of its output, forgetting or ignorant of the existence of its mines, its fleet of lake vessels and its blast furnaces, this refinement at the other end of the line is a matter regarding which almost complete ignorance prevails. The shapes and forms produced in these mills are not exploited or advertised, because they are made for some individual consumer, who takes this, for him, raw material and puts it into his own marketable output. So there are many who, wanting some delicately drawn or rolled shape, whose weight would be measured in ounces to the yard, would not apply to Johnstown to have it made, because the place is associated with heavy rails and beams. And yet, minute as much of this work is, and so light that hoists and cranes are not needed to handle it, its quantity is so great that the finished output of these little things at the Gautier plant amounts to between 20,000 and 30,000 tons a month.

CAR DEPARTMENT.

Although much of the output of the Cambria and Franklin plants, aside from that of the Gautier, is, though finished, in the form of the rough materials of rails and the heavier shapes, much of it is worked up into other forms ready for use. It is here that the structural and car departments step in as consumers for a goodly portion of the output of the rolling mills. They are both located within the domain of the Franklin plant and are equipped with every appliance for the economical and rapid handling of the work.

In the car department the axles, truck frames and car bodies, even to the bolts and rivets, are made from the works' own output. At present, with the forces working day and night, forty-five cars of 50 tons capacity each are made every 24 hours. If we place the weight of these cars at 39,000 lbs. each, the material consumption accounted for is 858 tons a day, which, with the wastage, would raise it to well over 900 tons.

There is the machinery used in the formation of the pressed steel parts of the cars, overhead cranes for handling the heavy parts, and riveters of the gap or hammer type for driving the rivets. The method pursued is to assemble the details, such as sills and bolsters, and rivet them with pneumatic gap riveters. Then when these are brought together they are first bolted and then riveted with the pneumatic hammer. The punching is done to a large extent with automatic machines, which serve to greatly cheapen the cost of duplicated work. After assembling, and before riveting is commenced, a precaution is taken against the straining action of excessive drifting, by reaming out each hole, so that there is a positive certainty of the easy driving of each individual rivet. This practice holds for all parts, whether of bolsters, sills, upper framing or plates. The result is that there is no delay in the riveting and the work is prosecuted with great despatch.

The general method is to rivet sills and bolsters, riveting them in an underframe, after which the superstructure is built on. All of this work is done on horses under cover, while the trucks are being assembled at one end of the shop. At the end of the day when the bodies have been completed, the trucks are lined up on a track outside. A traveling crane then picks up a body at a time and sets it on the trucks. The car is then run down to another shed for the application of the air brakes and for painting.

STRUCTURAL DEPARTMENT.

The structural department is operated along lines of equal simplicity. Punching of sheets and shapes is done on the automatic machines and the assembling is effected as in the case of the cars, the riveting being done only after the holes have been reamed.

IMPROVEMENTS UNDER WAY.

If we were to read back into the story of the plant, it would be one of steady and continuous growth from its first inception in the late thirties of the last century. So, judging from the past and from present appearances, it seems probable that the growth is to be a continuous one for some time to come. Two things of importance are now being pushed to completion. One is the construction of a 66-in. pipe line 14 miles long, to bring water to the works from a reservoir of 11,000,000 gals. capacity, that is being built at Quemahoning creek. This is necessitated by the scantiness of the present supply.

The second improvement is the addition of two Morgan semi-continuous bar mills to the Gautier plant to meet the increased demands for Cambria steel bar products.

The third important addition is a first-class wire plant. Prior to the great flood of 1889, at which time the wire mill was completely destroyed, the Cambria Iron Company was one of the most important manufacturers of wire in the country. This re-entrance into the wire market simply carries out a long-cherished plan, the consummation of which had been deferred until ample provision for the supply of steel necessary for the production of wire could be made.

OUTPUT.

This, then, is an outline of the work done by the Cambria Steel Co., and a brief sketch of the part it has played in the development of the steel industry of the United States; an industry that receives from these works alone an output of 250,000 tons of rails; 250,000 tons of shapes; 150,000 tons of plates; 300,000 tons manufactured into cars, and from 200,000 to 250,000 tons of miscellaneous material, based on an output of 1,375,000 tons of blooms, slabs and billets, with an ingot production of 1,608,000 tons. An output that necessitates the employment of about 20,000 men.

Surely this is an example of self-sufficiency that rivals even the isolated family of olden days. Taking the coal and iron from its mines, hundreds of miles apart, it brings them together, and by the manipulation of the magic of modern metallurgy, it sends out complete and ready for use the structural shapes of the modern building and the fully equipped car to carry them to their destination.

HOSPITAL FOR EMPLOYEES.

But its sole interest is not in the tonnage of steel that it can turn out, regardless of the safety and lives of the great army of workers that it must marshal to its aid in order to achieve these results. Happily there is a bright humanitarian side to its work that is deserving of the closest attention and imitation. From the time that the miner disappears from the light of day with his pick, until the completed car is drawn from the yard ready for service every step of every process that intervenes is fraught with danger to life and limb, some of which is very great. A slight distraction of the attention, an inadvertent step or motion may result in the loss of a life or a limb. Despite the safeguards that are thrown about the men, and the protection with which the machinery and furnaces are surrounded, accidents will occur. Realizing that the commonest sentiments of humanity demanded some means of relieving the suffering that resulted from these mishaps, the Cambria Steel Co. was the first to organize an industrial hospital for the systematic and immediate care of those of its employees who should suffer injury from accidental causes, either while going to, returning from, or at work.

No expense has been spared in the equipment, and no feature of scientific treatment and relief has been overlooked, until the little hospital on the hill back of Johnstown stands as a model

to be studied and copied, while its own work, if appearances are any indication of the truth, serves as a constant inspiration to its nurses and doctors and to the officials who are responsible for its existence and maintenance.

It ranks, we believe, as the first industrial hospital to be established by any steel works in this country for the care of its own disabled men. It was founded in 1881, when it was decided that it would be far better in every way for the company to care, and to care properly, for the men who were hurt than to trust them to the chances they must run if turned over to a public hospital or such surgeons as they might themselves engage. For many years it had been the custom to have the company's surgeon attend them at their own homes, but the difficulty of obtaining sanitary conditions and proper nursing or the execution of the doctor's orders, showed the necessity for a regularly organized hospital.

Two years after building the hospital, or twenty-seven years ago, a relief association was formed which has been in continuous and successful existence ever since. It was intended to take care of workmen disabled by injury or sickness, and the scope of this society has recently been enlarged to provide a pension for employees over 70 years of age, or those permanently disabled by accident. This association also manages the hospital service.

The monthly payments range per man from 90 cents to \$1.15 to the benefit fund and 10 cents for pension fund. The benefits are \$5 per week for accident or sickness, \$100 burial fee, and with various payments for loss of life, limb or sight, up to \$1,000. These payments are guaranteed by the Cambria company, which gives gratuitously the office and clerical services and \$1 per member yearly. Up to date the association has paid \$2,539,000 for deaths and benefits. This is the earliest beneficial organization founded in this country by a steel corporation and its employees.

The hospital had ten beds when first established, but this has been increased to 50 beds, with an operating room equipped with the latest appliances for scientific surgery. In connection with the hospital, there are emergency boxes scattered all over the works, with appliances for first aid to the injured. In each department there is a man trained in the use of this emergency apparatus and who is held responsible for its proper maintenance and the condition of the patient when he reaches the hospital. About once every three months these men are brought together to listen to a lecture by one of the hospital staff and witness demonstrations of the methods to be pursued in the care of the injured. The result is that the infection of wounds cared for in this way is down to less than 1 per cent. of those injured.

In connection with the emergency work, there are two ambulances stationed at the Cambria and Franklin works that answer calls at once in the regular manner. At present they are hauled by horses, but an automobile ambulance is to be established at the Franklin works to lessen the time required for the delivery of a patient to the hospital. Supplementing the ambulance service there is a buggy service for men who have suffered minor injuries and are able to sit up. The patient is at the hospital within half an hour of the time of injury, except for accidents in the mines, when the time is, of course, longer.

The magnitude of the work is greater than would be supposed. For example, in the dispensary more than 40,000 dressings are made a year. The new cases for dispensary work run from 20 to 30 a day. For the current year it is expected that there will be more than 1,000 admissions to the hospital. Last year there were 250 cases of fracture and between 200 and 300 operations performed. This indicates the importance of the work and it is difficult to understand why the example set at Johnstown is not followed elsewhere.

This, then, shows in skeleton outline the main features of the Cambria steel works; the wide range of its products, the completeness of its organization, and the self-sufficiency, and how, through it all, there is an anxious care for those of its employees who may have been injured while in its service.

General News Section.

The Atchison, Topeka & Santa Fe intends to convert all passenger locomotives running between Kansas City, Mo., and Newton, Kan., to oil burners.

Telephones are now being used for sending train orders on the line of the New York, Chicago & St. Louis between Bellevue and Comauit, Ohio, 137 miles.

On Wednesday of this week a young Spaniard named Mossant flew across the channel from France to England, carrying in his aeroplane one passenger.

A press despatch from Washington says that the commissioner of corporations will soon publish a report on terminals of water transportation routes in the United States.

The International Railway Congress, which has just closed its eighth session at Berne, Switzerland, has voted to hold its next meeting, which will come in 1915, at Berlin.

A committee of which C. J. McNitt, general auditor of the Oregon Short Line, is chairman, is making plans for the organization of a railway club at Salt Lake City, Utah.

The El Paso Southwestern is preparing in El Paso, at an expense of \$10,000, a club house for its employees. The club rooms are in the building formerly occupied by the general offices.

The Grand Trunk Pacific is now running a train regularly to and from Edson, Alberta, 146 miles west of Edmonton, which has been the terminus for the past year. From coal mines on the Brazeau river, south of Edson, the company expects to get 5,000 tons of coal daily.

The government has begun suit in the federal court at Jackson, Miss., against the Gulf & Ship Island to recover \$2,500 in penalties for violation of the law regulating the hours of service of telegraphers. The suit is said to be an outcome of a recent strike of operators on the road.

The governor of Montana has asked the railways to co-operate with the state and federal officers in supplying men to fight the forest fires. He expressly said that such assistance would not be taken as an admission of negligence by railways in starting fires. It is said that 125,000 acres have been burned over.

The Delaware, Lackawanna & Western has enlarged its force of policemen and has been making numerous arrests of tramps. On its Western division, robberies from freight cars have become serious during the past year, and the company has decided that it can no longer depend wholly on the local police authorities for protection.

In New York City, August 11, there was a conference between Chairman Knapp, of the Interstate Commerce Commission, and Chief Commissioner Mabey, of Canada, concerning the proposition, broached by Canada some months ago, to establish some kind of joint governmental control over traffic between Canada and the United States.

The Western Pacific has announced that it will begin running regular through passenger trains on August 22. There will be two trains each way daily. Westbound, they will leave Salt Lake at 4:45 p.m. and at 10:30 p.m. Eastbound, they will leave San Francisco at 9 p.m. and 7 a.m. The distance of 921 miles will be covered in about 33½ hours.

A Railroad Men's Picnic will be given at Freeport, Ill., on September 8 for the benefit of a home for aged and disabled railway men. Ex-President Roosevelt is expected to make an address and the railways will make a round trip rate of \$1.50 from all points within 75 miles from which the usual round trip rate exceeds \$1.50. The picnic will take place on the fair grounds and the county fair will be going on at the time.

The Illinois Central has been asked to establish a suburban passenger station at Monroe street, Chicago, and the citizens most interested say that the company has practically decided to grant their request. It is claimed that dwellers in the office buildings, banks and hotels near the proposed location, to the

number of 12,000 daily, will use the Illinois Central trains if they have the opportunity. These applicants estimate that a new station can be put up for \$75,000.

The Missouri railway commission has issued a notice to the railways that it will prosecute roads violating the state hours of labor law by requiring employees to return to their posts of duty before the periods of rest prescribed by the act have expired. The Missouri law provides that employees shall have eight, or ten, consecutive hours of rest, according to the kind of service in which they are engaged. The commission finds that some roads have been requiring employees whose hours of rest expired at, say, 9 o'clock a.m., to report for duty 30 minutes earlier than this, and the attorney-general of the state has given an opinion that this is in violation of the law.

The strike of track repair men on the Delaware & Hudson, which began July 2, has been settled at a conference of representatives of the road, the strikers and the New York State Bureau of Mediation and Arbitration. The company has agreed to pay the laborers \$57.50 a month and the foremen \$75. No payments will be made for overtime and no deductions for a single day's absence for good reasons. The disturbances along the line of the road since the strike was begun have been so annoying that the company recently offered a reward of \$1,000 for the arrest of any person tampering with the company's property. Trains have been delayed and the rails of the tracks have been loosened at Carbondale, Cork Lane, Forest City and other places. At Schenectady on August 11 eight Italian track laborers were arrested on charges of train wrecking, and it is stated that four of the men confessed to having had a hand in the derailment of a passenger train near Ballston July 31.

The state assessment board of South Dakota has this year made no increase in the assessment of railway lines in the state, one reason for this being that a suit is pending in the United States court, in which one of the vital points is the state physical valuation of the roads, and until this is settled, the board did not feel like making any changes. For a similar reason, the valuations of express companies operating in the state were given a substantial increase. The board used the reports of the express companies to the railway companies as a basis of assessment last year, declining to accept the reports of the companies, which showed only such business as was entirely intrastate, and failing to show any interstate business whatever. The companies brought suit to prevent the collection of taxes on that basis, and while that suit is pending, the board continues to use its same basis for valuation, and on that basis practically all the companies operating in the state were given heavy increase in their valuations.

Officers of the Ann Arbor Railroad have increased the pay of conductors, trainmen and firemen. Increases have already been granted to agents, operators and machine shop men. Negotiations are now going on relative to the wages of engine men.

The Louisville & Nashville has agreed with its locomotive engine men on a general advance in wages, which, according to the representative of the engine men's committee, is based on the following rates per 100 miles, the new rates to take effect as of August 1: Local freight, \$5.30; through freight, \$4.90; through passenger, \$3.95; branch passenger, \$3.80. Overtime will be allowed after a given number of hours on a run. This stipulation is based on the assumption that five hours shall be allowed for each hundred miles on passenger runs, eight hours to the hundred miles for fast freights, nine hours for slow through freights and ten hours for local freights. Beyond these periods overtime will be paid for at the rate of 50 cents an hour for local freights and 49 cents an hour for passenger and through freights. Yard engineers are to be paid on a time basis, \$1.10 per day of 11 hours or less, with payments for overtime at the rate of 38 cents per hour. Engineers making a run of less than 100 miles are to be paid for 100 miles, but fractions of 100 miles otherwise will be paid for on a proportionate basis. Heretofore the rates on the different divisions of the Louisville & Nashville have not been uniform.

Trade of the United States in 1910.

Exports from the United States to America and Africa showed an increase and those to Europe and Asia a decline in the fiscal year just ended. To North America the increase was 24½ per cent., to South America 22 per cent., and to Africa 9 per cent., while to Europe the decline was about 1 per cent., and to Asia and Oceania a little over 1 per cent.

Detailed figures just completed by the Bureau of Statistics of the Department of Commerce and Labor show exports to North America 385½ million dollars in 1910, against 309½ million in 1909; to South America, 93¼ million, against 76½ million in 1909; to Africa, 18½ million, against 17 million in 1909; to Europe, 1,136 million, against 1,146¼ million in 1909, and to Asia and Oceania, 111¼ million, against 113 million in the preceding year.

The chief growth in our exports has thus been in the trade with our next-door neighbors. To Canada the value of the exports in the fiscal year 1910 was 216 million dollars, against 163½ million in 1909, an increase of 52½ million dollars; to Mexico, 58 million, against 49¼ million in 1909, an advance of 8¼ million; to Cuba, 52¼ million, against practically 44 million in the preceding year, an advance of 9 million; to Central America, 30¼ million, against 25¼ million in 1909, an increase of 5 million; to Argentina, 40¼ million, against 33¼ million in 1909, an increase of 7 millions; and to Brazil, 22¼ million, against 17½ million in the preceding year, an increase of 5 million dollars. The percentage of gain in the exports to the principal American countries in the fiscal year 1910, compared with 1909, was as follows: Canada, 32 per cent.; Brazil, 30 per cent.; Argentina, 21 per cent.; Cuba, 20 per cent.; Central America, 20 per cent., and Mexico, 17 per cent.

In the trade with Europe, which as a whole shows a decline of about 11 million dollars in the exports of 1910 compared with those of 1909, those to Germany and France show an increase; those to the United Kingdom, Netherlands, Italy and Belgium a decline. The total exports from the United States to Germany in 1910 were valued at 249½ millions dollars, against 235½ million in 1909; those to France, 117½ million, against 108¼ million in 1909; to Russia, 17¼ million, against 17¼ million in the preceding year; to the United Kingdom, 505½ million, against 514¼ million in 1909; to Netherlands, 85 million, against 95 million in 1909; to Belgium, 41 million, against 45 million in 1909; and to Italy, 53½ million, against 58½ million dollars in 1909.

In the commerce with Asia and Oceania the exports to Japan in the fiscal year 1910 were valued at 22 million dollars, against 26¼ million in 1909; to China, 16¼ million, against 19½ million in 1909; and to Australia, 27¼ million, against 24 million in the preceding year.

The changing character of the exports of the United States, from natural products to manufactures, is illustrated by the figures of exports to the grand divisions. The chief growth in exports occurs in the trade with North, Central and South America, the West Indies and Africa, in which manufactures naturally form a large proportion of the imports; while the chief decline in exports occurs in the trade with European countries, in which foodstuffs and manufacturers' materials form a large proportion of the imports.

On the import side the figures show an increase in the value of merchandise brought from each of the grand divisions, those from Europe in 1910 being valued at 806¼ million dollars, against 654¼ million in the preceding year; from North America, 306¼ million, against 254 million in 1909; South America, 196 million, against nearly 161 million in 1909; Asia and Oceania, 231 million, against 224¼ million in 1909; and Africa, 17½ million, against 15 million in 1909. Imports from the United Kingdom in the fiscal year 1910 were 271 million dollars, against 267¼ million in 1909; Germany, 168¼ million, against 143½ million in 1909; France, 132¼ million, against 108¼ million in 1909; Belgium, 40 million, against 27½ million in 1909; Cuba, 122½ million, against 96¼ million in 1909; Argentina, 33¼ million, against 22¼ million in 1909; Canada, 95 million, against 79¼ million in 1909; Mexico, 58¼, against 47¼ million in 1909; and those from Brazil, 108 million, against 98 million in 1909.

Manufactures made a new high record in the exports of the fiscal year 1910, aggregating 768 million dollars in value, against 750 million dollars in 1909, the former high record year, and forming during the year just ended about 45 per cent. of the total exports and in the closing month of the year, over 55 per

cent. of the total. Manufactures, which formed in 1910 45 per cent. of the total exports, formed in 1900 35 per cent., in 1890 21 per cent., and in 1880 15 per cent., and aggregated in 1910, 768 million dollars, against 485 million in 1900, 179 million in 1890, and 122 million in 1880.

Manufacturers' material imported also made a new high record in 1910, the total value for the year being 856 million dollars, against 673 million last year and 751 million in 1907, the former high record year.

Iron Ore Resources of the World.

In January, 1908, the executive committee of the Eleventh International Geological Congress, soon to be held in Stockholm, Sweden, sent out circulars announcing its intention to compile a summary of the iron ore resources of the world, to be a permanent contribution to the literature on this subject. The task which the geologists of Sweden set for themselves was a large one. The idea was particularly attractive to Swedish mining geologists and mine owners, in view of the prominence their country has had in recent years as a source of high grade iron ores.

The co-operation of the iron ore authorities throughout the world was solicited. Official geological surveys and many experts in mining geology were addressed.

The two volumes of text and the accompanying atlas, which have recently come from the press, are proofs of the prodigious labors of the executive committee and its collaborators. Volume I contains 550 pages, 8½ in. x 11 in., in addition to 79 pages of introduction and summary, the latter, which is a resume of the two volumes, being prepared by H. Sjöegren. Volume II. contains 518 pages. The work is edited by J. G. Anderson, general secretary of the congress. There are 42 maps, 13½ in. x 19½ in., and the two volumes contain 28 plates, chiefly maps and views of mines, and 137 illustrations in the text. The publisher is Generalstabens Litografiska Anstalt, Stockholm. The price of the work is £3.

The world's summary, as shown by these reports, is given below. In the first and third columns the figures represent iron ore in million tons; in the second and fourth columns the figures represent pig iron equivalents, based on the average percentage of iron in the ore.

Summary of Iron Ore Resources of the World.

(Figures given are in million tons.)

	Actual		Reserves		
	Ore.	Iron	Ore.	Iron.	
Europe	12,032	4,333	11,029	12,075	+ considerable
America	9,855	5,154	21,822	40,131	+ enormous
Australia	136	74	69	37	+ considerable
Asia	200	146	457	283	+ enormous
Africa	125	75			
Totals	23,408	10,192	123,377	58,136	+ enormous.

* Many thousands.

† Plus many thousands of millions.

"Railway" Reading Matter.

The Chicago, Burlington & Quincy has found that Dr. Charles W. Eliot's "five feet of books" are not the kind of literature that travelers on its trains are hungering for. Daniel Willard, formerly vice-president of the Burlington and now president of the Baltimore & Ohio, who is one of the students and booklovers among high railway officers, was greatly interested in Dr. Eliot's list of books when it was announced and caused sets of the books to be put on the Burlington road's best trains. A record was kept of the use made of the books from November 21, 1909, to January 15, 1910, on four trains. Each set contained 11 volumes and the total number of books taken from the shelves to be read was 25. It is estimated that meantime the books were available for perusal by 49,500 people. The travelers seemed to be very little attracted by Adam Smith's "Wealth of Nations," Darwin's "Origin of Species," etc. In consequence, new libraries have been bought, consisting of more popular reading matter.

In this connection the following comment from the New York *Evening Post* will be of interest. "The action of the Burlington in removing Dr. Eliot's famous five feet of classics from its library does not involve no reflection either on the classics or on the Burlington. Serious reading at their best, Dr. Eliot's books

MEETINGS AND CONVENTIONS

The next meeting of the International Railway Congress will be held in Berlin, Germany, in 1945.

[illegible]

Traffic News.

Officers of the Chicago, Milwaukee & St. Paul expect to begin running passenger trains through to the Pacific coast over the St. Paul lines September 15.

The Northern Pacific has taken off through passenger trains No. 7 and No. 8 west of Glendive, Mont.; and trains 15 and 16 between St. Paul and Mandan, N. Dak.

The Philadelphia & Reading has re-established on the Shamokin division the passenger fares which were in effect before the reduction that was made in consequence of the Pennsylvania law in 1906.

There was received and forwarded at Indianapolis in the week ended July 31 a total of 34,578 cars, of which 27,838 cars were loaded. This compares with 24,673 loaded cars in the corresponding week of 1909 and 22,403 in 1908.

The St. Louis & San Francisco has contracted for trackage rights from Paris, Tex., to Dallas, 98 miles, over the Gulf, Colorado & Santa Fe; and from Dallas to Fort Worth, 34 miles, over the Rock Island lines, and is running its own trains through to Dallas and Fort Worth. The route of the Frisco trains from St. Louis to Dallas will now be 87 miles shorter than that of the Missouri, Kansas & Texas, and 27 miles shorter than the St. Louis, Iron Mountain & Southern.

Grain merchants represented in the Philadelphia Commercial Exchange, who, for a long time, have been protesting against the practice of the railways in making a charge for reconsigning carloads of grain, are now demanding that bills of lading be always dated the date on which the cars start. They claim that in Chicago bills are dated when the grain is loaded, but that shippers, for purposes of their own, secure the detention of the cars in Chicago from one to five days after they are loaded.

G. M. Brown, examiner for the Interstate Commerce Commission, opened, in New York City, last Monday, the hearing announced some time since on the proposed advances in freight rates which have been announced by the trunk lines and which were suspended at the request of the commission; but, by mutual agreement, the hearing was adjourned to September 7. Mr. McCain, chairman of the Trunk Line Association, said that the postponement would enable the railways to present their data in better shape than could be done at present and that the work of the commission would thus be facilitated.

Attorney-General Charles West, of Oklahoma, has issued an open letter to the public, suggesting the expediency of making an arrangement with the railways whereunder passengers shall pay a fare of 2½ cents a mile in Oklahoma instead of 2 cents a mile, and having the roads issue in return a coupon at the rate of 1 cent a mile which can be redeemed in case the state 2-cent fare law, which is in litigation, shall be held valid. He says he believes the roads probably would be willing to make the proposed arrangement, as it would save them a contingent liability of ½ a cent a mile and also a large amount of book-keeping expenses. On the other hand, it would save travelers a fare of 1 cent a mile in case the 2-cent fare law should finally be held invalid.

Freight Car Balance and Performance.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 78, covering car balance and performance for April, 1910, says:

There was a decreasing in traffic in April, and the beginning of a homeward movement of cars, the cars on the home lines increasing from 54 per cent. in March to 56 per cent. in April, with a corresponding decrease in the loaded mileage, which dropped from 71.3 per cent. to 68.7 per cent. There was a slight increase in the shop cars, which still held down close to the minimum. The average for April was 5.51 per cent.

"The miles per car per day averaged 24.0, which included idle cars equal to 1.19 per cent of the total on line. This compares

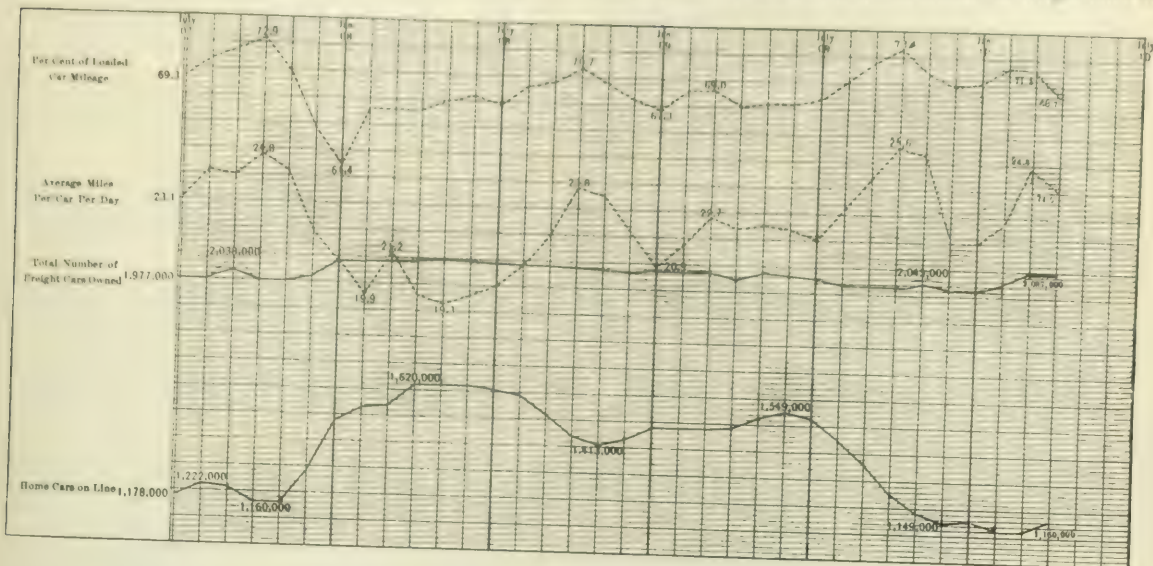
CAR BALANCES AND PERFORMANCE IN APRIL, 1910.										Grand Total.	
New England.	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Ill., Wis., Minn.	Iowa, Mo., Ark.	Mont., Wyo., Neb., Dakotas.	Kan., Colo., Okla., Mo., Ark.	Texas, La., New Mex.	Oriz., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.	
76,911	95,132	211,615	169,690	386,068	17,341	133,759	36,176	117,757	80,766	2,087,017	
38,389	334,911	119,683	92,772	82,575	5,693	75,971	17,265	59,714	57,542	1,157,067	
1,911	276,962	102,171	69,235	203,082	14,932	26,008	18,779	57,099	26,479	996,364	
76,191	634,205	212,854	162,097	406,850	30,896	120,082	56,084	116,813	81,021	2,093,431	
2,250	1,239	80,812	80,812	80,812	3,654	120,082	9,898	116,813	81,021	2,093,431	
99	92	53	54	68	34	56	66	51	61	56	
32	10	48	41	53	87	38	72	48	39	44	
102	92	104	95	121	121	91	138	99	91	100	
5,755	3,911	9,571	4,042	17,330	1,200	6,239	3,007	9,723	2,282	99,925	
82,096	671,550	222,428	166,069	484,210	22,075	132,321	39,041	126,536	80,504	2,183,356	
1,31	113	6,32	5,75	4,29	5,16	10,16	5,26	3,33	5,26	5,51	
1,126	1,214	2,799	2,988	6,341	468	2,514	700	2,336	1,896	33,981	
73	66	80	56	76	47	33	53	51	46	64	
43,111,114	48,801,473	142,431,296	126,630,485	302,987,528	24,725,395	96,776,396	53,251,392	119,217,133	76,753,801	1,571,849,117	
17.7	21.9	21.3	25.4	21.0	57.3	21.1	30.1	31.1	29.6	24.9	
753	98.1	68.1	65.6	69.4	71.9	63.3	61.2	68.5	76.9	68.7	
190,714,944	7,497,596,579	1,905,591,457	1,972,437,366	1,626,401,448	363,611,098	1,278,081,244	388,714,006	1,081,755,001	1,061,771,011	21,093,740,050	
11.2	15.9	14.5	15.6	12.4	15.4	13.1	11.0	14.1	13.8	14.2	
14.9	32.7	21.3	23.7	18.6	21.5	20.5	17.2	21.2	18.0	20.9	
109	571	313	306	241	606	332	332	450	410	310	
\$3,764,284	\$47,140,266	\$12,025,907	\$11,920,314	\$98,897,087	\$2,919,104	\$10,220,917	\$2,918,837	\$14,770,280	\$7,528,412	\$154,223,850	
\$2.40	\$2.49	\$1.89	\$2.21	\$2.49	\$5.65	\$2.54	\$2.76	\$4.18	\$2.41	\$2.17	
2.43	2.43	1.88	2.36	2.06	4.65	2.70	2.73	4.21	3.00	2.47	
2.34	2.34	1.80	2.25	1.99	4.40	2.57	2.52	3.89	2.92	2.55	

quite favorably with March, when the tonnage was about one-half of that reported for April. The tonnage loaded per rail from 21.6 to 20.9, the decrease being accounted for by the increased coal traffic, due to mine shipments in a number of states.

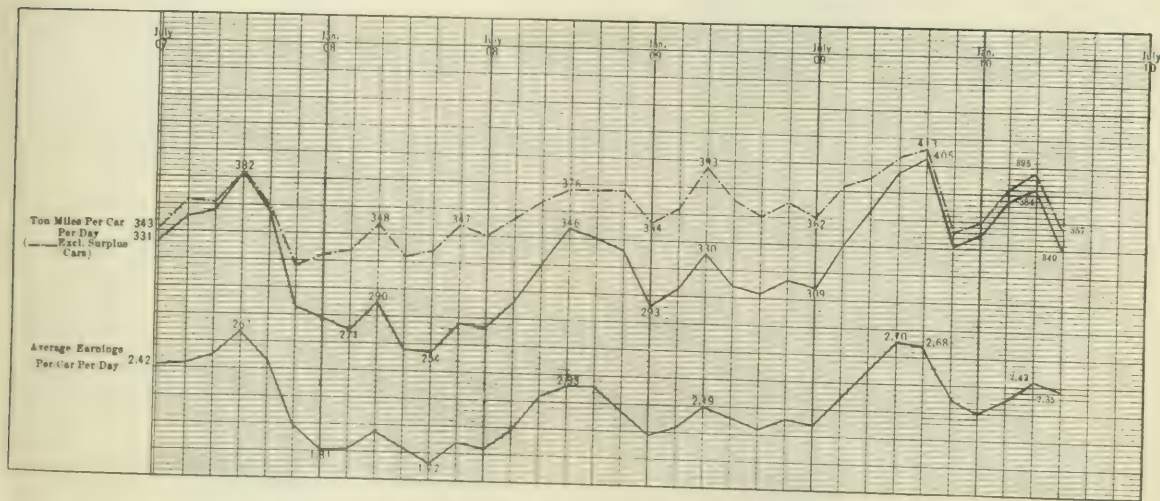
The ton miles per car per day and the daily average per car both show a decrease (the former to 340 and the latter to 5.1). The loss in earnings was much less than the loss in tonnage, this result also being explained by the decrease in coal traffic, which carries a lower rate than the average of all commodities.

Losses, which amounted from New York, and the railway net earnings in 1909 exceeded those of 1907 by \$1,000,000, and that railway net earnings in 1909 exceeded those of 1907 by \$147,000,000. Now, the loss in total railway gross earnings in 1909 were \$170,428,040 less than they were in 1907, and net earnings in 1909 were \$1,000,000 less than in 1907.

After reading such an extensive summary statement on this, as is prepared for the transportation of a document from Washington, showing that the proposed increase in freight rates in



Car Performance in 1907, 1908, 1909 and 1910.



Car Earnings and Loading in 1907, 1908, 1909 and 1910.

The table shows car balance and performance for the period covered by the report and the charts show earning and performance figures, in the last three years.

Misstatements in Regard to Earnings.

President S. M. Lusk, of the Chicago and Great Western, gave out a statement on August 15 regarding the erroneous reports that are constantly being put into circulation regarding railway affairs. He referred particularly to statements given out in New York and Washington, and appearing in despatches in Monday morning's papers. "One of these statements," said Mr.

official classification territory would amount to 16 per cent, it was stated that the proposed increases in freight rates would average 16 per cent, and that if they went into effect they would increase railway earnings by \$500,000,000. Now, the fact is that the freight earnings of the roads designated by the Interstate Commerce Commission as groups I, II, and III, which handle practically all the business in official territory, were, in 1907, the most prosperous year in their history, but \$786,545,547. Consequently, a 16 per cent increase in their rates would amount to about \$125,000,000, or only one-fourth as much as asserted. Furthermore, it is probably an exaggeration to say that the increase in rates will average anywhere near 16 per cent."

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on railway car service of the American Railway Association, in presenting statistical bulletin No. 17 giving a summary of the surplus and surplus by groups from March 12, 1909, to August 3, 1910, says:

The total surplus reported for the date of this bulletin is

and is made up of 1 (Eastern) and 2 (Middle Western) and 10 (Northwest) and 1 (Middle Western) and 10 (Northwest). The shortage of the grain service is largely responsible for the increased demand for new cars. The decrease in surplus is not reflected in the large grain producing sections, but group 2 (Eastern) and 2 (Middle) show large reductions in this class, indicating that the demand has extended to that territory. There are some scattering shortages reported and some requests by

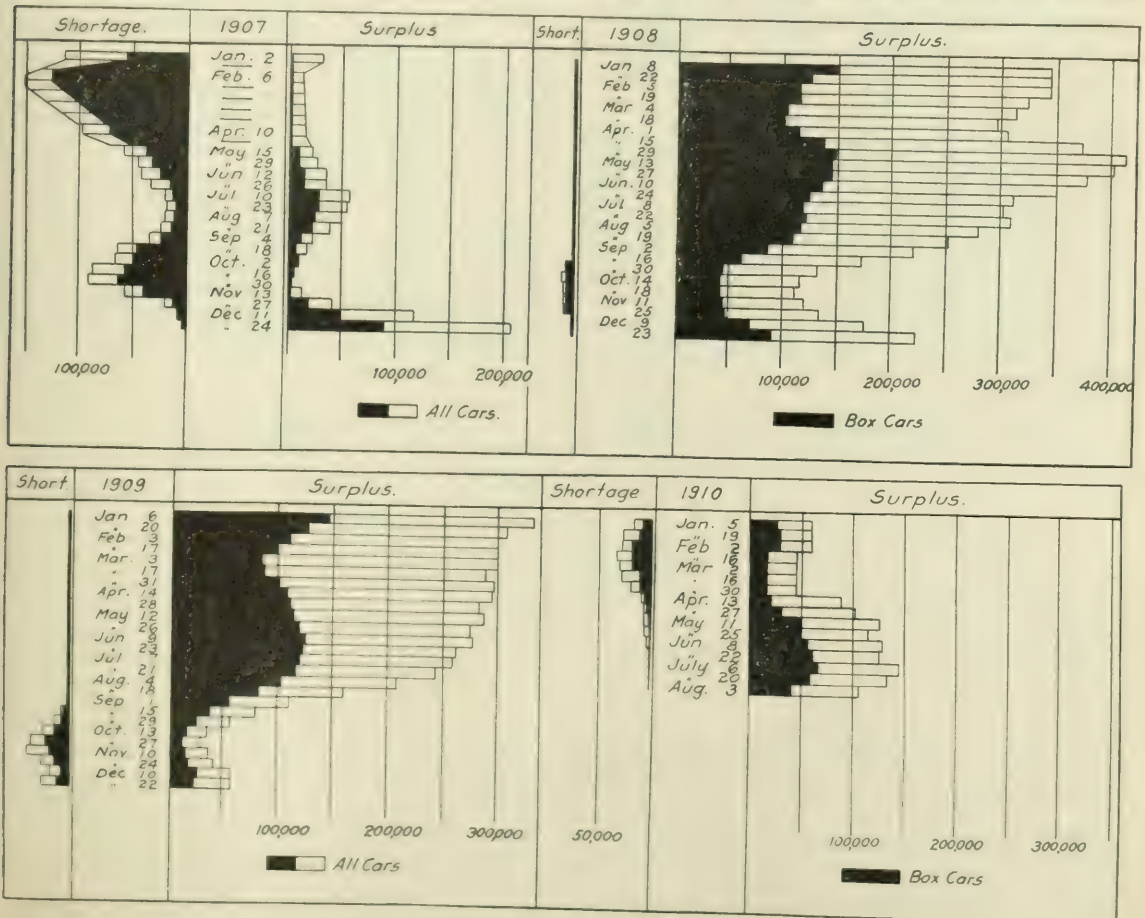
CAR SURPLUSES AND SHORTAGES.

Date.	No. of roads.	Surplus.				Shortage.			
		Box.	Flat.	Coal gondola.	Other.	Box.	Flat.	Coal gondola.	Other.
Group 1—August 3, 1910	6	693	191	175	—	153	—	—	—
" 2 " 3, 1910	6	3,812	135	9,004	9,985	26	0	—	—
" 3 " 6, 1910	11	14,003	945	6,071	2,506	62	174	—	—
" 4 " 9, 1910	20	3,611	391	950	4,111	17	195	—	—
" 5 " 12, 1910	20	3,506	—	3,048	3,571	140	3	—	—
" 6 " 15, 1910	20	7,008	—	—	4,804	229	1	28	108
" 7 " 18, 1910	17	3,061	81	3,906	3,513	—	0	0	0
" 8 " 21, 1910	14	1,118	299	300	—	16	12	—	—
" 9 " 24, 1910	5	1,000	1,011	1,082	5,640	50	30	16	—
" 10 " 27, 1910	—	1,016	—	—	—	0	28	0	—
Grand total	116	41,006	2,589	19,006	17,647	1,181	220	44	108

Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan, and Western Pennsylvania lines; Group 4—West Virginia, Virginia, and North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota, and North and South Dakota lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.

105,564, a decrease of 29,030 since our last report. Of this decrease 17,827 are box cars, 8,126 coal and gondola and 3,433 miscellaneous, the decrease in the latter being principally coke

grain carrying roads for assistance from lines still holding a surplus. As regards the coal car situation, the reports denote an increase in the demand for this class of cars, and with traffic



Car Surpluses and Shortages in 1907, 1908, 1909 and 1910.

equal to that of August, 1909, the present surplus should practically disappear by September 1.

"The committee recommends to the railways that they urge the public to make all possible shipments immediately while there is still a surplus of cars. If they will begin their fall shipments earlier than usual they will postpone to that extent the car shortage which now seems inevitable. The general adoption and enforcement of the car demurrage rules has done much to improve the situation, but the committee would further recommend that all industries be requested to unload cars as much as possible within the free time allowed by the demurrage rules.

"The committee also reminds the railways that the prompt handling of traffic and of empty cars will likewise do much to postpone the shortage."

The accompanying table gives car surpluses and shortages by groups for the last period covered by the report and the charts show surpluses and shortages in 1907, 1908, 1909 and 1910.

Corn Production in the Land of Cotton.

The last report of the U. S. Department of Agriculture shows that in Virginia, North Carolina, South Carolina, Georgia, Kentucky, Tennessee, Alabama and Mississippi 26,277,000 acres were planted in corn this year, being an increase of 1,535,000 over 1909 and 2,776,000 acres over 1908. This points to the fact that the South is constantly devoting more attention to raising its own food supplies. The acreage in corn for the three years in these states is shown in the following table:

States.	1908.	1909.	1910.
Virginia	1,925,000	2,040,000	2,142,000
North Carolina	2,787,000	2,898,000	3,072,000
South Carolina	2,673,000	2,218,000	2,418,000
Georgia	4,300,000	4,400,000	4,532,000
Kentucky	3,366,000	3,568,000	3,639,000
Tennessee	3,350,000	3,575,000	3,718,000
Alabama	3,050,000	3,233,000	3,324,000
Mississippi	2,650,000	2,810,000	3,232,000
Total	23,501,000	24,742,000	26,277,000

The table indicates that each state showed an increase over 1908 in 1909 and an increase over 1909 in 1910. The condition of this year's crop as reported by the department shows the states of the South leading the country, Mississippi being first, Alabama second and Georgia third.

In a letter to the directors of the Southern Railway, President Finley called particular attention to these figures and said:

"The increase in the acreage of corn, accompanied, as it is, by a quite general adoption of improved cultural methods, is one of the most encouraging features of southern agricultural progress. It is one of the results of a general movement throughout the South in the direction of diversified agriculture—a movement which we are endeavoring to encourage and assist as far as we can properly do so."

As the farmers of the South increase their yield of corn, they will save enormous sums which they have been spending in the West for food products, and will consequently themselves realize more from cotton and other market crops.

Traffic Through the Soo Canals.

There was a total of 3,242 vessels passing through the United States and Canadian canals at Sault Ste. Marie in July, 1910. These vessels carried a total of 9,975,173 tons of freight, of which 5,552,210 tons, in 1,062 vessels, passed through the Canadian canal, and 4,422,933 tons, in 2,180 vessels, passed through the United States canal. Of the total tonnage passing through both canals, 7,510,236 tons was eastbound and 2,464,937 tons was westbound.

Calves Is Cattle.

The Chicago Great Western gives a special carload rate to farmers who want to move. They may use one end of a box car for their household goods and the other for their live stock provided they do not put in more than ten head. Not long ago a farmer applied himself of this rate. He loaded ten cows in the car, but when it was opened it was discovered by the railway agent at the point of delivery that there were 12 head of cattle in the car, two of them new-born calves. Excess freight rates were demanded and paid by the farmer, who then registered a big kick with the higher freight officers of the road. An agent of the company has asked the Interstate Commerce

Commission if the company might refund the extra charge to the farmer without violating the anti-rebate provisions of the law. The commission probably will decide that it can.—Special Washington despatch to the Chicago Record-Herald.

INTERSTATE COMMERCE COMMISSION.

Reparation Awarded.

Beekman Lumber Co. v. Louisiana Railway & Navigation et al. Opinion by Chairman Knapp.

Excessive charges resulted from misrouting. (19 I. C. C., 343.)

Former Ruling Adhered To.

American Creosote Works, Ltd., v. Illinois Central et al. Opinion by Commissioner Cockrell.

Defendants' petition for rehearing of this case denied. (19 I. C. C., 314.)

Rates on Cypress Lumber Found Unreasonable.

Freeman Lumber Co. v. St. Louis, Iron Mountain & Southern et al. Opinion by Commissioner Clark.

Rates from Gleason, Ark., to points in Missouri, Kansas, Illinois, etc., found unreasonable, and rates for the future prescribed. (19 I. C. C., 348.)

Through Routes Established.

Florida Cotton Oil Co. v. Central of Georgia et al. Opinion by Commissioner Harlan.

Through routes on cotton seed from points on the Central of Georgia to Jacksonville, Fla., prescribed and rates fixed. Reparation on certain shipments denied. (19 I. C. C., 336.)

Increased Rate Found Reasonable.

Ohio Foundry Co. v. Pittsburgh, Cincinnati, Chicago & St. Louis et al. Opinion by Commissioner Cockrell.

Tariff in force prior to January 1, 1909, provided rates of \$1.35 and \$1.45 per 100 lbs. on "iron fireplaces and grates for same." Effective January 1, 1909, rates increased to \$1.40 and \$1.50. Held, that the lower rates should apply on complainant's shipments.

Rate of \$1.40 not found to be unreasonable. (19 I. C. C., 65.)

Lumber Rate Reasonable.

Alabama Lumber & Export Co. v. Philadelphia, Baltimore & Washington et al. Opinion by Commissioner Harlan.

Defendants' rate on lumber from Bellamy, Ala., to Holly Beach, N. J., not found relatively unreasonable under the circumstances disclosed by record.

Whether the Sumter & Choctaw Railway ought to have been included as a proper or necessary party to this record, or whether it is a common carrier or a private carrier, not considered; the commission looks to the Southern Railway Company to fix its course with respect to this carrier in conformity with all the requirements of the law. (19 I. C. C., 295.)

Reparation on Express Rates Denied.

Joseph Ullman v. American Express Co. et al. Opinion by Chairman Knapp.

Original complaint herein alleged unreasonable rates, but did not ask for reparation. Defendants contend that if complainant desired an award of reparation he should have given notice to that effect in his original complaint, and having failed to do so should now be estopped from claiming damages upon shipments which moved prior to the filing of such complaint.

With this contention we are inclined to agree. As has been heretofore suggested, the commission is not disposed to try complaints by piecemeal. If a complainant desires to secure repara-

adequate punishment for wrongful interference with the operation of appliances used to protect highway crossings.

That a statute be passed to punish all persons trespassing on railway tracks.

That the safety appliances law be further amended to require adequate and properly working hand-brakes on all cars, both freight and passenger, including interurban cars, and to give the commission authority to require the removal of lateral and overhead obstructions near railway tracks in cities and towns.

That the elimination of grade crossings be required, it being provided that steam and electric roads shall separate a specified number of grades each year for each 100 miles of road or fraction thereof, the expense of separation to be divided between the railways and the counties and cities or towns wherein the crossings are situated, on some basis to be fixed by the commission.

That town and city codes be so amended as to permit an appeal to the commission in respect to the regulations of town boards and city councils regarding the speed of trains within town or city limits.

That the two years' limitation on the life of orders of the commission be cut out of the law and a provision adopted that they shall remain in effect for such time as may be fixed by the commission itself or a court of competent jurisdiction.

Pennsylvania: Long and Short Haul Clause Upheld.

C. A. Clegg, Vice-President, C. & D. Lehigh Valley

Complainant is a large manufacturer of Portland cement at Coplay, Pa., and uses annually about 40 or 50 thousand tons of coal. The coal is shipped from the Lehigh coal region over the Lehigh Valley Railroad about 22 miles, the freight rate being 90 cents per ton. The defendant carries exactly the same grade of coal from the same coal fields in the same direction to more distant points at Hokendaqua, Allentown and South Bethlehem, three-fourths of a mile, six miles and 11 miles further from the mines, for 55, 58 and 60 cents per ton. The complainant said that these charges violate the act of 1907, which prescribes that "persons and property transported over any railway shall be delivered at any station at charges not exceeding the charge for transportation of persons and property of the same class in the same direction to any more distant station." The defendant claims that it is not subject to the act of 1907, because its charter definitely states what charges it may make; moreover, it claims that even if it is subject to the act of 1907, the prohibition in question cannot be enforced because the service to the more distant points is under substantially dissimilar circumstances, since there is competition at these points. It also claims that the coal at the more distant points is used for a different purpose, and that the tariffs specifically provide for coal used only for these purposes. The commission finds that the railway company is amenable to the act of 1907 because its charter, rights and privileges are subject to amendment. The commission takes the long and short haul clause to mean exactly what it says, and since the defendant admits that it does charge more for a short haul of exactly the same kind of coal from the same mines than for a longer haul in the same direction, it is violating this act. The effort to make a distinction as to the class of freight taken to the furnaces and to the cement works on the ground of a difference in material manufactured by its use does not impress the commission. As well might it be said that the same grade of coal becomes a different class when used in a stove from what it is when used in a grate, or when used in a store from what it is when used in a dwelling.

The commission [not having the power to order] recommends that the Lehigh Valley amend its tariffs to make them conform to the provisions of the long and short haul clause.

COURT NEWS.

The government has appealed to the supreme court in its case against the Baltimore & Ohio for maintaining an unreasonable obstruction in the Ohio river at Parkersburg, W. Va. In the northern district of West Virginia, Judge Dayton ordered a verdict of not guilty. The aim of the government was to enforce in order for removing a bridge pier from the channel of the river.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

S. W. Brown has been appointed receiver of the Bartlett-Florence, with office at Georgetown, Tex.

Fairfax Harrison, vice-president of the Southern Railway at Washington, D. C., has been elected president of the Chicago, Indianapolis & Louisville.

I. D. Minor has been appointed assistant general solicitor of the Yazoo & Mississippi Valley, with office at Memphis, Tenn., succeeding C. L. Silvey, resigned some months ago to become general attorney of the Illinois Central.

Operating Officers.

George L. Bonney has been appointed superintendent of dining and sleeping cars of the Great Northern, with office at St. Paul, Minn., succeeding C. L. Pratt, resigned.

J. B. Farrell has been appointed a trainmaster of the Cincinnati, Hamilton & Dayton, with office at Indianapolis, Ind., succeeding D. Sullivan, acting trainmaster, who has been assigned to special duties connected with the improvement of the line, and whose headquarters will be at Dayton, Ohio.

W. A. Beerbower, engineer maintenance of way of the Denver, Northwestern & Pacific at Denver, Colo., has been appointed general superintendent, in charge of operating, engineering and maintenance departments, succeeding to the duties of W. A. Deuel, general manager, who has been given an extended leave of absence. The offices of G. R. Simmons, assistant general manager and purchasing agent, and H. A. Sumner, chief engineer, whose resignations have already been announced, are abolished, and all business formerly handled by the general manager, assistant general manager and purchasing agent and chief engineer should be addressed to the general superintendent.

Traffic Officers.

C. R. Miller has been appointed general baggage agent of the Western Pacific, with office at San Francisco, Cal.

W. J. Wells, traveling passenger agent of the Canadian Pacific at Brandon, Man., has been appointed a district passenger agent, with office at Nelson, B. C.

W. C. Dibblee has been appointed acting division freight and passenger agent of the Western Pacific, with office at Sacramento, Cal., in place of J. C. Havely, absent on account of ill health.

H. F. Ledlie, division freight agent of the Lake Shore & Michigan Southern, with office at Youngstown, Ohio, has resigned to become vice-president and general manager of the American Warehouse Company at Wichita, Kan.

L. F. McFarland, city passenger agent of the Wabash at Kansas City, Mo., has been appointed district passenger agent of the Chicago Great Western, with office at Kansas City, succeeding Frank L. Matthews, resigned to engage in private business.

F. H. Thompson, industrial agent of the Michigan Central at Detroit, Mich., has been appointed general agent, with office at Detroit, succeeding F. V. Davis, commercial agent, resigned. W. S. Crowl succeeds Mr. Thompson as industrial agent.

C. O. Williams, city passenger and ticket agent of the Kansas City Southern at Kansas City, Mo., has been appointed traveling passenger agent, with office at Kansas City, succeeding H. D. Dutton, resigned to accept service with the Kansas City, Mexico & Orient.

John F. Ryan, traveling freight agent of the New Orleans, Mobile & Chicago, at Memphis, Tenn., having resigned to go to another company, W. H. Askew, traveling freight and passenger agent at Laurel, Miss., is temporarily assigned to Memphis.

William Weston, general agent of the Denver, Northwestern & Pacific, having resigned, the industrial land and mineral department has been discontinued, and all matters pertaining to

this department will in future be handled by A. C. Jones, general traffic manager, Denver, Colo.

Alfred Hunt Ream, whose appointment as railroad general freight agent at the Southern Pacific, with office at San Francisco, Cal., has been announced in these columns, was born January 19, 1871, in San Francisco. He received a high school education and began railway work in November, 1893, with the Southern Pacific as a messenger boy. He remained in the last freight office at Los Angeles, Cal., until October, 1898, when he became a clerk in the general freight office. Six years later he was appointed district freight and passenger agent at Bates, Neb., and in October, 1905, he was promoted to the general freight office in San Francisco as chief clerk, from which position he has now been promoted.

Alfred M. Fenton, whose appointment as assistant general freight agent of the Chicago, St. Paul, Minneapolis & Omaha at Minneapolis, Minn., has been announced in these columns, was born January 27, 1869, as Cresco, Iowa. He received a common school education and began railway work in 1886 with the Chicago, St. Paul, Minneapolis & Omaha as a telegraph operator. He continued as operator and agent at various places until 1898, when he was appointed a traveling freight and passenger agent, with headquarters at St. Paul. Two years later he was transferred to Grand Forks, N. D., and in 1901 he became general agent at Winnipeg, Man., where he remained until 1903. He was then for four years general agent at Helena, Mont., and from 1907 until his recent appointment he was division freight and passenger agent at Duluth, Minn.

Engineering and Rolling Stock Officers.

Alexander B. Todd has been appointed master mechanic of the Tonopah & Tidewater Co., which operates the Tonopah & Tidewater Railroad and the Bullfrog Goldfield Railroad, with office at Stagg, Cal.

C. E. Gossett, master mechanic of the Iowa Central at Marshalltown, Iowa, has been appointed master mechanic of the Minneapolis & St. Louis, with office at Minneapolis, Minn., succeeding J. Hill, resigned. William Hill succeeds Mr. Gossett.

W. A. Beerbower, engineer maintenance of way of the Denver, Northwestern & Pacific at Denver, Colo., has been appointed general superintendent, in charge of the operating, engineering and maintenance departments. (See an item under Operating Officers.)

C. E. Brinser, supervisor of the Pennsylvania Railroad, has been appointed division engineer of the New York, Philadelphia & Norfolk, with office at Cape Charles Va., and J. H. Martin has been appointed foreman of signals, with office at Pocomoke, Md.

A. J. Fries, division master mechanic of the Boston & Albany, at Springfield, Mass., has been appointed division superintendent of motive power of the Western division of the New York Central & Hudson River, with office at Depew, N. Y., succeeding C. H. Hogan, promoted.

OBITUARY.

Sidney B. Jones, for 30 years city passenger agent of the Chicago, Indianapolis & Louisville at Chicago, died of heart disease in Chicago on August 9. Mr. Jones has been in the service of the Monon since it was built.

C. L. Bretz, general manager of the Cumberland & Pennsylvania, died July 31 at Cumberland, Md. Mr. Bretz was born March 28, 1847, and began railway work in 1868 as a telegraph operator on the Pennsylvania Railroad. He was appointed general manager of the Cumberland & Pennsylvania on June 1, 1901.

T. A. Switz, formerly assistant to general manager and purchasing agent of the Minneapolis, St. Paul & Sault Ste. Marie, died August 13, at his home in East Orange, N. J. Mr. Switz was born November 15, 1857, at Madison, Wis., and began railway work in 1875 as telegraph operator on the Chicago, Milwaukee & St. Paul.

Paul S. Prendergast, of St. Paul, Minn., announced the revision of line for the Great Northern, died at Great Falls, Mont., on August 9, at the age of 32 years. Mr. Prendergast was a graduate of the University of Minnesota and had been in the service of the Great Northern almost continuously since June, 1901, consecutively as leveler, transitman, assistant engineer of maintenance of way and construction, locating engineer, and then as engineer in charge of the important revision work between Armington, Mont., and Great Falls.

James E. Hurley, general manager of the Eastern Lines of the Atchison, Topeka & Santa Fe, vice-president of the St. Joseph Terminal Railroad and member of the Topeka, Kan.,



James E. Hurley.

quette & Northern, at Topeka, Kan., died recently of heart disease at Carlsbad, Austria. Mr. Hurley was born June 1, 1860, at Wapello, Iowa, and went to the Wapello high school and later to the Normal School at Hamilton, Iowa, for three years. He began railway work in 1880, and his whole career has been on the Atchison system, where he began as brakeman, and was baggage-man, telegraph operator and station clerk at various stations in Kansas; relief agent, and then chief clerk and cashier at Hutchinson. In October, 1883, he was made agent at Florence, and

in 1887 became chief clerk to the general superintendent at Topeka. He was next appointed trainmaster of the Eastern division, remaining in that position until September, 1891, when he was appointed assistant superintendent of the Missouri division. The following month he was appointed assistant superintendent of the Chicago division. From June to October, 1894, he was superintendent of the New Mexico division, and was then made superintendent of the consolidated New Mexico and Rio Grande divisions. From January to October, 1901, he was acting general superintendent of lines west of Albuquerque, and was then appointed general superintendent of the Western Grand division, with office at La Junta, Colo. In July, 1902, he was appointed general superintendent of the Eastern Grand division, and in May, 1905, was made general manager of the same territory.

Albert Spies, who for many years was the editor of *Cassier's Magazine* and recently proprietor and editor of *Foundry News*, died of apoplexy on August 16 at his home in Jersey City, N. J. Mr. Spies was born in New York City July 20, 1862, and was a graduate of Stevens Institute. He was in engineering practice until 1893, when he became editor of *Cassier's Magazine*. He was vice-president, treasurer and managing director of *Cassier's Magazine Company* and vice-president of the Electrical Age Company until 1906, and then editor of the *Electrical Record*. Mr. Spies was a member of the American Institute of Mining Engineers, American Society of Mechanical Engineers, associate member of the American Institute of Electrical Engineers, and a member of the Engineers' club.

New Manager for Chilean State Railways.

Franz Doner, a German, has succeeded Huet, an Englishman, as general manager of the Chilean State Railways. This officer's power is only advisory, as he is not a member of the purchasing commission. The latter is composed of the director de la sección de materiales (at present James McCurly, a Scotchman), the head of the particular department needing repairs or supplies, and the official in charge of expenditures for railways. It is almost impossible, however, for any firm not having a representative on the ground to get an order.

Railway Construction.

New Incorporations, Surveys, Etc.

BALTIMORE & OHIO.—A contract is said to have been given to the Eyre-Shoemaker Co., Philadelphia, Pa., to build a 10-mile line into the coal fields of Somerset county, Pa., from Somerset north to Acosta.

A contract is said to have been given to the McLean Contracting Co., Baltimore, Md., for the retaining walls and bridge abutments for the overhead crossings of the Baltimore & Ohio tracks at Hamburg street, Baltimore. The contract calls for about 5,000 yds. of concrete work. The contract for the steel superstructure will be let soon. This work is being carried out by the Baltimore & Ohio under the ordinance passed last year which provides for the elimination of grade crossings near the Camden station.

According to press reports a contract has been given for piercing a 4,500-ft. tunnel and building three miles of railway. The improvements will cost about \$2,000,000 and are being carried out to eliminate an old tunnel at Tunnelton, W. Va.

BATESVILLE SOUTHWESTERN.—Incorporated in Mississippi, with \$100,000 capital, to build from Batesville, Miss., on the Illinois Central, south to Charleston, in Tallahatchie county, 28 miles. The line will traverse a rich agricultural and timber section. The promoters are identified with the Illinois Central. R. J. Darnell, Memphis, Tenn., is also interested.

BOSTON & ALBANY.—Work is shortly to be begun on the new tunnel between State Line, Mass., and Canaan, N. Y. This tunnel will be 1,200 ft. long and will be virtually a duplicate of the present two-track tunnel, thus making possible the four-tracking of the road at this point. (June 17, p. 1567.)

BROWNWOOD NORTH & SOUTH.—According to press reports, the Texas Grading Co., Fort Worth, Tex., will complete grading work on this line from Brownwood, Tex., north to May, during August, and track laying is to be started by September 1. (July 29, p. 205.)

CANADIAN NORTHERN.—According to press reports, application has been made to the Dominion government for a charter to build from Edmonton, Alb., west to Stewart, B. C.

Engineers are now at work, it is said, seeking a practicable pass for the Portland Canal short line, to be built under the name of the Pacific & Alaska eastward from the headwaters of the Salmon river towards the eastern boundary of the province to a connection with the main line at a point west of Yellow Head Pass.

The Carlton subdivision, extending from Dalmeny, Sask., north to Laird, 28 miles, of this road has been opened for business.

CANADIAN PACIFIC.—According to press reports, this company has concluded negotiations for buying nearly a mile of river front property at Kamloops, B. C., on the North Thompson river. This is to be used as a site for yards and increased terminal facilities. The total cost of the improvements will be about \$200,000.

CLARION & EAST BRADY (ELECTRIC).—It is announced that a contract will be let by September 1 for building this line from Clarion, Pa., southwest to East Brady, 31 miles. The road will connect with the Franklin & Clearfield at Reidsburg. It is understood that the line is to be completed by July 1, 1911.

CONCORD & KEELE RAILROAD.—Application has been made to the Massachusetts board of Railroad Commissioners to build an extension within the limits of the city of Chicopee, Mass., from a point on the company's right-of-way, about one-third of a mile east of the Chicopee Center station, on its Chicopee Falls branch, northeasterly and easterly about a mile and a half to a point near Gratton street. The work will involve the excavation of 31,000 cu. yds., the construction of 800 cu. yds. of masonry and putting up a bridge over the Chicopee river.

THE CUMING RAILWAY.—An officer is quoted as saying that an extension is to be built from Redmond, Ore., southward to connect with the Nation-Klamath Falls line now being built under the name of the Oregon Eastern. (Jan. 28, p. 209.)

EASTERN ILLINOIS (ELECTRIC).—This company is said to have

given a mortgage to secure an issue of \$5,000,000 bonds, of which \$400,000 are to be used for securing property and building and equipping the line. The company was organized in Illinois early this year and plans to build a line from West Hammond, Ill., west via Harvey and Riverdale to the Chicago city limits. T. E. Mitten, of the Chicago City Railways, is president. (March 18, p. 750.)

ERIE.—An officer writes that work is to be continued until stopped by extremely cold weather by the company's men making improvements through Jamestown, N. Y., rearranging the main tracks, providing switching leads for industrial tracks, and enlarging the freight house yards. Work is also being carried out at Kent, Ohio, rearranging and enlarging the division yards.

FAIRCHILD & NORTHEASTERN.—This company has amended its charter, permitting it to build an extension from Fairchild, Wis., west to a point on the Chicago, Milwaukee & St. Paul near Caryville, in Dunn county, about 40 miles. The line is now in operation from Fairchild, northeast to Owen, 38 miles. (June 17, p. 1568.)

GREAT NORTHERN.—An officer writes that plans are being made for a change of line on the main line west of Wellington, Wash., which involves the construction of a reinforced concrete snow shed.

GREENVILLE & KNOXVILLE.—This road has been extended from Cleveland, S. C., north to Riverview. (March 19, 1907, p. 654.)

HUDSON & MANHATTAN.—An officer is quoted as saying that work is being pushed on the Sixth avenue extension and that the Thirty-third street terminal station is expected to be finished and opened for operation about November 1. The Twenty-eighth street station will be finished about the same time. The extension to Forty-second street and connection with the train levels of the new Grand Central station it is expected will be completed within the three-year limit. (April 22, p. 1065.)

HUDSON BAY RAILWAY.—The government has not yet decided what action it will take in connection with carrying out the work of building this line from the present terminus of the Canadian Northern line at The Pass, Keewatin, north to Hudson bay. It is understood that the Canadian Northern is willing to build the line, but it is thought that the government will carry out the construction work and lease the line to the Canadian Northern. (July 8, p. 107.)

JOHNSTOWN & ALTOONA (ELECTRIC).—An officer writes that bids have been received and are under advisement for building the line from South Fork, Pa., northeast to Altoona, 30 miles. (July 29, p. 205.)

LAKE GENEVA & LAKE DELAVAN.—Incorporated in Wisconsin, with \$25,000 capital and office at Walworth, Wis. The incorporators include: H. T. Windsor, L. C. Church, L. K. Robar and H. H. Lawrence.

LEHIGH VALLEY.—The report of this company for the year ended June 30, 1910, under date of August 10, shows that the company carried out a number of improvements and betterments during the year. The construction of a single-track branch from Lumber Yard, Pa., to a connection with the main line at Hays Creek, 12 miles, with the necessary classification yard, engine house, shop for car repairs and fuel and water facilities, to cost about \$1,500,000, has been authorized. The new line will provide a shorter route for westbound traffic from the Mahanoy and Hazleton regions and the classification of coal shipments in the vicinity of the mines, thus avoiding the congestion at Packerton and the reverse movement at Penn Haven Junction. Final surveys are now being made preliminary to the active construction of the branch. Surveys are also being made for double-tracking the line between Laurel Junction and Silver Brook Junction, six miles. The work of extending third and fourth tracks through congested territory has been actively continued. Extensions from Redington to Richards Farm, 1.91 miles, and from Gap Junction to a point west of Fullerton, including a change of alignment, 1.38 miles, have been finished. A further extension from Fullerton to Cementon, 4.29 miles, is in course of construction. In extending the four-track system through South Bethlehem improvement in the alignment is being made by eliminating a sharp reverse curve in the main line. An extension was also made to the fourth track from Park avenue, South Plainfield, N. J., to Potters, two miles, and in connection

with this work, 1.5 per cent. in the line east of Porters, and a maximum of 3.1 per cent. in considerable sections of the grade. A recent inspection of the line has been completed at the west end of Park Avenue and near additional tracks were laid. Realignments have been made, eliminating sharp reverse curves, at Hixson, Pa., and further. Additional tracks were constructed at the latter place. At Hixson, the work has been completed on the new high grade, and at Hixsonville, N. J. During the construction, three hundred and thirty, 28 steel bridges and 10 concrete steel bridges were put in to replace light iron or wooden structures, and 11 small bridges were replaced by pipe culverts. Eight bridges were abandoned and the openings filled, and three wooden overhead highway trestles were replaced by steel bridges and are removed. On the Auburn and Ithaca branch the bridges have been removed and strengthened to carry heavier rolling stock. See report elsewhere in this issue.

LOUISVILLE & NASHVILLE.—According to press reports, this company is planning to build an double-track road between Birmingham, Ala., and Decatur.

MEXICAN ROADS.—Grading work will probably be started on the line between Monclova, Coahuila and Chihuahua, 410 miles, some time this fall. The state of Chihuahua is said to have granted a subsidy of \$400,000 in aid of the enterprise, and also a liberal subsidy aggregating nearly \$2,000,000 on that portion of the road between Monclova and the Chihuahua state line. It is also reported that assurances have been given by the general government that it will also contribute liberal aid in the way of bonds. (March 4, p. 461.)

MILWAUKEE & FOX RIVER VALLEY (ELECTRIC).—The Wisconsin State Railway Commission has granted this company a certificate of convenience and necessity for the proposed line from Milwaukee, Wis., to Fond du Lac, passing through Hamilton, Cedarburg, Newberg, Plymouth, Chilton, Stockbridge, Appleton, Kaukauna and Menasha.

MISSOURI PACIFIC.—A contract has been given to the Hodges-Downey Construction Co., St. Louis, Mo., by the St. Louis, Iron Mountain & Southern, for the filling of about 20 trestles, involving the handling of about 400,000 yds. on the line between McGee, Ark., and Helena.

NATIONAL RAILWAYS OF MEXICO.—An officer writes that contracts have been given to Bell, Semmes & Blackford, Morelia, Michoacan, Mexico, for realignment work, reducing the grades and changing the narrow gage line to standard between Acambaro and Andocutin; also between Morelia and Lagunillas. There will be some short girders and many masonry culverts. (July 29, p. 209.)

OREGON RAILWAYS (ELECTRIC).—According to press reports, financial arrangements have been made and rights-of-way are to be secured at once for an electric line from Oregon City, Ore., south through the Molalla valley. G. C. Fields, Oregon City, is said to be the principal promoter.

PACIFIC & ALASKA.—See Canadian Northern.

PECOS VALLEY SOUTHERN.—According to press reports, track laying has been finished from Pecos, Tex., south to Saragosa, 30 miles, and this section is now open for freight and passenger business. The line is eventually to be extended further south via Balmorhea to San Salomon. L. W. Anderson, chief engineer, Pecos. (July 5, p. 194.)

PEOPLES RAILWAY.—An officer writes that this company is building from New Hamburg, Ont., east to Guelph, 29 miles, and contracts are let as follows: F. W. Maxwell, Port Hope, for work on three miles of the main line from Berlin, Ont., east to Bloomingdale, the work to be finished by December 1; R. B. Campbell, Latchford, for the section from Berlin, westerly to New Hamburg, 14 miles; this work is to be finished by December 30. The Acme Construction Co. has been at work for the past month carrying out the grading work from Bloomingdale east to Guelph. It is expected that the grading will be finished from Bloomingdale east to New Germany soon, and on the entire line by December. A contract has been given to Thomas Robbins, Galt, for all the concrete work on the line, including the three large piers and two abutments for the Grand river east of Berlin; the work is to be finished by December 1. A large force of engineers will at once make surveys

from Guelph north to Port Hope and beyond to Arthur, all well from Guelph north to Port Hope. An estimated \$200,000 cost is set. The company expects to have ready at the end of operation by July, 1911, and to complete a total of about 80 miles during 1911. A. N. Warfield, Berlin, may be addressed.

ST. LOUIS & EASTERN TRACTION.—Incorporated in Illinois to build from Granite City, Ill., east through Madison and Bond counties to Greenville, about 50 miles. The office of the company is at Greenville. The incorporators include: A. W. Crawford, C. C. Hillsboro and C. C. Terry, Girard.

ST. LOUIS & SOUTHEASTERN.—Organized in Missouri, with \$700,000 capital, to build a line to connect Cape Girardeau, Mo., with the St. Louis & San Francisco, in New Madrid county, about 75 miles. E. S. McCarty, president and general manager; L. A. Lewis, W. H. Garandlow and A. B. Hunter are vice-presidents; D. R. Hunter, treasurer, and L. Hunter, secretary.

ST. LOUIS, IRON MOUNTAIN & SOUTHERN.—See Missouri Pacific.

SAN ANTONIO, RIO GRANDE & TAMPICO.—Press reports from Austin, Tex., say that the engineer of the Railway Commission has completed his preliminary valuation of this work. He estimates the cost of the proposed line at \$1,688,361, an average of about \$18,655 per mile. (May 27, p. 1325.)

SOUTHERN PACIFIC.—Press reports indicate that the new trestle, three-quarters of a mile in length, on the western end of the Lucin cut-off over the Great Salt lake, has been opened for traffic. (April 1, p. 919.)

SPRINGFIELD & WESTERN INTER-URBAN.—An officer writes that this electric line is to be built from Springfield, Mo., north and west to Nichols, thence west to Carthage and Joplin, with a branch from Paris Springs south through Mt. Vernon, Friedstadt and Monett to Pierce City, and another branch from North Springfield south to meet the other line between Springfield and Nichols. Contracts for grading, track laying, bridges, etc., will be let early in 1911. There will be one 2,000-ft. trestle. M. M. Hollinbeck, president and chief engineer, Springfield.

TWIN CITY & LAKE SUPERIOR (ELECTRIC).—An officer writes regarding the double-track, third-rail line from Minneapolis, Minn., via St. Paul and Superior, Wis., to Duluth, Minn., 130 miles, that a portion of the grading has been completed and that no new contracts will be let for about 60 days. The work on this line is not of a difficult nature, the cut and fill per mile averaging 6 ft. There will be a few grades of 1 per cent. maximum, and the maximum curves will be 3 deg. There will be about eight or ten steel bridges, the longest being 1,400 ft. There will be 20 substations along the line. L. N. Loomis, president; H. L. Laughlin, chief engineer, Minneapolis. (March 19, 1909, p. 658.)

TEXAS ROADS.—Engineers are now at work locating the route for a line to be built from Longview, Tex., to the iron ore fields in Cass county, about 40 miles. The line is to be built by L. F. Featherstone and associates of Galveston, and it is understood is being backed by the Santa Fe. Surveys are also being made for a line to connect the iron ore fields with the Missouri, Kansas & Texas, about 20 miles.

VERA CRUZ, TOBASCO & CAMPECHE.—The construction company which is locating the route for the proposed line from Santa Lucrecia, state of Oaxaca, Mex., east and north to Campeche, in the state of the same name, 490 miles, will, it is reported, also build a branch line to the port of Coatzacoalcas, Vera Cruz, which is the Atlantic terminus of the Tehuantepec National. The proposed branch will be about 50 miles long and will traverse one of the richest tropical regions in Mexico. It is said that the federal government, in view of the proposed early building of this line, has abandoned its plans for spending several million dollars in improving the labor at Frontera, Tobasco. The new line will afford an outlet for the products of that region and there will be little necessity for using Frontera as a shipping point. (June 17, p. 1568.)

WASHINGTON RAILWAYS (ELECTRIC).—Financial arrangements are said to have been made and right-of-way secured for an electric line from Chehalis, Wash., west to Randle, in Lewis county, about 55 miles. C. L. Wilson and W. H. Allen, Chehalis, are interested.

Railway Financial News.

BARTLETT-FLORENCE.—The property of this company, which consists of 11 miles of road in operation from Bartlett to Jarrell, and 15 miles of partly graded road from Jarrell to Florence, has been placed in the hands of S. W. Brown as receiver.

CANADIAN NORTHERN.—An agreement, dated May 9, 1910, for the merger of the Saskatchewan Midland with the Canadian Northern has been filed with the Secretary of State, Canada, and sanctioned by the governor-general. See also Quebec & Lake St. John.

CANADIAN NORTHERN ONTARIO.—This company has bought \$2,463,300 stock of the total outstanding \$2,650,000 of the Ontario & Ottawa Railway, which company controls the Iron-dale, Bancroft & Ottawa, the Central Ontario and the Marmora Railway.

CANADIAN PACIFIC. See New Brunswick Railway.

CENTRAL ARKANSAS & EASTERN.—See St. Louis Southwestern.

CENTRAL NEW ENGLAND.—Minority stockholders have deposited their stock in sufficient quantities to make the negotiations with the New York, New Haven & Hartford for the sale of this stock a success, and the National Bank of Northern Liberties, Philadelphia, is making payment on all stock deposited up to July 25. The bank will continue to receive deposits of stock until November 1. (July 22, page 175.)

CHESAPEAKE & OHIO.—The Chesapeake & Ohio Equipment Corporation, recently organized, has filed an equipment trust agreement covering rolling stock that cost \$5,595,000 to secure \$4,800,000 series A and B 5 per cent. one-year equipment notes dated July 1, 1910. This is the equipment issue that the company does not expect to sell at present. The equipment securing series A notes consists of 3,000 fifty-ton all-steel hopper cars, 500 forty-ton steel frame box cars and eight all-steel cars for passenger service. The equipment securing the series B notes, all of which is now in use, consists of 1,000 all-steel center dumping hopper cars, 400 double-bottom all-steel cars and 1,000 all-steel hopper cars.

DELAWARE & EASTERN.—The reorganization committee, C. C. Taylor, secretary, Pittsburgh, Pa., asks bondholders of the Delaware & Eastern to communicate with the committee, as the mortgage securing the \$1,000,000 bonds is to be foreclosed.

DETROIT, TOLEDO & IRONTON.—A reorganization committee has been formed representing holders of consolidated mortgage 4½ per cent. bonds. The committee consists of General Alvin Young, chairman; Strathearn Hendrie, F. Ross Williams, Benson Foraker, G. W. Young, G. H. Worthington, Francis Henderson, James J. Robison, Warren W. Foster, with Howard C. Dickinson, 26 Exchange place, New York, as secretary.

GRAND TRUNK.—The directors, in addition to the full dividends on the guaranteed 4 per cent. stock and on the first preference stock, have declared a dividend for the half year ended June 30 of 2½ per cent. on the second preference stock. In 1909 and 1908 no dividends were declared in the first half of the year. In the second half of 1908 2½ per cent. was paid and in the second half of 1909 5 per cent. was paid to cover the entire year of 1909.

IRON-DALE, BANCROFT & OTTAWA NORTHERN.—Sale of the property under foreclosure has been set for September 15. The reorganization of the property will probably take place under the third mortgage, the holders of which securities are expected to buy in the property. The Goulds own \$1,965,000 of the third mortgage bonds out of a total issue outstanding of \$2,965,000.

LEAVENWORTH TERMINAL RAILWAY & BRIDGE. The Chicago Great Western has bought the entire \$600,000 stock of this company, but has not guaranteed the \$600,000 bonds. The Terminal company owns the highway and railway bridge, 1,110 ft. long, over the Missouri river at Leavenworth, Kan., and also the terminal property in Leavenworth.

MONTGOMERY, FLORENCE & FORTY-SEVEN.—The supreme court of Califor-

nia has granted a delay in the sale of this property. The property was placed in the hands of Edward White, as receiver, in 1907. About six miles of the road from Watsonville to Monterey were operated for a short time. The rest of the property consists of real estate, rolling stock, power houses, warehouses, etc., and the total is said to be worth about \$2,000,000.

NEW BRUNSWICK RAILWAY.—The company has declared a dividend of 4 per cent. on its \$3,000,000 stock for the year ended June 30. This is an increase of 1 per cent. over the previous years. The road is operated under lease by the Canadian Pacific.

NEW YORK, NEW HAVEN & HARTFORD.—See Central New England.

NORFOLK & WESTERN.—At a meeting to be held October 13 stockholders are to vote on the question of authorizing an increase in the common stock of \$50,000,000, making the total authorized common stock \$150,000,000. Of the present authorized \$100,000,000 common about \$69,000,000 is outstanding and all of the authorized \$23,000,000 4 per cent. non-cumulative preferred is outstanding. Stockholders are also to vote on the question of authorizing \$50,000,000 bonds, to be convertible into common stock on a basis to be determined by the directors. It is said in a letter sent to stockholders by President Johnson that no sale of the common stock or bonds is contemplated at the present time, but that it is the purpose of the directors to give the stockholders an opportunity to subscribe to any securities that may be hereafter issued. The issue of bonds is limited in amount to the amount of new stock held for the purpose of conversion. It is evident, therefore, that it will only be possible to increase the total capitalization of the company by \$50,000,000.

Stockholders will also vote on the question of approving a proposal to acquire by purchase, consolidation, merger or lease the property of the Big Stony Railroad, and also to lease the property of the Norfolk Terminal Railroad.

PENNSYLVANIA RAILROAD.—The New York Stock Exchange has listed \$12,750,000 additional Allegheny Valley Railway general mortgage 4 per cent. bonds, due 1942. Of these bonds, \$10,000,000 were issued to retire a like amount of Allegheny Valley Railroad low-grade division first mortgage 7 per cent. bonds, due April 1, 1910, and \$2,750,000 were issued to pay for double track work, extension of yards and for additional real estate.

ST. LOUIS SOUTHWESTERN.—Stockholders are to vote October 4 on the question of ratifying the agreement to guarantee principal and interest on the first mortgage 5 per cent. bonds of July 1, 1910-1940, of the Stephensville North & South Texas; also on the question of guaranteeing payment of principal and interest on the first mortgage 5 per cent. bonds of July 1, 1910-1940, of the Central Arkansas & Eastern; also on the question of leasing the Central Arkansas & Eastern for 30 years, during which time the St. Louis Southwestern is to have an option on the property to take it over on assumption of the payment of all bonds. The Central Arkansas & Eastern operates a line from England, Ark., to McGregor, 9½ miles, and in February, 1910, increased its authorized capital stock from \$100,000 to about \$800,000, and proposes to build a line from McGregor to Stuttgart, 15 miles.

UNDERGROUND ELECTRIC OF LONDON.—An initial dividend of half of 1 per cent. has been declared on the income bonds for the half year ended June 30, 1910.

WABASH-PITTSBURGH TERMINAL.—The United States circuit court has given the receivers permission to bring a suit against the Wabash and the Wheeling & Lake Erie for an accounting under the traffic and trackage agreement by which the Wabash and the Wheeling & Lake Erie pledged 25 per cent. of their gross earnings from traffic interchanged to the Terminal company to meet any deficiency of interest on the Terminal company's bonds.

The German freight tariff has received a supplement which provides that when flying machines, dirigible balloons and the like are shipped, an attendant may accompany them in the baggage wagon, paying 2 pfennigs per kilometer.

Supply Trade Section.

The W. S. Tyler Company, Chicago, has moved its offices from 800 Railway Exchange building to old Harper building.

E. H. Summington has been appointed general manager of the T. H. Summington Co., Baltimore, Md., with headquarters at Chicago.

The Damascus Brake Beam Company will open a plant in Cleveland, Ohio, soon to replace that which was burned a few weeks ago at Sharon, Pa.

The Safety Foot Guard & Railway Apparatus Company, Columbus, Ohio, has been incorporated with a capital stock of \$10,000. The incorporators are H. D. Ridenour and others.

The Kellogg Switchboard & Supply Co., Chicago, has been made exclusive agent of the United States Electric Co., New York, for the sale of railway telephone equipments, including the Gill selector.

The Marion Shovel & Dredge Company, Marion, Ohio, has been incorporated with a capital stock of \$100,000. The incorporators are J. D. Owens, Arthur E. Cheney, B. W. Evans, C. A. Owens and H. J. Barnhart.

W. M. Lalor has resigned as manager of the railway department of the United States Light & Heating Company, New York, to accept the position of sales engineer with the Gould Coupler Company, Depew, N. Y., with offices in Chicago.

The Hodges-Downey Construction Company, St. Louis, Mo., has received a contract from the St. Louis, Iron Mountain & Southern for the filling of about 20 trestles, approximately 460,000 yards, on the line between McGehee, Ark., and Helena, Ark.

The Mexican Northwestern has recently placed a large order for motors with the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., including 160 induction motors, aggregating 3,736 h.p., of the types MS and HF, ranging from 3 to 200 h.p. each. These motors will be shipped to Madera, Chihuahua, Mex., to be used in the operation of the saw and planing mills.

William H. Silverthorn, president and a member of the executive committee of the Railway Steel-Spring Co., New York, died at his home in Painesville, Ohio, on the morning of August 13, 1910. Mr. Silverthorn, or "Silver" as he was familiarly known to a host of friends, was identified with the railway supply business for many years. For the last 16 years, which period ended on the day of his death, Mr. Silverthorn was associated with Julius E. French, now chairman of the board of the Railway Steel-Spring Co. Those who knew Mr. Silverthorn well will recall that his first work in the railway supply field was with the old Paige Car Wheel Company, which he was general manager. This concern was, in 1897, consolidated with



William H. Silverthorn.

makers of wheels into the Steel Tired Wheel Co., and Mr. Silverthorn became a director and general manager. The Railway Steel-Spring Co. was incorporated in February, 1902, and acquired the plants of several makers of springs for railway service, among them the A. French Spring Co., with which Mr. Silverthorn had been identified for a number of years. In June of that year the Steel Tired Wheel Co. was merged into the Railway Steel-Spring Co., and Mr. Silverthorn was elected a director, and, later, vice-president and a member of the executive committee. In March, 1906, he succeeded Julius E. French as president of the company. Mr. Silverthorn at the time of

his death was also president of the United States Light & Heating Co. and a member of the board of directors of the Company Co. of America, the Chicago-Cleveland Car Heating Co., and the United States & Mexican Trust Co., as well as the Railway Steel-Spring Co., and United States Light & Heating Co. Mr. Silverthorn was buried at Cleveland, Ohio, on August 16.

TRADE PUBLICATIONS.

Spring.—The Pittsburgh Spring and Steel Co., Pittsburgh, Pa., has issued a catalogue covering the elliptic and coil springs for locomotives, passenger, freight, traction and interurban cars which it manufactures.

Locomotive Firebox.—The Wm. H. Wood Loco. Firebox & Tube Plate Co., Media, Pa., has issued a mailing card, showing a side elevation of a locomotive boiler having a Wood's patent firebox and tube plates.

Diamond Steel Pipe.—The 1910 catalogue of the U. S. Metal & Manufacturing Co., New York, describes the diamond steel pipe for use on electric power lines, telegraph and telephone lines, signal, danger and semaphore posts.

Link Belt Machinery.—Catalogue No. 90 of the Link-Belt Company, Chicago, containing 400 pages, 6 in. x 9 in., cloth bound, has just been issued. This catalogue is devoted particularly to price lists, illustrations and dimensions of the standard articles manufactured by this company, showing only a few general illustrations that are typical of its large engineering installations.

Steel Car Paint.—The Joseph Dixon Crucible Company, Jersey City, N. J., has just issued a very attractive booklet of envelope size on paint for steel cars, which illustrates a number of different types of steel cars upon which Dixon's paint has given excellent service. The booklet also contains color chips showing the four colors in which Dixon's Silica-Graphite steel car paint is made.

Glue Heaters.—The Advance Machinery Co., Toledo, Ohio, has just issued its 1911 catalogue, which supersedes all glue heating catalogues heretofore issued by this company. This one describes 56 different types of glue heaters, made in all sizes from 1 pt. to 500 gals., for use in heating glue, paraffine, starch, gelatine, dextrine, paste and gum, using the following heating agents: Oil, gasoline, gas, steam and electricity.

Brake Operation and Manipulation.—A reprint of a paper entitled "Brake Operation and Manipulation in General Freight Service," given by W. B. Turner, chief engineer, before the Western Railway Club, Chicago, on December 21, has been made up in pamphlet form by the Westinghouse Air Brake Co., Pittsburgh, Pa. This paper is a development from, and an elaboration of, the discussion along this line at the convention of the Traveling Engineers' Association held in Denver, Colo., a year ago.

Electrical Supplies.—The General Electric Co., Schenectady, N. Y., has issued bulletin No. 4718, illustrating and describing all of the apparatus required for a complete series incandescent lighting system; bulletin No. 4750 on standard couplings adapted for coupling electrical apparatus together or to other machinery; bulletin No. 4752 on rectifier sets, luminous arc lamps and all necessary auxiliary apparatus for complete series luminous arc rectifier systems, and bulletin No. 4760 regarding a line of direct-current instruments, constructed upon the D'Arsonval principle and designed for switchboard use.

Car Heating and Lighting.—A 165-page catalogue, 9 x 12 in., has been published by the Gold Car Heating & Lighting Company, New York, the intention being to include in one volume all of the various devices, fittings and special fixtures connected with the Gold systems of steam, vapor, hot water and electric heating so that they may readily be identified when ordering complete outfits or repair parts. Diagrams show the general arrangement of the apparatus on the car or locomotive, while detail drawings and illustrations show each of the various parts; they are numbered for convenience in ordering. The

Gold improved storage system for heating refrigerator cars is described; also Gold's cyclone ventilator for passenger and refrigerator cars and Gold's improved system of acetylene car lighting.

RAILWAY STRUCTURES.

AMERICAN FALLS, IDAHO—It is said the Oregon Short Line is having plans made for a new steel bridge over the Snake river. The estimated cost is \$400,000.

BALTIMORE, MD.—See Baltimore & Ohio under Railway Construction.

BOSTON, MASS.—Plans for the subway station for the Cambridge subway, at Park street, have been made and bids will be asked for soon to carry out the work. The station will be under the present Park street station, with which it will be connected by six stairways. The section of the tunnel under Beacon hill, which was begun last September from a point northwest of Grove and Phillips streets, towards the Park street station, is finished to a point under Mount Vernon street, and it is expected that this section will be finished by January. The Cambridge part of this tunnel is being built by private contractors for the Boston Elevated Railway Co. and the part within Boston's municipal limits is being done by the Boston Transit Commission.

CHICAGO.—The Illinois Central is having plans prepared for a proposed new station at the foot of Monroe street. The estimated cost of the building is \$50,000.

CHICOPEE, MASS.—See Connecticut River Railroad under Railway Construction.

EDMONTON, ALB.—The Canadian Pacific has given a contract to John Gunn & Sons, Winnipeg, Man., to build the substructure of a bridge over the North Saskatchewan river.

FORT WORTH, TEX.—The Missouri, Kansas & Texas is said to have started work on a reinforced concrete bridge, to carry two tracks, over Hattie street, in Fort Worth.

HOUSTON, TEX.—The new union terminal station built by the Houston Belt & Terminal Co. at Texas avenue and Crawford street in Houston, was formally opened for traffic on August 10. (March 11, p. 464.)

JAMAICA, N. Y.—Work is now under way by the Long Island Railroad Company's men on the new station and office building at Jamaica. Some contracts will be let about September 20. The building will be of fireproof brick construction, three stories high, 70 ft. x 175 ft., and will cost about \$325,000. (Aug. 5, p. 265.)

KANSAS CITY, MO.—The Kansas City Terminal Company has given a contract to C. D. Smith & Co., Memphis, Tenn., to excavate the site for the new union station. There are 750,000 cu. yds. of earth to be removed and the work is to be completed by May 1, 1911.

MATAMORAS, MEX.—According to press reports the new railway bridge over the Rio Grande, built jointly by the St. Louis & San Francisco and the National Railways of Mexico, cannot be placed in use until the latter company extends its line from the present terminus in Matamoras to the bridge connection, about two miles. This work is held up by legal action on the part of a street railway, which objects to the crossing of its line.

SHEBOYGAN, WIS.—The Sheboygan Light, Power & Railway Co. is said to be making plans for a new car barn to be built at Sheboygan, at a cost of \$25,000.

SIR JOHN'S RUN, W. VA.—The Baltimore & Ohio has given a contract to Roberts & Schaefer Company, Chicago, to build a coaling station to cost \$25,000.

SPARKS, NEV.—The Southern Pacific will build an addition to the shops here. The building will be two stories high, 60 x 100 ft., and will be made of brick.

TACOMA, WASH.—The Chicago, Milwaukee & Puget Sound is to build a commissary.

WENDELL, MASS.—The Canadian Northern has given a contract to the Carter Halls Abbridge Company to build coach shops, to cost \$1,000.

Late News.

The items in this column were received after the classified departments were closed.

A press despatch from Columbia, S. C., says that the Southern Railway train No. 30 southbound is reported as having been derailed near Rockton and 15 persons have been injured. The despatch says that the mail, express and combination cars and two passenger coaches were overturned, but the three sleepers remained upright.

William P. Boland, an independent coal operator of Scranton, Pa., has filed with the Interstate Commerce Commission charges against the Delaware, Lackawanna & Western and a number of other roads, charging that these railways and the Temple Iron Company have been engaged in a conspiracy to drive the complainant out of business.

Protesting against an assessment of \$3,835,448 by the California Board of Equalization, officers of the San Pedro, Los Angeles & Salt Lake say that last winter's loss of 100 miles of track cost the company about \$6,000,000 earnings and \$4,000,000 physical damage. Gross earnings for the fiscal year 1909 were \$7,450,462, of which California tonnage provided \$2,296,977. The assessment will be reconsidered September 3.

W. G. Lee, chief of the Brotherhood of Railroad Trainmen, is quoted as saying that the final terms of the Pennsylvania Railroad wage scale adjustment give the trainmen the mileage and per diem rates in force on the New York Central and the Baltimore & Ohio wherever the Pennsylvania rates were lower than those of the New York Central, and the Pennsylvania rate has been maintained wherever it was higher than the New York Central.

The final award of the arbitrators in the settlement of the wage dispute between the Southern Railway and its telegraph operators has been filed in the district court in accordance with the Erdman law. The award provides for an increase in wages amounting to 8 per cent. and 15 days' vacation with pay for employees in service more than two years. It also provides for a working day of 10 hours where two telegraph operators are employed, and where three or more telegraphers are employed the working day is fixed at nine hours.

The Long Island Railroad has filed a passenger tariff with the New York Public Service Commission, showing the rates which will be in force to Manhattan when trains begin running through, on September 8. A charge of five cents will be made from Long Island City to the Seventh avenue station of the Pennsylvania Railroad. This is two cents higher than the present ferry rate from Long Island City to the foot of Thirty-fourth street and the East river, and since the majority of people take a street car on the Manhattan side to get to the shopping district, the fare for those going to places within walking distance of the new station will be actually less by three cents, after the opening of the tunnel, than it is now.

Press despatches of Thursday say that John B. Moissant, who on Wednesday crossed the English Channel in a Bleriot aeroplane, was born in Chicago. The statement that he was a Spaniard was due to the fact that he came to France from Spain and was a total stranger. The passenger whom he carried across the channel was his machinist, a Frenchman named Filoux, weighing 182 lbs. Moissant himself weighs 150, and the machine weighed about 800 lbs. The trip across the channel was taken in the course of his attempt to secure a prize which had been offered by a London newspaper for a flight from Paris to London. He was a stranger to the country through which he passed and took his course by means of a compass, floating in glycerine contained in an air-tight vessel, and placed between his feet. He was unable to continue his journey to London on Wednesday, both he and his passenger having been severely chilled by a cold rain which they faced during the latter part of their trip across the channel. He flew in the face of a west wind so high that experienced aviators thought he was foolishly to start. He landed at Libourne, near Bordeaux. The trip across the channel was made in 37 minutes. When he descended his eyes were bloodshot and greatly inflamed, this being due to the high wind heating the rain into his face. Moissant is about 40 years old.

Equipment and Supplies.

LOCOMOTIVE BUILDING

The *Wangmasheng* (Wangma) at 1,000 MVA, has ordered two switching locomotives from the China Locomotive & Machine Works.

[illegible]

.....	Chicago
Lubricators	Elliott
Flange oils	C. U. S. Metallic
Packing	Taylor iron
Piston rods	Taylor iron
Springs	Taylor iron
Stamps	Taylor iron

CAR BUILDING.

The *Kansas City, Missouri & Oregon* is in the market for 11 passenger cars.

The Southern Indiana has ordered 484 coal and 7 caboose cars from the Haskell & Barker Car Company.

The Denver & Rio Grande is reported to have ordered six automobile cars. This item is not confirmed.

The Texas & Pacific is building 300 flat cars in its Marshall, Texas, shops. It has also ordered two steel postal cars.

The New Orleans, Mobile & Chicago has ordered 200 flat cars and 100 box cars from the American Car & Foundry Co.

The Philadelphia & Reading has ordered 30 vestibule coaches, 5 vestibule combination cars and 6 baggage cars from Harlan & Hollingsworth Corporation.

The Nevada Northern, reported in the *Railway Age Gazette* of August 12 as being in the market for cars, has ordered 175 Ingolsby dump cars from the Pullman Company. One hundred of these cars are for the Ray Consolidated Company and 75 for the Nevada Northern.

MACHINERY AND TOOLS.

The Atchison, Topeka & Santa Fe is in the market for a number of tools.

IRON AND STEEL.

The *Delmar* (Aldens) *Ironville* is on the market at 1,000 tons of structural steel.

The Department of Railways of Canada has ordered a swing bridge and two roller-lift bridges from the Canada Foundry

The St. Louis, Iron Mountain & Southern has asked for bids on August 22 for a steel span bridge and approaches at Judsonia, Ark.

The Pennsylvania Lines West are in the market for 550 tons of steel for grade crossings in Chicago and 150 tons for additions to the Northumberland, Pa., shops.

The *Pennsylvania* is in the market for 2,000 tons of structural steel for a bridge over the Schuylkill river at Philadelphia. The company has also ordered 320 tons of structural steel from the American Bridge Company for the new two-span bridge at Petrolia, Pa.

It is estimated that the United States Steel Corporation during the past three months has been shipping at a rate between 1,000,000 and 12,000,000 lbs. of steel per year. The maintenance of this shipment rate depends upon new business received, although it is understood that the mills have sufficient orders booked to keep running at the present rate for several weeks to come. The feeling is general that there will be a strong revival of business in September and October.

SIGNALING.

The Rock Island expects shortly to install automatic, three-position, upper quadrant block signals with alternating current track circuits, between Gresham and Stony Island avenue (Chicago), on the South Chicago branch, 3½ miles of double track. This line is used jointly by the Rock Island and Baltimore & Ohio, and also, until the Grand Crossing elevation is completed, by the Nickel Plate and the Lake Shore.

High Speed Brake Beams.

The Damascus Brake Beam Company, Cleveland, Ohio, exhibited two brake-beams at the Atlantic City conventions which were used in the Lake Shore emergency brake tests at Toledo. One of these was similar in design to the regular No. 1 Wycott special high-speed beam, except that it was made of larger sections. It was subjected to a load of 53,412 lbs. in service; under test it deflected $\frac{1}{8}$ in. under a load of 50,000 lbs. The other beam was one of the standard Wycott high-speed beams, as furnished to the trade. In some of the Lake Shore test runs it was subjected to a load as high as 46,580 lbs. In the tests two cars were equipped with the heavy beams and eight cars with the lighter ones; at the conclusion of the tests all of the beams were found to be in perfect condition.

This company has also made a marked improvement in the trussed type of freight brake-beam by substituting steel forgings for the malleable iron castings used heretofore. It also has a patented adjustable brake head which can be changed to any desired position and is rigid after adjustment. This improved brake head has given remarkably successful results in service during the past year.

A New Swing Union.

The new swing union which is being made by the Jefferson Union Co., Lexington, Mass., consists of two 45-deg. elbow parts with a spherical iron-to-iron seat ground to fit, the two ends being connected by a brass or malleable iron nut. At slightly additional cost these unions can be made with the regular Jefferson brass-to-iron seat, which consists of a narrow brass or wrought metal ring sunk in a channel in which it fits tightly.



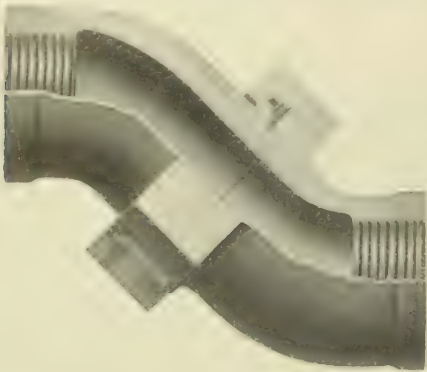
Five Positions of a Jefferson Union.

A lip of iron protects the brass ring from contact with the fluid, and also from injury, should the pipe be screwed in too far. For close work, the Jefferson swing union can be equipped with a special notched nut which can be set up with a bar of iron and a hammer.

The accompanying cuts show the union in various positions and the interior arrangement of the metal-to-metal joint. In the intermediate positions, it is possible to make connections between pipes at a great variety of angles, the joint always being

tight on account of the ground spherical seat. By using the combination of one end of the Jefferson swing union with the regular Jefferson parts, it is applicable to so many kinds of odd connections that it may almost be considered a universal union. It would require several more parts and much more time to accomplish by other means the same results as with the Jefferson swing union.

Owing to the necessarily irregular lines followed by piping around stationary and marine gas engines, automobile engines,

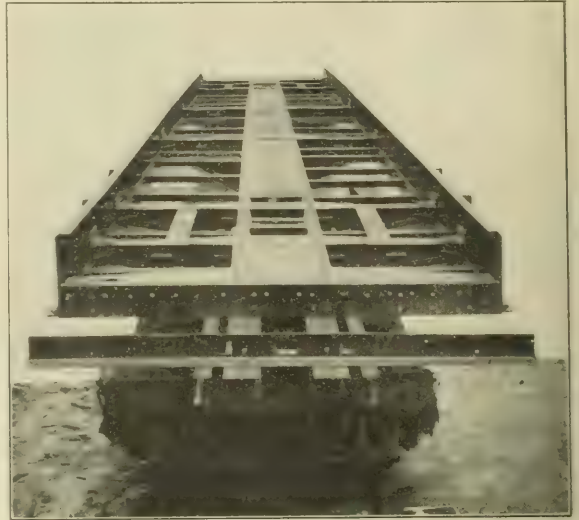


Part Sectional View of Jefferson Swing Union.

etc., this union is especially applicable. By using an iron-to-iron seat, these unions will withstand the high temperature of the exhaust from gas or gasoline engines. By using the male end of the regular Jefferson male and female union and a notched nut, connections can be made in a very short space. The materials used in the manufacture of these unions are selected with especial reference to their resistance to corrosion.

adjuster J. Cylinder levers are adjusted on the basis of 80 per cent. of the light weight of the car with 50 lbs. pressure in air-brake cylinder. Lindstrom malleable brake handles are used in the vestibule, with malleable drop uncoupling handles. Forsythe Bros. Company buffer is used with Westinghouse friction draft gear.

The cars are piped to be heated by direct steam with radiators in each section independent. Pipes underneath the cars are



Steel Underframe of A. C. L. Coach.

covered with sectional pipe covering wrapped with heavy cotton cloth and painted for protection from the weather. The interior finish is quarter sawed oak with semi-empire deck and no carving or veneering. Interior finish of the vestibule is poplar grained mahogany. All workmanship is of high quality and the cars are very tasteful and neat in appearance.

Steel Underframe Passenger Cars, Atlantic Coast Line.

The Atlantic Coast Line has recently placed in service six steel underframe passenger cars built by the Hicks Locomotive & Car Works, Chicago. The general appearance of the cars and the details of the steel underframe are shown in the illustration.

The general dimensions are as follows:

Length of frame over end sills.....	61 ft. 3 in.
Length over platforms about 68 ft. 3 in., not to exceed 69 ft. 2 in. over buffers, when uncoupled.	
Width over side sills.....	9 ft. 8 in.
Width over buffers.....	9 ft. 6 in.
Width of upper deck.....	5 ft. 6 in.
Height from top of rail to top of upper deck.....	14 ft. 4 in.
Height from top of rail to center of draw-bar.....	35 ft.
Height from top of rail to top of platform.....	4 ft. 3 1/4 in.

The frame is of open hearth steel. The brakes are Westinghouse high-speed with high-speed reducing valve and American slack

Railway Extensions in Brazil.

The Great Western of Brazil Railway Co., Ltd., has contracted with the federal government to extend its lines in the state of Parahyba from the town of Guarabira, Independencia, to Picuhy, a small town situated in the interior at the foot of the Borborema mountains, some 108 miles from Guarabira and 168 miles from the city of Parahyba.



Steel Underframe Passenger Car; Atlantic Coast Line.

ANNUAL REPORT.

LEHIGH VALLEY RAILROAD COMPANY. FIFTY-SIXTH ANNUAL REPORT.

Philadelphia, August 30, 1910.

LEHIGH VALLEY RAILROAD COMPANY.

The Board of Directors respectfully submit the following annual report of the business of the Company for the fiscal year ending June 30, 1910.

MILEAGE.

The first track mileage covered is described and set out by the Lehigh Valley Railroad Company for the year, as of June 30, 1910, extending from Hazleton, Pa., to Bethlehem and Susquehanna, Pa., is as follows:

	Miles.
Owned or controlled by ownership of interest capital stock.....	1,247.24
Controlled by ownership of majority of capital stock.....	115.87
Controlled by leases.....	27.88

Total mileage operated (owned and controlled)..... 1,385.99
 Trackage rights over railroads owned by other companies..... 47.08

Total first track mileage..... 1,433.02
 Of the above 597.19 miles, or 41.07 per cent., have second track, 62.24 miles have third track and 27.88 miles have fourth track. There are also 1,141.12 miles of yard tracks and sidings on the system, making a total of 3,261.43 miles of track in operation at the close of the year. The average number of miles of railway operated for the year, and upon which the mileage statistics in certain tables submitted in this report are based, are as follows:

The decrease of 8.29 miles of first track and the increase of 9.13 miles of second track are due principally to a rearrangement of the Hazleton and Tomblin Branches, heretofore operated as single track lines, which was completed the day of the year. The only other changes of importance in the mileage are those resulting from the construction of 5.77 miles of additional third and fourth track, mention of which is made elsewhere in this report.

OPERATING REVENUES AND EXPENSES.

The gross operating revenues for the year, not including other income, amounted to \$36,167,395.17, an increase of \$2,029,565.99, or 6.14 per cent., over the preceding year, and are the largest in the history of the Company. It may be pointed out that the increase in operating revenues occurred, with one exception, in each month of the year during a period when the general business of the country has not, to any appreciable extent, advanced, but on the other hand has during the last few months shown some evidence of receding. While the solicitation of both passenger and freight traffic has been actively carried on in competition with other lines, the increase may in large measure be ascribed to the high character of the service rendered shippers and the traveling public, your management having consistently sought to improve the service, believing, as has undoubtedly been the case, that the revenues would respond to the improvement in the service.

Notwithstanding the high character of the service rendered and with a liberal allowance for maintenance and depreciation of the property, the operating expenses have increased but \$1,108,410.93, or 5.39 per cent., over the preceding year, and are actually lower than for the fiscal years 1907 and 1908, when the operating expenses were estimated those of the present year. It is particularly gratifying to observe that the expenses have been controlled so that the major portion of the increase in gross earnings has been retained in the net operating revenues, making the total of the net operating revenues for the year \$35,058,884.18, an increase of 6.14 per cent. to state that these results have been attained during a year when practically all the elements of cost entering into the expense of operation have materially advanced. One of the most serious of these is the increase in the cost of fuel, which has increased 10.39 per cent. While this has affected the results for the year it has only been in the latter months, the more important increases did not apply until after January 1st.

The following statement shows the gross revenues, expenses, and net revenue from the operation of the entire system for the fiscal year, not including other income, and compares the figures for the fiscal years 1909 and 1910.

GROSS OPERATING REVENUES

	1910.	1909.	Increase or Decrease.
Freight.....	\$15,821,797.62	\$14,831,670.78	\$990,126.84
Merchandise freight.....	14,757,799.34	13,291,330.90	1,465,968.44
Passenger.....	1,000,128.11	3,905,062.74	425,109.71
Express.....	418,129.11	209,350.01	208,779.10
Mail.....	462,437.70	466,225.72	56,211.98
Other transportation.....	235,149.22	307,725.75	48,439.47
Miscellaneous.....	245,166.09	185,417.31	59,748.78
Total operating revenues.....	\$36,167,395.17	\$34,137,829.21	\$2,029,565.99

*Decrease.

OPERATING EXPENSES

	1910.	1909.	Increase or Decrease.
Maintenance of way and structures.....	\$4,462,098.17	\$3,273,439.47	\$1,188,658.70
Maintenance of equipment.....	5,995,810.09	6,082,489.16	86,679.07
Transportation expenses.....	10,593,565.10	10,292,000.00	301,565.10
General expenses.....	718,149.52	709,744.00	8,405.52
Total operating expenses.....	\$21,684,147.23	\$20,357,668.63	\$1,326,478.60
Net operating revenues.....	\$14,483,247.94	\$13,780,160.58	\$703,087.36

Net operating revenues to operating revenues.... 59.95% 62.09% *2.14%

*Decrease.

OPERATING REVENUES

The revenue derived from the transportation of coal, including coke, amounted to \$15,821,797.62, an increase of \$990,126.84, or 6.68 per cent., as compared with the previous year. Although the volume of bituminous coal offered for transportation has not been particularly heavy, the revenue

from that class of traffic has increased 10.39 per cent. as compared with the preceding year.

The percentage of freight revenue to total operating revenues was 43.74 per cent., as compared with 41.6 per cent. in the preceding year.

The coal and coke tonnage transported, not including supply coal, amounted to 14,034,896 tons, an increase of 761,260 tons, or 5.74 per cent. The number of miles moved on one mile amounted to 2,165,127,775, an increase of 147,514,126 ton miles, or 7.31 per cent.

The average haul increased from 152.01 to 154.27 miles, an increase of 2.26 miles, or 1.49 per cent.

The coal tonnage was 51.68 per cent. of the total tonnage hauled during the year, as compared with 53.39 per cent. for the previous year, being a decrease of 1.76 per cent.

MERCHANDISE FREIGHT

The transportation of merchandise freight produced a revenue of \$14,757,799.34, an increase of \$1,465,968.44, or 11.03 per cent., as compared with the preceding year. It is of interest to note that the increase in merchandise freight has been greater than in the case of coal freight. While every effort has been made to increase the latter, it has been the policy of your management in recent years to develop especially the merchandise traffic.

The percentage of revenue derived from the transportation of merchandise freight to total operating revenues was 40.80 per cent., an increase of .09 per cent.

The tonnage moved, exclusive of Company's material, was 13,147,141 tons, an increase of 1,561,072 tons, or 13.47 per cent.

The number of tons carried one mile amounted to 2,571,430,189, an increase of 191,284,501 ton miles, or 8.03 per cent.

The average haul decreased from 205.44 to 195.59 miles, a decrease of 9.85 miles, or 4.79 per cent.

GENERAL FREIGHT

The total revenue from both coal and merchandise freight was \$30,579,596.96, an increase of \$2,466,095.28, or 8.73 per cent., as compared with the previous twelve months.

The entire freight traffic amounted to 27,151,537 tons, being an increase of 2,322,332 tons, or 9.34 per cent.

The number of tons carried one mile was 4,730,557,964, an increase of 338,748,627 ton miles, or 7.70 per cent.

The average distance carried was 174.26 miles, a decrease of 2.65 miles, or 1.50 per cent.

The average revenue per ton was 112.50 cents, as against 113.13 cents last year, being a decrease of .63 cent, or .56 per cent.

Company's freight, not included in the above, amounted to 2,718,057 tons, an increase of 459,102 tons, or 21.30 per cent.

The total freight train mileage was 8,733,264 miles, an increase of 516,945 miles, or 6.29 per cent.

Revenue received per freight train mile was \$3.50, as compared with \$3.42, being an increase of \$0.08, or 2.34 per cent.

The average train load of revenue freight was 542.36 tons, an increase of 7.11 tons, or 1.33 per cent. Including Company's freight, the average train load was 561.51 tons, as against 553.13 last year, an increase of 8.38 tons, or 1.52 per cent.

The average number of tons of revenue freight in each loaded car was 22.65 tons, a decrease of .20 ton, or .88 per cent. Including Company's freight, the average carload was 23.45 tons, a decrease of .17 ton, or .72 per cent.

PASSENGER

The receipts from passenger traffic amounted to \$4,330,172.45, an increase of \$425,109.71, or 10.59 per cent., as compared with the previous year. Following a recent decision by the Supreme Court of the State of Pennsylvania as to the law enacted by that State in 1907 reducing the rate of fare to a maximum of two cents per mile, the passenger rates in Pennsylvania in effect prior to that law will be restored.

The total number of passengers carried was 5,172,961, an increase of 296,160, or 6.07 per cent.

The number of passengers carried one mile increased 24,289,315, or 10.38 per cent.

The average revenue per passenger was \$3.71 cents, an increase of 3.64 cents, or 5.5 per cent.

The average revenue per passenger per mile was 1.749 cents, showing no change as compared with the previous year.

The average distance traveled by each passenger was 47.86 miles, an increase of 2.07 miles, or 4.32 per cent.

Passenger train mileage was 4,150,558, an increase of 136,076 miles, or 3.39 per cent., whereas the traffic increased 10.89 per cent.

The revenue from passenger per passenger train mile was 104.32 cents, an increase of 7.05 cents, or 7.25 per cent. The average number of passengers per train was 59.65, an increase of 4.03, or 7.25 per cent., and the average number of passengers per car was 17.24, an increase of .63, or 3.71 per cent.

The pay received for the transportation of United States mails amounted to \$193,859.75, a decrease of \$16,039.36, due entirely to the change in the method employed by the Government in arriving at the average amount of mail carried at the time of the reweighing, which occurred last year; the new rates becoming effective at the beginning of the fiscal year.

The express revenue amounted to \$462,437.70, an increase of \$56,211.98.

OTHER TRANSPORTATION

The revenue derived from transportation other than that shown under the preceding headings was \$356,165.22, an increase of \$48,439.47.

MISCELLANEOUS

Miscellaneous revenue amounted to \$245,166.09, an increase of \$59,748.78.

OPERATING EXPENSES

The expenditures for maintenance of way and structures amounted to \$3,462,098.17, an increase of \$1,188,658.70, or 5.79 per cent., over the preceding year. The property has been fully maintained at its usual high standard.

During the year six new bridges were constructed of steel. Twenty-eight steel bridges and ten concrete steel bridges, replacing light iron or wooden bridges, were built. Eleven small bridges were replaced by pipe culverts and eight bridges abandoned and the openings filled. Three wooden overhead highway bridges were replaced by steel bridges and one removed.

Bridges on the Auburn and Ithaca Branch have been renewed and strengthened, enabling the use of heavier power on that section of the road.

The conditions now surrounding the railroad operations in this country present an element of uncertainty and apprehension that should receive the sober and earnest reflection of investors generally. Time and experience alone will demonstrate the benefit or harm attending the methods employed by Federal and State authorities in the regulation and control of the vast industries of this country. The greater difficulties now encountered in corporate management are apparent to all. The problem of offsetting the increase in 1918 of wages paid employees and in all of those

the expense of operation must be met. The logical and businesslike solution in this, as in any other occupation, would be an advance in the rates for service performed. If for any reason, however, the gross revenues cannot be so increased, the constantly increasing cost of the service will diminish the net revenue of the Company, and it becomes, therefore, of the utmost necessity to effect the greatest possible economies in operation. This problem of keeping the expenses of the Company within reasonable and well-defined limits, without any impairment of its physical well-being, has been given the most careful study and attention by your management, and many improved methods and economies have been introduced which have materially reduced the units of cost to various branches of the service.

The policy has been continued of discarding locomotives of small tractive power and obsolete design for heavier power capable of hauling a greater tonnage. Freight cars of limited capacity, expensive to maintain by reason of their age, have been torn down and replaced by steel cars of large capacity. In the case of wooden cars of fair capacity and in generally serviceable condition, steel underframes have been substituted for those of wood. These improvements in the character of the equipment, combined with the reduction in grades and straightening of alignment, a policy which will continue as the future may justify, have resulted in increasing the average number of tons of revenue freight in each train from 485.52 tons for the year 1903 to 542.36 tons or 56.84 tons. This increase in train-load naturally results in a corresponding decrease in the cost per ton-mile.

The extension of third and fourth track and the construction of additional passing sidings in the territory of greatest traffic density, with the important additions that have been made to yards at terminals, have been of decided benefit in not only reducing the expense for overtime, but in accelerating the movement of trains.

The experiments conducted by the Company in the matter of despatching trains by telephone instead of by telegraph have been successful, and on that portion of the road so equipped the change has resulted in a safe and prompt movement of trains. It is being rapidly extended to all parts of the line.

Notwithstanding the greatest economy, the operation of the Lehigh and New York Railroad has resulted for the year in a further loss of \$136,476.96. This property, as has heretofore been stated, is operated under a lease executed in the year 1895, which has been far from profitable. The matter is a vexatious one, in view of the fact that your Company is the owner of a majority of the capital stock of that Company, and also the endorser of \$2,000,000 of its bonds. Every effort is being made to work out a satisfactory solution.

No real estate of any importance was acquired during the year except that needed for extending the third and fourth track system, the enlargement of yards and changes in alignment, in which cases the real estate so acquired has been added to the road and equipment account. The Company recently acquired possession under a long-term lease from the city of New York of Pier 34, North River, at the foot of Canal street. This pier is advantageously located in the center of a district which both originates and receives a large volume of traffic.

The property of the Glen Summit Hotel and Land Company, which passed through foreclosure proceedings, as stated in the last annual report, has been sold. Other than a mortgage taken in partial payment, your Company now has no interest in this or any other hotel property.

The matter of encouraging and developing the local freight and passenger business is one that has received active attention, and much has been accomplished in this direction by the industrial department. The scope of that department has been considerably broadened, and an agricultural expert of reputation has been engaged by the Company, whose duty it is to explain in a practical manner to all interested along the line of the road methods that will produce an increase in the yield of farm products. During the year 74 new industries were located on the line of road, direct track connections being made with 24 of them.

Fifty-six and ninety one-hundredths per cent. of the total operating expense, including outside operations, or \$13,963,851.03, was paid direct to labor, being distributed among an average of 22,469 employees during the year.

The contributions made by the Company to its employees' relief fund for the year amounted to \$43,644.38. This fund was established over thirty years ago for the benefit of injured employees and their families, membership in the same being open to all employees in the service. The Company contributes an amount equal to that paid by the members and assumes the cost of handling and disbursing the fund. Payments are under the control of the company, and are made with the approval of a relief fund committee composed of employees.

Messrs. William H. Moore, Daniel G. Reid and Edward S. Moore were elected directors of the Company, succeeding Messrs. Robert C. Lippincott, George H. McFadden and Irving A. Stearns, whose terms of office expired. The board desires to acknowledge and thank the officers and employees of the Company for the faithful and efficient services rendered by them during the year.

By order of the Board of Directors, J. B. THOMAS, President.

PROFIT AND LOSS ACCOUNT OF THE RAILROAD COMPANY FOR THE YEAR ENDED JUNE 30, 1910

	Dr.	Cr.
Balance, July 1, 1909.....		\$19,212,322.00
Five per cent. on preferred stock, paid July 1, 1909.....	\$5,315.00	
Two per cent. on common stock, paid July 1, 1909.....	806,696.00	
Interest on preferred stock, paid from July 1, 1909.....	403,348.00	
Interest on preferred stock, paid from July 1, 1909.....	441.00	
Interest on common stock, paid from July 1, 1909.....	1,210,014.00	
Interest on bonds.....	89,130,180.00	
Interest on accounts of Baltimore, The Maryland & Pennsylvania R.R. Co. (see note 10).....	104,849.96	
Interest on accounts of Delaware, D.C. & Maryland, The Annapolis and Baltimore.....	49,809.28	
Interest on accounts of 1909, 1909 and 1910, transferred to Road and Equipment and to Maintenance and Miscellaneous.....	3,140,777.96	
Maintenance and Miscellaneous.....	88,638.45	
Net income for year ended June 30, 1910.....		7,993,523.53
Balance, June 30, 1910.....	\$2,419,239.64	
	\$30,005,491.94	\$30,005,491.94
Balance brought forward, July 1, 1909.....	\$7,419,796.64	

COMPARATIVE INCOME ACCOUNTS OF THE RAILROAD COMPANY FOR THE YEARS ENDED JUNE 30, 1910 AND 1909.

	1910.	1909.	Increase. or Decrease.
Revenue from operation:			
Coal freight revenue.....	\$15,821,797.62	\$14,831,670.78	\$990,126.84
Merchandise freight revenue.....	14,767,799.34	13,291,830.90	1,465,968.44
Passenger revenue.....	4,330,172.45	3,905,062.74	425,109.71
Mail revenue.....	193,859.75	209,899.01	*16,039.26
Express revenue.....	462,437.70	406,225.72	56,211.98
Other transportation revenue.....	356,165.22	307,725.75	48,439.47
Miscellaneous revenue.....	245,166.09	185,417.31	59,748.78
Total operating expenses.....	\$36,167,395.17	\$33,137,832.21	\$3,029,562.96
Operating expenses:			
Maintenance of way and structures.....	\$3,462,903.41	\$3,273,339.47	\$189,563.94
Maintenance of equipment.....	5,995,810.09	5,832,430.15	163,379.94
Tract expenses.....	918,720.11	\$10,293.00	108,427.11
Transportation expenses.....	10,393,565.10	9,949,909.59	643,655.51
General expenses.....	713,145.52	709,764.09	3,381.43
Total operating expenses.....	\$21,684,147.23	\$20,575,736.30	\$1,108,410.93
Ratio of operating expenses			
to operating revenue.....	59.95%	62.09%	*2.14%
Net operating revenue.....	\$14,488,260.94	\$12,562,095.91	\$1,926,165.03
Taxes.....	1,106,761.59	1,079,376.23	27,385.36
Operating income.....	13,376,499.05	11,482,719.68	1,893,779.37
Other income:			
Outside operations—			
Water lines.....	\$143,500.93	\$150,019.20	6,518.27
Other operations.....	72,532.31	73,268.53	736.22
Investments:			
Dividends on stocks.....	544,945.50	436,772.56	108,172.94
Interest on bonds.....	24,860.17	42,114.48	*17,254.31
Interest on real estate mortgages.....	15,933.33	15,004.13	329.20
Miscellaneous.....	678,329.34	362,677.20	315,652.14
Total other income.....	\$1,117,635.10	\$704,580.34	\$413,054.76
Total income.....	\$14,494,124.15	\$12,187,300.02	\$2,306,824.13
Deductions from income:			
Interest on funded debt.....	3,609,393.34	3,544,060.00	65,333.34
Interest on equipment trust obligations.....	190,716.00	245,902.50	*55,186.50
Rentals of leased lines and equipments.....	2,316,473.00	2,316,473.00	
Miscellaneous deductions.....	240,140.93	237,061.31	3,079.62
Additions and betterments.....	843,577.30	582,943.22	260,634.08
Total deductions from income.....	\$7,200,600.62	\$6,926,140.03	\$274,460.59
Net income.....	\$7,293,523.53	\$5,261,159.99	\$2,032,363.54

*Decrease. †Deficit.

LEHIGH VALLEY COAL COMPANY.

The Board of Directors' annual report of operations conducted by The Lehigh Valley Coal Company for the fiscal year ended June 30, 1910, shows that the net income from operations amounted to \$1,136,542.98, an increase of \$761,090.82, as compared with the preceding year.

The total production of anthracite coal from the lands owned and controlled by The Lehigh Valley Coal Company and affiliated companies was 3,092,940 gross tons, an increase of 358,862 tons, or 4.64 per cent., as compared with the previous 12 months. The improved earnings of the Company are of five main, due to the increased sales of coal, the demand for which was greater than during the previous year, and to the fact that the mining has been so conducted as to counteract wherever possible the constantly increasing cost of operation, naturally resulting from the greater depth and extension of the underground workings.

The usual sinking fund payments, as required by the various mortgages on the property, have been made and amount to \$183,075 for the year.

The Advance Royalty Account has been reduced by the sum of \$24,988.40. Current Assets are \$5,080,512.24 in excess of Current Liabilities, a net increase over the preceding year of \$747,361.61.

PROFIT AND LOSS ACCOUNT OF THE COAL COMPANY FOR THE YEAR ENDED JUNE 30, 1910

	Dr.	Cr.
Balance, July 1, 1909.....		\$2,272,891.45
Miscellaneous additions.....	\$13,997.76	
Net income for year ended June 30, 1910.....		1,136,542.98
Balance, June 30, 1910.....	2,393,412.67	
	\$2,407,410.43	\$2,407,410.43
Balance brought forward, July 1, 1909.....	\$2,272,891.45	

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED WEEKLY BY THE RAILWAY AGE GAZETTE CO., INC.
1111 RAILROAD GAZETTE BUILDING, NEW YORK, N. Y.

CHICAGO, ILL.: J. M. BELL. CLEVELAND, W. H. BELL. LONDON, C. H. BELL.

W. H. BELL, Editor

J. A. SIMMONS, Editor of the Railway Age. Address of the Editor: The Railway Age, 1111 Railroad Gazette Building, New York, N. Y.

EDITORS

W. H. BELL, Editor	RAY V. WHEELER	R. E. ASHLEY
SAUL O. DUNK	FREDERICK McLEOD	W. H. BELL
H. C. DUNK	G. L. FARRAR	E. L. FARRAR
BRADLEY R. BARKMAN	WILLIAM L. FARRAR	I. W. BARKMAN
WILLIAM L. FARRAR	S. W. FARRAR	H. H. FARRAR
CHARLES D. DUNK	CHARLES D. DUNK	

Subscriptions, including regular weekly issues and special issues, are published from time to time in New York, N. Y. (U. S. Post Office, New York, N. Y., available in advance and postage free).

United States and Mexico	\$3.00 a year
Canada	\$4.00 a year
Foreign (including postage)	\$10.00 a year
Single Copies	10 cents each

Step 1, 1910, and the right M. M. and M. C. R. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 42 Friday, August 26, 1910 NUMBER 9.

CONTENTS

EDITORIAL

Editorial Notes	343
Managers' Association for 1910 and Despatchers	345
New York, N. Y., Division of Railway Securities	345
President's Report to Congress	346
Revenue, Revenue & Pittsburgh	347
New York, N. Y., Division of Railway Securities	348

LETTERS TO THE EDITOR

ILLUSTRATED

Monthly and Quarterly Reports of West Virginia	355
Proposed Safety Appliance Standards	356
The New York Government Railway	359
Interstate Government Railways of Japan	362

MISCELLANEOUS

Traveling Engineers' Association	350
The Management of Small Passenger Stations	359
Foreign Railway Notes	360

GENERAL NEWS SECTION

SUPPLY TRADE SECTION

AS an example of an effective and aggressive organization the Traveling Engineers' Association may well be taken as a model by other organizations. The papers to be presented were carefully and thoroughly prepared by the various committees and were forwarded to the secretary in time to have the necessary cuts made and the papers distributed to the members in pamphlet form well in advance of the meeting. Sharp at the time advertised for the opening of the convention every officer was in his place ready for business; a few moments' delay was caused by the preacher and the mayor being unavoidably detained. The convention waited for the preacher, but not for the mayor, and when the latter finally arrived the proceedings were well under way. There was something doing every minute. If it was necessary to delay the regular course of business to

mount ballots, or for other causes the president always had some special business to occupy the attention of the convention until the tellers were ready to report. Due to the unfortunate location of the convention hall the noise of passing street cars and trucks proved most annoying, but by good arrangement the president reduced the annoyance to a minimum by insisting that speakers at the back or side of the room step forward and face the audience. The subjects chosen for discussion all related to improved efficiency and greater economy, appealing strongly to the members who entered upon the discussions enthusiastically and heartily. The membership has been increased to almost 800 and the attendance at the convention was very large. Such results could only be brought about by good work—and lots of it—on the part of the officers and executive committee, with hearty co-operation from all the members. An applicant who applied to the secretary for membership was told frankly that "if he became a member he would be expected to get busy and work hard for the good of the association," and it is quite evident that the members generally feel that their responsibilities do not end with the payment of their dues or attendance at the conventions.

THE safety appliances law, enacted by Congress at its recent session, requires the Interstate Commerce Commission within six months after its passage to prescribe the standards for the various safety appliances to be used on railway equipment, and makes it unlawful after July 1, 1911, for any carrier to haul any car not equipped with the appliances that the commission shall prescribe. The act was passed on April 14. The period within which the commission must prescribe the standards will, therefore, expire on October 14. Before it can act it must hold public hearings. Four of the six months allowed it were gone when, on August 10 the commission issued its suggested standards, and announced that on September 29 it would hold a hearing regarding them. The delay does not reflect on the commission. It is doing the best it can. The trouble is with the law, which gives much too short a time in which to determine what changes in appliances, if any, are desirable. Fortunately, the act provides that the commission may, upon full hearing and for good cause, extend beyond July 1, 1911, the period within which carriers may comply with its orders; but this provision applies only to "cars actually in service on the date of the passage of this act. In other words, the commission may after July 1, 1911, let a carrier haul a car not equipped with the standards prescribed by it if the car was built before April 14, 1910. But any car built after that date which is not equipped with such appliances as may be prescribed by the commission cannot be used after July 1, 1911. Many cars have already been built since April 14, 1910. As the commission as yet has not definitely prescribed any standards, it is necessary to equip them with the safety appliances now in use. Appliances which do not meet with the approval of the commission will have to be removed from all these new cars and others substituted before they can be used after July 1, 1911. It is hardly necessary to say anything more to show how short-sightedly and arbitrarily Congress acted in framing the act. But the commission is more familiar with the practical conditions with which railway managements have to deal, and, no doubt, it will co-operate with them in holding down to the practicable minimum the unnecessary trouble and expense which the legislation in question may cause.

IN his presidential address before the Master Mechanics' association last June, G. W. Wildin said: "It is also quite necessary that we as an association be more of a unanimous mind on questions that are likely to call for or be made the subject of either federal or state legislation." This cannot be too strongly emphasized in connection with the hearing on the proposed safety appliance standards before the Interstate Commerce Commission on September 29. A committee of the Master Car

and to be able to pay high wages it is essential that they shall be able to earn profits as substantial in proportion as those earned in other businesses. Educational work which is now being done among employees will, no doubt, in due time, cause many of them to perceive more clearly the extent to which their interests are identical with those of railway owners; but the wage earner, as such, will never feel anything like the same keen interest in the amount of profits that his employer earns as he does in the amount of wages that his employer pays him. The result is that we have a public sentiment in most of the country that regards the railways as a sort of an alien institution which may and should be treated differently from other industries—which should be given what the strict letter of the law requires it to be allowed, but not one cent more.

It is open to very serious question whether the time will ever come when the people will look with as favorable an eye on large profits in the railway business as they do on large profits in other lines of industry, until more of the people directly participate in railway profits. Honest, able, candid railway management can do much; educational work can do much; and disastrous results flowing from unwise regulation can do much to create a sentiment more favorable to the railways. But they probably cannot do all that is needed. The employee will become as much interested in railway profits as he is in his pay envelope only when he becomes a stockholder and shares directly in the profits. The farmer, the banker, the editor, the clerk, in the various communities of the country, will become an advocate and defender of large railway profits only when he becomes a railway stockholder and knows that the amount of his yearly income will to some extent depend directly on what the railways earn.

Is there any way by which a wider diffusion of the ownership of railway securities can be obtained? We believe there is. The United States Steel Corporation and other industrial concerns are successfully carrying out profit-sharing schemes. Why could not the railways in some similar way induce investment in their securities by their employees, who are the best paid wage earners in the world? In every community on every railway there is every year more or less money seeking investment. The agricultural communities have for some years been especially prosperous. What insurmountable obstacle would the railways encounter if they made a serious effort to get the farmers, the merchants, the manufacturers and other business men along their lines to buy their bonds and stocks, provided they were issued in small enough denominations to make investment in them by persons of moderate fortunes practicable? The subject seems of sufficient importance to justify serious study and action by every railway management in the country.

BROOKLYN RAPID TRANSIT.

IT is doubtful whether there is another road in the country, steam or electric, of any considerable size, that finished the fiscal year ended June 30, 1910, with as clean a showing in the claims and damage department as the Brooklyn Rap'd Transit. Barring slightly over \$25,000 in judgments on appeal, there is no outstanding judgment against any company in the system. Legal expenses and damages cost the B. R. T. \$1,129,396 in 1909 and but \$921,536 in 1910, a reduction of more than 18 per cent. These results are due to the policy of making prompt investigation and settlement of all claims, which policy the present management has pursued with increasing success. The item of legal expenses and damages is not a small one in itself, and the saving last year was considerable as a gross sum, but of great importance also is this indication of the general attitude of the present management towards claims of the public. One of the greatest difficulties that the company has had to overcome has been the hostile attitude of the public using its lines, and every sign of success in this direction is of especial interest.

In 1910, total earnings from operation of the Brooklyn Rapid Transit amounted to \$26,900,000, comparing with \$19,700,000 total earnings in 1909. After the payment of operating expenses, taxes,

interest and rentals, and after setting aside for special appropriations \$109,000 in 1910 and \$65,000 in 1909, the company had a surplus available for dividends of \$2,500,000 in 1910 and of \$1,870,000 in 1909. Last year dividends at the rate of 5 per cent. were paid, calling for \$1,900,000. The year before \$897,000 was paid in dividends.

The increased earnings came from larger gross business, the passenger revenue car mileage showing an increase over the preceding year of 3,784,215 miles, the average number of passengers per car mile being 7.30 in 1910 and 7.14 in 1909. The total number of passengers carried was 569,438,773 in 1910 and 530,149,597 in 1909. This is an increase of 7.41 per cent. in 1910 over 1909, as compared with an increase of 2.93 per cent. in 1909 over 1908. The increase in earnings was about evenly divided between the surface division and the elevated division. The earnings from the surface division last year amounted to \$12,346,325, and the year before to \$11,645,569. The earnings from the elevated division amounted to \$8,130,820 in 1910 and to \$7,413,124 in 1909.

Operating expenses as a whole amounted to \$11,726,392 in 1910 and to \$11,394,655 in 1909. The noticeable economies came in the legal expenses previously mentioned and in the operation of the power plant. The saving was made in this later department through the installation of more modern machinery. There was also a relatively large saving in operation of cars. With the greatly increased business handled, the operation of cars cost \$5,061,150 in 1910, an increase of but 5 per cent. over 1909. Economies in this department were due to the innumerable little savings in operating costs that, while actually small in themselves, when taken as a whole make the difference between successful and unsuccessful operation of a street railway system. It is in such little things as the saving effected by the enforcement of strict rules in regard to turning off lights on cars standing in car barns, turning off water faucets, and so on, that a street railway operating under such conditions as the Brooklyn Rapid Transit can hope to earn a return on the capital invested.

As in 1909, there were comparatively small expenditures for new construction last year. In 1910 \$1,181,277 was spent, comparing with \$1,970,858 in 1909 and with \$6,476,959 in 1908. The B. R. T. is now interested not so much in extending its lines into new territory or in developing new suburban districts as in developing the city of Brooklyn itself. Its province seems to be to leave the development of what really amounts to an inter-urban service to other companies. The B. R. T. would like to run its lines over the new bridges to Manhattan, and has made proposals to the New York Public Service Commission for this privilege, but no agreement has been reached. The opening of the Interborough subway through to Flatbush avenue has helped to build up Brooklyn and has in this respect been an auxiliary to the B. R. T. as well as a competitor.

The B. R. T. did not sell any bonds last year, for the first time in eight years, but the balance sheet shows bills payable on June 30, 1910, amounting to \$4,500,000. This is an increase over the bills payable in 1909 of \$1,100,000, and taken in connection with the fact that current liabilities amounted in 1910 to \$8,043,918, with current assets of \$3,151,835, seems to indicate plainly that the Brooklyn Rapid Transit will be in the market to sell bonds as soon as conditions make a successful sale at all probable. The company has in its treasury \$15,203,000 first refunding mortgage 4 per cent. bonds.

The following table shows the operations of the company in 1910 and 1909:

	1910	1909
Surface first track mileage	238	236
Elevated first track mileage	32.6	32.6
Passenger earnings	\$20,427,145	\$19,048,699
Total operating expenses	20,006,030	19,694,162
Maintenance of way	1,309,449	1,194,014
Maintenance of equipment	2,068,271	1,690,916
Operation of power plant	1,408,112	1,096,729
Operation of cars	5,061,150	4,840,556
Damages and legal expenses	991,738	1,119,896
Total operating expenses	11,846,720	11,934,655
Net income	2,641,095	1,936,609
Special appropriation	108,360	63,430
Dividends	1,906,287	897,076
Surplus	1,626,448	834,646

1910 and 1909, and the percentage of increase last year in each class of traffic over the previous year:

	1910.	1909.	Percent.
Passenger	6,726,487	5,180,043	27.8
Cash	778,480	261,486	94.0
Freight	458,000	400,000	100.0
Pig and bloom iron	209,032	192,137	8.8
Other freight	2,298,434	1,862,468	23.4

The balance sheet, prepared in accordance with the rules prescribed by the Interstate Commerce Commission and compared with a recast balance sheet for the previous year, shows the company in a considerably better position than it was last year. Cash on hand amounted to \$2,057,336 in 1910 and \$2,082,919 in 1909. Working assets amounted to \$5,786,553 last year, comparing with \$3,748,945 the year before. These figures compare with working liabilities of \$1,286,226 in 1910 and \$744,807 in 1909. Besides the increase in cash, the principal increase in assets is in materials and supplies, which are carried at \$1,194,859 in 1910, comparing with \$690,785 in 1909. Under working liabilities, audited vouchers and wages unpaid naturally show an increase in 1910 over 1909, with the higher rate of wages being paid; and the balance sheet also shows \$150,450 loans and bills payable in 1910, while there were no loans and bills payable in 1909.

In the second half of 1908 the company reduced the common dividend from a 6 per cent. annual basis to a 4 per cent., and although there was a surplus available for preferred and common dividends of \$1,199,676, or 8.4 per cent., on the common stock, after the payment of 6 per cent. on the \$6,000,000 preferred stock the company continued the 4 per cent. annual rate.

In President Iselin's very brief general remarks he calls attention to the building of a second blast furnace at Josephine, Pa., which it is estimated will materially increase the revenue tonnage of the Buffalo, Rochester & Pittsburgh. Josephine is almost at the southern end of the Vitondale branch of the road, so that the road will get a haul on iron ore from the Great Lakes equal to almost the entire length of its main line.

The following table shows the results of operations in 1910 compared with 1909:

	1910.	1909.
Average mileage operated	367	368
Freight revenue	\$7,062,259	\$6,001,372
Passenger revenue	966,370	887,625
Total operating revenue	8,028,629	7,171,897
Maintenance of way	1,220,100	769,037
Maintenance of equipment	1,857,017	1,538,191
Traffic	120,169	101,350
Transportation	2,451,100	2,095,212
Total operating expenses	5,003,005	4,665,171
Taxes	188,005	138,000
Operating income	2,841,749	2,378,092
Gross corporate income	3,391,143	2,809,905
Net corporate income	1,927,374	1,042,422
*Appropriations	327,697	12,484
Dividends	780,000	780,000
Surplus	419,677	249,939

*Of the appropriations, \$12,697 was paid into the pension fund in 1910 and in 1909. In addition, in 1910, \$125,000 was paid into sinking funds under equipment agreements, and \$190,000 was used to pay one-half of the principal of equipment bonds, series D, E, and F, the other half being refunded by 4½ per cent. bonds under the terms of the consolidated mortgage, and these bonds were held in the treasury.

NEW BOOKS.

The Railway Industry. Compiled and edited by Sharon Thompson, manager of the Bureau of Railway News and Statistics, Guthrie-Warren Printing Company, Chicago. 408 pages; 6 in. x 9 in.; cloth.

Mr. Thompson has brought together in this volume a number of papers and addresses by prominent railway executives and students of railway subjects. Some of the chapters deal with the early history of railways in America, one of these being the first annual report of the chief engineer of the Pennsylvania Railroad. Most of the papers, however, deal with contemporary affairs and particularly with government regulation of railways. Among the prominent railway men whose names appear in the table of contents are James I. Hill, Daniel Willard, Frank Trumbull, W. B. Smith, Julius Kruttschnitt, C. C. McLean, E. P. Ripley and J. B. Thayer. Others from whose writings selection have been made are John E. Wallace, Logan G. McPherson, John C. Spencer, W. M. Acworth and Sir George S. Gibb.

Sir George S. Gibb's paper on "Railway Nationalization" is a discussion, from the standpoint of English railway men, of government ownership, and Mr. Acworth's paper, "The Relation of the Railroads to the State," tells of the relations between railways and the state in various countries. The concluding chapters of the book contain the report of the Senate committee on interstate commerce in 1909 opposing legislation giving the Interstate Commerce Commission power to restrain advances in railway rates, and Mr. Thompson's statistics of American railways for 1909.

American Railway Association Proceedings; Vol. V, 1907-1909. New York; W. F. Allen, Secretary, 24 Park Place; 1,073 pages; 9 in. x 11¼ in.; price \$5.

This volume is thicker than any of its predecessors, although it covers a shorter period of time, which indicates the increasing amount of work that is being done by the association. The largest single subject dealt with in the present volume is the regulation of the transportation of explosives and other dangerous articles. As in former volumes, the index is made up in great detail, parts of it amounting to an abstract of what was done by the association on the subject dealt with. This index alone, printed in six-point type, leaded, with wide margins, fills 40 pages, in addition to the 1,073 pages of the body of the work. Under the index head, Committee Reports, the item Car Efficiency fills five pages; Executive Committee, four pages, etc.

Letters to the Editor.

HOW TO TEACH POLITENESS—BY EXAMPLE.

Philadelphia & Western Ry. Co., Upper Darby, Pa., Aug. 5, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Your issue of July 1 contained an excellent editorial under the title, "Can Politeness Be Taught?" Had this been a discussion concerning the qualities of materials or efficiency of locomotives there would have been considerable intelligent comment and criticism on the article by officials, but as the writer deals with the human agencies upon which the successful operation of a railway depends, it is likely to be permitted to rest undisturbed.

For many years railways have applied themselves most earnestly to the improvement of roadbed and equipment; they have built better engines and cars and greatly improved their physical resources, but there has not been the same care and attention given to the selection and training of employees.

Coming to the question, "Can politeness be taught?" the storekeepers of Berlin have recently started a special school for their clerks, the sole object of which is to be thorough training in dealing with buyers from every point of view. The pupils are instructed, not only in the details of the several trades, but also how to talk agreeably to customers, how to bow gracefully, how to handle customers who are in a bad temper, and how to conduct an animated conversation without undue familiarity. All this, of course, is based upon the principle that the polished clerk will sell more than the uncouth variety.

In the old-fashioned stores of England, which may seem slow to some of us, the civility and painstaking care of the employees goes very far to make amends for what we may miss in the equipment of the places themselves. In the main, this same courtesy prevails in the best stores in this country. If courtesy is requisite and attainable in stores, it is certainly essential and possible to secure it on railways.

The appeal issued by the Delaware, Lackawanna & Western, referred to in your article, is presented in a clever and pleasing way, but the reasons given to prove that courtesy pays are out of place. To advocate courtesy on the basis that it pays implies a right to be discourteous when it is obvious that it does not pay.

In forming a staff of excellent men the same homely rules

apply as in the case of the conductors in the Pennsylvania Railroad, the careful selection, supplemented by judicious cultivation of the same. Real courtesy is based upon sympathy and understanding of the individual, and right action will be an individual manifestation of knowledge, power and good judgment, a consideration of what is due to others.

The manifestation of the feelings, good or bad, of an employee, may make a lasting impression upon a passenger. The writer, while a conductor on the Pennsylvania Railroad, on arriving at Broad Street Station one morning, while passing through a gate, was accosted by a distinguished-looking man, who asked, "What time does the first express train leave for Macon, Georgia?" I answered, "I don't know," and was about to add that I would ascertain, when the man sneeringly said, "I thought you didn't," and, turning on his heel, he walked away. I followed him and said, "I beg your pardon, sir; I would like to make an explanation; there are several lines running out of this station in different directions. I have just come in from Harrisburg and am not certain what time the first train leaves for Macon, but if you will come with me to the bureau of information, we can soon ascertain." On reaching the bureau I asked for the leaving time of the train, secured a time-table and ascertained the track from which the train departed. I then showed him the train gate and gave him the time-table. He then said to me, "I owe you an apology." I replied, "No, you don't owe me anything—it is a pleasure for me to serve you." He insisted, "Yes, sir, I owe you an apology. I live in Georgia and am a stranger here. Some time ago a conductor came through that gate; he was dressed just as you are, and I asked him what time the first express train left for Macon. He said, 'I don't know' in an indifferent way and passed on. After awhile another conductor came through and I asked him the same question. He hardly looked at me, but he, too, said, 'I don't know' and paid no further attention to me. By the time you came along my patience was about exhausted and I spoke to you in a manner that I regret and therefore I offer an apology." I answered, "That's all right, sir, so far as I am concerned; your annoyance was justified but unfortunate. I hope you will have a pleasant journey and that your future experience with the Pennsylvania Railroad will be satisfactory and pleasant." What I did was only what any decent man would do for another. If I had neglected that man he would somehow have found a train, of course; but no man on earth could afterward convince him that courtesy was to be found among employees on the Pennsylvania Railroad.

On the 19th of last month, in conversation with a gentleman at a hotel in Atlantic City, I was told that he lived at Newburgh, on the Hudson, and used the New York Central a great deal. Continuing, he said:

"I have heard a great deal about the high standards of service on the Pennsylvania Railroad, but my experience in coming from New York here last week does not bear out what I have heard of it. The conductor came to the car where I was sitting. A young man and a young woman were sitting together just ahead of me with two dress-suit cases close beside their seat in the aisle of the car. The conductor said to the young man in a loud, gruff tone of voice, 'Say, do these belong to you?' pointing to the dress-suit cases. The young man answered, 'Yes,' and the conductor said in a rough, loud, contemptuous tone, 'Well, get them out of here.' The young man looked about, at a loss to know what to do with them. He put one of the suit cases in front of them between the seats, but there was not room there for the other. He tried to put it in the rack, which was then pretty well filled. In trying to get it in the rack, he knocked out a bottle of perfume, which fell down on the floor in front of a woman in the seat ahead. She was instantly in a rage and said, 'There, you have broken my bottle of perfume that cost me two dollars and a half.' The young man who was trying to dispose of the suit cases was manifestly embarrassed through the whole proceeding, but he tendered five dollars to the woman and expressed as best he could his apologies for breaking her bottle, and there the conductor stood gloating over the whole affair. The young man and his companion were embarrassed and humiliated; the woman whose bottle was broken was enraged, and my mother and I were indignant at the brutal conduct on the part of the conductor. Coming back to the car, I saw that a friend of mine, an exceptionally high standard of service that the employees are talking about now, in their strike settlement, as being rendered on the Pennsylvania Railroad."

I think that this man represents the Pennsylvania Railroad in the average standard of its service, the effects of that same attitude toward its employees, and my personal objection to such humiliating treatment, and there are men wearing its uniform that would be just as independent as well treatment as you are." He answered me, "That conductor represents the Pennsylvania railroad. The company put him there and it keeps him there." What answer could I make to that? That man uttered the truth; the company did put that man there and is keeping him there. It is the company's duty to know whether or not a man in his position is fit to deal with passengers. Here was a conductor, presumably of mature years, having passed through several years of training, or at least several years when he should have been trained—a man well paid and cared for. If he had pleasantly and quietly said to the owner of the suit cases, "It is against the rules to have suit cases in the aisles; let us see what we can do with these," and taken hold good-naturedly to dispose of the obstruction, everything could have been satisfactorily adjusted.

The railway officer employing men is under an imperative obligation to provide the best men obtainable, and he is under a moral obligation to provide men who are proper associates for other employees. Good men attract men of like character. The conditions of a railway are vastly different from those of a store or workshop, where men can be closely supervised. On a railway they are sent out in small groups and a great deal depends upon the individual quality and character of the men composing crews.

After securing the proper men they must be taught and trained. Some men resent discipline, but it is only the trained horse that wins the race. A capable, courteous conductor, if given the right men, will train up men exemplifying the good qualities that he himself possesses. Instead of the professor of deportment, it seems that on the large systems we shall some day have the social engineer, qualified to look beneath the pretensions of men and discern the real qualities that animate the individual.

So much for the employing agency; now let us consider the obligations that rest on the employees. Permit me to again quote a leaf from my own experience. While a young man the Pennsylvania railroad gave me employment as a freight brakeman, and it was my good fortune to remain in the employ of that company for 34 years. I was advanced as fast and as far as my abilities warranted. Notwithstanding panics, good wages were regularly paid and indulgent consideration was given to the interests of every employee. I did not "give" my best days to the Pennsylvania railroad, but I sold my skill and abilities, and they paid me for every day's service, treating me with kindness at all times and with sympathetic consideration when suffering from illness and accident. I have always felt profoundly grateful for the consideration shown me. My case is but a typical one and could be multiplied by thousands; therefore, it was only natural that I should feel a deep concern and pride in maintaining and improving the standards of the service. The desired standards can only be attained when every man in the service, without regard to rank, is animated by a sincere desire and purpose to acquit himself in the best possible way in dealing with all that pertains to the service, and especially in dealing with its patrons.

While serving as a passenger conductor in the local service I received \$3.50 a day. I felt at that time that I was very well paid and expressed myself to that effect to my associates, pointing out that a capable foreman carpenter, who rode on my train, was receiving but \$3 a day for ten hours' work, whereas I received \$3.50 for seven hours, which in the main only provided me with proper exercise. For that same service to-day a conductor receives \$4.67 a day, though conductors on the electric roads receive but half that amount for much harder work.

There is no question but what politeness can be taught, but it depends altogether on having the right teachers and the right scholars. Nine-tenths of life's actions, say psychologists, depend

upon habit; hence, the importance of training men into good habits. The railway officer who aims to inculcate courtesy should exemplify it individually in all the relations of life. Emerson said, "Every great institution is the lengthened shadow of one man." That truth is particularly applicable to railways, for if the spirit of real courtesy characterizes the individual intercourse of officials, it is bound to permeate the ranks of the employees. Politeness can be taught, but the trainmasters are overburdened now; in fact, the strain on some of them tends to impair their amiability. Who, then, is to teach this divine accomplishment? Above all things, let us get away from the thought that courtesy pays; that is too sordid a thought to be associated with real courtesy. Courtesy embraces fair play, right relations, respect, consideration, sympathy, kindness, reverence and sincerity, and in daily life it brings the sweetest of all compensations. It is a divine element that a man imbibes from his mother; like mercy, "it blesseth him that gives and him that takes."

"A poor man served by thee shall make thee rich;
A sick man helped by thee shall make thee strong;
Thou shalt be served thyself by every sense
Of service which thou renderest."

WILLIAM H. SIMMS.

A SUPERINTENDENT WHO REQUIRES POLITENESS.

Melrose, Pa., August 5, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Reading your issue of to-day I noted a letter in which the point is urged, in response to a recent editorial suggestion, that railway superintendents seldom, if ever, seriously impress upon trainmen the importance and value of politeness. Having traveled thousands of miles over many railways, it is my conviction that as a rule the managers would seem not to appreciate how invaluable an asset to any public service corporation is the hearty good will of its patrons.

But there are some notable exceptions, and they deserve to be held up as good examples. For many years I have lived on the Philadelphia & Reading, and have seen it operated under conditions of bankruptcy and of the highest prosperity. Adversity taught the operating officers of this company how much can be done under necessity. Prosperity has enabled them to demonstrate what good service a railway can perform.

About 200 miles of the most largely traveled lines of the Reading system are operated as the New York division, of which Charles A. Beach is superintendent. This man is a Christian gentleman. He began his railway career as a freight trainman around about Albany, N. Y. His superintendent at that time was a man of great profanity, and Mr. Beach then promised himself that if he should ever be placed over men in a position of authority he would not swear at them. This, by way of introduction. As superintendent of the New York division of the Reading, Mr. Beach holds "school" in his office about once a week. Trainmen and others attend in squads. The lessons consist largely of friendly, man-to-man talks concerning all manner of things which enter into the practical operation of a carefully managed railway.

Upon the passenger trainmen Mr. Beach makes it a point to impress the lesson that courtesy is just as much a part of their duty as it is to obey operating rules. This teaching has borne fruit, not only in the conduct and demeanor of the men, but in making travel for the company.

Ladies, particularly, note this condition. I have, on various occasions, heard ladies, not only from other parts of the United States, but also from Europe, comment upon the courtesy and consideration of gentlemen, attention shown them by conductors and brakemen on Reading trains; have heard this remarked upon as something out of the ordinary, and, therefore, worthy of praise. And so I want to bear witness to the fact that there are superintendents who try, and that successfully, to carry passenger trains promptly, as well as comfortably and safely.

AMULE H. BARKER

TRAVELING ENGINEERS' CONVENTION.

The eighteenth annual convention met at the Clifton hotel, Niagara Falls, Canada, on August 16, 17, 18 and 19, President C. F. Richardson, assistant to the general superintendent of motive power of the Chicago, Rock Island & Pacific, presiding. In his address President Richardson placed special emphasis on the importance of fuel economy and the extent of the authority of the traveling engineer.

PRESIDENT'S ADDRESS.

Fuel Economy.—The railways are facing an unusual condition. The increased cost of operation, brought about by increased cost of material and labor, makes it necessary to practice the strictest economy, and I believe one of the greatest opportunities for the traveling engineers to assist in reducing the cost of operation lies in fuel economy. This question has a special interest for us, as it comes directly under the supervision of the traveling engineer, and the possibilities of economy in fuel consumption, together with the question of how to educate the engineer and fireman to the highest efficiency, are questions demanding serious consideration by the members of this association. Also the waste of coal in other ways should be carefully looked into on his division by every traveling engineer.

The saving that may be brought about by using low grade coal in many places where high grade coal has been used, will cause your general manager to wonder why it was not done before. If you will study the situation and make a recommendation showing what can be saved by making the change, it will be worth while. The traveling engineers should be able to give better information as to these savings than anyone else, and we cannot afford to overlook any opportunity to reduce the cost of operation of the road we represent. Most railway managers are looking for subordinates who can work out plans to reduce the cost of pulling a ton of freight one mile.

Another important matter is to systematize our work; we should keep certain records that we may work intelligently. I believe every traveling engineer should have a record of the draft arrangement in the front end of every engine on his division. By having this record, he will be able to regulate the drafting of the engines to reduce fuel consumption. I am assuming that the traveling engineer receives proper support from the master mechanic in not allowing the roundhouse employe to change the draft appliances after they have been properly adjusted. It has been my observation that more fuel is wasted by reducing nozzle tips to overcome the poor operation of a locomotive and neglected work in the roundhouse in not keeping flues bored out, grates in good condition, valves squared, front ends tightened and packing in good order, than can possibly be saved by the traveling engineer. When an engine is once properly adjusted to steam and be economical in coal, if it fails for steam, the real cause of the failure should be located instead of reducing nozzle tips to overcome it. When the traveling engineer can get the proper support from his master mechanic to have the draft appliances let alone after they are rightly adjusted, it will increase the efficiency of the traveling engineer by allowing him more time to ride with and instruct such engine crews as are not 100 per cent. in efficiency.

Many railways fail to get the best results of the work of the traveling engineer, the organization being such that he has no authority over the men. An organization of this kind I consider sadly defective, and I am unable to understand why it should be allowed to continue. The traveling engineer should be a man capable of instructing and directing the men under him, and if he is not, a change should be made at once. The engine crews must understand that the traveling engineer is responsible for the successful operation of the locomotives on the road, and that they are operating them under his supervision. When their attention is called to irregular or improper handling of engines, the instructions of the traveling engineer

must be obeyed, and not be referred to the master mechanic 100 miles away.

SUPERHEAT

The report opened with a brief study of the elementary principles of superheated steam, followed by detail, illustrated descriptions of types of superheaters, that have been developed since the report presented at the 1908 convention, and including the Emerson, Union Pacific, Jacobs, Buck, Buck Jacobs, Vaughan-Horsey applied to a Mallet locomotive and the Cole improved superheater. Data were presented for a number of tests, all of which showed a decided advantage of the superheater engine over the non-superheater engine.

Conclusions Based on Superheater Tests.—The engineer of tests of the Atchison, Topeka & Santa Fe recently completed a set of elaborate tests conducted to compare the road performance of a locomotive equipped with a Jacobs superheater, with the road performance of a locomotive of the same class without a superheater. He reports that the tests lead to the following conclusions:

1. There is a marked decrease in coal consumption for a superheater engine. The decrease averages 20.8 per cent. per thousand ton miles for up-grade runs, 11.5 per cent. for down-grade runs and 19.6 per cent. for constant hard working of engine on heavy grades.

2. There is a reduction of total water for up and down-grade runs, also for heavy grade work with superheater engine.

3. Superheater engine uses 10 per cent. less water per hour, developing more drawbar horse-power on heavy working.

4. Superheater engine shows for heavy working a decrease of 16.3 per cent. in coal per indicated horse-power hour.

5. Superheater engine shows for heavy working a decrease of 12.9 per cent. in dry steam per indicated horse-power hour.

6. There is a reduction in coal of 14.1 per cent. per drawbar horse-power hour in favor of superheater engine.

7. Superheater engine shows a decrease in heat units per drawbar horse-power of 17.3 per cent.

8. There is a marked increase in evaporation of superheater engine. It gave an average of 11.6 per cent. more dry steam per pound of coal than non-superheater engine.

9. Superheater engine with 16.6 per cent. less heating surface gives equivalent evaporation of 10.6 per cent. more water per square foot of heating surface than the non-superheater engine.

10. Superheater engine shows a boiler efficiency 7.6 per cent. greater than non-superheater engine; with credit for heat to superheater from waste gases, the boiler efficiency is 15.8 per cent. greater.

11. Boiler capacity is increased because of heat recovered in superheated steam by 7.1 per cent. Boiler requirements are further decreased on account of lower water rate of engine, due to superheated steam. The resulting effect of superheating, as shown by the tests, is to increase the effective boiler capacity without increasing its actual capacity.

12. Superheaters insure that the steam is delivered to the cylinders without moisture in the steam, even though the engine may be working considerable water in the steam as it leaves the dome. On this account a superheater engine is not liable to knock out cylinder heads, or in case of compound engines loosen the intermediate joint between a high and low-pressure cylinder.

13. Steam from low-pressure superheater was superheated 90 to 125 degs. and supplied to cylinders at not over 450 degs.

14. Superheat was sufficient to prevent entirely the dripping of water from cylinder cocks.

15. There was great uniformity of superheat under varying loads and rates of fuel consumption.

16. The tests show that for operation under local conditions with usual side track delays a superheater engine gives greater economy than a non-superheater engine.

17. Steam entering low-pressure cylinders from the high-pressure exhaust in non-superheater engines contains more moisture than steam entering high-pressure cylinders. Superheating

steam involves evaporation of all moisture in the steam before any superheat occurs. On account of the greater per cent. of moisture to low-pressure cylinders than high-pressure cylinders under ordinary conditions, superheating low-pressure steam is more desirable than superheating high-pressure steam.

18. The brick arch in the firebox gave an increase in economy of operation by decreasing the coal per thousand ton miles and by increasing the evaporation per pound of coal.

19. Superheater engine developed 20 per cent. more drawbar horse-power per square foot of heating surface than non-superheater engine.

20. Superheater engine gave for best performance 10 per cent. more horse-power for the same cylinder volumes than non-superheater engine.

There are over 800 superheater engines on 20 railways in North America, and the number is increasing daily. The following information concerning the operation of superheated steam locomotives was taken from replies to a circular of inquiry:

Boiler Pressure.—The general practice upon applying superheaters is to increase the diameter of the cylinders when the boiler pressure is reduced. This results in decreased boiler repairs.

Lubrication.—But little trouble has been experienced in lubricating superheater engines, and it has not been found necessary to adopt forced lubrication where piston valves are used. But little information was received in regard to lubrication of slide valves. The Canadian Pacific with Vaughan-Horsey superheaters uses oil fed to each end of steam chest, and also to center of cylinder. About 80 per cent. of the oil is fed to steam chest. Wheeling & Lake Erie (Cole), Great Northern (Schmidt and Emerson), and El Paso & Southwestern (Cole), lubricate in cylinder as well as valve chamber.

Fuel.—The great Northern (Schmidt and Emerson) reports a saving of 18 per cent. in coal and 20 per cent. in water. Wheeling & Lake Erie (Cole) reports a saving of 20 per cent. in coal and water. Canadian Pacific (Vaughan-Horsey) saves 10 to 15 per cent. of coal consumed in freight service, and 15 to 20 per cent. in passenger service. Pennsylvania (Baldwin)—Coal about equal; saving in water of 6½ per cent. Santa Fe (Jacobs) reports saving of from 15 to 20 per cent. in coal and from 10 to 15 per cent. in water.

Front End Apparatus.—No change of importance in front end apparatus seems to be made when superheater is applied.

Steaming Qualities.—Engines with superheaters steam better than non-superheater engines. The Canadian Pacific finds that on an engine with cylinders too large for the capacity of the boiler with saturated steam, the same boiler will supply the same cylinders satisfactorily when using superheated steam.

Foaming Water.—The Canadian Pacific, Great Northern and Santa Fe report that engines with superheaters operate to better advantage with foaming water than engines not so equipped.

Piston Rod and Valve Stem Packing.—The Great Northern uses Allan metal for rod packing on engines carrying 200 lbs. of steam where temperature runs up to 600 degs. Other roads use same packing as used before the introduction of superheaters.

Leaking Joints in Superheater.—The Northern Pacific has had some trouble with leaking joints between superheater header and superheater pipes. Gaskets of copper and asbestos are now being used and give better service than previous gaskets. The Great Northern is now welding superheater pipes into return bends. The Wheeling & Lake Erie (Cole) is using ground joints in superheater tube connections in place of cup and ball, and believes this method superior to using dummy when grinding joints in the superheater tubes. The Canadian Pacific uses gaskets of soft copper and has very little trouble with leaking joints. Ground joints used in connection with headers to dry pipes and steam pipes. The El Paso & Southwestern uses ground joints.

Discussion.—The discussion brought out the following facts:

Unless at least 50 degs. of superheat are obtained it will not pay to install a superheater in a locomotive. Ninety per cent. of the superheaters in service are of the fire-tube type. One of the members stated that his road feared to use a high degree of superheat because of the possible effect on the cast iron fittings. Another member replied that such fittings had given no trouble with the high superheat used abroad. The question of lubrication for superheated locomotives was thoroughly discussed. Roads that are using superheaters extensively seem to have no particular trouble, although judging from the discussion some of those who have only one or two superheater locomotives have had some difficulty, particularly where slide valves are used. The members generally believe the superheater locomotive has come to stay and will be extensively adopted. In an address on the third day of the convention D. R. MacBain, superintendent of motive power of the Lake Shore & Michigan Southern, stated emphatically that the superheater had come to stay. The Canadian Pacific has about 400 superheater engines which are proving very satisfactory and, in Mr. MacBain's opinion, any attempt to convert these to saturated steam locomotives would meet with most strenuous objection on the part of the enginemmen.

EDUCATION OF FIREMEN.

We take it for granted that any man who accepts the position of fireman does so with the intention of some day becoming an engineer, and those of us who employ them should be careful in our selections. Mistakes can easily be made by employing a man on his fitness for a fireman rather than as an engineer. Men for the position of fireman should be of good moral habits, physically able for the duties expected of them, eyesight good, and have a fair education. We recommend a physical and visual examination to be required before they are employed.

A man who has passed the experimental stage of firing and has been placed on the list for regular duties should commence the study of some part of the locomotive. We would advise that these studies be divided into four parts as follows:

1. The boiler and its attachments. Firemen should be taught the construction of the steam gage, the correct meaning of the figures on its dial, the failures to which it is subject and how to proceed should one fail on the road. They should have a fair knowledge of the pop-valves and their functions and should be taught the dangers of carelessly overlooking their failure to work, also the danger of misusing them in a way. It would be well to teach firemen the circulation of water in a boiler, the bad effects of too much water, the dangers of not enough water, and the best way to safely know when it is foaming. They should know how much strain each staybolt carries and to what bolts this strain is transferred when one is broken, and should be taught to mark and report every hollow staybolt they may have to plug on the road. They should know how the draft rigging is constructed in the smokebox of each class of engine they may later have to run, also how to adjust it and the cause for doing so. Every man firing a locomotive should know how to work an injector; also how to care for it on the road and have it ready for immediate use, more especially in cold weather. They should be taught the failures to which injectors are subject, how to locate the trouble and remedy it, if possible to do so, and make an intelligent report of it at terminals.

2. Inspection of the locomotive; the proper names of the parts inspected and how to make intelligent reports at terminals. There are two important things to consider: defects, commonly called pounds and blows, and how to locate them while running and with the engine standing still. In years past the men had to be thoroughly posted on setting up wedges and boxing up rods before they were promoted to the position of engineer, but with the more modern engines these rods are bushed and it requires little skill on the engineer's part to inspect and report this work, which perhaps has caused some of us as teachers to grow careless in training the young men of today. The committee recommends that the present-day

engineer and fireman should be trained to take care of these parts of an engine as carefully as was done in the past. There was another old custom on some railways where the men were compelled to have some shop experience before they were promoted to the position of engineer, which we believe would be valuable in educating the young men of to-day, if possible to practice it. They were employed as machinist helpers, which gave them information of the locomotive and its construction that served them well in after years. If young men between 19 and 21 years of age could be given these positions at a living salary and afterwards transferred to road service, it would be best for both individual and the railway company and would not be compelling them to serve two apprenticeships, as they are not eligible to road service until they are of age.

3. Engine failures should be considered next. The men should be taught the best and quickest way to remedy any trouble of this kind, get the main track clear, and if possible get the engine and train safely to the terminal.

4. Valve motion. Every engineer should have a fair knowledge of valve motion, yet it is the hardest part of the locomotive for some men to understand. A traveling engineer should teach the men on his division about this part of the engine carefully and patiently. He may have to revert to many shop rules to get them to understand it, and should do so if necessary. They have the right to know how to set an eccentric, how the length of the rods is obtained, the distance the valves move on their seat for the different cut-offs at which an engine may be worked, and any other information that applies to valve setting which would give them a more thorough knowledge of the motion at work, thereby aiding them to quickly detect and locate a defect in it which would allow the valves to admit and exhaust steam to and from the cylinders irregularly. They should be taught expansion of steam and should know how to trace steam from the boiler into the cylinders and out through the exhaust tips. There are books which contain this information and every engineer and fireman should have them and keep them where they can be studied as often as possible.

We recommend progressive examinations as another method of educating the fireman. These examinations may be either in writing or oral, as best suited to the conditions existing on the different railways. The final examination for promotion should be a review, and we recommend that it be oral. If firemen were required to stand an examination on machinery equal to that required of them on standard rules they would have a better knowledge of the locomotive.

Another and one of the best methods of educating the firemen on machinery is in the class room. Meetings held as often as possible are valuable and very necessary. The traveling engineer should preside over them and teach and advise the men to the best of his ability. A good valve model is valuable for these meetings.

Classes can be taught from the locomotive with good results, and we recommend it. In these classes the men can be taught the names of the different parts of the locomotive, and also the functions of each part and how to handle it in case any part should have to be removed on account of a failure. The engine should be placed in position to test for any defect the men may have to look for with it standing still, and they should be shown how to make these tests.

LATEST DEVELOPMENTS IN AIR-BRAKE EQUIPMENT.

Detail illustrated descriptions were given in the report of the New York automatic control equipment, the K triple valve, and the Westinghouse L N and the New York J A improved passenger equipments.

NEW VALVE GEARS.

The construction and operation of the Walschaert, Baker, Pilliod and the Hobart Allrice radial balanced valve gears were described and brief directions were given in each case as to what should be done in case of breakdown.

LOCOMOTIVE LUBRICATION.

The report traced the development of locomotive lubrication.

In summing up it said: "One of the first things concerning the introduction of the light road lubricator and the keen interest taken by all whose duty it was to look after lubricating material, in providing suitable storage rooms, measuring and weighing facilities, and educating employees in the most economical method of handling lubricants. It is estimated that the adoption of the lubricator and the educating of the men as to its use has brought about a reduction in the cost of at least 50 per cent. Other things that have followed in the line of progress are the reclaiming of all old packing and waste, the careful attention given to renovating and re-using it, keeping a correct record of all lubricating materials, charging it to engineers as well as to engines, and submitting monthly statements showing the amount of oil drawn and the miles run by each engine."—

"Another important factor is the driving box lubricator and the use of grease on the crank pins, the grease being pressed into cakes for the driving box cellars and into sticks for the crank pin cups; also by reclaiming and re-using grease taken from cellars undergoing repairs. It is estimated that with the economical handling of grease this device has been responsible for a reduction from 25 to 40 per cent. in the cost of lubrication. The careful attention given to preparing packing for engine trucks, trailers, oil-lubricated driving boxes and tender truck boxes, and the care exercised in packing them by not allowing strands of packing to hang over the edge, thereby siphoning the oil out, the improved construction and convenient location of lubricators, so they can be easily observed by the engineers both day and night, have resulted in a reduced cost. Another important factor is the close supervision of the issuing of all lubricating materials as well as of its use by the road foremen of engines. Where engines are pooled, the individual supply cans have resulted in a reduced cost and have encouraged the engineer in his efforts to make a good showing."

Discussion.—The question of lubrication brought out a lengthy discussion. D. R. MacBain, superintendent of motive power of the Lake Shore & Michigan Southern, who was present during the discussion, said in an address the next day that it was poor policy to save one cent's worth of oil if it resulted in a loss of 33 cents' worth of coal. In his opinion the greatest cause of trouble was due to the drying of the valves and cylinders in drifting into a station. Plenty of oil must be used in starting up in order to overcome this.

FUEL ECONOMY

Value of Draft Appliances.—With the different kinds of fuel used for locomotives there is without doubt a large field to work in for drafting engines to obtain fuel economy. The first consideration should be given to the service required, next to the quality of coal furnished, and then the engine should be drafted to use the minimum amount of coal for furnishing the necessary amount of steam. There are so many conditions which enter into the proper drafting of the locomotive that in treating this subject we must assume that the following items are given consideration and proper attention: The boiler must be kept free from mud and scale and leaks, the crown and flue-sheets should be kept free from honeycomb, and the grates must have the proper opening. No lost motion should be permitted in the grate rigging. The ash-pan should have the necessary number of openings to admit air for perfect combustion. The steam pipe joints, nozzle base and tip joints, the cinder chute and handhold plate joints, smokebox ring and door joints should be kept tight to prevent any irregularities in the draft. The cylinder packing, valves, piston rod and valve rod packing should be kept free from leaks. The valves should be adjusted for an equal distribution of the steam in the cylinders, and the engine must have the proper cylinder clearance.

With these items properly cared for and the valves and cylinders receiving proper lubrication, you are in position to adjust the draft appliances to burn the least amount of coal possible, if properly handled, to do the required amount of

work expected of the engine. But in ordinary locomotive practice we find many of the above mentioned items neglected, which affect the steaming of an engine, and after a locomotive has been properly drafted in a majority of cases the first thing done in the roundhouse is to reduce the size of the exhaust nozzle by bushing or bridging, in order to overcome defects in some other part of the engine. In consequence draft appliances, which have been thoroughly demonstrated to be all right, have not given good results.

It has been the experience of the committee that where the grate area and netting are increased fuel economy has resulted, and we believe that there is room for further economy along these lines.

Firing Practices, Including the Prevention of Black Smoke.—In order to prevent black smoke and form the habit of proper firing it is necessary when employing the fireman to instruct him in the importance of learning to fire light and even, scattering the coal as thinly over the grate surface as possible, opening and closing the door between each scoopful of coal and allowing sufficient time between each shovelful for the gases to be expelled and consumed. Explain to him that black smoke is unconsumed gas and a waste of fuel. In addition to this he should also be notified of the importance of seeing that the fire is properly prepared before starting with a train, to have tools and appliances to care for the fire and to see that the grates are in proper working order; also that the grates must not be shaken too soon after leaving the terminal, or too much, or too violently at a time. After receiving these instructions, the fireman should be required to make his student trips with a fireman whose practice is light and careful firing and be kept with him until he is O. K'd by both engineer and fireman; then before being allowed to enter the service he should be asked what practice he has followed while making his learning trips, and again impressed with the importance of being always careful to fire lightly, carefully and regularly for the prevention of black smoke, economy of fuel, maintaining an even temperature in the firebox, preventing clinkered and dirty fires, and avoiding the annoyance to patrons of the road and the public.

Many devices have been introduced for the prevention of black smoke, such as air and steam jets, but it is the opinion of many that these devices simply overcome the shortcomings of poor firemen and are wasteful of fuel, and that if the firemen are properly instructed and their interest kept stimulated the black smoke can be prevented to a large extent without these devices. The brick arch, when heated to a high temperature, has given good results in preventing black smoke and in saving fuel, but by many mechanical men it is not considered economical on account of the expense of its application, cost of maintenance and prevention of easy access to the flues.

The use of the blower with the firebox door slightly open, when the engine is standing or drifting, is successful in preventing black smoke to a large extent, and in this connection it is important that the blower valves be placed convenient to the fireman; also that the blower pipe be large enough and properly located in the smokebox to have a good action on the fire. An important factor in the prevention of black smoke is to have the engine free from leaks in the firebox and smokebox, the boiler clean, all flues open, grates working properly, ash-pan with sufficient openings for the proper admission of air, and the pistons and valves not blowing. With the engine free from leaks and blows and properly drafted for free steaming, there is no good reason why the smoke cannot be reduced to a minimum.

Another thing essential in reducing black smoke, as well as to secure fuel economy, is to have the engine crew working in harmony and co-operation with each other at all times. Impress upon the engineer that good results in the prevention of black smoke cannot be obtained unless he properly supplies the boiler with water and works the engine as economically as pos-

sible; he should keep the fireman fully informed of all moves that are to be made.

Should Fires be Banked or Knocked at Terminals?—We believe that this matter is best governed by local conditions. For instance, where boiler troubles prevail, due to bad water and inferior coal, it has not been found practicable to bank fires; however, in some sections of the country it has been found very economical to do so. A number of tests were made by one member of the committee on a road having about 1,000 engines in daily service, 75 per cent. of which had banked fires at terminals for 12 hours. It was found that there was a saving in fuel of about \$700 per day, or \$200,000 per year, by banking the fires.

A tabulated form of this test and kind of fuel used is shown below.

Class, engine.	Grate surface, sq. ft.	Total htg. surf., sq. ft.	Coal used		Hours layover.	Cost		Remarks, save.
			New F.	Bnk F., lbs.		Coal, \$3.75	F. oil, \$0.10	
4-6-2	54.0	3,923	2,500	1,500	12	2.70	...	\$1.15
4-6-0	34.6	2,665	2,000	...	12	2.85	.08	...
4-6-0	34.6	2,665	...	1,200	12	1.71	...	1.22
4-4-0	18.7	1,360	1,200	...	12	1.71	.06	...
4-4-0	18.7	1,360	...	700	12	1.00	...	.77

An analysis of coal used during the test is shown below. For 4-6-2 engines see first line; 4-6-0 and 4-4-0 see last line.

Fixed carbon.	Volatile matter.	Ash.	Sulphur.	Moisture.	B. t. u.
55.85	33.36	10.15	1.57	.61	12,935
57.34	32.02	10.20	4.37	.14	13,247

It is claimed by others that the disadvantage of banked fires is that it prevents the examination of grates and grate rigging and the cleaning of flues, which may result in the engines not steaming freely on the road, causing greater and more rapid variations of temperature than would be caused by knocking the fire, also resulting in more coal being used by the engine crew in their anxiety to keep a uniform steam pressure. It is advocated by many that if an engine is to be placed in service within 12 hours, it is better to leave the fire undisturbed until one hour before the engine is to be used, as there is always sufficient fire in the firebox when the trip is completed to keep for several hours by adding a few shovelfuls of coal, and no cold air will strike the flues as it does when the fire is banked.

Devices and Appliances for Use on Engines and Tenders to Prevent Waste En Route.—There are a number of devices and appliances used on engines and tenders to prevent waste en route, such as shields over tank valves, side boards and racks. One of the best devices of this kind is a hood extending about 24 in. toward the center of the tender; however, these are not advocated for tenders in passenger service, as it is claimed they make the tender top-heavy. We believe that one of the best methods of preventing waste of coal is to have the coal docks placed so that there will be no occasion for overloading the tenders in order to make coal stations. Considerable attention should be given to the lost motion between engine and tender. This lost motion should not be allowed as the coal will be jarred off while running. The springs and tender trucks should also receive careful attention to make the tender as easy riding as possible and to prevent the coal being jarred off. An angle plate placed at the right side of the tender at the gangway prevents coal from working out of the gangway. We also recommend that the openings in the coal gates should not be so large that they will allow coal to sift down and work out of the gangway.

Discussion.—The discussion of the paper on fuel economy was so enthusiastically entered into that the officers had great difficulty in bringing it to a close in a reasonable amount of time. The most important contribution was an address by D. R. MacBain, superintendent of motive power of the Lake Shore & Michigan Southern, which has already been mentioned in connection with the discussion of the reports on superheating and lubrication. In his opinion the first requisite is to start with the engines in good condition. A 10 per cent. saving is

possible by the proper installation and maintenance of the front ends. Most designs of front end are good if properly maintained, but a large loss results if this is not done. The engines should be drafted for the poorest coal, where more than one grade is used. This will mean a loss of economy when high grade coal is used, but it may be reduced to a minimum by the proper adjustment of the nozzle and skilful work on the part of the engineer and fireman.

He stated that if the brick arches were to be taken from locomotives on the New York Central, Lake Shore & Michigan Southern and Michigan Central the service would be paralyzed, because of the loss in efficiency and capacity. It is well known that until a couple of years ago Mr. MacBain was strongly opposed to the use of the brick arch, especially in pooled service. He has found, however, that with the improvements in brick arch design and construction and the proper organization to look after them, they not only give no trouble but are a source of considerable economy. All locomotives on the Lake Shore are now equipped with them. The saving in fuel is estimated at 10 per cent. and black smoke is eliminated.

The discussion centered very largely on the use of the brick arch. The committee had directed attention to its value in preventing black smoke and in saving fuel. A number of the members spoke enthusiastically about these advantages and showed that with the more improved types of brick arch the disadvantages mentioned by the committee had been entirely overcome.

Mr. MacBain has noticed that the engineers, particularly the older ones, are not always as attentive to business and as interested in fuel economy as the firemen are. As far as possible only one class of coal should be used on each division.

PROGRESSIVE EXAMINATION.

A committee was authorized to prepare for distribution as quickly as possible a revised series of questions for progressive examinations. After a short discussion it was decided to prepare the answers and have them accompany the questions, thus making it easier for the student to master the subject.

Election of Officers.—The following officers were elected for the ensuing year: President, F. C. Thayer, general road foreman of engines, Southern Railway, Atlanta, Ga.; first vice-president, W. C. Hayes, superintendent locomotive operation, Erie, New York; second vice-president, W. H. Corbett, road foreman of engines, Michigan Central, Jackson, Mich.; third vice-president, F. P. Roesch, master mechanic, El Paso & Southwestern, Douglas, Ariz.; treasurer, C. B. Conger, Wm. Sellers & Co., Grand Rapids, Mich.; secretary, W. O. Thompson, master car builder, New York Central & Hudson River, East Buffalo, N. Y. Executive committee: J. McManamy, road foreman of engines, Pere Marquette, Grand Rapids, Mich.; C. F. Richardson, assistant to general superintendent of motive power, Chicago, Rock Island & Pacific, Chicago, Ill., and M. J. McDrews, road foreman of engines, Michigan Central, St. Thomas, Ont.

It was decided to hold the 1911 convention in Chicago. The secretary's salary was increased from \$600 to \$1,200 per annum. The association has 770 members.

Exhibitors.—The following companies had exhibits in the billiard room of the Clifton hotel: The American Arch Company (brick arches), New York; The Commercial Acetylene Company (headlight and accessories), New York; Detroit Lubricator Company (lubricators), Detroit, Mich.; Franklin Railway Supply Company (various devices), New York; C. M. Goodrich (cab window), Clinton, Iowa; The Leslie Company, Lyndhurst, N. J.; Pilliod Bros. (valve gear), Toledo, Ohio; The Pilliod Company (valve gear), New York; Strong, Carlisle & Hammond Company (Randall graphite sheet lubricator), Cleveland, Ohio; Watson-Stillman Company (Chambers throttle valve, Nosealon boiler water treatment, hydraulic tools), New York. The Hunt-Spiller Manufacturing Corporation, South Boston, Mass., unfortunately lost its exhibit in shipment.

MULTIPLE TRACK RAILWAYS IN WEST VIRGINIA.

The railways in West Virginia on which there are two or more main tracks are shown in the accompanying map, the number of tracks on the different sections being indicated by the thickness of the lines in the drawing. On the Norfolk & Western, between Naugatuck and Kenova, about 80 miles, there are two single-track lines which serve in part for double-track service, most of the westbound trains being run over one of these lines and most of the eastbound over the other. The termini of the sections having more than one main track are as follows:

WEST VIRGINIA.

Chesapeake & Ohio.

	No. tracks	Approx. miles
Harpers Ferry to Engle	2	3
Engle to Martinsburg	2	15
Martinsburg to Hedgesville	4	8
Hedgesville to Sir John's Run	2	23
Sir John's Run to Hansroth	2	14
Hansroth to Magnolia	2	7
Magnolia to Okonoko	2	10
At Okonoko	2	
Okonoko to Green Springs	2	
Green Springs to Patterson Creek	2	

Chesapeake & Ohio.

	No. tracks	Approx. miles
East Allegheny, Va., to Rossford	2	29
East Spring to Big Bend	2	18
Hilldale to Primer	2	20
N. Cabin to Cotton Hill	2	18
Canton to Lewis	2	22
Barboursville to Russell, E.	2	9

Norfolk & Western.

Chaplin to Glenwood Junction	2	64
Devon to Naugatuck	2	80

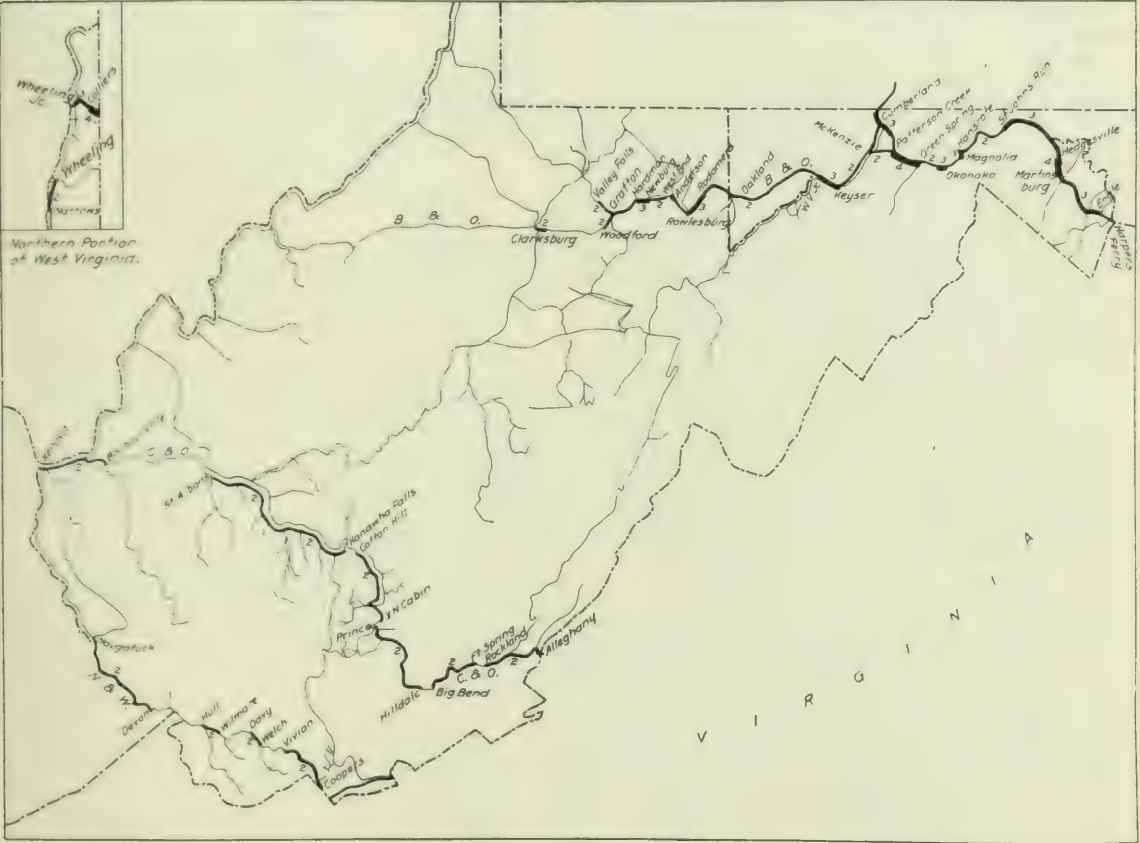
Pennsylvania.

Pennsylvania State line to Cabin	2	1
Cabin to Wheeling Junction	2	20
Wheeling Junction to Ohio State line	2	

THE MANAGEMENT OF SMALL PASSENGER STATIONS.

The unpleasant features of passenger stations, having come up for discussion (as they do every summer), and the new wisdom on the subject being no better than the old, we reprint here an extract from Charles Paine's "Elements of Railroadng," written in 1884:

The waiting rooms should not be cramped in size nor in com-



Multiple Track Railways in West Virginia.

Patterson Creek to North Branch	2	7
North Branch to Cumberland	2	5
Patterson Creek to McKenzie	2	5
Keyser to West Virginia Junction	2	6
Oakland, Md., to Rodamers	2	14
Rodamers to Rowlesburg	2	8
Rowlesburg to Anderson	2	6
Anderson to Tunnelton	2	1
West End to Newburg	2	5
Newburg to Hardman	2	3
Hardman to Woodford	2	..
Crafton to Valley Falls	2	6
At Clarksburg	2	..
Wheeling to Narrows	2	7

fort; at large stations, such as important junctions, passengers find it convenient often to remain at the station between trains, particularly ladies and children; the more attractive and convenient the rooms are, the oftener they will go over the road. A fire-place in each waiting-room adds not only to the cheerful appearance of the room, especially in spring or autumn, when a little fire only is needed, but it insures ventilation in the easiest way, which is a valuable result, for all public rooms should have ventilation to be comfortable, although we have become accus-

tomed from long habit to tolerate bad air. A few chairs, of strong pattern, which can be moved about, should always be provided in the ladies' room for the use of mothers with infants, or for persons who would like to sit in a group; it is not possible for more than three persons to talk together upon a bench, and an infant cannot be suitably dandled or nursed upon one.

Nowhere are the waiting-rooms so well lighted in the daytime as in the United States; in part because we have the most cheerful sun, and in part because we have taken care to avail of it; but generally it is impossible to read at all in them after dark; not often because there are not lights enough but that they are placed too high. It is often difficult for the passenger to see his money or ticket, while he is buying it at the window, with sufficient distinctness to enable him to correct a mistake, if one were made.

There should be ample shelves outside of the ticket offices and telegraph offices near the windows, upon which the travelers may open out their wallets or write their despatches.

If drainage can be had, or if it is not necessary, the station should be provided with a cellar, to contain fuel and a furnace or steam apparatus for heating the entire building. There is no other convenient or so neat mode of storing the fuel; the risk of conflagration and the nuisance of dirt are both lessened by having only one fire to attend to, and that out of sight.

The matter of drainage will settle the question of water-closets also; if that can be secured, they are the most convenient of any form of privy, for water can be pumped by hand into a tank sufficient to provide for them, where other means do not exist. But water-closets must be kept warm enough not to freeze. Where drainage can be had, the dry earth closet will answer the purpose perfectly; it requires no skill nor unusual labor, only energy on the part of the agent to see that it is properly attended to. The horrible vaults which have so long disgraced our civilization should not be tolerated by a respectable railroad officer, even if the improved sanitary vigilance of the towns would permit their use. There has not been any invention yet, however, which will secure neatness on the part of the public which uses the privies; they must be watched, and attended to when necessary, at once; if neglected, the Augean stables were nothing in comparison with what they will attain to; yet that does not excuse a public corporation which fails to provide decently those conveniences which it professes to afford its patrons.

The urinary vessels always give much odor unless the urine is discharged into cold water; if the water, which is generally discharged at the bottom of the vessel, were allowed to fill it and to overflow at the top there would be no odor. Try this! In winter they must not be allowed to freeze, of course.

A cheap means of providing more waiting room at a station likely to be crowded is to place benches outside, under shed roofs or overhanging eaves; they will be frequented in any tolerable weather by smokers and by many other persons who prefer fresh air. A well with a good pump in it and a cup attached is a comfort at every station, or a drinking hydrant and even a fountain where water is abundant; either is much more attractive than a water cooler, apt to be not too well attended to. As to the surroundings, let them be neatly kept, at any rate. The addition of trees and grass with graveled paths suggests itself. Flowers are beautiful and attractive, but require more care and more expense, while they are of less consequence. The ash heap, so common at country stations, does not seem to be needed, and the ashes spread over muddy roads will serve some good purpose if distributed not too thickly.

FOREIGN RAILWAY NOTES.

Consul W. L. Avery, of Belize, says that the British Honduras Railway extension is nearly completed. The pier construction at Commerce Light, 1,200 ft. long, extending into four fathoms of water, is built with heavy piling from the American Creosote Works, New Orleans, La. The railway line extends

through dense tropical growth, which will be cleared for fruit planting. The Government will grant small holdings only, selling crown land at \$3 to \$8 an acre, with the obligation to cultivate within a given time. The United Fruit Company, New York, is beginning work on its 7,528 acres recently purchased. It is expected that before many months a steamer load of 20,000 bunches of bananas will be shipped from the pier.

The Prussian authorities have been moved, apparently by a recent accident when signals were not observed, to issue new orders regarding the inspection of signals. Every year the officer in charge of trains, the officer in charge of signals, and an engineman selected for his experience and familiarity with the part of the line to be inspected, are to go over the road on a locomotive, but only two of them at a time on engines hauling trains. They are to pay particular attention to the following points: 1. The visibility of the signals—their background, their obscuration by telegraph poles, station buildings, trees, etc.; the effect on night signals of arc lights in the vicinity, or the reflection of other signals; the condition of the glasses of signals. 2. The distance of the signal from the danger point. 3. The grouping of signals, where several stand near each other, in one row or otherwise; the appearance of the signal from every position in succession; the possibility of the confusion of signals. 4. The substitution for signals standing left of the main track of signals on the right of the track. 5. Substitution of high distant signals for low ones. 6. Superfluous signals. 7. The proper designation of main and branch tracks, where one post has several signals.

PROPOSED SAFETY APPLIANCE STANDARDS.

The Interstate Commerce Commission, in accordance with the provisions of the safety appliance law, approved April 14, 1910, has, after conferences with representatives of the railways and their employees, prepared a set of safety appliance standards. A hearing will be held in Washington, D. C., September 29, 1910, at 10 a.m., at which time arguments for or against the suggested application of these appliances may be presented. It is desirable from the standpoint of the railways that they agree among themselves as to just what changes they want made and go before the commission as a unit, as suggested in an editorial note in this issue. To this end any criticisms or suggestions should be forwarded to the president of the Master Car Builders' Association, T. H. Curtis, superintendent of machinery, Louisville & Nashville, Louisville, Ky.

The proposed standards for box and other house cars, except caboose cars, are reproduced below. Similar standards have been prepared for all classes of freight and passenger cars and for steam locomotives used in both road and switching service, or both.

BOX AND OTHER HOUSE CARS, EXCEPT CABOOSE CARS. HAND BRAKES.

Number.—Each freight car shall be equipped with an efficient hand brake, which shall operate in harmony with the power brake.

Location.—So located that it can be safely operated while car is in motion. The brake shaft shall be located on the end of the car, to the left of and not less than 17 nor more than 22 in. from the center.

Material.—The brake shaft shall be of wrought iron or steel, without weld. Brake wheel shall be of malleable iron, wrought iron or steel.

Construction.—There shall be not less than 4 in. clearance between brake wheel and car. Outside edge of brake wheel shall be not less than 4 in. from a vertical plane parallel with the end of the car and passing through the inside face of knuckle when closed, with coupler horn against the buffer block or end sill.

The brake pawl shall be pivoted upon a bolt or rivet not less than $\frac{3}{8}$ in. in diameter or upon a trunnion secured by not less than $\frac{1}{2}$ in. bolt or rivet, and there shall be a rigid metal connection between brake shaft and pivot of pawl. Top brake shaft support shall be fastened with not less than $\frac{1}{2}$ in. bolts or rivets. (See Plate "A.")

A brake shaft step shall support the lower end of the brake shaft. A brake-shaft step which will permit the brake chain to drop under the brake shaft shall not be used. "U"-shaped form of brake-shaft step is preferred. (See Plate "A.")

Brake shaft shall be not less than $1\frac{1}{4}$ in. in diameter, arranged with square fit to secure hand-brake wheel at its upper

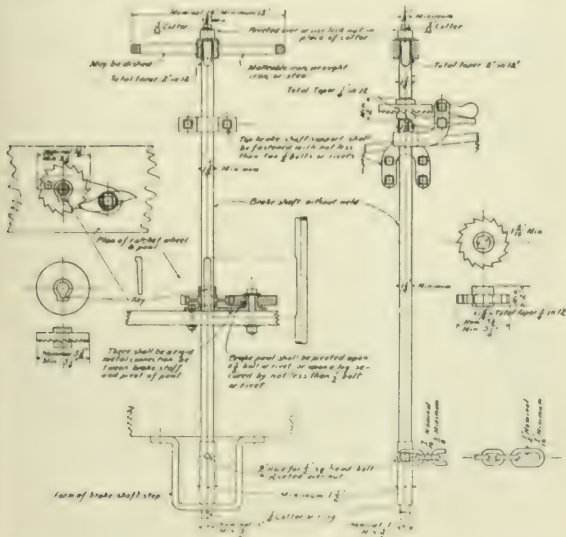


Plate A.

end; said square fit shall be not less than $\frac{3}{4}$ in. square. Square fit shall taper nominally 2 in 12 in. (See Plate "A.")

The brake chain shall be of nominally $\frac{1}{2}$ in. but not less than $\frac{3}{8}$ -in. wrought iron or steel, with a link on the brake-rod end of nominally $\frac{1}{2}$ but not less than $\frac{3}{8}$ -in. wrought iron or steel. (See Plate "A.")

Lower end of brake shaft shall be provided with a trunnion nominally 1 but not less than $\frac{3}{4}$ in. in diameter, extending through the brake-shaft step and held in operating position by a $\frac{1}{4}$ -in. cotter or ring. (See Plate "A.")

Brake-shaft drum shall be not less than $1\frac{1}{2}$ in. in diameter; said drum shall receive a $\frac{1}{8}$ -in. hole for not less than $\frac{1}{4}$ -in. square-headed bolt, which shall secure brake chain to shaft; nut on said bolt shall be secured by riveting end of bolt over nut. (See Plate "A.")

Brake ratchet wheel shall be secured to brake shaft by a key or square fit; said square fit shall be not less than $1\frac{1}{8}$ in. square and taper nominally $\frac{1}{4}$ in. in 12 in. When ratchet wheel with square fit is used, provision shall be made to prevent the ratchet wheel from rising on the shaft to disengage the brake pawl. (See Plate "A.")

Brake ratchet wheel shall be nominally $5\frac{1}{2}$ but not less than $5\frac{1}{4}$ in. in diameter, and have nominally 16 but not less than 11 teeth. (See Plate "A.")

If brake ratchet wheel is more than 36 in. from the brake wheel, a brake shaft support shall be provided to support this extended upper portion of the brake shaft; said brake-shaft support shall be fastened with not less than $\frac{1}{2}$ in. bolts or rivets.

Brake wheel shall be held in position on brake shaft by a nut on a threaded extended end of brake shaft; said threaded

portion shall be not less than $\frac{1}{2}$ in. in diameter, and nut shall be secured by riveting over or the use of a lock nut or cotter; said cotter shall be not less than $\frac{1}{2}$ in. in diameter. (See Plate "A.")

Brake wheel may be flat or dished, nominally 16 and not less than 15 in. in diameter, with square fit for brake shaft in hub of said wheel; taper of said fit, nominally 2 in 12 in. (See Plate "A.")

BRAKE STEP

If brake step is used, it shall be not less than 28 in. in length. Outside edge shall be not less than 8 in. from face of car and not less than 4 in. from a vertical plane parallel with the end of the car and passing through the inside face of knuckle when closed, with coupler horn against the buffer block or end sill. Supported by not less than two metal braces; minimum cross-sectional area $\frac{3}{4}$ by $1\frac{1}{2}$ in. or equivalent; which shall be securely fastened to body of car with not less than $\frac{1}{2}$ in. bolts or rivets.

RUNNING BOARDS.

Number.—One longitudinal running board.

Location.—Full length; center of roof. On outside metal roof cars, two latitudinal extensions from the longitudinal running board, to the corners above ladder locations if car construction will permit.

Material.—Wood.

Dimensions.—Longitudinal board not less than 18 in. in width; nominally, 20 in. Latitudinal extensions not less than 24 in. in width if car construction will permit.

Construction.—Shall be continuous from end to end and not cut or hinged at any point; provided that the length or width of running boards may be made up of a number of pieces securely fastened to saddle blocks with screws or bolts. The ends of the running board shall be not less than 6 nor more than 10 in. from a vertical plane parallel with the end of the car and passing through the inside face of knuckle when closed, with coupler horn against the buffer block or end sill; and if more than 4 in. from the edge of the roof of the car, it shall be securely supported with two substantial metal braces.

Fastenings.—Shall be securely fastened to the car.

SILL STEPS.

Number.—Four.

Location.—One near each end on each side, as near end of car as practicable. Outside edge of tread of step not more than 4 in. inside of face of side of car; nominally, flush with side of car. Tread shall be not more than 24 in. above rail; nominally, 22 in.

Material.—Wrought iron or steel.

Dimensions.—Minimum cross-sectional area $\frac{1}{2}$ by $1\frac{1}{2}$ in. or equivalent. Minimum length of tread 10 in.; nominal length, 12 in. Minimum clear depth 8 in.

Construction.—Steps exceeding 18 in. in depth shall have an additional tread.

Fastenings.—Securely fastened with not less than $\frac{1}{2}$ -in. bolts with nuts outside when possible and riveted over; or not less than $\frac{1}{2}$ in. rivets.

LADDERS.

Number.—Four; except on cars with platform end sills 6 or more inches in width measured from end post or siding, and extending entirely across the end of car; such cars shall have two end ladders. Side ladders not required on cars with platform end sills as heretofore described.

Location.—One near the right end of each side not more than 8 in. from the end; one near the left side of each end not more than 8 in. from the side, measured from inside edge of ladder stile or clearance of ladder treads, to corner of car. On cars having platform end sills, as heretofore described, the end ladders may be located near center of ends of car.

Material.—Hard wood, iron or steel.

Dimensions.—Minimum clear length of tread; side ladders 16 in., end ladders 14 in. Maximum spacing between ladder treads 19 in. Top ladder tread shall be located not less than 8 nor more than 12 in. from roof at eaves. Spacing of ladder treads shall be uniform from top ladder tread to top tread of sill step. Hard-wood treads; minimum dimensions $1\frac{1}{2}$ by 2 in. Iron or steel treads; minimum diameter $\frac{5}{8}$ in. Minimum clearance of treads 2 in.; nominal clearance $2\frac{1}{2}$ in.

Construction.—Metal ladders without stiles near corners of cars shall have foot guards or upward projections not less than 2 in. in height near inside end of bottom treads. Stiles of wooden ladders will serve as foot guards.

Fastenings.—Securely fastened with not less than $\frac{1}{2}$ -in. bolts with nuts outside when possible and riveted over; or not less

than $\frac{1}{2}$ -in. rivets. Outer end not more than 8 in. from clearance of handhold to end of car.

Material.—Wrought iron or steel.

Dimensions.—Minimum diameter, $\frac{5}{8}$ in.; minimum clear length, 16 in.; minimum clearance, 2 in.; nominal clearance, $2\frac{1}{2}$ in.

Fastenings.—Securely fastened with not less than $\frac{1}{2}$ -in. bolts with nuts outside when possible and riveted over; or not less than $\frac{1}{2}$ -in. rivets.

HORIZONTAL END HANDHOLDS.

Number.—Eight or more. Four on each end of car. (Tread of end ladder is end handhold when within 8 in. of side of car.)

Location.—One near each side on each end of car not less than 24 nor more than 30 in. above center line of coupler; except as provided above when tread of end ladder is end handhold.

Location.—Outer end shall be not more than 8 in. from clearance of handhold to side of car. One near each side of each end of car on the face of the end sill or sheeting over end sill projecting outward or downward. Outer end not more than 14 in. from clearance of handhold to side of car. One additional end handhold on each end of cars with platform end sills, as heretofore described, to be not less than 24 in. in length, located near the center of the car, not less than 30 nor more than 60 in. above platform end sill.

Material.—Wrought iron or steel.

Dimensions.—Minimum diameter, $\frac{5}{8}$ in.; minimum clear length, 16 in.; handholds 14 in. in length may be used where it is impossible to use one 16 in. in length on end sills. Minimum clearance, 2 in.; nominal clearance; $2\frac{1}{2}$ in.

Fastenings.—Securely fastened with not less than $\frac{1}{2}$ -in. bolts, with nuts outside when possible and riveted over; or not less than $\frac{1}{2}$ -in. rivets.

VERTICAL END HANDHOLDS.

Number.—Four, on full-width platform end-sill cars, as heretofore described, having end ladder near center of each end of car. If end ladder is located within 8 in. of side of car, only one vertical handhold is required on each end of car, located at opposite side from ladder.

Location.—One near each side on the end of car not more than 8 in. from side of car; bottom end of handhold not less than 24 nor more than 30 in. above center line of coupler to clearance of handhold.

Material.—Wrought iron or steel.

Dimensions.—Minimum diameter, $\frac{5}{8}$ in.; minimum clear length, 24 in.; minimum clearance, 2 in.; nominal clearance, $2\frac{1}{2}$ in.

Fastenings.—Securely fastened with not less than $\frac{1}{2}$ -in. bolts with nuts outside when possible and riveted over; or not less than $\frac{1}{2}$ -in. rivets.

UNCOUPLING LEVERS.

May be either single or double and of any efficient design, provided that—

Location.—Handles of uncoupling levers shall be not more than 6 in. from the sides of the car, except those shown on Plate "B" or similar designs. When single lever is used it shall be placed on left side of end of car. Uncoupling levers of design as shown on Plate "B" and similar designs shall be within the following prescribed limits: Handle to be not more than 12 in. from side of car; nominally, 9 in. The center lift arm shall be not less than 7 in. long. The center of eye at the end of center lift arm shall be not more than $3\frac{1}{2}$ in. beyond the center of eye of uncoupling pin of coupler when horn of coupler is against the buffer block or end sill. (See Plate "B.") The end of handle to extend not less than 1 in. below bottom of end sill or shall be so constructed as to give a minimum clearance of 2 in. around handle. The minimum drop of handle to be 12 in. maximum, 15 in. over all. (See Plate "B.")

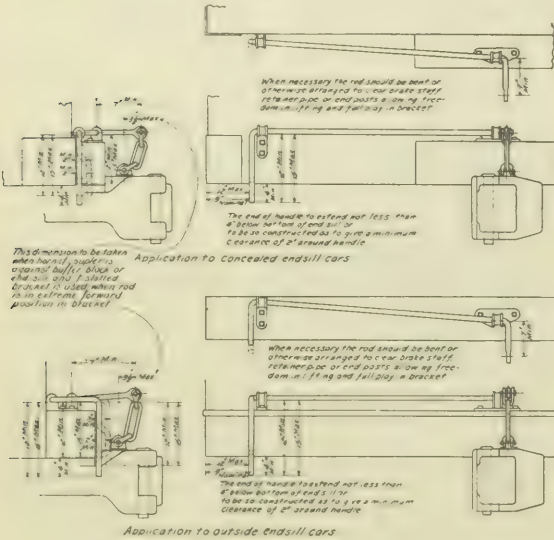


Plate B.

than $\frac{1}{2}$ -in. rivets. Three-eighths in. bolts may be used for wooden treads which are gained into stiles. No part of car or lading above end sills, except buffer block, brake shaft, brake wheel, brake step, running board or uncoupling lever shall extend to within 12 in. of a vertical plane parallel with the end of the car and passing through the inside face of knuckle when closed, with coupler horn against the buffer block or end sill.

ROOF HANDHOLDS.

Number.—One over each ladder. One right-angle handhold may take the place of two adjacent specified roof handholds provided the dimensions and locations coincide and that an extra leg is securely fastened to car at point of angle.

Location.—Roof; one in line with and running parallel to treads of each ladder, not less than 8 nor more than 15 in. from edge of roof, unless construction of car will not permit.

Material.—Wrought iron or steel.

Dimensions.—Minimum diameter, $\frac{5}{8}$ in.; minimum clear length, 16 in.; minimum clearance, 2 in.; nominal clearance, $2\frac{1}{2}$ in.

Fastenings.—Securely fastened with not less than $\frac{1}{2}$ -in. bolts with nuts outside when possible and riveted over; or not less than $\frac{1}{2}$ -in. rivets.

THE HANDHOLDS.

Number.—Four. (Tread of side ladder is side handhold.)

Location.—Horizontal, one near each end on each side of car, not less than 24 nor more than 30 in. above center line of coupler, except as provided above when tread of ladder is

THE SIERRA LEONE GOVERNMENT RAILWAY.

BY EUGAR ALLEN LORRIE.

It isn't much of a railway, compared with the New York Central or the Pennsylvania, or even with the newer railways now under construction in other British colonies on the west coast of Africa, but it is the crowning glory of a hundred years of English rule in Sierra Leone. It runs from Freetown, on the coast, 227 miles into the interior. Being the pioneer of British West African railways, its gage is the narrowest, 2 ft. 6 in., but it has a commercial and military and civilizing importance out of all proportion to its size. There are 220 miles of main line and 35 miles of branch lines.

As its name indicates, the road is a government enterprise, and the men who operate it are colonial officials. The first section was opened for traffic in 1899, and its extension has slowly but steadily gone forward year by year. The present inland terminus is within a day's march of the Liberian frontier, where the builders have apparently halted to await expected changes in the political status of the neighboring negro republic before going farther.

The road is a surface line, winding around the bases of the hills instead of cutting through them, and often avoiding the necessity of a trestle by making a long detour. In this respect the French railway builders in Africa are immeasurably superior to the British. The roadbed of the Sierra Leone Railway is a good piece of work, however; in spite of the torrential rains of the wet season, there has occurred but one serious washout in ten years. The grades are quite steep at times; the mountain section at Freetown rises 850 feet in 6 miles, but the light locomotives ascend it without evidences of shortness of breath.

Railway construction in every part of West Africa must overcome certain difficulties peculiar to this coast. One of the most serious is the insignificant looking white ant, usually known as the "bug-a-bug." This voracious ant has a mania for dried wood, and it devours everything from a dead tree in the forest to the furniture of the white man's bungalow. There are very few varieties of wood hard enough to resist its attack. In the face of an omnipresent enemy like the bug-a-bug, it would be folly to make use of timbers in construction work; so all the ties, piles and bridges are of metal instead of wood.

The inventory of rolling stock on December 31, 1908, showed 28 Leeds locomotives, 59 coaches and 204 freight cars on hand. Of the 50 main line coaches 20 are third-class, 14 are second-class and 7 are composites. There are 5 baggage cars and 4 "saloon vans." If these alleged parlor cars are all like that assigned for the use of the American Commission to Liberia, they are unworthy of the name. The nine remaining coaches, including one funeral car, are in use on the mountain section which serves the suburban district near Freetown. The European compartment system is in use, and first-class is none too good for the white man, however low his degree.

The 204 freight cars include many patterns. The covered cars number 68, and their capacity is from 7 to 8 tons each. There are also 5 covered cars with small compartments in front for the use of brakemen in bad weather. There are 28 high-sided cars and 10 others of the same type, but with removable corrugated iron covers—a special convenience designed by Mr. Comber, the general manager. The open ballast cars number 43, with 4 others having the corrugated covers, and there are 38 flat cars. The 8 remaining cars are inventoried as follows: 2 cattle cars, 2 mountain ballast cars, 2 mountain flat cars, and 2 construction cars.

The construction cost of the main line was about \$5,248,800, and that of the mountain railway was approximately \$187,200. This was financed by an issue of Sierra Leone Government bonds in 1904. The 4 per cent. interest is paid out of the revenues of the colony.

The most profitable year in the road's history was 1907, when the market for palm oil and palm kernels was particularly favorable. The net profit on the year's working on the main line was

\$71,663, a return of 14½ per cent. on the capital cost. The mountain section was operated at a loss of \$8,128. The present calculations the return for 1909 will establish a new record.

It was not possible to obtain the exact figures showing the relation of inward to outward traffic; so far as freight revenues are concerned, the inward traffic is much the lighter. Of the imports into Sierra Leone in 1907, the following are the most important of those handled by the railway: Cotton cloth, £251,152; leaf tobacco, £49,193; beads, £10,823; gin and rum, £4,655; telegraph materials, £17,139. These imports, most of which found their way inland, amounted to £332,962, or \$1,598,178.

Of the exports handled by the railway, the value of the palm kernels alone (£447,800) exceeded that of all the imports mentioned above. Other items of country produce exported in 1907 were: Palm oil, £51,144; rubber, £22,489; kola nuts, £113,674; ginger, £11,578; rice, £5,635, a total of £652,311, or \$3,131,092. The greater part of these country products reached the seaboard via the railway, though many natives yet cling to the old trails, carrying their loads on their heads. Freetown is the only port of consequence in Sierra Leone. The road has a somewhat formidable rival in the Sierra Leone river, which affords both natives and traders a quick and cheap means of transportation, but the road is bending its energies toward this conquest also. The happy



A Flag Station for Natives.

thought of inaugurating market trains on certain days in the week has accomplished much in that direction. The railway statisticians appear to keep no records showing the volume of inland traffic as compared with that destined to Freetown, but the relation is approximately that which exists between the totals of imports and exports. The up-trains are not called on to carry more than half as much as the down-trains.

In a colony like Sierra Leone, which is yet in the first stages of development, the transportation of troops and government stores helps out the revenues immensely. In 1907 and 1908, government business contributed about 25 per cent. of the passenger revenue and from 6 to 11 per cent. of the freight.

Among the sources of miscellaneous revenue are some auxiliaries that are distinctly African. Three of these were inaugurated in the latter half of 1908, with a view to increasing the traffic by providing up-country traders with facilities for transporting palm kernels and other products from the villages to the railway. Two of these experiments—traction engines and bullocks—were disappointing on account of local conditions, but the method described as "barrel roller transport" seems to be working out. This is a very primitive method, the device being nothing more than a well-constructed barrel with a detachable head. The produce is loaded into the barrels, the heads are fastened down

and the barrels are rolled to the nearest station. It is a vast improvement over the native portage method. The other auxiliaries consist of the Boia and the Baiima tramways (same gage as the main line) and a quarry of laterite stone, much used for building purposes in Freetown.

The telegraph system is also an asset of financial importance, as well as a railway and military necessity. The operators, including those at Freetown, are natives of the colony and give the management reasonable satisfaction, in spite of the slowness in transmitting and receiving messages. The service is not continuous all along the line; a telegram encounters two or three relays before reaching its destination.

In the revenue derived from passenger traffic there is an overwhelming preponderance of third-class tickets—those purchased only by the blacks. It is evident that the West African quickly learned to appreciate the conveniences of a railway, even though the saving of time be of no consequence to him whatever.

Through tickets over the 220 miles of main line are sold at approximately the following rates per mile: First class, $4\frac{1}{4}c$; second class, $4\frac{1}{2}c$; third class, $3\frac{1}{3}c$. Between Bo (136 miles

ists, mostly blacks. The general manager was quite proud of this train.

Under climatic conditions such as prevail throughout West Africa, one may expect constant trouble with machinery of all kinds—and with the men who have it in charge. Months of daily rain cause everything from a watch to a locomotive to go wrong with rust, and even in the dry season the atmosphere contains a superabundance of moisture. Moreover, a large part of the road's equipment must necessarily be entrusted to native subordinates, who have neither the requisite knowledge nor the inclination to forestall the necessity for repairs by the exercise of proper precautions. And, indeed, some of the white men who come out are deficient in the same respects, yet they must be paid higher salaries than they can command at home, and must also be furnished with transportation both ways (about \$230) every eighteen months and also provided with expensive bungalows on the field. As a result of these and other conditions, the working expenses of the little railway amount to upward of \$300,000 a year, the operating ratio being over 90 per cent.

Soft coal is used almost exclusively as fuel, the supply being



Passenger and Freight Station at Freetown.

fraction of a cent more per mile. Round-trip tickets over the entire line are sold at about the following rates: First class, $6\frac{1}{2}c$; second class, $4-4\frac{1}{2}c$; third class, $3-1\frac{1}{2}c$. Between Bo (136 miles inland) and Freetown, second and third-class market tickets are sold on Mondays and Tuesdays at one fare for the round trip. The return ticket must be used on the up-train leaving Freetown on Wednesdays. Children over the age of three and under twelve are charged half fares.

On the Mountain Railway, Freetown's suburban line of six miles, the fares are as follows for the first, second and third classes, respectively: Single trip, $18c$, $12c$, $6c$; round trip, $30c$, $20c$, $10c$. Most of the commuters travel second class for about \$5 a month. Though it is a government railway, the officials do not ride free; but since they pay no rent for their \$10,000 bungalows, the railway expense is not burdensome.

With a white population so small as to be scarcely appreciable, the opportunities for railway excursions are much curtailed. On holidays, however, trains are run up to Waterloo, where there are a merry-go-round and numerous "thrust parlors." One special that was sent out of Freetown during my visit carried 100 excursion-

ists always available at the station of the Sierra Leone Coaling Co. in Freetown. It is cheaper than wood because there are no good forests along the line, it being a region of "small bush."

The general offices (with the exception of the auditing department) are in the Freetown station, which is a much finer depot than one would expect to see on this coast. In its extent and arrangements it is almost metropolitan. The country stations are also commendable structures and the grounds enclosing them are laid out in tropical plants and flowers. The only diminutive buildings are the flag stations, which are not much larger than a dry-goods box but answer their purpose admirably. The freight depot at Freetown has a novelty in the line of enabling native shippers to classify their own cargo according to its destination. Since they cannot read the painted signboards, the background of each is of a different color. A man accustomed to shipping goods to Bo, for example, need learn the place of deposit only once; thereafter he remembers the color of the sign.

The shops, engine house and car-sheds are nearly all at Clinton, a suburb of Freetown, and these buildings are also quite

creditable. All the sheds are of iron or corrugated iron, no wood being used in their construction. The mechanics' shop and carpenter shop are beehives of industry, with Sierra Leone workmen in charge of two white men in each. The machine shop is quite useful to steamers also and to anchored, needing repair work. A feature of the yards is the group of attractive stone bungalows for the white employees. Each of those holding the higher positions has a house to himself, while the fitters, enginemen, are housed in groups. An ample recreation ground has been prepared and a club-house is now being fitted up. The men in the shops draw better wages and live in finer houses than they ever knew in England and Scotland, but the white man's life on the West Coast, even at its best, is a life that few men would envy.

The men who come out are usually selected by the consulting engineers in England, and their term of service in Africa is only 12 months (half as long as the American missionaries stay); their passage is paid both ways and they are allowed to remain four months at home, on full pay. The following is a list of the positions filled by white men, with the salaries per year: General manager, \$3,360; his clerk, \$1,368; chief accountant, \$2,100; his assistant, \$1,140; senior assistant traffic manager, \$1,920 + \$384 duty allowance; his assistant, \$1,140; traffic in-

pector, \$1,272; two traffic officers, \$1,416 and \$1,080; locomotive superintendent, \$2,780; his assistant, \$1,824; locomotive foreman, \$1,440; six fitters at an average of \$1,152; three fitters and enginemen, average \$1,180; boilermaker, \$1,080; eleven enginemen, from \$860 to \$1,224; two blacksmiths at \$1,176; maintenance engineer, \$2,640 + \$432 allowance; his assistant, \$1,920 + \$432 allowance; two draftsmen at \$1,680; track inspector, \$1,440; thirteen trackmen at \$1,032. All of these are provided with free quarters.

Some of the Sierra Leone blacks receive salaries equal to those of many of the whites. Among the examples are the traffic supervisor, \$1,440; junior draftsman, \$1,440; storekeeper, \$1,008; inspector of telegraphs, \$864, and two enginemen at \$864. But the natives receive no free quarters, no travel allowance and no four-months' leave.

Some adequate conception of the working efficiency of the European staff may be gathered from the following figures, which are for the latter half of 1907:

Number of white officials, 52.

Number of days on duty, 7,058 = 75.19 per cent.

Number of days on leave, 2,111 = 22.48 per cent.

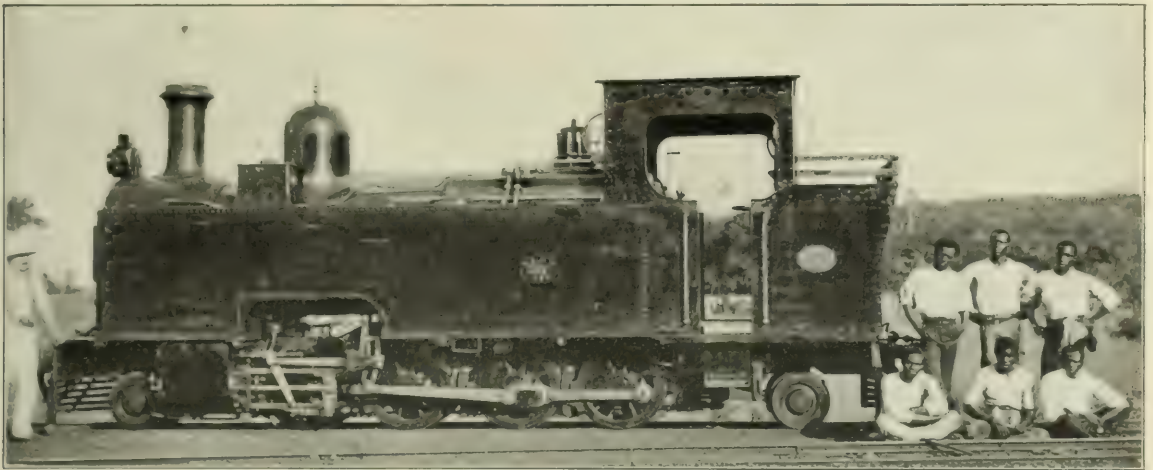
Number of days on sick list, 219 = 2.33 per cent.

Twenty-six (one-half) of the men were not sick at all; nine

were sick for ten days or longer. The longest sick leave was for nineteen days.

No trains are run after dark, chiefly because they would not pay, but partly because of a playful native habit of placing stones on the rails.

Through trains from Freetown to the Baiima terminus, and vice versa, are run three times a week, leaving each end of the line on Tuesdays, Thursdays and Saturdays. Since they tie up at night, two days are required for the 220 miles, or four days for the round trip. The speed averages about thirteen miles an hour, including stops. On the alternate days—Mondays, Wednesdays and Fridays—a train leaves Freetown at 11:15 a.m., and runs as far as Moyamba (75 miles), requiring six hours for the trip. Returning, this train leaves Moyamba on Tuesdays, Thursdays and Saturdays. There is one daily train on the main line, leaving Freetown at 4.30 p.m., but it goes no farther than Songo (32 miles), where it is due at 7.10 p.m. It leaves Songo at 5.37 the next morning and gets into Freetown at 8.23 a.m. There is also an important weekly train, arranged especially to accommodate natives who want to market their produce. It is made up at Boia Junction, 64 miles inland, whence it departs on Mondays at 6.30 a.m., arriving in Freetown at 2.52 p.m. This market train does not leave Freetown



One of the Latest Locomotives on the Sierra Leone Railway.

on its return trip until Wednesday at 9.05 a.m., so the natives have nearly a day and a half in which to spend the few shillings received for their palm nuts, kola nuts or miscellany. This up-train reaches Boia Junction at 2.39 p.m. and connects with the tramway there. The market trains are the only ones which make no provision for first-class passengers.

On certain days these short-run trains vary their schedules, but the changes are only of local interest. From the native's point of view these variations must be vexatious, for the primitive mind of the West African is not yet able to cope with the intricacies of that literary production known as the railway time-table. The irregularities may be partly responsible for the native habit of congregating at the station hours before train time, though the lack of a timepiece doubtless has something to do with it.

The service on the Mountain Railway is also very confusing, but as this section was constructed mainly for British officials the punishment is visited upon the offenders. The run of six miles requires half an hour, and there are nine stations, four of them being flag stations. Three daily down trains run from Hill Station into Freetown, and five irregular trains. Of the latter, one leaves the hill at 4.15 p.m. daily except Saturdays, and two run on Saturdays only—1.10 and 5.00 p.m. The fourth

leaves the hill at 6.55 p.m. on Mondays, Thursdays and Saturdays, while the fifth starts at 6.25 a.m. on Tuesdays, Wednesdays and Fridays. No trains at all are run on Sundays.

The peculiar genius of the Englishman is shown in the schedule of one of the trains. This is the regular 12.30 daily out of Freetown, but on Saturdays it is replaced by a train on another schedule starting just two minutes later!

Some of the minor regulations governing passenger traffic would provoke perspiration and profanity, if not rioting, should they be adopted by American roads. Here are a few:

(1) The ticket offices at all stations are opened thirty minutes before train time, but close five minutes before the train leaves. No tickets are sold thereafter and no one is admitted to the station platform without a ticket, though there may be an abundance of time in which to board the train.

(2) The friends of a passenger may not pass the gatekeeper to see him off without presenting platform tickets, costing two cents apiece.

(3) The baggage regulations are very restrictive. Hand baggage consisting of personal effects (but not merchandise) up to

nuts and skins, and such imported goods as ale and wine, cigars and tobacco, millinery and perfumery, sewing machines and unspecified merchandise. Crockery and furniture, unless shipped at owner's risk, also belongs to this class.

Class II is much larger, but it contains only one native product, piassava, a fiber obtained from a species of palm and used in Europe for making baskets, etc. Most of the food products belong here, such as butter and cheese, preserved provisions, dried fruit, refined sugar and beer. This class also includes wearing apparel, boots and shoes, cotton and woolen goods, coarse furniture, machinery, hardware, glassware, iron building material, paint, tinware, earthenware, candles, kerosene, mineral waters and fine soap. Just why kerosene is not classed as "dangerous goods," along with rum, is not apparent.

Class III embraces the majority of products shipped from up-country and coarser grades of imported goods. The most important item is palm kernels, but the native coffee and cocoa, ginger, peanuts, lumber, stone and fruits are also included, along with empty barrels, casks and bottles. Of the imported merchandise, such articles as agricultural implements, bamboo



Main Line Passenger Train.

24 lbs. may be carried free on one ticket. Beyond that weight the passenger is confronted with these excess charges:

Distance up to 76 miles, 8 pounds for 2 cents.

Distance up to 136 miles, 6 pounds for 2 cents.

Distance above 136 miles, 4 pounds for 2 cents.

An ordinary steamer trunk carried over the main line and back again would cost from \$8 to \$12.

But the payment of the excess charges does not end the passenger's woes. His luggage must bear his name and address and be distinctly labeled to his destination. He must travel by the train that conveys it. If he intends leaving on an early morning train it must be presented for booking not later than 1.30 of the preceding day, yet the company does not guarantee that it will be forwarded by the morning train! The freight regulations are not so stringent.

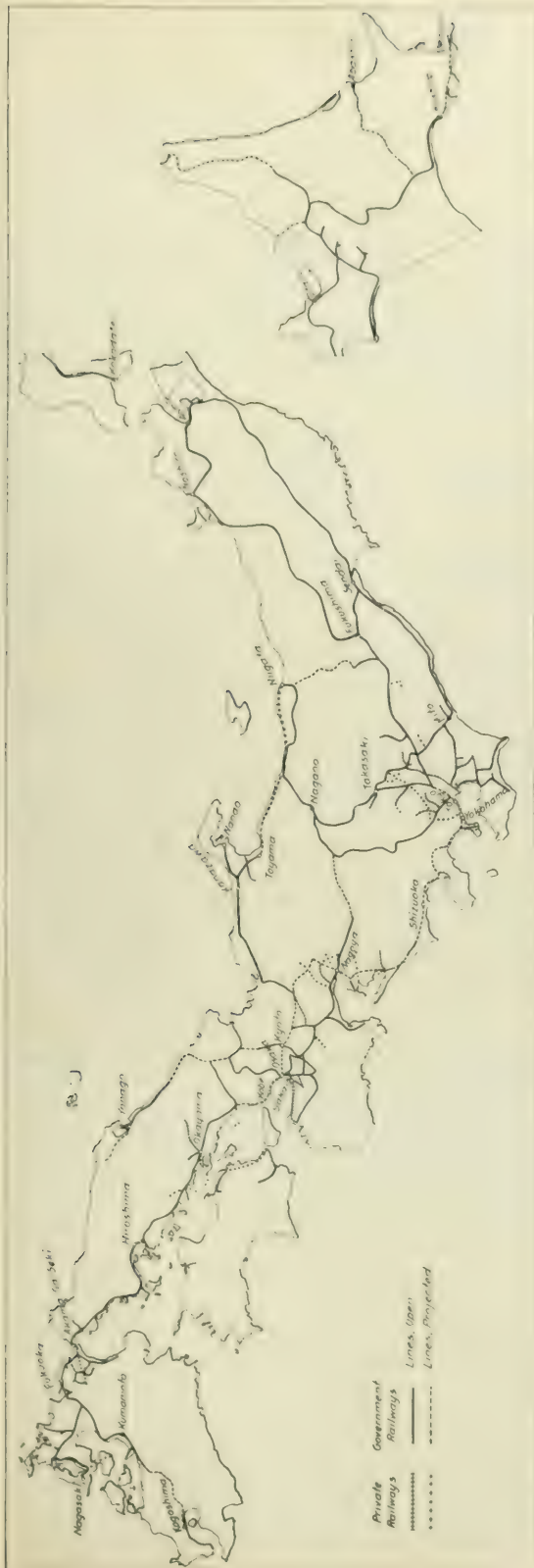
At the present time freight is divided into four classes, one of which is called "Dangerous Goods." It includes absolute alcohol, mineral oils, gunpowder, matches, rum and most important of all—palm oil.

Class I embraces non-native products—ivory, rubber, koka

furniture, books, iron castings, cement, cutlery, fish, flour, meat, nails, potatoes, salt and common soap belong in this lowest class. Live animals and birds are excluded from the freight classification and carried as "parcels" or express matter.

IMPERIAL GOVERNMENT RAILWAYS OF JAPAN.

Under the railway nationalization law, the government of Japan has been since 1906 buying and taking over the operation of private railways. Since July 1, 1907, up to March 31, 1908, 15 lines had been bought, but the purchase price on only seven of them had been decided on, so that the total capitalization of government railways, as given in the report for the year ended March 31, 1909, does not include the sums that will be required to pay for eight railway lines. Of the total railway mileage in Japan, including Formosa, only 446 miles were owned by private companies in 1908, the remaining 1,455 miles were government railways. The average mileage operated of government railways in the fiscal year



Railways of Japan.

ended March 31 was 3,982 mile. This is greater by 1,532 mile than the mileage operated in 1907. The total amount invested in government railways in 1908 was \$199,171,729.

The total revenue from operation, including the revenue from steamship lines, amounted in 1908 to \$31,566,177. This is an increase of \$16,149,289 over the previous year. The average receipts per mile of line totaled \$8,397, an increase of \$337 over the previous year. Of the total receipts but \$417,774 were from the steamship business. Of the total revenues, freight furnishes about 44 per cent. and passengers about 55 per cent.

Total operating expenses amounted to \$17,876,922. The operating ratio, therefore, in 1908, was 51 per cent. In 1907 operating expenses amounted to \$9,123,800, and the operating ratio was the same in 1907 as in 1908. Maintenance, which corresponds roughly to maintenance of way and structures on American railways, cost \$1,029 per mile of line operated in 1908 and \$942 in 1907. Motive power and rolling stock, which apparently corresponds to maintenance of equipment, cost 18.1 cents per engine mile in 1908 and 19.9 in 1907. Transportation expenses totaled \$5,324,024, as compared with \$2,487,378. The total number of passengers carried in 1908 was 101,115,739, an increase of nearly 100 per cent. over the number of passengers carried in 1907. Of these passengers about 95,600,000 were third-class, 5,000,000 second-class, and the remaining 400,000 first-class. The average mileage traveled, however, by third-class passengers was 22; second-class passengers, 43; and first-class, 66; and the average receipts per passenger per mile were 1.799 cents first-class, 1.049 cents second-class, and 0.703 cents third-class, making the average receipts per passenger per mile, all classes, 0.746 cents.

During the year the passenger tariffs were revised on a number of roads and the fares were fixed on a mileage basis; less, however, being charged per mile when the journey was a long one than when it was a short one. The following table shows the charges per mile per third-class passenger:

1 to 50 miles	..0.83 cts.	261 to 300 miles	..0.4 cts.
50 " 100 "	..0.65 "	Above 300 "	..0.35 "
100 " 200 "	..0.5 "		

The total tonnage of goods carried, which includes express, amounted to 18,300,000 in 1908, an increase of 10,700,000 over 1907; the average haul per ton being 78.8 miles in 1908. The average train load was 71 tons, an increase over the previous year of about three tons. This train load was carried in trains averaging a little over 20 cars; the total car mileage being 413,800,000 and the empty car mileage being 109,200,000. The average receipts per ton per mile amounted to 0.676 cents.

On the Japanese government railways there were but four passengers killed through accidents, 10 through negligence and five through suicide in 1908. There were 10 employees killed in accidents, 93 killed through negligence and one suicide. The collision of passenger or freight trains with locomotives or trains that were performing switching service contributed more than any other one cause to the total accidents on the Japanese railways. One of these accidents is described as follows: "On April 8, 1907, at the Nagoya station, a yardman needlessly moved a shunting engine as No. 8 passenger train was about to move into the yard, and came against the engine that had stood in the way. The locomotive and two passenger cars were overturned, causing injuries to eight passengers and four officials. The train was temporarily recomposed with the cars that were intact and started on its way."

The railway stores fund, to which are charged expenses for materials apparently for renewals, replacements and additions and betterments, showed receipts in 1908 of \$30,714,997, and disbursements of \$30,640,077. Contracts for the purchase of railway stores amounted to \$35,380,000, of which \$27,450,000 was paid for home products and \$7,930,000 for foreign products. The purchase of home products was about twice as great in 1908 as in 1907, and the purchase of foreign products was nearly four times as great.

General News Section.

The Southern Pacific is to build for its employees at San Luis Obispo, Cal., a club house, costing \$30,000.

The bridge of the Rock Island across the Cimarron river, Okla., 900 ft. long, was carried away by a flood August 18.

A stockholder of the Illinois Central has filed a bill in court at Chicago to restrain the road from allowing the display of advertising in its stations or cars, or on its right of way.

At Northampton, Mass., the freight house and yards of the New York, New Haven & Hartford have been abandoned and that company will be a joint occupant with the Boston & Maine in the house and yards of the B. & M.

In a fire at Long Island City, N. Y., on the night of August 20, the Long Island Railroad lost five baggage cars, two mail cars, a hospital car and a pay car; and a dozen other cars were badly damaged; loss \$75,000. Loss on express shed, \$5,000.

At Sioux City, Iowa, petitions are being circulated among the employees of the Illinois Central, which are to be sent to President Taft, to Congress, to the Interstate Commerce Commission and to State legislatures, asking that the railways be not hindered from increasing freight rates.

L. L. Whitman, who arrived in San Francisco on the night of August 18, reported that he had traveled to that city from New York in an automobile in 10 days, 15 hours, 12 minutes and one second; this is four days, 11 hours better than the best previous time, which was made by Mr. Whitman four years ago.

On Thursday, August 18, a train of 120 coal cars was run over the Pennsylvania from Altoona to Harrisburg, 131 miles, at the rate of more than 20 miles an hour. The cars were all of 100,000 lbs. capacity each, and the train was hauled by an engine of class H-8, the same that made the record with 105 cars a year ago.

The Interstate Commerce Commission has established at Chicago a branch office for its bureau of statistics and accounts, which will be headquarters for between 40 and 50 of the special examiners assigned to the duty of making periodical examinations of the railways' accounts. The office is on the 14th floor of the Steger building and is in charge of Examiner F. W. Sweney.

The Pennsylvania Railroad has increased the pay of its telegraphers 6 per cent. This, added to the 6 per cent. which was granted all employees last spring, gives the operators an increase of about 12 per cent. The Lake Shore & Michigan Southern has increased the pay of its locomotive enginemen. The Central Vermont has increased the wages of locomotive enginemen about 20 per cent.

The borough of Lansdowne, Pa., has just appropriated for the paving of a street the sum of \$50,000, which was furnished by the Delaware County & Philadelphia Electric Railway Co.; and the railway company gets nothing in return. The company intended to build a line to connect Lansdowne with 69th street, Philadelphia, but this intention was never carried out and now the sum named, which was deposited with the borough as an evidence of good faith, is forfeited to the borough.

The Capital Traction Co., operating street railways in Washington, D. C., has distributed among 311 employees the sum of \$18,825 in rewards for good service during the year ending July 1 last. Of the 624 conductors and motormen in the service of the company a year ago, 382 were in the classified service; 103 were dropped out during the year, leaving the number in service July 1, 1910, 315; and only four of these failed to receive a bonus of some amount. Seventy-nine men received premiums who had been in the service only one year, notwithstanding the fact that six reprimands would have disqualified them.

Two Views.

Mr. W. McEwan, president of the Whippany Railroad [now the Morrisown & Erie], which runs from Essex Fells, N. J., and Caldwell to Morrisown, takes umbrage at recent remarks of

some of the patrons of the road. The road has but one train, consisting of a locomotive and one car, which shuttles back and forth between Essex Fells and Morrisown all day long. [This is an exaggeration. The trains shown on the time-table are Nos. 573, 511, 481, 581, 510, 470, 524, 582 and 484.] Patrons say that the passenger car in use was built before the civil war. Mr. McEwan admits that the coach is of old design, but says it is in good condition, clean and comfortable. The small locomotive is of the Forney type, 30 tons in weight, and Mr. McEwan says it was designed especially (?) for service on his road and is as fine a piece of machinery as runs on any rails. He says that it stops and starts quicker than an electric car, which enables the train to stop between stations to pick up passengers who otherwise would have long walks to the stations. The road has a second engine, which hauls a freight train.—*New York Times*.

Train Resistance Experiments on the Santa Fe.

Vice-president J. W. Kendrick, of the Atchison, Topeka & Santa Fe, is this week making a trip with a special train of 14 passenger cars and a dynamometer car over the whole of the main line from Chicago to Los Angeles, with a view to getting exact data as to train resistance on every division of the line. The train left Chicago on Monday night at 10 o'clock. Mr. Kendrick plans to eliminate the use of helping engines wherever possible, and he is taking this trip to ascertain the exact power needed on every grade. Tests will be made also on the return trip from Los Angeles to Chicago.

Strikers Reject Plan of Officers.

The Baltimore & Ohio S. W. machinists on strike at the shop in Washington, Indiana, have rejected the proposition to return to work offered by Vice-President Potter by a vote of 104 to 2. This is regarded a hard blow to the business interests of Washington. Faith was broken with them, the business men assert, and they are in no mood to further countenance the strike which they have worked diligently to terminate. The proposition as offered by Mr. Potter was that preference would be shown the strikers in the employment of men, when applications for places were made; that no difference between union and non-union men would be recognized and no grievance committee would be recognized. Some of the men wanted to accept the proposal because they are needy and the strike benefits are not sufficient to sustain their families.

Carrying Out the Commission's Rule.

Two dollars and thirteen cents is the amount of damages asked by the Pennsylvania Railroad in a suit filed at Chicago in the municipal court this week against George W. Milligan, 169 Wabash avenue, a manufacturer's agent. The basis of the suit is as follows: "Plaintiff's claim is for railway fare due from the defendant to the plaintiff for carriage of the defendant from North Philadelphia to Jersey City on January 4, 1910." The costs of filing the suit are \$3. If Milligan demands a jury trial there will be a charge of \$6 more.

Proposed Railway Legislation in Texas.

Governor T. M. Campbell, of Texas, issued a call on August 17 for a special session of the state legislature to be convened on August 18. Among the subjects suggested by the governor for action by the legislature are the following:

Legislation to prescribe the conditions upon which the purchaser of a railway may organize a new corporation, and regulating the stock and bonds of the new corporation, and providing for the protection of holders of all claims against the old corporation. The enactment of laws defining bills of lading and the word "carriers," and providing that it shall be the duty of common carriers and their officers and agents to issue negotiable bills of lading and straight, or non-negotiable, bills of lading at the request of the shipper, between places to be

prescribed by law, and making all negotiable bills of lading negotiable by endorsement and delivery in the same manner as bills of exchange and promissory notes, and prohibiting the placing on the negotiable bills of lading of any terms which would in any manner limit their negotiability. Legislation requiring the erection and maintenance of buildings for protecting those inclement weather employees engaged in repairing cars and other railway equipment. A law reducing passenger fares to two cents a mile.

Red Ball System of Handling Freight.*

One of the important and interesting phases of "teamwork" finds expression on the Atchison, Topeka & Santa Fe in the red ball system. Due to the growth in business and mileage of the system and its splitting up into grand operating divisions under several general managers, it became essential that some better plan for keeping track of important freight in its movement over the system should be devised than formerly existed. To this end, in 1899, C. W. Kouns, then superintendent of transportation, conducted a number of experiments with the object of perfecting a plan to accomplish this result, and in this way the red ball system had its birth.

When a red ball train is made up at Los Angeles, for instance, the agent gives each of the cars in this train a red ball symbol and number for the purpose of thereafter designating this car in all movements to its destination.

Each red ball billing station is given a letter or letters and is assigned a series of numbers to be used in numbering the envelopes carrying the waybills for cars loaded with red ball freight.

A special red ball card, which is a familiar sight to every employee—the large red ball on the white card—is attached to every car of red ball freight, one on each side. Immediately after a red ball train leaves the station the agent telegraphs a report to the red ball bureau in the office of the car accountant.

When the telegram is received at the red ball office a duplicate train is made up by using small wooden pegs. On top of each is pasted a label containing the symbol letter and number as it appears on each car in the road train. These pegs are stuck in a board which represents a train, and the "trains" are hung on a large geographical board.

On the arrival of a red ball train at a terminal point a freight arriving report is telegraphed. If this report is blank except the heading it is understood that all cars from the initial terminal are in the train. If any red ball cars have been picked up or set out between terminals full information concerning each car is given.

This system is kept in proper working order by the enforcement of the rule that all reports must be in the red ball office within an hour of the departure and arrival of trains. In this way accurate information can be furnished traffic department officials and patrons of the company promptly as to the movement of trains generally or of any particular car.

The red ball system of moving and tracing freight has been of great value both to the Santa Fe and its patrons.

The traffic department has found it of most valuable assistance in the solicitation of business and for the special information which patrons are able to receive regarding the movement and location of cars. Through the careful working of this system the operating department has been given great assistance in bringing quickly to light any improper handling of business along the line. In this respect the red ball system has exerted a great influence in keeping every man alert to the great necessity of moving the business in its proper order. Every man upon whom the moving of freight depends knows that if a single car is not properly attended to it will show up on the board like a sore thumb.

The system does away entirely with indiscriminate tracing of freight by officials, agents or anyone who might desire information. Before this system was put into effect it was no uncommon thing for an agent to have four or five telegrams from different people about the same car. Now if any information is wanted application is made to the red ball office.

Estimated Blast Furnace Capacities.

According to the *Bulletin*, the Iron and Steel Association in 1898, estimated the annual capacity of the then live blast furnaces of the United States at 34,000,000 tons. Since November 1, 1907—the time of taking the statistics upon which the above estimate was made to June 30, 1910, 17 furnaces, representing an annual capacity of 287,000 tons, were abandoned or dismantled, and 35 furnaces, representing 4,468,000 tons annually, were completed. Also, 16 furnaces, designed for an annual capacity of 2,083,500 tons, were building June 30, 1910. During this same period a number of furnaces, classified as active in the estimate, were equipped with additional blowing machinery, rebuilt or re-equipped, which resulted in an estimated annual capacity increase of 925,000 tons. On the other hand, a number of furnaces which had been listed as active were really inactive, the estimated annual capacity of which is 1,795,000 tons. The summary of these details shows that the approximate live capacity of blast furnaces of the United States at the end of 1911 will be 40,228,400 tons. The summary is as follows:

Furnaces—gross tons	Annual capacity
Completed furnaces on November 1, 1907.....	34,834,900
Abandoned or dismantled since November 1, 1907.....	287,000
Remainder.....	34,547,900
Completed since November 1, 1907.....	4,468,000
Total.....	39,015,900
Rebuilt and enlarged since November 1, 1907.....	925,000
Total.....	39,939,900
Furnaces idle since November 1, 1907.....	1,795,000
Approximate live capacity June 30, 1910.....	38,144,900
To be completed in 1910, after June 30.....	728,500
Building furnaces to be completed in 1911.....	1,355,000
Approximate live capacity at end of 1911.....	40,228,400

Another Note on Politeness.

One London store has issued printed instructions to its employees containing the following:

Our employees are reminded that whilst serving customers they are expected to wear a commercial smile.

The "commercial smile" is intended, no doubt, to be a happy blend of supreme confidence in the quality of the goods offered with a benevolent desire not to allow the customer to miss the greatest opportunity of his life.—*New York Evening Post*.

Arrests in Connection with Illinois Central "Graft" Scandal.

Three arrests were made in Chicago on August 19 in connection with the charges of extensive "grafting" in the car repair department of the Illinois Central. Those arrested were Frank B. Harriman, formerly general manager, who resigned on March 15; Charles L. Ewing, formerly general superintendent of the lines north of the Ohio river, who resigned on April 1, and John M. Taylor, formerly general storekeeper, who resigned on May 1. The warrants charge conspiracy to obtain money by false pretenses. Two charges are being made against each man. Each gave bond for \$10,000 to answer for each alleged offense.

The arrests followed a conference in the office of Chief Justice Olson of the municipal court, which was attended by Chief Justice Olson, Judge Bruggemeyer, Assistant State's Attorney John M. Barnes, President Harahan, of the Illinois Central, and Murray Nelson, Jr., and Walter L. Fisher, of counsel for the road. The informations on which the warrants were issued were signed by President Harahan.

The alleged frauds against the Illinois Central frequently have been referred to in these columns. The methods used in carrying them out, it is said, was for certain of the officers of the railway to arrange with car repair companies to pay the latter excessive prices for the repair of cars and then in various ways to divide the profits resulting from the frauds between those officers of the road and the repair companies. No official statement has ever been made as to the exact aggregate amount of the frauds, but civil suits which have been brought against the car companies indicate that the management of the road believes they exceeded \$1,000,000.

*From the Santa Fe Engineering Magazine. The Santa Fe system of keeping track of the movement of fast freight was described in the *National Geographic*, August 25, 1906.

Progress of Electrification in Sweden.

Reports of the progress of electrification in foreign countries are increasing. While we in America are timorously approaching the issue and are hesitating at the initial step, up in Lapland, within the Arctic circle, the Swedish government is pushing ahead with its far reaching plans for electrifying the complete State Railway system.

The government controls water rights representing a minimum output of 70,000 h.p. When developed in conjunction with regulation of the lakes in the Great Lule river, this will be increased to about 300,000 h.p. The government proposes establishing a hydro-electric plant at the present time of two generating units of 12,500 h.p. capacity each to supply the energy for propelling the trains. In addition, there will be a reserve unit of the same capacity and two 12,500 h.p. units for furnishing power for industrial purposes.—*Electric Trunk Line Age*.

"Railroad Day" at Denver.

August 20 was "railroad day" at Denver, Colo. A big celebration was given under the auspices of the American Railroad Employees' and Investors' Association. In the morning a long procession, composed of men employed in every branch of railway service, marched through the city's streets, and in the afternoon and evening there were field sports and public speeches at one of the parks. The speakers were W. W. Hall, president of the local branch of the Employees' and Investors' Association; P. H. Morrissey, president of the national organization; Mayor Speer of Denver; Governor Shafroth of Colorado; A. D. Parker, vice-president of the Colorado & Southern; and C. H. Bristol, division superintendent of the Atchison, Topeka & Santa Fe at Pueblo. Mayor Speer delivered a vigorous denunciation of political demagogues who are using the railway question as a means to get into office. He said:

"I do not want to be understood as trying to defend the bad management of some railways. They have made it necessary to pass laws to correct evils and abuses, put into operation by themselves. The professional reformer, ever alert, comes forward, and where one or two bars should be firmly put up, he wants to build a fence which no one could cross and would put most of our railways in the hands of a receiver." Mr. Morrissey in his talk described the purposes of the association of which he is the head. He dwelt on the mutuality of interests of railways and their employees.

Chicago Signal Club.

The Chicago Signal Club, which was organized on August 1 by members of the signal departments of the railways having headquarters in Chicago, held its first regular meeting on Monday, August 22, at the office of *The Signal Engineer*, 402 Plymouth Building, Chicago. The following subjects were discussed: Typical vs. continuous plans for automatic block signal work; comparative efficiency of the time lock and the electric lock from the standpoint of the maintainer; and how much territory a maintainer can cover efficiently under various conditions of track and signals.

The Chicago Signal Club was organized to bring those engaged in signal work in Chicago and vicinity together at intervals for discussion and study of the problems constantly arising in their work and for the interchange and comparison of ideas, experience and opinions. The next meeting will be held on Tuesday, September 6, at 7 p.m., at the office of *The Signal Engineer*. The subjects to be discussed at that meeting will include mechanical towers, lead-outs, wire numbering and the maintenance of potash batteries.

American Society of Engineering Contractors.

The annual convention of this society will be held in St. Louis, Mo., September 27-29, with headquarters at the Coliseum. Papers will be presented as follows: "Dam Construction for City Water Supplies," by J. M. Goldsboro and E. Wegmann, both of New York City, and "Work Preliminary to Street Paving and Road Work," by George C. Warren, Boston, Mass. A banquet will be held and several sightseeing trips will be made to important engineering works in and around St. Louis.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
 AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; next meeting June 22, 1911; Niagara Falls, N. Y.
 AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn.
 AMERICAN ASS'N OF LOCAL FREIGHT AGENTS' ASS'N.—G. W. Dennison, Penna. Co., Toledo, Ohio.
 AMERICAN ASS'N OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew Bldg., Cincinnati, Ohio; Sept. 16; St. Louis.
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York; September, Nov. 16; St. Louis, Mo.
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 18; Fort Worth, Tex.
 AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASS'N.—E. H. Fritch, Monadnock Bldg., Chicago; March 21-23, 1911; Chicago.
 AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; May 9, 1911; Detroit, Mich.
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago.
 AM. RAILWAY TOOL FOREMEN'S ASS'N.—O. T. Harroun, Bloomington, Ill.
 AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. Edgar Marburg, Univ. of Pennsylvania, Philadelphia.
 AM. SOC. OF CIVIL ENGS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and Aug.; annual, Jan. 19, 1911, New York.
 AM. SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Haer, 13 Park Row, New York; annual, Sept. 27-29; St. Louis, Mo.
 AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., N. Y.; annual, Dec. 6-9; New York.
 AMERICAN STREET AND INTERURBAN RAILWAY ASS'N.—H. C. Donecker, 29 W. 39th St., New York; Oct. 10-14; Atlantic City.
 ASSOCIATION OF A. S. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; April 26, 1911; New Orleans, La.
 ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; May, 1911; Montreal, Can.
 ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Colegrove, I. C. R.R., Chicago; annual, Sept. 27-30; Chicago.
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston, Mass.
 ASS. OF TRANS. AND CANAL OFFICERS.—G. C. Conard, 94 Park Place, N. Y.; Dec. 13-14, Chicago; June 20-21, 1911, Cape May City, N. J.
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
 CANADIAN SOCIETY OF CIVIL ENGS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays; Montreal; annual, last week January.
 CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kinkead, 841 North 50th St., Chicago; 2d Tues. in month; Chicago.
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
 ENGINEERS' SOCIETY OF PENN.—E. R. Dasher, Box 704, Harrisburg, Pa.
 ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton bldg., Pittsburgh; 1st and 3d Tues.; annual, Jan. 17, 1911, Pittsburgh.
 FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R.R., Richmond, Va.; 1st Tues. in month; St. Paul, Minn.
 GENERAL SUPERINTENDENTS' ASS'N OF CHICAGO.—H. D. Judson, 209 Adams St., Chicago; Wednesday preceding 3d Thursday; Chicago.
 INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; next convention, Omaha, Neb.
 INTERNAT'L RY. FILE ASS'N.—D. B. Sebastian, La Salle St. Station, Chicago.
 INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, 8 & L. Ry., 2 Two Rivers, Minn.
 INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASS'N.—A. L. Woodworth, Lima, Ohio.
 INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1911, Berlin.
 IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
 MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony Bldg., Chicago.
 MASTER CAR AND LOCO. PAINTERS' ASS'N OF U. S. AND CANADA.—A. P. Reed, P. & M. Reading, Mass.; annual, St. Louis, Sept. 13-16.
 NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept.; Boston.
 NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
 NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, So. Line, Minn.; 1st Tues. after 2d Mon., except June, July, August; St. Paul and Minn.
 NORTHERN RAILWAY CLUB.—C. J. Kennedy, C. & M. & St. P., Duluth; 4th Saturday; Duluth, Minn.
 OHIO RAILWAY CLUB.—A. H. Chesapeake, Barks Bk., Second W. & 1st W. City; 3d Friday in month; Kansas City.
 RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa., 4th Friday in month, except June, July and August; Pittsburgh.
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Richmond, Va.; annual, Oct. 11-13; Richmond, Va.
 RAILWAY SIGNAL ASS'N.—J. P. Mulder, Box C, Colwellwood, O.; 1911, May, 1911.
 RICHMOND RAILROAD CLUB.—F. O. Robinson, 2d Monday, Richmond.
 ROADMASTERS AND MAINTENANCE OF WAY ASS'N.—Walter E. Emery, P. & P. Co., Peoria, Ill.; annual, Sept. 13-16, Chicago.
 ST. LOUIS RAILWAY CLUB.—B. W. Francfort, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
 SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Niquist, La Salle St. Station, Chicago; Oct. 26 and 28; Hotel Chamberlin, Old Point Comfort, Va.
 SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—F. A. Sandberg, A. & S. Ry., Montgomery, Ala.; annual, Oct. 20; Atlanta.
 SOUTHERN & NORTHWESTERN R.R. CLUB.—A. J. Merrill, Piedmont Bk., Atlanta; 3d Thurs., Jan., Mar., July, Sept. and Nov.; Atlanta.
 LOUISIANA TRANS. & CANAL CLUB.—J. G. Macomber, Woolson Spree Co., The Bldg., 1st St.; annual, May 6, 1911, Toledo.
 TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; 1st Sat. after 1st Wed. after, Oct. 13.
 TRADED CLUB OF NEW YORK.—C. A. Skoppe, 290 Broadway, New York; 1st Tuesday in month, except June, July and August; New York.
 TRAIN DISPATCHERS' ASS'N OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 20, 1911; Baltimore.
 TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo.
 WESTERN CANADA RAILWAY CLUB.—W. H. Rosencup, P. O. Box 1707, Winnipeg; 2d Monday, except June, July and August; Winnipeg.
 WESTERN SOCIETY OF ENGINEERS.—J. H. Warfield, Monadnock Bldg., Chicago; Wednesdays, except July and August; Chicago.

Traffic News.

The Ohio, Mississippi, Appalachian and Great Lakes railroads are to consider the influence of any shippers of lumber in weight in road and inland water it may become the subject.

The Western states agreement is confirmed that freight available at 27 hours from any terminal to that Lake City will be 25 cents per 100 lbs. for freight through in 24 hours or less from that time the last passenger is loaded.

The Great Northern & Great Northern Great Lakes, which is now being built, has been ordered and opened for traffic at 27 hours from any terminal to that Lake City will be 25 cents per 100 lbs. for freight through in 24 hours or less from that time the last passenger is loaded.

A final decision from the Interstate Commerce Commission will on September 1 restore passenger rates to the basis of three cents a mile. The agreement under which a rate of 2.5 cents has been in use experimentally will expire at the end of August.

The Interstate Commerce Commission has decided that the lines in that territory intend to make an advance of 10 per cent on the rates in the case of freight from southern producing points to places in the Central Freight Association and Trunk Line territories.

The Iowa state railroad commission, acting in conjunction with the Interstate Commerce Commission, has complained to the Interstate Commerce Commission that towns in the interior of Iowa have to pay excessive rates on freight from places east of the Mississippi river.

The Interstate Commerce Commission has ruled against a charge of discrimination in freight rates between Verdi, Nev., and San Jose, Cal., and was fined \$1,000 by the federal court. A like fine was imposed on the California Pine Box & Lumber Company, which pleaded guilty to having procured an interstate shipment of freight at less than the published rates.

Fred M. Dickson, Master in Chancery of the federal court at St. Paul, Minn., has filed a report holding that the rate of 1 cent per 100 lbs. fixed by the Interstate Commerce Commission on lumber moving from the Pacific coast to St. Paul is unreasonably low, and that the rate should be not less than 50 cents. The case will be argued before the United States circuit court on September 15.

A press despatch from Springfield says that the Illinois State Railroad Commission will at once issue an order, requiring the express companies of the State to make a general horizontal reduction of 10 per cent. in their rates October 1. The commission investigated express rates some weeks ago. It is expected that the express companies will resist the action of the commission and get the matter taken into the courts.

According to the government statistical bureau, the total amount of freight carried by vessels on the Great Lakes in the month of June was 13,002,516 gross tons, which is the heaviest amount ever recorded. It is 16 per cent. greater than the amount of June, 1907. For the six months of this year, the aggregate movement was 30,118,065 gross tons. The largest gain in preceding years is in iron ore from Lake Superior.

Press despatches from Omaha report the detection of extensive frauds on the Chicago, Burlington & Quincy Railroad by its conductors and ticket sellers. The only particulars given are that the station agent at Sioux City and five conductors have been discharged because of the irregularity of the sale and use of tickets. The reports say that conductors taking up tickets returned them, unpunched, to be sold from the office at a low price.

The Grand Trunk Pacific announces that the section of its line which was built by the government, from Winnipeg eastward to Superior Junction, 280 miles, will be opened for business September 1. Trains can then be run from Fort William, on Lake Superior, westward to Edmonton, about 1,100 miles.

The road is expected to carry the new lumber shippers. The company is also expected to be a partner in the new Interstate Commerce Commission, which is expected to be a partner in the new Interstate Commerce Commission, which is expected to be a partner in the new Interstate Commerce Commission.

The Interstate Commerce Commission has decided that the lines in that territory intend to make an advance of 10 per cent on the rates in the case of freight from southern producing points to places in the Central Freight Association and Trunk Line territories.

The difficulty of satisfying jobbers who complain about freight rates is illustrated by the fact that the shippers at Spokane are now voicing their complaints regarding the decision recently rendered by the Interstate Commerce Commission in the Spokane rate case. The commission in this case tentatively ordered reductions in the rates which to the traffic officers of the railways seemed very drastic, but the shippers at Spokane have told the commission that in their judgment it has not yet done enough for them. Which tends to verify the prediction repeatedly made by traffic officers that no matter what the commission did regarding rates to the western intermountain country the complaining communities would never be satisfied.

The Southern Railway announces that in conformity to the agreement which was made at White Sulphur Springs, W. Va., July 19, it will appoint a validation officer, to certify to the signatures of the freight agents of the company on bills of lading issued for cotton going to foreign countries. Certificates will be fastened to the bills of lading to which they apply, and each bill of lading will bear the number of the certificate issued in connection with it.

A press despatch from London says that the American Express Company has informed the banks in England that it stands ready to guarantee the genuineness of bills of lading for cotton where such bills are transmitted through the express company. From information given out in New York in connection with comments on this despatch, it appears that the express company has been assured of the co-operation in the proposed arrangement of many trust companies and banks in the Southern states.

The latest "Farmers' Special" of the Pennsylvania is one of three cars which is now making a 15 days' trip over the lines of the Pennsylvania in the state of Indiana to teach the farmers how to improve their methods of cultivating wheat. The lecturers are from the Purdue Experiment Station. Lectures are to be given at 150 stations, two of 30 minutes each at each station. This week, the Pennsylvania is running a farmers' instruction train also in the state of Ohio, where 25 stops will be made, with three 20-minute lectures at each stop.

The Southern Railway is running "Farmers' Specials" in Virginia, the lecturers being professors from the State Department of Agriculture. In Oklahoma, the Commissioner of Agriculture of the state is to make a lecturing trip of about 12 days, which will include 95 towns, on a train furnished by the Rock Island road. This is called a "Better Wheat Train." In Missouri, the St. Louis & San Francisco is to run a "Good Roads Train," leaving St. Louis September 12. This train will be in charge of the State Highway Engineer and will have three platform cars, containing exhibits of road making material and machinery.

Mann-Elkins Act Now in Effect.

Most of the provisions of the Mann-Elkins act amending the act to regulate commerce went into effect on August 18. The provision giving the Interstate Commerce Commission power to suspend advances in rates, of course, went into effect when President Taft signed the bill on June 18. The entire act is now in force. The day the new law went into effect the Western Union Telegraph Company sent out a notice saying that under the law it became illegal for that company to issue franks for the transmission of telegrams except to persons specifically mentioned in the law, and that it likewise became unlawful, except for those mentioned by the law, to use such franks. The class of persons to whom telegraph franks and reduced rates may still be granted are those to whom the law allows free and reduced transportation to be given by the railways.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF JUNE, 1910.

SEE ALSO ISSUES OF AUGUST 3, 12, AND 19.

Name of road.	Mileage operated, end of period.	Operating Revenues			Operating Expenses			Net operating deficit.	Outside operations.	Taxes.	Operating on the road last year.	Increase on the road last year.
		Paid.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.					
Albany & Saratoga	309	\$2,780,013	\$1,400,746	50.4	\$829,615	\$113,438	13.7	\$2,950,361	\$7,044	\$136,545	\$246,006	\$246,006
Albany & Saratoga	301	2,611,401	1,376,159	52.7	800,544	113,438	13.7	2,950,361	7,044	136,545	246,006	246,006
Albany & Saratoga	167	950,256	509,855	53.7	337,233	46,951	13.7	950,256	33,723	102,508	178,383	178,383
Albany & Saratoga	233	2,020,890	1,080,733	53.5	650,801	85,037	13.7	2,020,890	85,037	102,508	246,006	246,006
Albany & Saratoga	191	1,850,000	950,000	51.3	575,000	75,000	13.7	1,850,000	75,000	102,508	246,006	246,006
Albany & Saratoga	148	1,350,000	700,000	51.9	425,000	57,500	13.7	1,350,000	57,500	102,508	246,006	246,006
Albany & Saratoga	100	850,000	450,000	53.0	275,000	37,500	13.7	850,000	37,500	102,508	246,006	246,006
Albany & Saratoga	170	1,200,000	630,000	52.5	375,000	50,625	13.7	1,200,000	50,625	102,508	246,006	246,006
Albany & Saratoga	143	1,000,000	525,000	52.5	312,500	41,667	13.7	1,000,000	41,667	102,508	246,006	246,006
Albany & Saratoga	130	900,000	472,500	52.5	281,250	37,500	13.7	900,000	37,500	102,508	246,006	246,006
Albany & Saratoga	120	800,000	420,000	52.5	250,000	33,333	13.7	800,000	33,333	102,508	246,006	246,006
Albany & Saratoga	110	700,000	367,500	52.5	218,750	29,167	13.7	700,000	29,167	102,508	246,006	246,006
Albany & Saratoga	100	600,000	315,000	52.5	187,500	25,000	13.7	600,000	25,000	102,508	246,006	246,006
Albany & Saratoga	90	500,000	262,500	52.5	156,250	20,833	13.7	500,000	20,833	102,508	246,006	246,006
Albany & Saratoga	80	400,000	210,000	52.5	125,000	16,667	13.7	400,000	16,667	102,508	246,006	246,006
Albany & Saratoga	70	300,000	157,500	52.5	93,750	12,500	13.7	300,000	12,500	102,508	246,006	246,006
Albany & Saratoga	60	200,000	105,000	52.5	62,500	8,333	13.7	200,000	8,333	102,508	246,006	246,006
Albany & Saratoga	50	100,000	52,500	52.5	31,250	4,167	13.7	100,000	4,167	102,508	246,006	246,006
Albany & Saratoga	40	0	0	0	0	0	0	0	0	102,508	246,006	246,006
Albany & Saratoga	30	0	0	0	0	0	0	0	0	102,508	246,006	246,006
Albany & Saratoga	20	0	0	0	0	0	0	0	0	102,508	246,006	246,006
Albany & Saratoga	10	0	0	0	0	0	0	0	0	102,508	246,006	246,006
Albany & Saratoga	0	0	0	0	0	0	0	0	0	102,508	246,006	246,006

The Peaches and the Freight Rate

"Missouri peaches, I notice," said a local freight agent, "are quoted in the Des Moines market at \$2 per bushel to retail dealers. By the time they reach the consumer they cost, perhaps, \$2.50 a bushel, meaning that two boxes make a bushel. Several days ago the owner of a Des Moines farm received a letter from a friend stating that, while selling peaches in Missouri for 50 to 75 cents a bushel. Assuming the price paid the producers was 75 cents, he was inclined to lay the blame for the addition of \$1.75 to high freight rates. Now, the fact is that the freight and icing charges on peaches are 85 cents each 100 lbs. shipped from southern Missouri and Arkansas. As there are only 52 lbs. in a bushel of peaches it follows that the freight and icing charges do not exceed 16 cents a bushel. If the peaches cost consumers in Des Moines \$2.50 per bushel, and the producers in Missouri get only 75 cents a bushel, there remains \$1.30 per bushel to be accounted for other than the freight and the cost of production. Who gets it? You may search me, but it certainly is not the railways."—*Des Moines Register and Leader*.

Tap Line Allowances.

The lumbermen of the Southwest are organizing to appeal to the Interstate Commerce Commission regarding the announcement of the railways in the southwest that on September 24 they will cease to pay tap line allowances to lumber roads. The action of the railways was taken in pursuance of a ruling by the commission holding that such allowances to roads that are not common carriers are in the nature of a rebate and illegal. Most of the lumber roads are not common carriers, but haul only the output of the lumber concerns that own them.

INTERSTATE COMMERCE COMMISSION.

Distribution of Coal Cars Discussed.

Hillsdale Coal & Coke Co. v. Pennsylvania Railroad. Opinion of the Commission, 1919.

To the physical capacity of a coal mine the defendant adds its commercial capacity tested by the shipments made from it during the preceding 12 months, and divides the sum by two; these two factors being revised quarterly the mine is thus given a constantly corrected rating in the distribution of coal cars during percentage periods. If this basis is equitably applied to all mines served by the defendant the commission is unable to see that it results in an unequal, unfair, or discriminatory distribution of its equipment.

The complainant's contention that physical capacity alone is the fair and sound basis for rating coal mines for car distribution is not sustained; the utmost obligation of a carrier under the law is to equip itself with sufficient cars to meet the requirements of a mine for actual shipment; and it is of no real concern to the carrier what are the physical possibilities of a mine in the way of daily output except as that factor may afford some measure of what its actual shipments will be.

The commission reaffirms its previous ruling to the effect that the owner of private cars is entitled to their exclusive use and that foreign railway fuel cars assigned to a particular mine cannot be delivered to another mine; but it again holds that all such cars must be counted against the distributive share of the mine receiving them. It is therefore held that the defendant's rule, providing that the capacity in tons of such "assigned" cars shall be deducted from the rated capacity of the mine receiving them and that the remainder is to be regarded as the rated capacity of the mine in the distribution of all "unassigned" cars, is unlawful and discriminatory.

The defendant's contention that, so long as the petitioner receives all the coal cars it is entitled to, it has no right to complain because some other operator receives an undue proportion of cars is not sustained. The law not only gives the shipper a right to an equal or a justly ratable use of the facilities of an interstate carrier but the assurance also that no other shipper shall fare ratably better at the hands of the carrier.

The question of damages, which the complainant claims to have suffered as the result of the discriminations herein found to have been practised against it, reserved for further argument.

Commissioner's Report—Continued

Although I am opposed to the opinion that they have been sufficiently talked about, and sufficiently considered, and that it ought to be finally disposed of, still if the majority deems it necessary to hear further argument on the question of damages, I do not dissent from that course. I do not agree with the holdings of the majority that this commission has no authority to assess and award these damages, and while it is not now proposed to make an order, from which I dissent, I wish to express my views on the subject. Sections 8 and 9 of the act to regulate commerce, in my opinion, give a clear statement, that in case of a violation of the act, resulting in damages to any person the carrier shall be liable for such damages, and an equally explicit declaration that the recovery of such damages may be had either by a proceeding before the commission, or by suit in court. But both remedies shall not be pursued for the recovery of the same damages.

The reasons of the majority for declining to exercise this jurisdiction, which is explicitly conferred by the ninth section, are stated in the *Joynes case*. It is there said in substance that damages resulting from a violation of the act may be divided into two classes, "rate" damages and "general" damages. By rate damages are meant those damages which can be ascertained by computation from a reference to the rates of the carriers only. The commission determines what the reasonable rate ought to be; it determines what rate has been paid; the damages are the difference between the rate exacted and the rate which should have been exacted. These damages the commission can and should award.

General damages may involve a consideration of all those elements which enter into the determination of damages in other cases. There is no exact measure by which such damages can be computed. To assess them involves the consideration of evidence and the exercise of judgment. For the assessment of such damages this commission has no greater qualification than a jury. Therefore, it is assumed that Congress, notwithstanding its express language to the contrary, did not intend to confer upon the commission authority to deal with damages of that character.

In support of this somewhat novel canon for the interpretation of statutes the commission refers to the action of the Supreme Court of the United States in the *Abilene case, supra*, in which that court held that, notwithstanding the language of the ninth section, by which a claimant is given an election between his suit in court and his proceeding before the commission, nevertheless, in certain cases, the proceeding must be in the first instance before the commission and cannot be in court. Just as the Supreme Court in that case has read out of the ninth section the right to begin certain cases before the courts, so the commission now proposes to read out of that same section the right to proceed in certain cases before the commission.

I can find no case in which the Supreme Court of the United States has ever undertaken to qualify the express language of an enactment upon the ground adopted by this commission in the *Joynes case*. That court has repeatedly said that courts have nothing to do with questions of expediency. Whether a statute is wise or unwise, whether it is expedient or inexpedient, whether the object aimed at is reached in the best way or not, are questions for the legislature, not reviewable by the courts. The *Abilene case*, as I read it, not only fails to sustain the position of this commission in declining to accept jurisdiction in matters like that before us, but, upon the contrary, plainly holds, both by necessary inference and by express language, that in a case like the one now under consideration the only tribunal in which complaint can be brought and damages obtained is this commission. If that be so, it is certainly the duty of the commission, no matter how inconvenient the exercise of that function may be, to entertain the complaint, determine as best it can the damages, and award those damages by its order.

I am unable to see any valid distinction between an excessive rate, and a rule or practice for the distribution of coal cars like that involved in this proceeding. This being so, I am utterly unable to see any ground on which a distinction can be made between the remedy, which has been open to the shipper for the recovery of damages in the two instances. Through appeals to the Supreme Court of the United States, the fact has been established that the commission has the power and can properly order the distribution of coal cars to mines on the basis

which is used in making this order. Nothing can be plainer than that Congress intended to confer on this body the authority of the law, and the duty to award damages for infractions of the act. The delays and expenses of the law are proverbial. One purpose of the act to regulate mines was to provide a speedy and inexpensive method by which the shipper could obtain relief in such cases. My own observation is that to an extent this expectation of the framers of the act has been realized. The complainant does ordinarily obtain his order for damages with less delay and outlay than in court, and the railway generally pays the award. The complainant claims to have been damaged by more than \$100,000. Though the discrimination, which I have found to exist, and its evidence tends to strongly support that claim. A material part of these damages can never be recovered unless awarded in this proceeding, and that through no fault of the complainant, which promptly began and has zealously prosecuted its suit.

The opinion of McPherson, Judge, in *Morristdale Coal Co. v. Penn. R.R.*, 176 Fed. Rep. 748, which has come to my attention since the foregoing matter was prepared, fully sustains the position taken.

The records indicate that at times the number of private cars delivered to certain mines has exceeded the recovery assignments to these mines. Even if private cars had been counted against the assignment of those mines, they would still have received more cars in proportion to their rating than the complainant. In such cases, it seems to me that the railway is guilty of discrimination, although it delivers to the mines only the cars

STATE COMMISSIONS.

The Texas railway commission has made a ruling that wherever a combination of local rates, whether passenger or freight, is lower than the through rates, the former shall be applied.

The State Railroad Commission of Texas proposes to require the ticket agent at every station to fill out, for the conductor and train auditor of every regular passenger train, a statement declaring that the office has been open 30 minutes and that tickets have been sold to all applicants; or if there are exceptions to such a statement to make the necessary explanation in writing. A blank, for 1126, has been prepared by the commission.

COURT NEWS.

Justice Brown, of the circuit court sitting at Little Rock, Ark., has handed down an opinion in a case brought by the state of Arkansas against the St. Louis & San Francisco, in which he holds that the state cannot collect a toll of \$8,000 from the road because it hauled a carload of lime over its line in such a way as to make it interstate rather than state traffic. The shipment moved from Johnson, Ark., to DeQueen, Ark., and the road hauled it over a line, part of which is in Oklahoma, the length of the haul over this line being 200 miles and the rate applied being 23 cents. The Arkansas railway commission claimed that the shipment should have moved entirely within the state, although the shortest possible length of a haul within the state over its own lines would have been 100 miles and the rate that it would have got would have been 12 cents. The court held that the Arkansas law forbade the Frisco to haul the shipment entirely within the state was an interference with interstate commerce. The state rate, of course, was void.

The citizens of the Primm state mining country part of their own property for the purpose of securing with the grade of the country, and also with the quality where he is satisfied a better result than would be obtained for rent in a crowded city than at a country station. The allowances for the lowest rates of companies in the five classes of places are \$100, \$200, \$300, \$400 and \$500. For the next higher class they are \$600, \$700, \$800, \$900 and \$1,000. The next higher class is \$1,100, \$1,200, \$1,300, \$1,400 and \$1,500. The next higher class is \$1,600, \$1,700, \$1,800, \$1,900 and \$2,000. The next higher class is \$2,100, \$2,200, \$2,300, \$2,400 and \$2,500. The next higher class is \$2,600, \$2,700, \$2,800, \$2,900 and \$3,000. The next higher class is \$3,100, \$3,200, \$3,300, \$3,400 and \$3,500. The next higher class is \$3,600, \$3,700, \$3,800, \$3,900 and \$4,000. The next higher class is \$4,100, \$4,200, \$4,300, \$4,400 and \$4,500. The next higher class is \$4,600, \$4,700, \$4,800, \$4,900 and \$5,000. The next higher class is \$5,100, \$5,200, \$5,300, \$5,400 and \$5,500. The next higher class is \$5,600, \$5,700, \$5,800, \$5,900 and \$6,000. The next higher class is \$6,100, \$6,200, \$6,300, \$6,400 and \$6,500. The next higher class is \$6,600, \$6,700, \$6,800, \$6,900 and \$7,000. The next higher class is \$7,100, \$7,200, \$7,300, \$7,400 and \$7,500. The next higher class is \$7,600, \$7,700, \$7,800, \$7,900 and \$8,000. The next higher class is \$8,100, \$8,200, \$8,300, \$8,400 and \$8,500. The next higher class is \$8,600, \$8,700, \$8,800, \$8,900 and \$9,000. The next higher class is \$9,100, \$9,200, \$9,300, \$9,400 and \$9,500. The next higher class is \$9,600, \$9,700, \$9,800, \$9,900 and \$10,000. The next higher class is \$10,100, \$10,200, \$10,300, \$10,400 and \$10,500. The next higher class is \$10,600, \$10,700, \$10,800, \$10,900 and \$11,000. The next higher class is \$11,100, \$11,200, \$11,300, \$11,400 and \$11,500. The next higher class is \$11,600, \$11,700, \$11,800, \$11,900 and \$12,000. The next higher class is \$12,100, \$12,200, \$12,300, \$12,400 and \$12,500. The next higher class is \$12,600, \$12,700, \$12,800, \$12,900 and \$13,000. The next higher class is \$13,100, \$13,200, \$13,300, \$13,400 and \$13,500. The next higher class is \$13,600, \$13,700, \$13,800, \$13,900 and \$14,000. The next higher class is \$14,100, \$14,200, \$14,300, \$14,400 and \$14,500. The next higher class is \$14,600, \$14,700, \$14,800, \$14,900 and \$15,000. The next higher class is \$15,100, \$15,200, \$15,300, \$15,400 and \$15,500. The next higher class is \$15,600, \$15,700, \$15,800, \$15,900 and \$16,000. The next higher class is \$16,100, \$16,200, \$16,300, \$16,400 and \$16,500. The next higher class is \$16,600, \$16,700, \$16,800, \$16,900 and \$17,000. The next higher class is \$17,100, \$17,200, \$17,300, \$17,400 and \$17,500. The next higher class is \$17,600, \$17,700, \$17,800, \$17,900 and \$18,000. The next higher class is \$18,100, \$18,200, \$18,300, \$18,400 and \$18,500. The next higher class is \$18,600, \$18,700, \$18,800, \$18,900 and \$19,000. The next higher class is \$19,100, \$19,200, \$19,300, \$19,400 and \$19,500. The next higher class is \$19,600, \$19,700, \$19,800, \$19,900 and \$20,000. The next higher class is \$20,100, \$20,200, \$20,300, \$20,400 and \$20,500. The next higher class is \$20,600, \$20,700, \$20,800, \$20,900 and \$21,000. The next higher class is \$21,100, \$21,200, \$21,300, \$21,400 and \$21,500. The next higher class is \$21,600, \$21,700, \$21,800, \$21,900 and \$22,000. The next higher class is \$22,100, \$22,200, \$22,300, \$22,400 and \$22,500. The next higher class is \$22,600, \$22,700, \$22,800, \$22,900 and \$23,000. The next higher class is \$23,100, \$23,200, \$23,300, \$23,400 and \$23,500. The next higher class is \$23,600, \$23,700, \$23,800, \$23,900 and \$24,000. The next higher class is \$24,100, \$24,200, \$24,300, \$24,400 and \$24,500. The next higher class is \$24,600, \$24,700, \$24,800, \$24,900 and \$25,000. The next higher class is \$25,100, \$25,200, \$25,300, \$25,400 and \$25,500. The next higher class is \$25,600, \$25,700, \$25,800, \$25,900 and \$26,000. The next higher class is \$26,100, \$26,200, \$26,300, \$26,400 and \$26,500. The next higher class is \$26,600, \$26,700, \$26,800, \$26,900 and \$27,000. The next higher class is \$27,100, \$27,200, \$27,300, \$27,400 and \$27,500. The next higher class is \$27,600, \$27,700, \$27,800, \$27,900 and \$28,000. The next higher class is \$28,100, \$28,200, \$28,300, \$28,400 and \$28,500. The next higher class is \$28,600, \$28,700, \$28,800, \$28,900 and \$29,000. The next higher class is \$29,100, \$29,200, \$29,300, \$29,400 and \$29,500. The next higher class is \$29,600, \$29,700, \$29,800, \$29,900 and \$30,000. The next higher class is \$30,100, \$30,200, \$30,300, \$30,400 and \$30,500. The next higher class is \$30,600, \$30,700, \$30,800, \$30,900 and \$31,000. The next higher class is \$31,100, \$31,200, \$31,300, \$31,400 and \$31,500. The next higher class is \$31,600, \$31,700, \$31,800, \$31,900 and \$32,000. The next higher class is \$32,100, \$32,200, \$32,300, \$32,400 and \$32,500. The next higher class is \$32,600, \$32,700, \$32,800, \$32,900 and \$33,000. The next higher class is \$33,100, \$33,200, \$33,300, \$33,400 and \$33,500. The next higher class is \$33,600, \$33,700, \$33,800, \$33,900 and \$34,000. The next higher class is \$34,100, \$34,200, \$34,300, \$34,400 and \$34,500. The next higher class is \$34,600, \$34,700, \$34,800, \$34,900 and \$35,000. The next higher class is \$35,100, \$35,200, \$35,300, \$35,400 and \$35,500. The next higher class is \$35,600, \$35,700, \$35,800, \$35,900 and \$36,000. The next higher class is \$36,100, \$36,200, \$36,300, \$36,400 and \$36,500. The next higher class is \$36,600, \$36,700, \$36,800, \$36,900 and \$37,000. The next higher class is \$37,100, \$37,200, \$37,300, \$37,400 and \$37,500. The next higher class is \$37,600, \$37,700, \$37,800, \$37,900 and \$38,000. The next higher class is \$38,100, \$38,200, \$38,300, \$38,400 and \$38,500. The next higher class is \$38,600, \$38,700, \$38,800, \$38,900 and \$39,000. The next higher class is \$39,100, \$39,200, \$39,300, \$39,400 and \$39,500. The next higher class is \$39,600, \$39,700, \$39,800, \$39,900 and \$40,000. The next higher class is \$40,100, \$40,200, \$40,300, \$40,400 and \$40,500. The next higher class is \$40,600, \$40,700, \$40,800, \$40,900 and \$41,000. The next higher class is \$41,100, \$41,200, \$41,300, \$41,400 and \$41,500. The next higher class is \$41,600, \$41,700, \$41,800, \$41,900 and \$42,000. The next higher class is \$42,100, \$42,200, \$42,300, \$42,400 and \$42,500. The next higher class is \$42,600, \$42,700, \$42,800, \$42,900 and \$43,000. The next higher class is \$43,100, \$43,200, \$43,300, \$43,400 and \$43,500. The next higher class is \$43,600, \$43,700, \$43,800, \$43,900 and \$44,000. The next higher class is \$44,100, \$44,200, \$44,300, \$44,400 and \$44,500. The next higher class is \$44,600, \$44,700, \$44,800, \$44,900 and \$45,000. The next higher class is \$45,100, \$45,200, \$45,300, \$45,400 and \$45,500. The next higher class is \$45,600, \$45,700, \$45,800, \$45,900 and \$46,000. The next higher class is \$46,100, \$46,200, \$46,300, \$46,400 and \$46,500. The next higher class is \$46,600, \$46,700, \$46,800, \$46,900 and \$47,000. The next higher class is \$47,100, \$47,200, \$47,300, \$47,400 and \$47,500. The next higher class is \$47,600, \$47,700, \$47,800, \$47,900 and \$48,000. The next higher class is \$48,100, \$48,200, \$48,300, \$48,400 and \$48,500. The next higher class is \$48,600, \$48,700, \$48,800, \$48,900 and \$49,000. The next higher class is \$49,100, \$49,200, \$49,300, \$49,400 and \$49,500. The next higher class is \$49,600, \$49,700, \$49,800, \$49,900 and \$50,000. The next higher class is \$50,100, \$50,200, \$50,300, \$50,400 and \$50,500. The next higher class is \$50,600, \$50,700, \$50,800, \$50,900 and \$51,000. The next higher class is \$51,100, \$51,200, \$51,300, \$51,400 and \$51,500. The next higher class is \$51,600, \$51,700, \$51,800, \$51,900 and \$52,000. The next higher class is \$52,100, \$52,200, \$52,300, \$52,400 and \$52,500. The next higher class is \$52,600, \$52,700, \$52,800, \$52,900 and \$53,000. The next higher class is \$53,100, \$53,200, \$53,300, \$53,400 and \$53,500. The next higher class is \$53,600, \$53,700, \$53,800, \$53,900 and \$54,000. The next higher class is \$54,100, \$54,200, \$54,300, \$54,400 and \$54,500. The next higher class is \$54,600, \$54,700, \$54,800, \$54,900 and \$55,000. The next higher class is \$55,100, \$55,200, \$55,300, \$55,400 and \$55,500. The next higher class is \$55,600, \$55,700, \$55,800, \$55,900 and \$56,000. The next higher class is \$56,100, \$56,200, \$56,300, \$56,400 and \$56,500. The next higher class is \$56,600, \$56,700, \$56,800, \$56,900 and \$57,000. The next higher class is \$57,100, \$57,200, \$57,300, \$57,400 and \$57,500. The next higher class is \$57,600, \$57,700, \$57,800, \$57,900 and \$58,000. The next higher class is \$58,100, \$58,200, \$58,300, \$58,400 and \$58,500. The next higher class is \$58,600, \$58,700, \$58,800, \$58,900 and \$59,000. The next higher class is \$59,100, \$59,200, \$59,300, \$59,400 and \$59,500. The next higher class is \$59,600, \$59,700, \$59,800, \$59,900 and \$60,000. The next higher class is \$60,100, \$60,200, \$60,300, \$60,400 and \$60,500. The next higher class is \$60,600, \$60,700, \$60,800, \$60,900 and \$61,000. The next higher class is \$61,100, \$61,200, \$61,300, \$61,400 and \$61,500. The next higher class is \$61,600, \$61,700, \$61,800, \$61,900 and \$62,000. The next higher class is \$62,100, \$62,200, \$62,300, \$62,400 and \$62,500. The next higher class is \$62,600, \$62,700, \$62,800, \$62,900 and \$63,000. The next higher class is \$63,100, \$63,200, \$63,300, \$63,400 and \$63,500. The next higher class is \$63,600, \$63,700, \$63,800, \$63,900 and \$64,000. The next higher class is \$64,100, \$64,200, \$64,300, \$64,400 and \$64,500. The next higher class is \$64,600, \$64,700, \$64,800, \$64,900 and \$65,000. The next higher class is \$65,100, \$65,200, \$65,300, \$65,400 and \$65,500. The next higher class is \$65,600, \$65,700, \$65,800, \$65,900 and \$66,000. The next higher class is \$66,100, \$66,200, \$66,300, \$66,400 and \$66,500. The next higher class is \$66,600, \$66,700, \$66,800, \$66,900 and \$67,000. The next higher class is \$67,100, \$67,200, \$67,300, \$67,400 and \$67,500. The next higher class is \$67,600, \$67,700, \$67,800, \$67,900 and \$68,000. The next higher class is \$68,100, \$68,200, \$68,300, \$68,400 and \$68,500. The next higher class is \$68,600, \$68,700, \$68,800, \$68,900 and \$69,000. The next higher class is \$69,100, \$69,200, \$69,300, \$69,400 and \$69,500. The next higher class is \$69,600, \$69,700, \$69,800, \$69,900 and \$70,000. The next higher class is \$70,100, \$70,200, \$70,300, \$70,400 and \$70,500. The next higher class is \$70,600, \$70,700, \$70,800, \$70,900 and \$71,000. The next higher class is \$71,100, \$71,200, \$71,300, \$71,400 and \$71,500. The next higher class is \$71,600, \$71,700, \$71,800, \$71,900 and \$72,000. The next higher class is \$72,100, \$72,200, \$72,300, \$72,400 and \$72,500. The next higher class is \$72,600, \$72,700, \$72,800, \$72,900 and \$73,000. The next higher class is \$73,100, \$73,200, \$73,300, \$73,400 and \$73,500. The next higher class is \$73,600, \$73,700, \$73,800, \$73,900 and \$74,000. The next higher class is \$74,100, \$74,200, \$74,300, \$74,400 and \$74,500. The next higher class is \$74,600, \$74,700, \$74,800, \$74,900 and \$75,000. The next higher class is \$75,100, \$75,200, \$75,300, \$75,400 and \$75,500. The next higher class is \$75,600, \$75,700, \$75,800, \$75,900 and \$76,000. The next higher class is \$76,100, \$76,200, \$76,300, \$76,400 and \$76,500. The next higher class is \$76,600, \$76,700, \$76,800, \$76,900 and \$77,000. The next higher class is \$77,100, \$77,200, \$77,300, \$77,400 and \$77,500. The next higher class is \$77,600, \$77,700, \$77,800, \$77,900 and \$78,000. The next higher class is \$78,100, \$78,200, \$78,300, \$78,400 and \$78,500. The next higher class is \$78,600, \$78,700, \$78,800, \$78,900 and \$79,000. The next higher class is \$79,100, \$79,200, \$79,300, \$79,400 and \$79,500. The next higher class is \$79,600, \$79,700, \$79,800, \$79,900 and \$80,000. The next higher class is \$80,100, \$80,200, \$80,300, \$80,400 and \$80,500. The next higher class is \$80,600, \$80,700, \$80,800, \$80,900 and \$81,000. The next higher class is \$81,100, \$81,200, \$81,300, \$81,400 and \$81,500. The next higher class is \$81,600, \$81,700, \$81,800, \$81,900 and \$82,000. The next higher class is \$82,100, \$82,200, \$82,300, \$82,400 and \$82,500. The next higher class is \$82,600, \$82,700, \$82,800, \$82,900 and \$83,000. The next higher class is \$83,100, \$83,200, \$83,300, \$83,400 and \$83,500. The next higher class is \$83,600, \$83,700, \$83,800, \$83,900 and \$84,000. The next higher class is \$84,100, \$84,200, \$84,300, \$84,400 and \$84,500. The next higher class is \$84,600, \$84,700, \$84,800, \$84,900 and \$85,000. The next higher class is \$85,100, \$85,200, \$85,300, \$85,400 and \$85,500. The next higher class is \$85,600, \$85,700, \$85,800, \$85,900 and \$86,000. The next higher class is \$86,100, \$86,200, \$86,300, \$86,400 and \$86,500. The next higher class is \$86,600, \$86,700, \$86,800, \$86,900 and \$87,000. The next higher class is \$87,100, \$87,200, \$87,300, \$87,400 and \$87,500. The next higher class is \$87,600, \$87,700, \$87,800, \$87,900 and \$88,000. The next higher class is \$88,100, \$88,200, \$88,300, \$88,400 and \$88,500. The next higher class is \$88,600, \$88,700, \$88,800, \$88,900 and \$89,000. The next higher class is \$89,100, \$89,200, \$89,300, \$89,400 and \$89,500. The next higher class is \$89,600, \$89,700, \$89,800, \$89,900 and \$90,000. The next higher class is \$90,100, \$90,200, \$90,300, \$90,400 and \$90,500. The next higher class is \$90,600, \$90,700, \$90,800, \$90,900 and \$91,000. The next higher class is \$91,100, \$91,200, \$91,300, \$91,400 and \$91,500. The next higher class is \$91,600, \$91,700, \$91,800, \$91,900 and \$92,000. The next higher class is \$92,100, \$92,200, \$92,300, \$92,400 and \$92,500. The next higher class is \$92,600, \$92,700, \$92,800, \$92,900 and \$93,000. The next higher class is \$93,100, \$93,200, \$93,300, \$93,400 and \$93,500. The next higher class is \$93,600, \$93,700, \$93,800, \$93,900 and \$94,000. The next higher class is \$94,100, \$94,200, \$94,300, \$94,400 and \$94,500. The next higher class is \$94,600, \$94,700, \$94,800, \$94,900 and \$95,000. The next higher class is \$95,100, \$95,200, \$95,300, \$95,400 and \$95,500. The next higher class is \$95,600, \$95,700, \$95,800, \$95,900 and \$96,000. The next higher class is \$96,100, \$96,200, \$96,300, \$96,400 and \$96,500. The next higher class is \$96,600, \$96,700, \$96,800, \$96,900 and \$97,000. The next higher class is \$97,100, \$97,200, \$97,300, \$97,400 and \$97,500. The next higher class is \$97,600, \$97,700, \$97,800, \$97,900 and \$98,000. The next higher class is \$98,100, \$98,200, \$98,300, \$98,400 and \$98,500. The next higher class is \$98,600, \$98,700, \$98,800, \$98,900 and \$99,000. The next higher class is \$99,100, \$99,200, \$99,300, \$99,400 and \$99,500. The next higher class is \$99,600, \$99,700, \$99,800, \$99,900 and \$100,000. The next higher class is \$100,100, \$100,200, \$100,300, \$100,400 and \$100,500. The next higher class is \$100,600, \$100,700, \$100,800, \$100,900 and \$101,000. The next higher class is \$101,100, \$101,200, \$101,300, \$101,400 and \$101,500. The next higher class is \$101,600, \$101,700, \$101,800, \$101,900 and \$102,000. The next higher class is \$102,100, \$102,200, \$102,300, \$102,400 and \$102,500. The next higher class is \$102,600, \$102,700, \$102,800, \$102,900 and \$103,000. The next higher class is \$103,100, \$103,200, \$103,300, \$103,400 and \$103,500. The next higher class is \$103,600, \$103,700, \$103,800, \$103,900 and \$104,000. The next higher class is \$104,100, \$104,200, \$104,300, \$104,400 and \$104,500. The next higher class is \$104,600, \$104,700, \$104,800, \$104,900 and \$105,000. The next higher class is \$105,100, \$105,200, \$105,300, \$105,400 and \$105,500. The next higher class is \$105,600, \$105,700, \$105,800, \$105,900 and \$106,000. The next higher class is \$106,100, \$106,200, \$106,300, \$106,400 and \$106,500. The next higher class is \$106,600, \$106,700, \$106,800, \$106,900 and \$107,000. The next higher class is \$107,100, \$107,200, \$107,300, \$107,400 and \$107,500. The next higher class is \$107,600, \$107,700, \$107,800, \$107,900 and \$108,000. The next higher class is \$108,100, \$108,200, \$108,300, \$108,400 and \$108,500. The next higher class is \$108,600, \$108,700, \$108,800, \$108,900 and \$109,000. The next higher class is \$109,100, \$109,200, \$109,300, \$109,400 and \$109,500. The next higher class is \$109,600, \$109,700, \$109,800, \$109,900 and \$110,000. The next higher class is \$110,100, \$110,200, \$110,300, \$110,400 and \$110,500. The next higher class is \$110,600, \$110,700, \$110,800, \$110,900 and \$111,000. The next higher class is \$111,100, \$111,200, \$111,300, \$111,400 and \$111,500. The next higher class is \$111,600, \$111,700, \$111,800, \$111,900 and \$112,000. The next higher class is \$112,100, \$112,200, \$112,300, \$112,400 and \$112,500. The next higher class is \$112,600, \$112,700, \$112,800, \$112,900 and \$113,000. The next higher class is \$113,100, \$113,200, \$113,300, \$113,400 and \$113,500. The next higher class is \$113,600, \$113,700, \$113,800, \$113,900 and \$114,000. The next higher class is \$114,100, \$114,200, \$114,300, \$114,400 and \$114,500. The next higher class is \$114,600, \$114,700, \$114,800, \$114,900 and \$115,000. The next higher class is \$115,100, \$115,200, \$115,300, \$115,400 and \$115,500. The next higher class is \$115,600, \$115,700, \$115,800, \$115,900 and \$116,000. The next higher class is \$116,100, \$116,200, \$116,300, \$116,400 and \$116,500. The next higher class is \$116,600, \$116,700, \$116,800, \$116,900 and \$117,000. The next higher class is \$117,100, \$117,200, \$117,300, \$117,400 and \$117,500. The next higher class is \$117,600, \$117,700, \$117,800, \$117,900 and \$118,000. The next higher class is \$118,100, \$118,200, \$118,300, \$118,400 and \$118,500. The next higher class is \$118,600, \$118,700, \$118,800, \$118,900 and \$119,000. The next higher class is \$119,100, \$119,200, \$119,300, \$119,400 and \$119,500. The next higher class is \$119,600, \$119,700, \$119,800, \$119,900 and \$120,000. The next higher class is \$120,100, \$120,200, \$120,300, \$120,400 and \$120,500. The next higher class is \$120,600, \$120,700, \$120,800, \$120,900 and \$121,000. The next higher class is \$121,100, \$121,200, \$121,300, \$121,400 and \$121,500. The next higher class is \$121,600, \$121,700, \$121,800, \$121,900 and \$122,000. The next higher class is \$122,100, \$122,200, \$122,300, \$122,400 and \$122,500. The next higher class is \$122,600, \$122,700, \$122,800, \$122,900 and \$123,000. The

at Cincinnati, Ohio, has been appointed general superintendent, with office at Cincinnati, and E. A. Gould, general agent, with office at Cincinnati, has been appointed assistant to the general superintendent at Cincinnati.

E. J. Brown, manager of the National Railways of Mexico at Mexico City, having been appointed the vice-president in charge of construction and operation of the Pan-American railway, E. M. Wray, vice-president and general manager of the Pan-American at London, Ont., has been appointed general superintendent and assistant to E. J. Brown, general manager of the National Railways of Mexico City. See item under Executive, Financial and Legal Officers.

J. P. Strick, general superintendent of the Cincinnati & Great Western, Inc., has had his jurisdiction extended over the Chesapeake & Ohio of Indiana. H. P. Dyer, acting superintendent of the latter road, with office at Chicago, has been appointed superintendent at Seymour and general agent in charge of the Chicago branch, including the route at Hammond, Ind., and M. S. McDonald has been appointed a division superintendent, with office at Peru, Ind.

The Canadian Pacific has re-districted the lines now included in the Central, Western and Pacific divisions of the western lines, and there will henceforth be four general divisions, as follows: Manitoba division, Fort William to Broadview, J. T. Arundel, general superintendent, Winnipeg, Man.; Saskatchewan division, Yorkton to Swift Current and Hardisty, J. J. Scully, general superintendent, Moose Jaw, Sask.; Alberta division, Swift Current to Field and Kootenay Landing, and Wetaskiwin to Hardisty, A. Price, general superintendent, Calgary, Alb.; British Columbia division, from Field, Kootenay Landing and West, F. F. Busted, general superintendent, Vancouver, B. C.

Traffic Officers.

J. H. Price has been appointed general freight and passenger agent of the Millers Creek Railroad, with office at Van Lear, Ky. A. V. Brown, general agent of the Missouri Pacific, has been appointed general agent of the Missouri Pacific, with office at Texarkana, Tex., succeeding T. J. Brown.

George W. Lehy has been appointed a contracting freight agent of the Baltimore & Ohio Southwestern, with office at Cincinnati, Ohio.

C. W. Fish, traffic manager of the National Railways of Mexico at Mexico City, has had his jurisdiction extended over the Pan-American Railroad.

J. W. Ellington, chief clerk in the traffic department of the San Pedro, Los Angeles & Salt Lake, has been appointed contracting freight agent, with office at Salt Lake City, Utah.

George B. McClean, city passenger agent of the Louisville & Nashville at Memphis, Tenn., has been appointed a district passenger agent, with office at Memphis, succeeding Max Baumgarten, resigned.

E. J. O'Neil, general agent in the freight department of the Chicago, Rock Island & Pacific at St. Louis, Mo., has been placed in charge of all traffic and transportation matters of the Rock Island lines in St. Louis.

G. B. Lindsay, general agent mail service of the Wabash, with office at St. Louis, Mo., has had his title changed to general agent mail and express traffic, and he has been appointed also general baggage agent, succeeding S. H. Overholt, assigned to other duties.

C. K. Junkins, contracting freight agent of the Western Pacific at San Francisco, Cal., has been appointed a traveling freight agent, with office at San Francisco. H. J. Morley has been appointed a traveling freight agent, with office at Elko, Nev. T. A. Jones succeeds Mr. Junkins.

J. H. Pearman has been appointed district passenger agent of the Western Pacific, with office at San Francisco, Cal. Walter B. Townsend, traveling freight and passenger agent at San Francisco, has been appointed district freight and passenger agent, with office at Oakland, Cal.

J. N. Harrison, district passenger agent of the Southern Railway, at Jacksonville, Fla., has been appointed Pacific coast passenger agent, with office at San Francisco, Cal., succeeding P. K. Gordon, resigned to go to another company. G. R.

Price, traveling passenger agent at Miami, Fla., succeeded by Harrison, and C. L. Carson, Jr., at New Orleans and Jacksonville at Jacksonville, succeeded by Price. J. J. Carson succeeds Mr. Carson, effective September 1.

Engineering and Rolling Stock Officers.

H. M. Taylor has been appointed director of construction of the Pan-American Railroad.

E. H. Alfred, assistant to the president in charge of the engineering department of the Cincinnati, Hamilton & Dayton, at Cincinnati, Ohio, has been appointed general superintendent, with office at Cincinnati. See item under Executive, Financial and Legal Officers.

S. A. Rogers has been appointed a road foreman of engines of the Baltimore & Ohio Southwestern, with office at Seymour, Ind., succeeding Richard Mallen, appointed trainmaster at Seymour. H. A. Brown has been appointed an assistant road foreman of engines on the Illinois division, a new office.

L. B. Allen, engineer maintenance of way on the Kentucky general division of the Chesapeake & Ohio at Richmond, Va., and W. T. Smith, superintendent of motive power on the same general division at Covington, Ky., have both had their jurisdiction extended over the Chesapeake & Ohio of Indiana.

Purchasing Officers.

J. H. Guess, general purchasing agent of the National Railways of Mexico at Mexico City, has had his jurisdiction extended over the Pan-American Railroad.

OBITUARY.

A. C. Goodrich, traveling passenger agent of the Baltimore & Ohio Southwestern, with office at Kansas City, Mo., died in that city on August 21, at the age of 72 years.

T. S. McDowell, formerly general superintendent of the Missouri, Kansas & Texas, died on August 18 at St. Louis, Mo. Mr. McDowell was born November 23, 1858, at Sturgeon, Mo., and was educated at Transylvania University, Lexington, Ky. He began railway work in October, 1874, as telegraph operator on the Missouri, Kansas & Texas, remaining with that company until September, 1887, when he went to the St. Louis Suburban Railway as master of transportation. The following year he was appointed trainmaster of the International & Great Northern, and in April, 1889, he returned to the Missouri, Kansas & Texas as trainmaster. He was appointed division superintendent of the same road in February, 1895, and from November, 1902, to July of the following year he was superintendent of the Choctaw division, then from July to September, 1903, he was division superintendent at Parsons, Kan., and was appointed general superintendent in September of the same year.

Colonel W. R. Woodard, formerly prominent in railway circles in the Middle West, died August 13, at Smithville, Tex. Mr. Woodard was born in 1841 in Shelby county, Ohio, and began railway work in 1855 as telegraph operator and waybill clerk on the Cleveland & Toledo Railway. In 1857 he was appointed train dispatcher on the Ohio & Mississippi. He went to the Missouri Pacific in 1866 as superintendent, and was subsequently made assistant general superintendent of that company. In 1869 he went to the Missouri, Kansas & Texas as general superintendent and superintendent of construction, which road he completed. He was then general superintendent and assistant to vice-president of the Ohio & Mississippi for about a year up to the time it passed into the control of the Baltimore & Ohio. He then went to the Hannibal & St. Joseph, now part of the C., B. & Q. Resigning as general superintendent from that company in December, 1883, he became general manager of the Texas & St. Louis, now part of the St. L. S. W., and the following January was appointed receiver of that company. From April, 1885, to March, 1890, he was general superintendent of the Louisville, New Albany & Chicago, now part of the C., I. & L. Next he was general manager of the Louisville Southern, now part of the Southern Railway, and in March, 1891, was appointed general manager of the Kentucky & Indiana Bridge Co. About three years ago he became president of the Tacoma Railway Construction Co. He went to Texas a few months ago in the hope of regaining his health.

Railway Construction.

New Incorporations, Surveys, Etc.

ATCHISON, TOPEKA & SANTA FE.—The first section of 38 miles from Coleman, Tex., northwest to Tuscola, on the Texico-Coleman cut-off, has been opened for business.

BALTIMORE & OHIO.—A contract has been given to Bennett & Talbott, Greensburg, Pa., for piercing a new tunnel, parallel to and south of the old Kingwood tunnel, which is located at the summit of the grade between Grafton, W. Va., and Rowlesburg, in Preston county. The present tunnel is single track, 4,100 ft. long, and was built between 1849 and 1852. The new tunnel will be on a lower grade plane than the old one. The line will be relocated from the tunnel to a point three miles east. The tunnel will be double-track, with 14-ft. track centers, and will be 4,250 ft. long. After the completion of the improvements the old tunnel is to be used for westbound traffic only. The work is being carried out under the direction of A. W. Thompson, chief engineer. (Aug. 19, p. 332.)

BUFFALO & NORTHERN OKLAHOMA.—Organized by residents of Buffalo, Okla., and other towns in northwestern Oklahoma, with a capital of \$100,000. The company proposes to build a line east and west through several counties in that section of Oklahoma. Surveys from Buffalo, eastward to Avar, are now being made. E. M. Best, president; O. L. Zook, vice-president; F. C. Platte, secretary, and E. C. Johnson, treasurer. It is understood that the St. Louis & San Francisco interests are back of the project.

BUFFALO, ROCHESTER & PITTSBURGH.—See annual report of this company elsewhere in this issue.

CANADIAN NORTHERN.—Work on the gap between Sellwood, Ont., and Port Arthur, about 500 miles, it is understood, will be commenced early next spring. Surveyors are now at work and it is expected that the surveys will be finished during the coming winter.

Arrangements are said to be made for carrying out extensive improvements at St. Boniface, Man., during the next two years. The work is to include putting up a roundhouse, storehouses, coal warehouses, freight sheds and a union station to be used jointly with the Grand Trunk Pacific. A new traffic bridge is also to be built over the Red river from St. Boniface to Winnipeg. The total cost of the improvements will be over \$1,000,000, and the company agrees to have all the work finished within two years.

CANADIAN PACIFIC.—This company is said to have under consideration plans for the electrification of a part of its old steam line to Prescott, Ont., through the city of Ottawa, and the formation of an electric railway belt line around Ottawa, in connection with the Hull Electric Railway, which is controlled by the Canadian Pacific.

A contract has been given to Foley, Welch & Stewart, it is said, for building the remaining 26 miles of line between Carmangay, Alb., and Aldersyde. This work is on a section of the line between Calgary and Lethbridge, about 56 miles. It is expected to have the line finished about the middle of October.

CENTRAL PACIFIC.—See Southern Pacific.

CHARLES CITY & WESTERN.—Construction work is said to have been started recently on this line. The plans call for a line from Charles City, Iowa, west to Rockford, about 20 miles. A. W. Dennis, Charles City, is interested. (March 25, p. 849.)

CHATTANOOGA SOUTHERN.—An agreement is said to have been made between this company and the Rome & Northern to build a line connecting these two roads, to form a through line between Chattanooga, Tenn., and Atlanta, Ga. The Chattanooga Southern now operates a 90-mile line from Chattanooga, south to Gadsden, Ala. The Rome & Northern operates a 20-mile line from Rome, Ga., north to Gore, and is building an extension from Gore, northeast to Tunnel Hill, 43 miles. The proposed connecting line will be built partly by each company, the Chattanooga Southern is to build from Bronco, Ga., to Trion, eight miles, and the Rome & Northern from Gore to Trion, nine miles. It is understood that the Chattanooga Southern will build

from Rome, south to Rockmart, or to some other point on the Seaboard Air Line, over which connection will be made for Atlanta. The work will probably include a 1,200-ft. tunnel through Taylor ridge on the section between Gore and Bronco.

CHICAGO & WISCONSIN VALLEY.—This company, which was organized to build about 180 miles of line from Merrill, Wis., south to Janesville, has applied for a franchise in Madison, also for right-of-way on several streets in that city. A. J. Behymeyer, J. E. Jones and T. W. Potts are directors. (June 24, p. 1812.)

CHICAGO, MILWAUKEE & PUGET SOUND.—The Grays Harbor & Puget Sound, which has been under construction for the past two years from Centralia, Wash., west via Gates City, Cosmopolis and Grays Harbor to Hoquiam, about 60 miles, has been opened for traffic to South Aberdeen. Owing to the difficulty of securing a suitable right-of-way across the Chehalis river at Aberdeen, the line has not been extended to Aberdeen and Hoquiam, but it is expected to reach those places soon. The new line will be used jointly by the C., M. & P. S., and the Oregon & Washington, which is a Harriman line.

CINCINNATI, HAMILTON & DAYTON.—An officer is quoted as saying that the company is planning to build an extension from Ironton, Ky., to a point about 147 miles south of the Ohio river. The work will include a bridge over the Ohio river near Ironton.

CRYSTAL CITY & UVALDE.—This company has filed an amendment to its charter, increasing its capital stock from \$65,000 to \$100,000. The increase is for the purpose of securing funds to build an extension under the name of the Crystal City & Gardendale, from Crystal City, Tex., east to Gardendale, 41 miles. E. Breaker, chief engineer, Crystal City. (July 8, p. 103.)

DENVER & RIO GRANDE.—An officer writes regarding the reports that extensive improvements are to be carried out between Pueblo, Colo., and Colorado Springs, that the company has not yet perfected plans for this work and it is not probable that any thing will be done during the present season. (Aug. 12, p. 297.)

GRAND TRUNK PACIFIC.—According to press reports, this company will begin operating soon a section of about 250 miles from a point west of Weymontachene, Que., to the west side of the St. Lawrence river bridge. MacDonald & O'Brien have finished the work and will soon turn the section over to the operating department.

GRAYS HARBOR & PUGET SOUND.—See Chicago, Milwaukee & Puget Sound.

GULF & MAGNOLIA NORTHERN.—This company, which was organized to build from Hope, Ark., southeast to Magnolia, 35 miles, has been granted permission in Arkansas to build an extension from Hope west via Columbus and Horatio to the Oklahoma state line, 55 miles, and another extension from Magnolia, southeast through Columbia and Union counties to the Louisiana state line at Junction City, 37 miles. S. Q. Sevier, president, Hope. (Dec. 3, p. 1107.)

LOUISVILLE & EASTERN (ELECTRIC).—This company recently opened for business an extension from Lakeland, Ky., east to Shelbyville, 23 miles.

MISSOURI, KANSAS & TEXAS.—A contract is said to have been given to the Patton-Gibson Co. for constructing extensive yards west of Denison, Tex., in connection with the Ray yards.

NEBRASKA ROADS.—Surveys are to be made soon, it is said, and a charter will shortly be asked for by a company with \$5,000,000 capital. The plans call for a line from Beatrice, Neb., south via Greenleaf, Kan., Clay Center, Manchester, Sading, Lindsay, McPherson and Halstead to Wichita, about 200 miles. The office of the company will be at Clay Center.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, expects to advertise soon for bids for the construction, equipment and operation by private capital of the proposed tri-borough rapid transit route, and also for construction with municipal funds of certain portions of the same route. Neither the date for beginning advertising or the parts of the roads selected for municipal construction have been finally determined upon. (July 22, p. 206.)

NEW YORK, WHITEHOLE & BOULEVARD.—This company has submitted a plan, providing for a number of changes in the borough of the Bronx, New York City, from the original route, to the New York Public Service Commission. First district, the plan is as follows:

The substitution of the use of the New Haven Company's tracks (six tracks) from 174th street to Willis avenue, instead of building the proposed line over that section.

The abandonment of the proposed line to Clason's Point and Throg's Neck, and substituting for the same an elevated double track line from the proposed terminal at 180th street, along East 177th street to Throg's Neck, with a double-track elevated branch to Clason's Point, along White Plains road from its intersection with East 177th street.

The building of a double-track elevated line from the main line of the N. Y. W. & B., near Unionport road, along White Plains road to a connection with the N. Y., N. H. & H. tracks, near 241st street.

The building of a connector between the tracks of the N. Y., N. H. & H. near Van Nest station, along Unionport road to a connection with the main line of the N. Y., W. & B., near the proposed 180th street terminal. (Aug. 5, p. 265.)

NORTHERN, ILLINOIS & SOUTHERN WISCONSIN INLAND LAKES.—Plans made for building a line during the next 12 months to connect with a number of inland lakes in Kenosha county, Wis. Work is already under way, it is said, on a power plant at Palatine, Ill. J. K. Orvis is the principal promoter.

OAKLAND & ANTIOCH (ELECTRIC).—Work is said to be under way on this line, between Lafayette, Cal., and Oakland. The plans call for a line from Oakland, northeast via Berkeley, Walnut Creek and Concord, to Bay Point, 34 miles. H. A. Mitchell, president, 347 Grant avenue, San Francisco. (Jan. 28, p. 209.)

OHIO ROADS (ELECTRIC).—According to press reports, a number of capitalists of Toledo, Ohio, and Jackson, Mich., are considering the question of building an electric line from Toledo, northwest via Tecumseh, Mich., and Sand Lake to Jackson, about 65 miles. T. P. Brown is the principal promoter.

OREGON & WASHINGTON.—See Chicago, Milwaukee & Puget Sound.

OREGON RAILROAD & NAVIGATION CO.—Work is being pushed on the change of line between Yoakum, Ore., and Pendleton, 13 miles. The work is heavy, with several channel changes on the Umatilla river. Twohy Brothers, the contractors, now have a force of 400 men at work and will double this force, to include a night gang. There will be three new steel bridges. (Feb. 25, p. 429.)

ROME & NORTHERN.—See Chattanooga Southern.

ST. LOUIS, BROWNVILLE & MEXICO.—An officer is quoted as saying that work will be started early in September on the first section of the branch from Kingsville, Tex., northwest to Alice, 22 miles. The company intends to eventually extend the line to San Antonio, a total of 160 miles. (Jan. 14, p. 118.)

SOUTHERN PACIFIC.—Plans for the proposed line of the Central Pacific have been filed in Nevada. The surveys call for a line from Fernley, Nev., thence over the old Central Pacific railway bridge, via Wadsworth along the west side of Pyramid lake and over Astor pass into the Honey lake country to the Nevada-California state line. It is understood that the line will eventually be continued north into Oregon, and that the work will be started soon.

UNITED RAILWAYS ELECTRIC (PORTLAND, ORE.).—A contract is said to have been given to Porter Brothers for building a section of the line from near Banks, Ore., to the head of Cedar canyon. The company now operates a 17-mile line from Portland, west via Burlington, and will push construction work on an extension west to the Pacific coast at Tillamook, in all about 80 miles. (July 22, p. 174.)

WESTERN PACIFIC.—This company opened its line on August 22 for through passenger service from San Francisco, Cal., east to Salt Lake City, Utah, 921 miles. The line is also open for through freight service.

Railway Financial News.

ATCHISON, TOPEKA & SANTA FE.—The Texas Railroad Commission has ordered canceled the lease whereby the Santa Fe operates the Rio Grande & El Paso. The commission expires in December, but the commission took this action to prevent the renewal. The Rio Grande & El Paso is controlled by the Santa Fe.

COLORADO & INTERURBAN.—Carter, Decker & Co. and White, Weld & Co., both of New York, have bought from the company and are offering to the public \$3,000,000 refunding and extension mortgage 4½ per cent. bonds of May 1, 1905-1935. This is part of an authorized issue of \$100,000,000, of which \$28,230,490 have been issued. Of the bonds issued, \$348,590 are held in the treasury. The bonds subject to the lien of the first mortgage are a direct lien on 1,041 miles of road, and through the deposit of securities have the equivalent of a first lien on 41.5 miles of the Colorado Railroad, 20.6 miles of the Denver & Interurban, 304 miles of the Trinity & Brazos Valley and 256.5 miles of the Wichita Valley; and in addition are secured by a first lien on securities of a par value of \$23,064,653.

DELAWARE & EASTERN.—The reorganization committee has issued a circular in which they say that they have had an examination of the property made by J. T. O'Dell, formerly general manager of the Baltimore & Ohio, and that his report in substance says that he found the country traversed by the road fertile and capable of supporting a railway, but that the original construction of the Delaware & Eastern was so poor that the expense of operation was increased to an extent which prevented the road's being run at a profit. He says: "Any money judiciously expended will pay two and probably three times the interest on the amount of new money required. The road can and must be put in condition to be operated, say, for \$1,700 or \$1,800 per mile per year, with \$2,100 per mile as gross earnings, instead of as at present earning \$2,100 per mile gross and spending \$2,500 per mile for bare operating expenses by reason of the incomplete condition of the roadbed."

MISSOURI, KANSAS & TEXAS TERMINAL OF ST. LOUIS.—This subsidiary of the Missouri, Kansas & Texas has filed with the secretary of state of Missouri a certificate of increase in the authorized stock from \$100,000 to \$10,000,000. Only \$100,000 is now outstanding.

RIO GRANDE & EL PASO.—See Atchison, Topeka & Santa Fe.

SPOKANE, PORTLAND & SEATTLE.—The following have been elected to the board of trustees of the Spokane, Portland & Seattle: George T. Reid, western counsel of the Northern Pacific at Tacoma, Wash.; Howard Elliott, president of the Northern Pacific; Louis W. Hill, president of the Great Northern; F. V. Brown, attorney for the Great Northern at Seattle, Wash., and John F. Stevens, recently elected president of the S. P. & S.

TEXAS-MEXICAN.—The secretary of state of Texas has received an amendment to the charter of the Texas-Mexican, which reduced the company's authorized capital stock from \$12,000,000 to \$2,500,000.

Railway for Caspian Fish Market.

Astrachan, at the mouth of the Volga, the only considerable town on the Caspian Sea, had been shut out from the world five months of the year when the ice closes the Volga; but it has been let into it by the construction of a railway east of the Volga, a distance of 343 miles, in the face of considerable obstacles. Except for a short distance at the northern end, the line is through the arid or semi-arid country which was once the bed of the sea which connected the Caspian and the Aral seas, and which has left some enormous deposits of salt, and no fresh water whatever. Then at the southern end it crosses the Volga delta, with three large and a great many small water courses, while the land itself at the time of the spring floods is covered with water 6 ft. deep. A very large part of the petroleum produced in Russia finds its way to market up the Volga, and Astrachan is the great fish market of the Caspian, and the headquarters of the trade with Persia.

Supply Trade Section.

Dalton Risley, formerly with the National Refining Co., has accepted a position with the Indian Refining Co., Cincinnati, Ohio.

David W. Pye has been elected president of the United States Light and Heating Co., succeeding William H. Silverthorn, whose death we reported last week.

The American Concrete & Steel Railroad Tie Company, St. Louis, Mo., will build a plant in St. Louis for the manufacture of concrete railway ties. The plant is designed to turn out 2,000 ties daily.

Kolesch & Co., New York, have just published a new and revised form of traverse sheet. They are ruled, with printed headings, to conform with the system generally in use for figuring traverses, and are arranged for the co-ordinate system.

The Rapid Motor Vehicle Co., Pontiac, Mich., is installing a complete clam shell bucket coal handling crane system, manufactured by the Northern Engineering Works, Detroit, Mich. This company has also installed a 10-ton Northern crane in its power station.

John J. Mallay has been appointed general purchasing and supply agent of the Safety Car Heating and Lighting Co. and the Pintsch Compressing Co., New York, effective August 23. Mr. Mallay has been associated with the Safety company for several years in the departments over which he has now been placed in charge.

The Williams All Service Car Door Company, Clinton, Ill., was recently incorporated, as mentioned in the *Railway Age Gazette* of August 12. The officers are: W. S. Williams, president; C. W. Pifer, vice-president; C. R. Westcott, secretary and treasurer. The directors are W. S. Williams, C. W. Pifer, C. R. Westcott, William H. H. Hastings and Henry C. Koehler.

Wells Brothers Company, Greenfield, Mass., send the foremen of its various factory departments, with their families, on outings during the summer months. These outings take the form of all-day automobile trips through the surrounding country. One or two of the foremen, with their families, are sent at a time, the company providing a large touring car and paying all expenses. Each trip covers about 125 miles.

William J. Bali has been appointed mechanical engineer of the Crawford Locomotive & Car Co., Streator, Ill. Mr. Bali was in the engineering department of the Pullman Company for 12 years. He was mechanical engineer and sales representative of the Bettendorf Axle Company for four and a half years and spent four years in the railway supply business in Seattle, Wash., Portland, Ore., and Chicago. He is thoroughly familiar with the details of car construction, estimating and designing.

Gross sales of Western Electric Company, New York, for the eight months to August 1, ran at the rate of \$61,000,000 per annum, which is an increase of 48 per cent. over the same period of the 1909 fiscal year. July sales increased somewhat, showing a 10 per cent. increase over July of a year ago. The company now has 23,000 employees on its pay-rolls, an increase of 3,000 in the last four months, and compares with 17,000 last fall. The addition to working forces in the last few months has been necessitated largely by the increasing use of telephone apparatus in train despatching.

The Federal Switch & Signal Co., Sayreville, Pa., according to a press despatch from Pittsburgh, has done more business during the first six months of this year than in any similar period before, and the year 1910 promises to far exceed any previous years record. It is reported that the net earnings for the year will be 50 per cent. on the capital stock, and will leave a surplus of over six million dollars after the payment of the usual dividends. The business of the month of July amounted to \$600,000, resulting net earnings at the rate of 50 per cent. per annum on the stock of the company.

The Locomotive Superheater Company, 39 Church street, New York, announces that it has acquired the United States and Canadian rights of what it regards as the best patents of fire

tube superheaters. The patents acquired include the inventions of Wilhelm Schmidt, H. H. Vaughan, A. W. Horsey, Francis J. Cole and others. There are more than 6,000 of these superheaters in successful operation or in course of construction in Europe and over 800 in America. The officers of the company are: President, Wilhelm Schmidt; vice-president, Simon Hoffman; secretary, Otto Von Schrenk; treasurer, Samuel G. Allen. The directors include the officers and Fritz Von Briesen, Oscar Gubelman, J. S. Coffin and Le Grand Parish.

The Damascus Brake Beam Company denies reports that it will move its entire business to Cleveland, Ohio, from Sharon, Pa. These reports grew out of a fire in the company's Sharon plant, the destructiveness of which has been greatly exaggerated. Before this fire, which took place about three weeks ago, the company was considering whether it should enlarge its plant at Sharon or build in Cleveland in order properly to take care of its increased beam business as well as to install special machinery for the making of forged steel heads and fulcrums. An opportunity to purchase a plant at Cleveland ready for occupancy—that of the Cowing Engineering Company, at the corner of Crosby avenue and the Nickel Plate railway—presented itself at just about the time the fire referred to took place, and the acquisition of this plant caused the report to be circulated that the company would immediately move to Cleveland. Its operations at Sharon were interrupted only temporarily and its output there in August will exceed that of any month in the company's history, except in 1907. The Cleveland plant will not begin operations before October, and just how much of the company's work will be done at that point will depend on the manufacturing advantages found there. The company's general offices and headquarters being at Cleveland may have a tendency to cause it to consolidate its organizations at that point. The property it has bought there will make such a plan easy to carry out, but it is too early yet to say that this will be done.

TRADE PUBLICATIONS.

Chain Power Transmission. With a title "Maximum Silent Chain," book No. 102, of the Link-Belt Company, Nicetown, Philadelphia, Pa., describes the latest improvement in the form of power-transmitting chain manufactured by this company.

RAILWAY STRUCTURES.

BELLEVILLE, ONT.—Work is said to have been started by the Grand Trunk on a 42-stall roundhouse at Belleville. (Dec. 17, p. 1217.)

BROWNSVILLE, TEXAS.—The international bridge across the Rio Grande river between Brownsville, Tex., and Matamoras, Mexico, was formally opened on August 20. The bridge has been built jointly by the National Railways of Mexico and the St. Louis, Brownsville & Mexico. It makes possible the opening of new traffic routes from Chicago by way of St. Louis, Houston, Tex., and Brownsville to the City of Mexico and all principal Mexican cities.

CAMPBELLTON, N. B.—The Canadian Government will call for tenders for the rebuilding of the Intercolonial Railway roundhouse and shops, recently destroyed by fire. The cost is estimated at \$250,000. (July 15, p. 144.)

CHADRON, NEB.—The Chicago & North Western is rebuilding the roundhouse and shops destroyed by fire recently.

CHICAGO.—The Chicago & North Western is having plans made for new machine shops at Fortieth avenue and Kinzie street. There will be two buildings, one 200 ft. x 500 ft., and the other 150 ft. x 200 ft. The cost will be \$400,000.

CLEVELAND, OHIO.—The Toledo & Ohio Central has given a contract to Nicol & Carr, Columbus, Ohio, to build a substation, to cost \$61,300.

COLLIER, PA.—The Pittsburgh & Lake Erie has given a con-

tract to American & Canadian. The firm had a thirty-day option and will build.

DETROIT, MICH.—The Capital Transit will build a new, one-story building, near the river.

The Michigan Central has begun work on a new building for a second class depot in addition to the main one. It will have a frontage of 120 ft., and the cost of the building is \$100,000.

DETROIT, ILL.—The Chicago, North Branch & Southern is building a new building for a new office.

The Lake Shore & Michigan Southern has plans for a new building, including a new one-story building, 300 x 100 ft., erecting shop, repair shop, boiler shop and power plant.

DETROIT, ILL.—The Chicago & North Branch & Southern will build a new building.

The Michigan Central is planning to build a new building for the piers, abutments and pedestals of the bridge over the Kalamazoo river. (July 18, p. 351.)

DETROIT, ILL.—The Chicago, North Branch & Southern is building a new building.

The Chicago & North Branch & Southern is building a new building.

HOUSTON, TEX.—According to local reports, the Southern Pacific will let the contract soon for putting up the new office building at Franklin and Travis streets in Houston. (July 15, p. 345.)

HOUSTON, TEX.—See Canadian Northern under Railway Construction.

JOHN, MISS.—The Joplin Union Depot Company has given a contract to the Manhattan Construction Company, Ft. Smith, Ark., to build a stone concrete station.

LIBERAL, KAN.—The Chicago, Rock Island & Pacific has given a contract to the George B. Swift Company, Chicago, to build a railway station, 30 x 128 ft., and a two-story hotel, 71 x 80 ft., to cost \$50,000.

MARSHALL, TEXAS.—The Marshall & East Texas has given a contract to W. H. Pugh to build a new blacksmith and machine shop.

NORTH PLATTE, NEB.—The Union Pacific, it is understood, will put up a passenger station at North Platte, to cost \$80,000.

NORTHUMBERLAND, PA.—The Pennsylvania Railroad has given a contract to W. B. Steinbach & Son, Lewistown, Pa., for putting up 28 buildings, to cost \$200,000, in the new Northumberland classification yards. The buildings will be of brick and frame construction and will include shops, offices, coal wharves, chutes and other structures. The work is to be started at once.

PALATINE, ILL.—See Northern Illinois & Southern Wisconsin Inland Lakes under Railway Construction.

PORT ARTHUR, TEX.—The Kansas City Southern will build a station to cost \$15,000.

QUEBEC, QUE.—The time for receiving bids for the steel superstructure for the Quebec bridge, which were asked for by L. K. Jones, secretary of the Department of Railways and Canals, Ottawa, Ont., up to September 1, has been extended for one month. (July 22, p. 176.)

ST. BONIFACE, MAN.—See Canadian Northern under Railway Construction.

SHORT LINE CO. ILL.—The Oregon Short Line is planning to build a new general office building.

ST. PAUL, MINN.—A resolution has been passed by the Board of County Commissioners, which requires the Wisconsin Central to put up a new bridge at Arcade street, just north of the St. Paul city limits.

SNYDER, OKLA.—The St. Louis & San Francisco will build a brick or reinforced concrete station, to cost \$10,000.

TOWACO, N. J.—An officer of the Delaware, Lackawanna & Western writes that the company will put up a small fireproof passenger station at Towaco.

Late News.

The items in this column were received after the printed department's were closed.

W. R. Sibley has been appointed a traveling agent for the foreign freight department of the Erie Railroad, with office at Chicago, succeeding J. H. C. Clark, resigned.

The Division of Transportation has authorized plans for the construction of a new bridge at St. Louis, Mo., for building a bridge across the river. Plans are also made for building a bridge on Jackson street.

B. L. Bugg, general agent of the Old Dominion Steamship Co., at Norfolk, Va., has been appointed traffic manager of the Norfolk Southern. W. W. Croxton, assistant general passenger agent of the Norfolk Southern, at Norfolk, has been appointed general passenger agent.

Charles W. Bullen, vice-chairman of the freight department of the Trunk Line Association, at New York, has resigned. Mr. Bullen for more than 25 years has been identified with this branch of the work of the association and was an authority on all questions connected with freight rates.

Seven hundred men at the Law shaft of the Pennsylvania Coal Co., at Averca, Pa., went on strike on Thursday. They claim that they have been docked excessively, and say that there is a difference of 3,000 tons between the amount of coal they claim they mined during the last two weeks and the amount for which the company declares it will pay.

E. A. Wigren has been appointed auditor of disbursements of the Toronto, Hamilton & Buffalo; Thomas Edson, freight accountant and freight claim agent, has been appointed auditor of freight accounts and freight claim agent, and H. J. Broderick, ticket accountant, has been appointed auditor of passenger accounts, all with offices at Detroit, Mich. All these officers hold similar positions on the Michigan Central.

Construction has been started on the Youngstown & Northern Railroad, the new belt line of the United States Steel Corporation, which will connect the Youngstown plants with Niles, Pa., McDonald and New Castle, where a junction will be formed with the Bessemer road. This belt line will be completed before work is started on the new finishing mills to be built at McDonald, the new town the company will build.

Western Pacific's new traffic arrangement with the Toyo Kisen Kaisha, the Oriental steamship company, will become operative Jan. 26, 1911. After completing arrangements whereby the Toyo Kisen Kaisha will sever its connections with the Pacific Mail Steamship Co. and other Harriman lines and will become affiliated with the Western Pacific, the general manager of the Oriental Line has announced that January, 1911, will be the date when the new arrangements will become effective and also that on and after Jan. 26, 1911, his company would operate five steamships between San Francisco and the Orient instead of three, the number now in service. The new ships will be the America Maru, which is being repaired for the new service, and a turbine steamer under construction in the yards at Nagasaki. The new turbine will be a sister ship to the Chiyo Maru and the Tenyo Maru. The traffic arrangements with the Western Pacific will be similar to the arrangement which existed with the Southern Pacific. The steamship company will have full and free interchange of traffic, both inward and outward bound. Through rates will be made from anywhere in the United States to the Orient via San Francisco. It is expected that considerable attention will be devoted to securing cotton traffic from the Southwest via San Francisco under the new traffic arrangement. The most of the cotton traffic to the Orient has heretofore gone via Puget Sound, the Hill roads handling the largest proportion. This trade can be made an important item. With the extensive system of Gould roads reaching every portion of the Southwest, the Western Pacific, with its new Oriental connection, should secure a large proportion of the traffic for supplying raw cotton to the mills of Japan. Western Pacific officials have made a careful study of the cotton traffic possibilities and expect to develop important business from this source.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Union Railroad advise that it has not yet placed an order for 10 consolidation locomotives.

The Cuba Eastern has ordered, through J. G. White & Co., New York, three five-ton locomotives from the American Locomotive Company.

The Delaware & Hudson has ordered 12 compressed air locomotives from the Vulcan Iron Works. These locomotives will be used about the Scranton, Pa., operations of the railway company.

The Imperial Railways of Japan, Korean Lines, have ordered nine 10-wheel passenger locomotives from the American Locomotive Company. These engines will have 20-in. x 26-in. cylinders, 66-in. driving wheels, and a total weight of 150,000 lbs.

CAR BUILDING.

The Havana Central, reported in the *Railway Age Gazette* of August 12 as being in the market for freight cars, has altered its inquiry to include 150 thirty-ton flat, 100 thirty-ton box, 15 caboose and 125 stock cars.

The Cuba Eastern, reported in the *Railway Age Gazette* of May 20 as being in the market for miscellaneous freight equipment, has ordered, through J. G. White & Co., New York, 70 thirty-ton cone and 26 forty-ton box cars from the Mt. Vernon Car Mfg. Company, and 30 forty-ton flat cars from the Fitz-Hugh, Luther Company.

IRON AND STEEL.

The Wabash has ordered 1,500 kegs of spikes.

The Baltimore & Ohio has ordered 2,000 tons of spikes.

The Bengal North Western is in the market for 1,100 tons of rails.

The Bengal Nagpur Railway is in the market for 2,500 tons of rails.

The Pennsylvania Lines West are in the market for 1,600 tons of structural steel.

The Lake Shore & Michigan Southern is in the market for 900 tons of structural steel.

The Sind Light Railway has ordered 2,200 tons of rails from the Workington Steel Company.

The Seaboard Air Line has ordered 300 tons of structural steel from the Phoenix Bridge Works.

The Pennsylvania has ordered 1,500 tons of structural steel from the Pennsylvania Steel Company.

The Great Indian Peninsula Railway has ordered 6,000 tons of rails from the Barrow Hematite Company.

The National Railways of Mexico have ordered 10,000 tons of rails from the Lackawanna Steel Company.

The Atamancu, Tepica & Santa Fe has ordered 1,650 tons of bridge steel from the American Bridge Company.

The Chesapeake & St. Paul has ordered 45 tons of structural steel from the Pennsylvania Steel Company.

The New York Central has ordered 10,000 tons of structural steel from the American Bridge Company for terminal improvements in New York.

General Conditions in Steel—The railways are showing signs of activity, which is, however, confined mostly to structural steel although rail inquiries are pending. The Lackawanna Steel Company obtained the order for 10,000 tons of rails for the National Railways of Mexico, which it was generally thought, would be placed in foreign markets. It is understood that the shipments of finished steel by the United States Steel Corporation during August will be considerably in excess of what they

were in July, and that net earnings in August may run close to \$14,000,000. In April they amounted to approximately \$13,415,000; in May, \$13,229,000, and in June, \$13,526,000.

SIGNALING.

The Indiana State Railroad Commission has approved the plans and specifications for the interlocking now being installed near Hammond for the use of nine railways. The machine, which will soon be ready for use, is all-electric and has 224 levers. Trains of the following roads will use this plant: The Chicago & State Line, the Chicago & Western Indiana, the New York, Chicago & St. Louis, the Chicago & Erie, the Louisville, New Albany & Chicago, the Chicago & Calumet Terminal, the Michigan Central, the Hammond & Blue Island and the State Line & Indiana City.

Specifications.

A specification is defined as a definite, particularized and complete statement, the written document in which engineers and architects describe those portions of proposed work which they cannot clearly show by diagrams. In addition, they are expected to specify the material and quantities required, and, with this, the manner of carrying out the work.

Specifications should be both definite and exact; then the engineer not only fully understands what he requires, but where, also, he expects to enforce their carrying out. Engineers may think that they are able to shield themselves behind a host of unreasonable clauses should a mistake be made. The client must pay for these unreasonable requirements, and the engineer who inserts them places himself in an unfavorable light before the contractors, the men who do the work and are in a position to judge of the necessity of each and every clause.

The insertion of such a clause as "All works are to be done to the entire satisfaction of the engineer. He is to be the sole judge, and the work or material, both of quality and quantity, and his decision only on all questions of dispute with regard to work or material, or as to the meaning or interpretation of plans and specifications, is to be considered final and binding on all parties," are among the most difficult to understand. Why the engineer who prepares specifications and who is a client's representative shall be the sole judge or referee or arbitrator in matters of dispute between himself and the contractor it is difficult to understand.

The engineer requires certain work to be done. The contractor, for a price, is willing to do the work. They both are agreed with the drawings and specifications covering the work required. It is unreasonable to expect the contractor to be content with any matters of dispute between himself and the engineer when the engineer is the only referee. Such a clause would probably not hold in a court of law, although engineers persist in inserting such clauses in the specifications. Such a clause as this places the men who make the drawings, prepare the specifications, the contract and issue the progress estimates, the arbitrators in the matters of dispute.

Such a clause undoubtedly keeps a number of contractors from bidding on work where they are not personally acquainted with the engineer. This reduces the number of bids considerably, and places the work practically in the hands of the friends of the engineer, which is frequently not good business, either for the client or the engineer.

The wording of specifications and the preparation of drawings and designs for the purpose of securing what is required and the statement of what the contractor is expected to perform should be prepared in such a way as to place all contractors upon the same footing. Nor should they be so stringent as to eliminate competition.

The Shantung Railway had an immense increase in freight traffic in 1909, perhaps because of carrying materials for the new line from Tien Tsu to Nankin. The freight earnings increased from \$931,358 in 1908 to \$1,316,615 in 1909, or 45 per cent., there being a small decrease in passenger and other earnings. The dividend was increased from 1 1/4 to 6 per cent. The increase in net earnings was 36 1/2 per cent. The company is beginning to establish a forest, and is to plant a million trees yearly for ten years.

ANNUAL REPORTS

BUFFALO, ROCHESTER & PITTSBURGH—TWENTY-FIFTH ANNUAL REPORT.

The following is a statement of the financial condition of the Buffalo, Rochester & Pittsburgh Railway Company, as shown by the annual report for the year ending June 30, 1910.

ROAD OPERATED			
	1910	1909	Increase, or decrease
Operating revenues	\$5,003,904.93	\$4,665,170.93	\$338,734.00
Operating expenses	4,082,982.02	3,812,482.27	270,499.75
Net operating revenue	\$920,922.91	\$852,688.66	\$68,234.25
Operating income	\$920,922.91	\$852,688.66	\$68,234.25
Gross corporate income	\$920,922.91	\$852,688.66	\$68,234.25
Net corporate income	\$920,922.91	\$852,688.66	\$68,234.25
Pension Fund	\$12,696.54	\$12,483.66	\$212.88
Special appropriation	\$315,000.00	\$315,000.00	
TOTAL APPROPRIATIONS	\$920,922.91	\$852,688.66	\$68,234.25
Surplus available for dividends	\$1,199,676.92	\$1,029,938.61	\$169,738.31

The increase in Taxes was caused by the operation of the new Federal Corporation Tax law, also by higher taxes imposed on Capital Stock. "Other Income" shows a net increase of \$115,567.22. The reduction in the dividend on the stock of the Ontario Car Ferry Company, Limited, and "Joint Facilities" and "Interest."

INCOME			
	1910.	1909.	Increase, or decrease.
Operating revenues	\$5,003,904.93	\$4,665,170.93	\$338,734.00
Operating expenses	4,082,982.02	3,812,482.27	270,499.75
Net operating revenue	\$920,922.91	\$852,688.66	\$68,234.25
Operating income	\$920,922.91	\$852,688.66	\$68,234.25
Gross corporate income	\$920,922.91	\$852,688.66	\$68,234.25
Net corporate income	\$920,922.91	\$852,688.66	\$68,234.25
Pension Fund	\$12,696.54	\$12,483.66	\$212.88
Special appropriation	\$315,000.00	\$315,000.00	
TOTAL APPROPRIATIONS	\$920,922.91	\$852,688.66	\$68,234.25
Surplus available for dividends	\$1,199,676.92	\$1,029,938.61	\$169,738.31

"Decrease in Taxes was caused by the operation of the new Federal Corporation Tax law, also by higher taxes imposed on Capital Stock. "Other Income" shows a net increase of \$115,567.22. The reduction in the dividend on the stock of the Ontario Car Ferry Company, Limited, and "Joint Facilities" and "Interest."

The increase in "Deductions for Interest and Rentals" is accounted for by increased payments for rentals, joint facilities and interest on additional obligations outstanding at the close of the year.

A special appropriation of \$315,000 was made from the "Net Corporate Income." Of this amount, \$125,000 was added into the Sinking Funds and Equipment Agreements Series A, B and C, for the purchase of new rolling stock, and \$190,000 represents one-half of the principal of bonds Series D, E and F, paid during the year, the other half being refunded by 4 per cent. bonds, issued under the terms of the Consolidated Mortgage, held in the Treasury of the Company.

DIVIDENDS.			
	1910.	1909.	
Preferred stock	\$6,000,000	\$6,000,000	6%
Common stock	10,500,000	420,000	4%
Total	\$16,500,000	\$780,000	

Since the close of the fiscal year, your Board of Directors has declared a semi-annual dividend of three per cent. on the preferred stock and two per cent. on the common stock, both payable August 15, 1910.

CAPITAL STOCK.

There has been no change during the year in this account. The total outstanding Capital Stock of the Company amounts to \$16,500,000, and consists of \$6,000,000 preferred stock, and of \$10,500,000 common stock.

FUNDED DEBT.

During the year the \$3,000,000 Income 6 per cent. Bonds, heretofore outstanding, were purchased and, together with the \$1,000 of that issue held by the Company, turned over to the Trustee, against which \$3,000 Consolidated Mortgage Bonds, Series A, B and C, were issued. These transactions allowed the Trustee to cancel \$1,870,000 Income 6 per cent. Bonds, being the entire issue of that security created in 1881.

The remaining \$360,000 Construction and Improvement 4½ per cent. notes maturing August 1, 1909, were paid and canceled.

In accordance with the provisions of the 4½ per cent. Consolidated Mortgage of 1907, \$1,277,000 of bonds were issued and sold, and the proceeds applied, as far as necessary, to pay for additions and betterments; and the unexpended balance was carried over to meet similar expenditures in the new year. The Trustee also delivered to the Company \$709,000 Consolidated Mortgage Bonds, Series A, B and C, maturing on or after July 1, 1910. These bonds are held as a reserve in the Treasury of the Company.

Under the terms of the Sinking Funds for the redemption of Equipment Bonds, \$350,000 bonds were retired as follows: \$115,000 of Series "D", \$98,000 of Series "E", and \$137,000 of Series "F."

The following is a statement of the financial condition of the Buffalo, Rochester & Pittsburgh Railway Company, as shown by the annual report for the year ending June 30, 1910.

The increase in Taxes was caused by the operation of the new Federal Corporation Tax law, also by higher taxes imposed on Capital Stock. "Other Income" shows a net increase of \$115,567.22. The reduction in the dividend on the stock of the Ontario Car Ferry Company, Limited, and "Joint Facilities" and "Interest."

The increase in "Deductions for Interest and Rentals" is accounted for by increased payments for rentals, joint facilities and interest on additional obligations outstanding at the close of the year.

A special appropriation of \$315,000 was made from the "Net Corporate Income." Of this amount, \$125,000 was added into the Sinking Funds and Equipment Agreements Series A, B and C, for the purchase of new rolling stock, and \$190,000 represents one-half of the principal of bonds Series D, E and F, paid during the year, the other half being refunded by 4 per cent. bonds, issued under the terms of the Consolidated Mortgage, held in the Treasury of the Company.

CONSTRUCTION			
	1910.	1909.	Increase, or decrease.
Operating revenues	\$5,003,904.93	\$4,665,170.93	\$338,734.00
Operating expenses	4,082,982.02	3,812,482.27	270,499.75
Net operating revenue	\$920,922.91	\$852,688.66	\$68,234.25
Operating income	\$920,922.91	\$852,688.66	\$68,234.25
Gross corporate income	\$920,922.91	\$852,688.66	\$68,234.25
Net corporate income	\$920,922.91	\$852,688.66	\$68,234.25
Pension Fund	\$12,696.54	\$12,483.66	\$212.88
Special appropriation	\$315,000.00	\$315,000.00	
TOTAL APPROPRIATIONS	\$920,922.91	\$852,688.66	\$68,234.25
Surplus available for dividends	\$1,199,676.92	\$1,029,938.61	\$169,738.31

To further provide a pure water supply for locomotives, a storage reservoir at Indiana Junction was built during the year. Reservoirs at Ketner, Pa., and Falls Creek, Pa., are now in course of construction.

The mechanical ore unloader on the Buffalo docks, purchased in 1908, was rebuilt and its capacity greatly increased.

A modern brick and stone building is under construction at Du Bois, Pa., for the accommodation of the officers located at that point, and will be shortly completed.

Improvements to the Rochester terminal, including the remodeling of the passenger station, were undertaken and are well advanced.

A brick and stone passenger station was completed at Ridgway, Pa.

A crossting plant is being constructed at Bradford, Pa., of sufficient capacity to treat the annual tie supply of your Company. It will be ready for use by September 1st and will result in material economy in expenditures for ties.

The Nesbit Run line, a spur track projected to tap new mines, is now in operation; another spur track known as the Jacksonville Line is rapidly approaching completion.

A great deal of work of a permanent character was also done on trestles, culverts and bridges.

There were laid 1.49 miles of new double track at Elk Run Junction, Pa., and a considerable amount of grading was done on 8.52 miles of new double track between Newton, Pa., and Mt. Jewett, Pa. With the completion of this link, the main line will be double tracked from Punxsutawney, Pa., to Ashford, N. Y., a distance of 131.85 miles.

Facilities for handling traffic have been materially increased by the construction of additional siding and yard tracks.

EQUIPMENT.			
	1910.	1909.	
Expenditures were made for new rolling stock as follows:			
Fifteen locomotives	\$237,593.22		
Three passenger service cars	26,930.80		
Two thousand freight service cars	1,708,446.78		
Sundry betterments, air brakes, etc., including transfer of one freight service car and one hundred Company's service cars	93,712.49		
Total	\$2,066,683.29		

The account was further increased by the amount charged to "Reserve for Accrued Depreciation" since June 30, 1907, in accordance with the Classification of Expenditures for Additions and Betterments prescribed by the Interstate Commerce Commission, effective July 1, 1909..... 464,850.86

\$2,531,534.15

DEPRECIATION.			
	1910.	1909.	
There was credited for Equipment sold, transferred or destroyed, the following Accrued Depreciation:			
Operating Expenses, and the balance, representing the depreciation written off since June 30, 1907, to "Reserve for Accrued Depreciation":			
Three locomotives	\$18,417.89		
Two passenger service cars	3,944.78		
Nine hundred fifty-eight freight service cars	305,994.05		
Four Company's service cars	8,020.75		
Total	\$331,377.47		

Making a net increase of \$2,200,156.68

All cars in freight service are now provided with automatic couplers and 93.36 per cent. of the cars are equipped with air brakes.

The figures from 1908 to date are based on the Interstate Commerce Commission's classification of locomotive and train mileage.

" tons carried 1 mile ...

ST. AUGUSTINE AND SEABOARD RAILROAD

ST. AUGUSTINE AND SEABOARD RAILROAD

ST. AUGUSTINE AND SEABOARD RAILROAD

ST. AUGUSTINE AND SEABOARD RAILROAD

second blast furnace at Josephine, Pa., which will materially increase the revenue tonnage of your line.

Under date of October 1, 1909, an agreement was entered into with the

when

operation over the line used.

Mr.

players for their faithful and efficient services.

By order of the Board,

Wm. T. ...

	Percent.	1910	1909	Percent.
Operating Expenses:				
Maint. of equipment...	20.78	1,857,616.59	1,538,190.93	1.41
Transportation expenses...	1.71	2,551,197.46	2,099,212.30	2.25
Total operating exp.	33.93	\$5,903,904.93	\$4,665,170.93	65.95

BROOKLYN RAPID TRANSIT: REPORT OF THE DIRECTORS FOR THE YEAR ENDING JUNE 30, 1910.

RESULTS OF THE OPERATIONS OF THE BROOKLYN RAPID TRANSIT SYSTEM

	1910.	1909.	Increase or Decrease.
Gross Earnings from Operation	\$20,906,929.80	\$19,694,462.11	+\$1,212,467.69
Operating Expenses	11,389,427.31	6,055,172.21	5,334,255.10
Total Income	\$9,719,964.91	\$8,905,624.66	+\$814,340.25
Taxes and Fixed Charges	7,108,360.62	6,999,915.59	108,445.03
Net Income	\$2,611,595.29	\$1,936,609.07	+\$674,986.22
Properties	108,560.19	65,429.82	43,130.37
Total Surplus for Year	\$2,572,319.75	\$1,871,179.25	+\$701,040.50
Surplus at June 30, 1909-1908	4,387,229.84	3,853,159.90	534,069.94
Surplus at June 30, 1910-1909	4,781,035.42	4,387,229.84	393,805.58
Gross Earnings of the System from Operation for 12 months ending June 1910, were \$20,906,929.80, an increase of \$1,212,467.69 over last preceding year.			
Net Earnings from Operation were \$9,180,537.60 and Net Surplus after			

and \$631,855.85 over previous year.

Expenditures for Maintenance of Way and Structures increased \$115,704.43. The increase is chiefly due to quite extensive rebuilding of trolley tracks.

Maintenance of Equipment shows an increase of \$377,354.64. The unit cost of shop work was materially less than in 1909; the increase lies mainly in cost of changing air brake equipment on elevated cars, and the substitution of steel for iron wheels, together with over \$100,000 charged off and carried in accrued amortization of capital.

The increase of over \$200,000 in Operation of Cars is largely accounted for by advance in wage scale.

There was a decrease of \$207,858.12 in the combined items of Damages and Legal Expenses. The cost of Damage settlements and judgments amounted to 2.66 per cent., and Legal and Claim Department Expenses 1.43 per cent. of Gross Earnings from Operation. There was a further reduction in number of suits brought, and, barring slightly over \$25,000 in judgments on appeal, there is no outstanding judgment against any Company in the System.

Passengers carried, 569,438,773, against 530,149,957 last year. Of the number carried this year 151,279,806 rode on transfers.

Compared with last year there was a decrease of 6/10 of a mill in the average gross receipt per passenger and 9/10 of a mill in operating charges. Taxes increased 1/10 of a mill, Interest and Rentals decreased 7/10 of a mill, making a total reduction of 1.5 mills in cost per passenger, and increase in surplus of 9/10 of a mill, or 2.57 per cent. per passenger carried.

Passenger Revenue Car-Mileage of the System shows an increase over the preceding year of 3,784,215 miles. The average number of passengers per car-mile was 7.30 against 7.14 last year.

The total Power House output measured at the switchboard was 326,894,950 K.W.H. Average cost of Power House Operation including power house and sub-station repairs was 0.567 cents per K.W.H. Although the output was nearly 16,000,000 K.W.H. in excess of last year the cost of Operation of Power Plant was \$98,000 less. In the four years ending June 30 there has been a reduction of slightly above 20 per cent. in unit cost of power at the switchboard. A lower consumption of power per car-mile through improvement of appliances and better methods of operation has contributed to favorable results in this department of the service.

PENSIONS.

A Pension System was inaugurated on January 1, 1910, the affairs of which are administered by a Board of Pensions consisting of the Vice-President and General Manager, the Secretary and Treasurer of the Brooklyn Rapid Transit System and the President of the Brooklyn Rapid Transit Employees' Benefit Association. The amount of pension is based upon the average monthly wage received by the pensioner during the ten years immediately preceding retirement and graduated from a minimum of 30 to a maximum of 50 per cent. of this rate, according to length of service. At the end of the first six months, twenty-six employees had qualified and were receiving pension allowances.

INSURANCE RESERVE FUND.

In addition to \$61,428.27 Insurance Reserve Fund accumulated prior to the agreement entered into on November 15, 1907, by the Companies composing the System there has been earned \$183,897.26, making a total to credit of the Reserve Fund of \$235,325.53. The balance sheet reflects but \$180,979.87, for the reason that the difference, \$54,345.66, while earned, is not distributable until the close of the insurance year, November, 1910. There has been invested by the Trustees in interest bearing securities \$190,243.75, representing a par value of \$201,000, yielding an income of \$8,895 per annum.

The suits brought by the Brooklyn Union Gas Company in 1905 against several constituent companies on account of damages claimed to have been suffered from electrolysis of pipes were disposed of by compromise and all Companies in the System released from liability on this account. It is believed by all concerned that the negative return system now in use is an effective safeguard against further trouble from this source.

No important construction work was undertaken during the year.

The extension of the Nostrand Avenue line from the crossing at Flatbush Avenue was commenced and 1.572 miles of single track laid, and in the extension of the Utica Avenue line between Church Avenue and Avenue "N" there has been laid 3.228 miles of single track.

Montague Street line, heretofore operated by cable, was electrified and track connections made at Montague and Court Streets enabling the discontinuance of cable operation between Wall Street Ferry and Court Street and the installation of through electric service between Wall Street Ferry and Fulton Ferry. The cable power station was closed.

Trolley surface tracks were improved by the laying of 52,312 square yards of first class pavements covering 5.778 miles of city streets.

Forty-three pieces of special work were renewed and 20 pieces of new special work and 15 electric switches were installed.

The grade crossings of the Long Island Railroad Company at Emmons Avenue in Sheepshead Bay and at the intersection of Liberty and Atlantic Avenues were eliminated by changes of grade.

Upward of eight miles of single track originally constructed with light girder rail on wooden ties and sand foundation were relaid with 102-pound 7-inch girder rail, 4.9 miles on steel and 3.1 miles on wood ties, all on concrete foundation with granite pavement.

Thirteen thousand five hundred feet of elevated structure was reinforced, making a total of 61,000 feet of structure reinforced to June 30, 1910.

The rights of way of the Prospect Park & Coney Island Railroad, between Ninth Avenue and Kensington Junction, and the Sea Beach Railway, between 62d and 86th Streets, were fenced.

Ten stations on the Fulton Street line were renovated and repainted.

Two new stations were established, to wit: Bay 50th Street, on the West End Division, and Fifteenth Avenue, on the Prospect Park & Coney Island Line.

A new freight house and yard were constructed at the Sea Beach Terminal, Coney Island, and rented property abandoned.

One 55-ton electric locomotive for the handling of freight service on private rights of way was contracted for.

Two thousand six hundred and seventy-nine surface and 828 elevated cars were put through the shops for overhauling, repainting and varnishing.

Wheelguards for 2,563 surface cars have been ordered in conformity with the requirements of the Public Service Commission, and will be installed during the current year.

The air brake equipment of 960 elevated cars has been replaced by the latest type of automatic quick action brakes.

The generating capacity of the power plant was increased by the installation of two 10,000 K.W. units in the Williamsburg station. The total Power House capacity is 115,780 K.W., of which 103,500 K.W. represents the capacity of the power plant.

The Prospect Park, Bridge and 38th Street sub-stations have each been increased by 2,000 K.W. capacity.

There are now 10 sub-stations with a total rated capacity of 85,500 K.W. A total of 0.29 mile of underground conduit, equivalent to 1.72 miles of overhead line, was installed.

12.12 miles of high tension transmission cables were installed in subway conduits during the year.

14.26 miles of overhead feeders were removed and 110.67 miles of trolley wire were replaced.

REFUNDING BONDS.

To June 30, 1910, there had been authenticated and delivered to the Company by the Central Trust Company of New York, Trustee, under the First Refunding Gold Mortgage, dated July 1, 1902, 4 per cent. bonds of a par value of \$1,625,000. This was an increasing amount during the fiscal year of \$1,255,000, of which \$795,000 were issued for Certificates of Indebtedness of First Consolidated Mortgage Bonds of the Nassau Electric Railroad Company.

The Certificates of Indebtedness were issued at par and represent the actual cost of additions and improvements by constituent companies, while the bonds exchanged were issued in connection with the retirement of \$730,000 First Consolidated Mortgage Bonds of the Atlantic Avenue Railroad Company.

Of the \$1,625,000 bonds authenticated and delivered on June 30, 1910, \$1,000,000 were secured, but the same could not be cashed, realizing \$20,000,000, and

\$1,709,000, par value, exchanged for stocks and bonds of constituent companies.

On July 1, 1909, there were Brooklyn Rapid Transit

Gold Mortgage 4 per cent. bonds in the treasuries of all companies \$13,693,000 par value
Authenticated and delivered, during the fiscal year ended June 30, 1910..... 1,525,000 "

Total on hand June 30, 1910.....\$15,218,000 par value

Of these the Brooklyn Rapid Transit Company owns \$13,509,000 par value, and the Nassau Electric Railroad Company \$1,709,000, par value.

In addition, the Company has expended to June 30, 1909, \$761,923.40 for which bonds may be issued.

Complete exhibit of issue and disposition of the First Refunding Gold Mortgage Bonds outstanding at June 30, 1910, is given below:

Received from Trustee upon execution of Mortgage.....\$5,000,000.00
Authenticated from time to time upon deposit with Trustee of Securities and Certificates of Indebtedness of Constituent Companies to the extent of actual cost of improvements. 43,296,000.00

Total authenticated by Trustee.....\$48,296,000.00

Held in Treasury of B. R. T. Co.....13,509,000.00

Amount outstanding\$34,787,000.00

Proceeds realized from Sale and Exchange for Underlying Bonds26,355,295.93

Discount (absorbed as indicated below).....\$6,401,704.07

BOND DISCOUNT DISPOSITION.

Year.	1903—Charged to Surplus	Cost of Securities
1903—Charged to Surplus	1,153,200.00	
1904— " " "	1,746,800.00	
1905— " " "	588,130.41	
1906— " " "	871,825.24	
1907— " " "	1,457,173.42	
1908— " " "	89,575.00	
1909— " " "		
		\$6,401,704.07

Appended hereto may be found statements, relating to the business of the fiscal year, and the condition of the Company's affairs on June 30, 1910.

EDWIN W. WINTER,
President.

BROOKLYN RAPID TRANSIT CO.,
85 Clinton Street,
Brooklyn, N. Y.

COMPARATIVE SUMMARY OF OPERATIONS, FOR YEAR ENDING JUNE 30, 1910-1909.

	1910.	1909.	Inc. + or Dec.	Per Cent.
GROSS EARNINGS.				
Passenger	\$20,477,144.74	\$19,058,693.14	+\$1,418,451.60	7.44
Freight, Mail & Express	272,140.08	254,642.81	+	17,497.87 6.87
Advertising	157,644.98	155,860.31	+	1,784.67 1.14
Am. Ry. Traffic Co.		225,265.85	—	225,265.85
Total Earnings from Operation	\$20,906,929.80	\$19,694,462.11	+\$1,212,467.69	6.16
OPERATING EXPENSES.				
Maintenance of Way and Structures	\$1,509,748.35	\$1,194,014.13	+	115,734.22 9.69
Maintenance of Equipment	2,068,270.97	1,690,916.33	+	\$37,354.64 22.32
Operation of Power Plant	1,498,712.04	1,596,769.17	—	98,047.13 6.14
Operation of Cars	5,061,150.43	4,812,555.95	+	248,594.48 5.17
Damages and Legal Expenses	921,538.19	1,120,396.31	—	207,858.12 18.40
General Expenses	689,521.75	676,665.93	+	12,855.82 1.90
Freight, Mail and Express	1,138,845.45	1,389,044.45	—	35,044.01 25.71
American Railway Traffic Co. Expenses	1,191.80	1,35,192.39	—	132,000.59 97.96
Total Operating Expenses	\$11,246,792.20	\$11,394,664.66	—	\$93,734.46 2.94
Net Earnings from Operation	\$9,180,137.60	\$8,299,801.45	+	\$880,336.15 10.61
INCOME FROM OTHER SOURCES.				
Rent of Land & Bldg.	86,008.44	7,248.65	+	78,759.79 82
Rent of Cars, etc.	104,600.82	104,090.44	+	510.38 1.05
Miscellaneous	300,000.00	425,871.45	—	125,871.45 13.85
Total Income from Other Sources	\$9,170,609.26	\$8,500,010.54	+	\$670,598.72 7.84
Total Income	\$18,350,746.86	\$17,800,011.99	+	\$550,734.87 3.09
Total Deductions	7,108,369.62	6,969,011.39	+	139,358.23 2.00
Net Income	\$11,242,377.24	\$10,830,999.60	+	\$411,377.64 3.80
Special Appropriations	108,400.19	65,129.83	+	43,270.36 6.62
Surplus	\$11,350,777.43	\$10,896,129.43	+	\$454,648.00 4.17

COMPARATIVE STATISTICS FOR THE FISCAL YEARS ENDING JUNE 30, 1902 AND 1901, BOTH INCLUSIVE

	1900	1901	1902	1903	1904	1905	1906	1907	1908
Total Passenger Earnings	\$20,477,145	\$19,058,693	\$18,930,164	\$18,443,988	\$17,586,722	\$15,649,401	\$14,429,546	\$13,086,840	\$12,321,265
Freight, Mail and Express, etc.	429,785	635,769	940,403	937,604	886,606	684,044	309,163	193,481	189,357
Other Earnings	339,427	605,817	677,824	555,166	323,935	252,135	211,853	277,193	232,046
Total Earnings	\$21,446,357	\$20,300,279	\$20,548,391	\$19,936,753	\$18,797,263	\$16,585,580	\$14,950,562	\$13,557,514	\$12,762,668
Operating Charges	11,844,953	11,460,084	12,169,360	11,907,768	11,021,720	10,257,155	9,144,145	8,139,562	8,268,325
Depreciation	6,611,404	\$8,840,195	\$8,379,031	\$8,028,985	\$7,775,543	\$6,328,425	\$5,806,417	\$5,418,252	\$4,494,348
Interest and Rentals	3,134,253	3,134,253	3,134,253	3,134,253	3,134,253	3,134,253	3,134,253	3,134,253	3,134,253
Total Fixed Charges	\$7,108,360	\$6,969,016	\$6,534,939	\$6,026,387	\$5,612,934	\$5,178,491	\$4,801,215	\$4,661,856	\$4,475,450
Surplus	\$2,503,035	\$1,571,179	\$1,844,092	\$2,002,598	\$2,162,609	\$1,149,934	\$1,005,202	\$750,396	\$15,893
Passenger Earnings	\$20,477,145	\$19,058,693	\$18,930,164	\$18,443,988	\$17,586,722	\$15,649,401	\$14,429,546	\$13,086,840	\$12,321,265
Increase over preceding year	7.44%	0.68%	2.64%	4.87%	12.38%	8.43%	10.26%	6.21%	.....
Passengers Carried	569,438,773	539,149,597	515,184,967	511,839,437	452,604,203	387,213,469	361,701,049	338,365,269	321,501,324
Increase over preceding year	7.41%	2.93%	0.65%	13.00%	16.59%	7.05%	6.90%	5.24%	.....
Transfers Redeemed	151,279,806	141,326,125	128,650,863	136,240,669	96,455,314	70,980,877	67,198,622	69,411,386	67,691,915
Increase over preceding year	7.04%	9.82%	5.57%	41.25%	37.63%	4.29%	3.18%	2.54%	.....
Revenue Mileage	77,984,651	74,200,436	73,674,770	68,273,181	63,657,323	57,599,743	54,573,384	52,292,501	52,614,950
Increase over preceding year	5.10%	0.71%	7.91%	7.25%	10.53%	5.55%	4.36%	0.74%	.....
Earnings per Revenue Mile	26.3 cts.	25.7 cts.	25.7 cts.	27.0 cts.	27.6 cts.	27.2 cts.	26.4 cts.	25.0 cts.	23.4 cts.
Passenger Earnings	3.60 cts.	3.60 cts.	3.60 cts.	3.60 cts.	3.88 cts.	1.94 cts.	3.99 cts.	3.87 cts.	3.83 cts.
Miscellaneous Earnings	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total Earnings	3.77 cts.	3.83 cts.	3.99 cts.	3.89 cts.	4.15 cts.	4.28 cts.	4.13 cts.	4.01 cts.	3.97 cts.
Operating Charges	2.08 cts.	2.17 cts.	2.36 cts.	2.33 cts.	2.43 cts.	2.65 cts.	2.53 cts.	2.41 cts.	2.37 cts.
Interest and Rentals	.26 "	.25 "	.25 "	.25 "	.25 "	.25 "	.25 "	.25 "	.25 "
Total	3.33 cts.	3.48 cts.	3.43 cts.	3.50 cts.	3.67 cts.	3.98 cts.	3.86 cts.	3.79 cts.	3.90 cts.
Surplus	0.44 cts.	0.35 cts.	0.56 cts.	0.39 cts.	0.48 cts.	0.33 cts.	0.27 cts.	0.22 cts.	0.006 cts.
Repairs and Renewals	16.16	14.65	14.39	13.66	13.30	13.13	12.35	9.85	8.85
General Operating	37.48	39.45	39.69	37.95	38.77	40.32	42.67	42.85	42.85
Interest and Rentals	2.66	3.66	4.14	3.86	3.48	4.25	4.77	5.31	6.88
Total Operating	56.09	57.86	60.09	59.16	59.52	60.02	59.37	58.01	65.41
Interest and Rentals (net)	6.96	6.79	4.68	4.61	4.78	5.07	5.70	5.70	5.70
Special Appropriations	24.46	25.52	24.80	23.61	23.85	25.10	26.15	27.31	27.82
Capital Stock	55,800.00	55,800.00	55,870.00	53,700.00	67,514.96	63,613.13	36,561.87	90,131.20	31,600.00
Federal Tax	46,996.94	.....	.....	.....	.....	.....	.....	.....	.....

FIXED CHARGES FOR THE FISCAL YEARS ENDING JUNE 30, 1902 AND 1901, BOTH INCLUSIVE

	1900	1901	1902	1903	1904	1905	1906	1907	1908
Special Franchise	482,355.47	464,526.01	222,517.50	224,980.00	215,900.00	205,800.00	187,800.00	187,800.00	187,800.00
Use of Buildings	27,000.00	27,000.00	27,000.00	27,000.00	27,000.00	27,000.00	27,000.00	27,000.00	27,000.00
Capital Stock	55,800.00	55,800.00	55,870.00	53,700.00	67,514.96	63,613.13	36,561.87	90,131.20	31,600.00
Federal Tax	46,996.94	.....	.....	.....	.....	.....	.....	.....	.....

COMPARATIVE STATISTICS FOR THE FISCAL YEARS ENDING JUNE 30, 1902 AND 1901, BOTH INCLUSIVE

	1900	1901	1902	1903	1904	1905	1906	1907	1908
Buildings and Fixtures	2,488,198.27	2,488,198.27	2,488,198.27	2,488,198.27	2,488,198.27	2,488,198.27	2,488,198.27	2,488,198.27	2,488,198.27
Depreciation	6,611,404	8,840,195	8,379,031	8,028,985	7,775,543	6,328,425	5,806,417	5,418,252	4,494,348
Interest and Rentals	3,134,253	3,134,253	3,134,253	3,134,253	3,134,253	3,134,253	3,134,253	3,134,253	3,134,253
Capital Stock	55,800.00	55,800.00	55,870.00	53,700.00	67,514.96	63,613.13	36,561.87	90,131.20	31,600.00
Federal Tax	46,996.94	.....	.....	.....	.....	.....	.....	.....	.....

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED WEEKLY, EXCEPT ON SUNDAYS AND HOLIDAYS

THE RAILROAD GAZETTE, 1101 N. 4TH ST., NEW YORK

CHAS. A. W. BROWN, JR., Editor, 1101 N. 4TH ST., NEW YORK
LONDON: 1101 N. 4TH ST., NEW YORK

W. H. BARNES, Jr., Editor

W. H. BARNES, Jr., Editor, 1101 N. 4TH ST., NEW YORK
LONDON: 1101 N. 4TH ST., NEW YORK

EDITORS

W. H. BARNES, JR., Editor	R. A. V. WILSON, Editor	B. E. ADAMS, Editor
W. H. BARNES, JR., Editor	W. H. BARNES, JR., Editor	W. H. BARNES, JR., Editor
W. H. BARNES, JR., Editor	W. H. BARNES, JR., Editor	W. H. BARNES, JR., Editor
W. H. BARNES, JR., Editor	W. H. BARNES, JR., Editor	W. H. BARNES, JR., Editor
W. H. BARNES, JR., Editor	W. H. BARNES, JR., Editor	W. H. BARNES, JR., Editor

Subscriptions, including regular weekly issues and special daily editions, are sent by mail to subscribers in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada.....	\$6.00 a year.
Foreign (including postage).....	\$12.00 (\$8.00 a year)
Single Copies.....	10 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00. Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 19 FRIDAY, SEPTEMBER 2, 1910 NUMBER 10.

CONTENTS

EDITORIALS:	
The New Theory of Reasonable Strength and Weakness of Rates...	384
Railway Appliances	385
LETTERS TO THE EDITOR	386
ILLUSTRATED:	
A New Method of Single Phase Railway	389
Double Track Railways in North Carolina	393
MISCELLANEOUS:	
W. H. BARNES, JR., Editor	388
Railway Architects in Great Britain in 1909	390
The Campaign Against Accidents on The Chicago & North Western	391

SHOP SECTION.

EDITORIALS:	
Editorial Notes	394
Technical Computations	394
Possible Economies of High-Speed Steel	395
Mechanical Articles During August	396
LETTERS TO THE EDITOR	396
ILLUSTRATED:	
Shop Notes	397
How a Foreman Can Promote Shop Efficiency	413
W. H. BARNES, JR., Editor	417
Master Blacksmiths' Convention	420
Box Car Door Fastenings	429
MISCELLANEOUS:	
Specifications for Staybolt Iron	418
Consolidation Locomotive Repaired in Record-Breaking Time	429
Lessons From the Passenger Cars	429
Foreign Railway Notes	412, 419, 430
GENERAL NEWS SECTION	431
SHIPPING TRADE SECTION	442

GREEN lights for proceed and red lights for stop make an exceedingly simple and satisfactory signal code for use at night, and nobody has yet devised anything better, except by introducing shape or position signals (colorless) at heavy expense; and every such device thus far introduced has other faults besides costliness. Unless the engineman

is color blind there is practically no fault to be found with the green and red code now in general use. That regulations for color-blind and color-sighted persons from the train service are now well-nigh universal on American railroads, as well as those of European countries, and do not mean that any railway of any consequence tolerates enginemen with defective vision. With good vision our colors are satisfactory. There was much delay in the accomplishment of this reform, due largely to the tender feelings of the superintendents of 1880-1895 who had not the courage to deprive an old and faithful engineman of his job, even when it was clear that he did not know green from red; but the situation is now so well understood that it would be astonishing to find any considerable neglect of the eye-sight regulations. It is with mild astonishment, therefore, that we see the Traffic Club of St. Louis giving an evening to a lecture by a physician on the dangers of defective vision in the railway service. These are so great, in this physician's opinion, that he would introduce position- or shape-signals at once. He has in mind the injustice imposed on color-blinds by keeping them out of the train service; but as only one man in 25 is color blind this cannot be a great wrong. This lecturer also devotes considerable space in his essay to the need of having signals that can be seen a long way off; but any signal engineer could have told him that, because of the necessity of providing for the running of trains in time of fog, all railway signaling apparatus, fixtures and regulations have to be so arranged and adjusted that the system will be as safe when one can see only 500 ft. from his nose, as at any other time. The argument that an engineman must be able to see a rock on the track a mile away, or an opposing train that is going to collide with him, is also rather academic. Roads that run fast trains have watchmen to look out for landslides; and as for butting collisions, we must have something more than good eyesight, if we are going to prevent them! We mention this St. Louis lecture merely as a notice that if any one knows of a railway which, in spite of the general knowledge on the subject and the simple nature of the vision problem, tolerates enginemen with defective vision, he should report it to the state railway commissioners; or, perhaps, publish its name.

IN discussing last week the country station agent and some of his joys and sorrows we observed that the agent's courage in keeping his building neat was often greatly dampened by unpleasant features which, so far as the agent is concerned, are beyond remedy. The very next day we read in a paper from Ohio the following:

The N. Y. & Z. Railroad has issued orders that men employed at the station in ——— must appear daily in bright, clean uniforms. The order is regarded as a good deal of a joke, as this station is about the dirtiest building of the kind in the country.

In quoting this item we disguise the name of the road because "all roads have them" and we do not care to give prominence to any one. What makes this particular station dirty we do not know; but everybody is familiar with the station which from lack of paint, or from toleration of English sparrows and other filth producers, as from being surrounded by dusty streets, or simply from old age or bad taste in design, presents a most unpleasant appearance immediately after both the floors and the windows have been faithfully washed. Another incongruity as bad as a neat agent in slovenly surroundings is that of the \$100,000 express train manned by a conductor and brakeman whose clothes, by reason of shabbiness, neglect or old age, are fit only for a freight train. We do not advocate the employment of dudes as trainmen; but the strenuous efforts of the passenger department to put everything about a train in condition to be acceptable to the most refined passengers certainly must be regarded as unsuccessful so long as they ignore such a prominent feature as the personal appearance of the men with whom these refined passengers have to deal. It is no answer to this criticism to say that conductors to be competent must be brought up in

the dirty work of running freight trains, for freight train conductors possessing the energy, education and ambition to run a passenger train have enough of those qualities to dress neatly. As a matter of fact, most of these men do groom themselves properly some of the time. It is the duty of the trainmaster to see that they do so all of the time. In the note of last week we referred to the unpleasant numerousness of station buildings to-day which are no cleaner or more attractive than the buildings of 1884, but the proof reader, by changing the word "no," converted that sentence into nonsense. This error is particularly annoying, because when we set out to commend the work of Charles Paine we desire to make no mistake, for he was a prince among writers as well as among railway managers.

THE chief engineer of a large railway system, commenting on a recent article in this paper on "Time Tonnage Rating of Fast Freight Trains" (*Railway Age Gazette*, June 17 and 24, 1910) remarked that in railway operation ideals always have to give way to compromises by which may be secured the most that is practical. As he pointed out, it may seem foolish to run an overloaded engine at slow speed when there is always a "right load" which, considering motive power only, can be hauled more economically at a faster rate, assuming that ample tracks were available. But traffic has an awkward tendency to move in two directions, and until tracks are provided for an uninterrupted movement both ways the overloaded engine and the slow movement of freight will continue as an annoying factor in railway operation. On a double track line properly equipped with signals both tracks are available for movement in both direction, the effect being that of continuous passing tracks, but on a single track line the proper disposition of passing tracks is a serious problem. Numerous trains carrying loads so proportioned to the engines that the maximum economical speed may be attained call for a clock work nicety in operation that cannot be attained after the volume of business increases to the point that calls for double tracking. The loading of freight trains so that the freight may be carried in the shortest time with the least expense for fuel and attendance must stop when the freight business is developed to the point where it interferes with passenger train operation. The passenger train, traveling on an average at double the speed of the freight, must perforce take to a passing track occasionally, and the first time this happens conflict begins. From that day the problem becomes one of adjusting the freight and passenger train schedules so that the former cannot interfere with the latter. A few long comparatively slow moving trains on a system cause less trouble in case of accident than a large number moving according to a fixed schedule. This subject is timely because many systems now have single track lines which are being worked to the practical limit.

BALLAST IN TRACK DESIGN.

ONE of the questions before the committee on ballasting of the American Railway Engineering and Maintenance of Way Association is that of the proper thickness of ballast to insure uniform distribution of loads on the roadbed. At present some assume the load to be distributed in a pyramidal form, the sides of the pyramid being inclined at an angle of 60 degs., so that the base widens with the depth. Others hold, and their opinions can be backed up mathematically, that the distribution of the load in loose material does not follow a straight line but is along a curve which approaches the vertical.

If that be true the distribution of load over a larger area as greater depths of roadbed means at a comparatively shallow depth and added ballast is useless. The distribution of load, then, in loose material is an important matter to investigate. If the straight line distribution of load is correct the unit load on the roadbed can be reduced to any amount desired by increasing the thickness of ballast under the ties and varying the spacing of the ties so that the toes of the pyramids of which the rails form the apices will not overlap. Should the curved line

theory of load distribution through loose materials be found to be correct the present American practice of close tie spacing will be justified; the theory of track construction being to consider the rail as a girder supported on cross ties which form non-rigid supports. The minimum practicable tie spacing is that which will permit proper tamping between ties. With the adoption of heavy rails the tendency has been to widen the space between ties, the heavy rail forming a stiff girder calling for fewer supports. With the ballast carrying the load through a pyramid it may be proper to lessen the number of supports with an increase in rail depth, but if the ballast carrying the load is in the form of a solid ellipse then the use of heavy rails will insure a more rigid track provided the number of ties per rail is not reduced, and such a reduction is not warranted on this hypothesis.

For years the question of the proper thickness of ballast has been settled by considerations of first cost and the theoretically proper design of track has not been attempted. If the investigation as to load distribution through loose materials is carried out by means of experiments thorough enough to determine the truth a great development in track construction along economical lines may result. It was first pointed out by Wellington that the per track-mile for maintenance varies with the character of the roadbed and is less with a good roadbed, but the cost per train-mile is practically independent of the track-mile cost. This is not due to the operation of any unvarying natural or economic law, but to the simple fact that improvements in standards of construction and maintenance can be made only when the increase of traffic yields larger earnings which can be applied to the improvement of these standards; and on the other hand, it is this increase in traffic which makes the improvements in standards necessary. The most durable part of the track, the rail, comes the nearest to involving a constant cost per mile of road. The rail makers having declared that little more improvement can be expected in rails and that increased depth of rail means added difficulties in fabrication, further improvement in track probably must be secured by obtaining more durable ties and a better knowledge of the true action of the ballast in distributing loads to the roadbed. It surely is possible by improved methods substantially to reduce the cost of track maintenance per train mile below what it was fifty years ago, even though not much reduction in it has been accomplished heretofore.

THE NEW THEORY OF REASONABLE RATES.

IT looks as if the shippers are going to rely for success in their fight against advances in freight rates mainly, if not almost wholly, on figures and arguments tending to show that the railways as a whole are earning a "fair return," and, therefore, are not entitled to higher rates; their notion of a "fair return" being the current rate of interest. In other words, they are going to take the position that the true criterion of the reasonableness of rates is the amount of the aggregate earnings of the railways. This shows how far from the old idea of what constitutes a reasonable rate our efforts at regulation of railways have led us. The old idea of a reasonable rate was one which did not unfairly discriminate and was not extortionate. If none of the rates in an entire schedule was excessive per se, it was considered that the entire schedule was reasonable, regardless of what profit the carrier earned. The new idea is that each of the individual rates in a schedule may be reasonable and yet that, taken as a whole, they may be unreasonable if by charging them the carrier makes over 6 per cent. Just how each of the rates in a schedule may be reasonable and all of them may be unreasonable, we leave to be settled by those who know more about the subject than we do. We cannot refrain, however, from calling attention to some of the interesting conclusions to which this sort of reasoning about railway rates leads.

It starts with the premise that if a road's earnings are large

its rates must be expensive. On the same theory it must be that if a road's earnings are small its rates are too low. So the right way to get the rates of the former road on a reasonable basis is to reduce them. But suppose, as frequently happens, that a reduction of rates leads to an increase in profits. In that case the reduction of the rates makes them still more unreasonably high. On the same theory the right way for the road whose earnings are too small to make its rates reasonable is to increase them. But an increase in its rates may destroy traffic and reduce its earnings. In that event, the raise in its rates makes them more unreasonably low than they were before. With every further increase of its rates, its earnings will be further reduced, which, on the theory in question, will make its rates more reasonable; and if it would but so advance its rates as entirely to destroy its earnings it would make its rates reasonable and good!

Let us apply this new theory in another way. Here are two competing roads which cost the same amount to build, have the same capitalization per mile, and charge the same rates, but one of which is earning 8 per cent and the other only 4 per cent. Now, are their rates reasonable or unreasonable? It is evident, on this theory, that the road which is earning only 4 per cent. ought to be allowed to raise its rates, and that the road which is earning 8 per cent. ought to be compelled to reduce its rates. It must be, therefore, that the same rates applied to the same traffic in the same territory can be both reasonable and unreasonable at the same time.

A visitor from Mars might suggest that the difference between the profits of the two roads does not indicate that the rates are either reasonable or unreasonable, but merely that the more prosperous road is better managed than its competitor; and he might contend that it is entitled to receive a larger profit as the wages of good management. But the spokesmen for the shippers would repudiate this suggestion, and tell him that the railway is entitled only to a "fair return" and that the shipper is entitled to receive, in the form of reductions in his rates, all the benefit of any good management which, except for reductions in rates, would enable the road to earn more.

This doctrine is so confidently enunciated and widely accepted that to reject it seems like heresy. And yet it does not appear to be very well founded. The law requires the carrier to haul the shipper's goods for reasonable rates. This is because the railway is a public service corporation. The shipper not being the entire public, his cheerful assumption that the railway owes no duty except to him can hardly be correct. Travelers are part of the public, and the carrier owes to them also the duty of giving good service at reasonable rates. It owes to the entire public the duty of making transportation safe, whether for those who ship in its freight cars, who are in its employ, who ride in its passenger cars, or who cross its tracks on the public highways. The shippers lay great stress on the value of low freight rates. But there is something else that is even more important to the public, and that is good and safe transportation service. And the more of the railway's earnings that are appropriated for the benefit of the shipper by reductions in freight rates, the less able will the railway be to give good service. Then, there is still another part of the public to which the railway management owes a duty: Its stockholders. Unlike its bondholders, they did not loan the railway corporation money. They invested their capital in its securities, taking the risk of getting a return much less than the current rate of interest, in the hope and expectation of getting much more.

We have touched on these points to call attention to the fallacy of the argument that the reasonableness of a railway's rates is to be measured by the amount of its net earnings. Whether rates which yield a given amount of net earnings are reasonable or unreasonable depends not only on the amount of those earnings but on the value and amount of the services which are rendered in return for the rates charged, and also to some extent on what use is made of the earnings derived from them. If the railway devotes part of its earnings to improving

its property, so that it can render safer and better service, it thereby confers a benefit on the entire public. When it reduces its rates and thereby reduces its earnings, it confers a benefit on only part of the public. We shall never deal consistently or beneficially with the question of railway rates until we look beyond those immediately affected by the rates charged—the traveler, the shipper and the railway—and consider what are or will be the effects, in the long run, of a particular policy which is being followed or which is proposed on the entire public, of which travelers, shippers and railways are merely parts.

STRENGTH AND WEAKNESS OF RAILWAY ARBITRATIONS.

TWO somewhat important street railway arbitrations have just ended in Massachusetts involving the wage of trolley men in Worcester and Springfield. They concede slight "compromise" advances to the men. There have followed larger arbitrations, some of them on big railways, and other arbitrations are pending. The general situation indicates a distinct tendency toward arbitration as an agency of settling railway disputes with labor, taking generally the form of a board of three formed by two appointive representatives of the disputing interests and a third chosen by the first two. The situation may be temporary and the result of the frequency of the dispute with labor; or it may prove temporary from the development of weaknesses and disputing factions, particularly as labor, generally speaking, seems to get the larger profits. On the other hand, arbitration may gain permanence as a sequel of organized labor's more general acceptance of it and both the corporate and public dread of strikes, a dread which seems to be increasing. We may even be entering on the initial stage of a period when the ultimate is to be official arbitration, advisory at first, and at last, perhaps, compulsory.

The present condition of voluntary arbitration by a board of three, organized in the manner stated, has its strength and its weakness. On the positive side its values in avoidance of a strike are in the foreground and obvious. There are few worse evils in the contacts and collisions of labor and capital than the strike, extensive, protracted and violent, of the employees of a public service corporation. The innocent public, the corporation and the men suffer, and in somewhere nearly equal ratios; and the injury of the men must be reckoned not merely in the loss of wages, but in morale, discipline and character. If the strike is successful this last evil often stands first; and if the strike, as it often does, ends in an arbitration or other form of compromise, its ills become the more lamentable because so gratuitous and originally avoidable. But there are, after all, worse things than a strike immediate. One of them is the weak yielding of a principle that sooner or later, as new demands increase and culminate, spell the worse strike ultimate. Still, with that reservation, the potency of arbitration as a preventive of labor disorder is readily conceded. If not carried too far there must also be granted its good moral and mental effects on labor as familiarizing it with peaceful methods in contrast to the opposite mental influence of the strike.

A second beneficent result of arbitration in its up-to-date form is its finality for the stated period of the finding—and there usually is a stated period. In the courts, the labor dispute—or other dispute—must run its mazy, long and indefinite path. There are delays, appeals, counter appeals, overrulings and rehearings. The "boycott" case in the United States tribunals, still pending, is a familiar one to the point. But the arbitration ends quickly and ends with itself. It has no court of appeal; and its good and growing tendency now is not only toward fixing definite periods for the agreement, but toward prolonging those periods. A better tendency still is that toward complete acceptance. Labor unions, particularly on the railways, are often and justly accused of violation of minor compacts. Not so in these days, with the clear-cut finding of arbitrators which command more and more finality and respect and which, as agreements, even the labor agitator does not often dare attack. Indeed, there seems to be developing slowly but steadily on the railways a body of

erstwhile agitators turned to arbitration attorneys without their law degree—men who as “national officers” find surer and more legitimate profit in arguing or managing labor cases in arbitrations than they received as walking delegates. Perhaps in this new body the old pernicious walking delegate will at last find his antidote.

The weakness and, it may be, the future peril of arbitration rests in the conditions of the choice of the “king pin,” the third arbitrator. Theoretically he should be the strongest man in the board—strong not merely in his sense of justice and power of despoiling the equities, but an arbitrator with force of character and with individuality. In him ideally should blend the traits of the trial justice and the lucid, moral vision of the common sense layman. Such is the theory. In practice too commonly the product of the double selection is the reverse. The third arbitrator is apt to fall into the category of the “available” man who wins the party nomination in a closely contested district. Individuality, positiveness, decision of character go by the board. A “compromise” of outward respectability is chosen often even by the two primary arbitrators who may be men of determination themselves. And the finding is like unto him—a balancing of this and that, a set-off of one paltry consideration against another. Very rarely, indeed, is there an absolute finding for the railway—or the other side—where one only may be right. Even less often is there a recognition of moral, as distinguished from material forces in the verdict, though that verdict must be expressed in terms of dollars and cents. That the three arbitrators sometimes agree in the compromise verdict does not strengthen it intrinsically.

In seeking the betterment of these boards that are the product of voluntary arbitration of the railway's disagreement with labor there are difficulties in the way. If a single arbitrator is to be chosen by the conflicting parties in place of three the same obstacle is encountered in finding the arbitrator who is both just and able, while the man of special training is apt to be ruled out by his affiliations. The other extreme of adding to the size of these arbitration boards has the merit of increasing the chance of securing at least one arbitrator of dominating personality. But it also means increased delay in the constitution of the board, its greater cumbrousness and its longer sessions. The courts have been suggested as appointing power for arbitrators, whether single or multiple. They would probably give us stronger arbitrators than are secured now, but they are not acceptable to labor and the outcome would probably be no voluntary arbitrations at all. On the whole, finding these seemingly inherent obstructions to the selection of positive arbitration boards, we must be content with them as they are. We may regret that the great interests of the railways, represented by wages as an element of operating expense, are so often the victims of weak compromise. But far better that, usually, than prolonged dissension, rupture and the strike. Arbitration is not the only railway problem in which conditions fall short of the ideal.

Letters to the Editor.

RAILWAY OFFICERS' TITLES.

August 26, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE.

Will some aspiring genius please step up and suggest a decently simple and intelligible set of titles for railway officers? Have we not on this continent carried the title business in railway work to the limit of absurdity? We boast that in America is found the only simon-pure brand of democracy, clear and undefined, but on our railways we lavish high-sounding titles on the functionary who mails the stationery and the lead pencils; and on the obliging young man who keeps the wires warm until he finds out for you why one brown leather suit case, received by baggage clerk L.H.H. did not arrive from Ogden's "baggage" the "Colorado" car! And we have our tables of

precedence. To the uninitiated it may look laughable, but to us it seems quite the thing that the head lost baggage finder, pardon me, the General Baggage Agent, should be entitled to much more respect than the quiet, brainy young man who is the General Manager's Prime Minister and Father Confessor. But then you see the latter has no title—he is only a clerk, and the Great Baggage Agent addresses him as “Son,” lounges over the corner of his desk, asks him how the “Old Man's” liver is this morning and patronizingly hands him out a cheap cigar. A well-groomed, pleasant young man talks to the dining car conductor and quietly suggests a change of water for the carnations on the next table; he looks to be merely a capable young American business man. Hush, he is more; you are in the presence of the General Superintendent of Dining and Parlor Cars, Restaurant and News Service of the great P. D. I. Railway. The shrewd, middle-aged man with the air and attire of a prosperous farmer, who gets off the train at Brown's Corners, inquires for Farmer Brown's farm, and drops down there to negotiate for two acres of right-of-way for the Hazleton Branch; Who is he? Right-of-way buyer, you say. Nothing of the sort. That's the Right-of-way, Lease and Industrial Commissioner of the Yukon division of the Transcontinental Road.

And so it goes. The plain business man comes in from a nearby town to the city where the headquarters of the great railway company are located. He wants to know if he can get a spur track to his new brick plant; he asked the division superintendent for it six months ago and the latter officer endorsed the application and started it on its rounds, but it is now stalled somewhere—nobody knows where. Mr. Business Man decides he'll find out. He enters the general office building with a bold and firm step, takes a look at the directory in the lobby, gasps, and then gasps some more. Where is he to find his man among that medley of chiefs of this and chiefs of that, and superintendents of this and superintendents of that, managers of this and managers of that? Where is he to look for the authority for his spur track? He gives up. He goes home, and some time, perhaps five years hence, the application will finally receive the last august signature and the division superintendent be told that if Mr. Brown is still alive and will deposit the cost of the track and sign a fifteen-page copper riveted agreement he may have his 200 ft. of track. Oh, for a Dickens to describe the Circumlocution Department of some of our great railways.

But we stray from the point. The readers of your journal probably have an illustration of what I mean in the next office, or in their own. We have First, Second and Third Vice-Presidents who could never “preside” because they have no seat on the board. We have Freight Traffic Managers and Passenger Traffic Managers who do not manage anything but the rate schedules. We have Superintendents of Motive Power who are not superintendents, but expert advisers. We have Superintendents of Transportation who are merely car accountants with enlarged territory.

What is the object of giving a railway officer a title—to gratify his self esteem? No. To give his wife prestige? No. Then what? To convey to the public, to the officers and employees of his own railway and the officers of every other railway a clear idea of just what duties he is supposed to perform.

What is the first requisite? Simplicity. What is the second requisite? Simplicity. And the third? Again I say simplicity.

Then why not copy the worthy example of poor old title-ridden England and keep the name “Superintendent” for the man who superintends and operates the railway. There the Division Superintendent of a leading railway, in spite of the civil service system of advancement, is almost a national figure. The sovereign who passes in safety and luxury over his division once or twice a year honors and possibly decorates him. If a sovereign started passing decorations around on an American railway he would be so dazed by the number and variety of the officers that he would be decorating the negro porters, along with Assistant

A Vice-President of an Oriental prince did a few years ago on a certain road. The General Manager in England of the road was really "business" and it got the unsatisfied price of machinery, who carried out the beliefs of an army of Vice-Presidents and destroy the machines built at him to useful engines. (The Manager)

Probably we could never have the same simplicity which is true in England and some European railways, but with all our simplicity and inventive genius we can do a railway organization which would work smoothly. The first step would be to have a set of titles which meant what they meant.

—EDWARD M. MAYER.

THE LAW OF COAL CAR DISTRIBUTION.

New York, August 26, 1919.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In a letter of mine which you printed on January 28, 1910, I attempted to outline the effect of the recent decisions of the Supreme Court in the coal car distribution cases, but called attention to the fact that while most questions in regard to coal car distribution were settled there were still open questions in regard to the mine rating upon which the car distribution must depend. I attempted to state the question as follows:

"Shall a mine be rated on the amount of coal which can be physically taken out of it in a day, or shall it be rated on its past shipments?"

and ended my article by stating that the decision that past shipments were a proper element in rating coal mines would help considerably the settlement of the coal car question.

That decision has now come in the Interstate Commission's opinion No. 1383 in the case of the Hillsdale Coal & Coke Company vs. Pennsylvania Railroad, a digest of which was given in your issue of August 26. In this decision the Commission speaks of the past shipments as being a proper indication of the mine's "commercial capacity" and it confirms the legality of the Pennsylvania Railroad's arrangement under which the rating of a mine is based on an average between its physical and commercial capacities, the commercial capacity being determined by the total commercial shipments of the preceding year.

It is to be noted that the Commission in approving of this arrangement is careful not to give an exclusive approval. In a previous case, that of the Rail and River Coal Co. vs. the Baltimore & Ohio, the Commission has given a qualified approval of the B. & O. Co.'s method, which, while it combines physical and commercial capacities, does it in a somewhat different way from that adopted by the Pennsylvania.

The Commission is to be congratulated on its breadth of view in recognizing that there may be more than one legal way in which to rate a mine. I have already called your attention to the fact that there is plenty of room for improvement and development of mine rating. The subject of mine rating and coal car distribution was a matter of careful study and experiment by many railway officers up to the year 1906, when the coal and steel investigations were begun. One of the unfortunate results of that investigation was that many of the roads felt obliged to defend and to adhere to the systems of car distribution which they then had in effect; and it became almost impossible for the railway men to aid in the developments in car distribution which have been made since that date. Now that a certain leeway is allowed by the Commission, it is to be hoped that the roads will take advantage of it and improve their car distribution system wherever this is possible.

The ruling of the Commission in this matter should tend to stop the over-development of mines which has been so prevalent in the many cases where mine owners have thought and hoped that their rating would be based entirely on physical capacity. This tendency toward extravagant and premature development of mines has been a source of many troubles, and, possibly, of many accidents.

Although the Commission upheld the railways in this matter,

it has pronounced illegal that part of its distribution system under which the Pennsylvania Railroad gave a certain advantage to the owner of private cars and the shipment of their coal. The Pennsylvania held that any arbitrary allotment of cars to a mine reduced the capacity of the mine on that day by so much, and allotted its own cars on the basis of this allotment. The Interstate Commerce Commission finds this to be an "undue and unlawful discrimination" and it makes the same order in the case of the Pennsylvania Railroad that it has in the case of other carriers, to the effect that all cars must be distributed on an absolutely equal basis, the only exception being that a mine may receive more assigned cars on a particular day than its quota entitles it to, provided that it receive none of the railway company's cars.

I hope I am not hypercritical in calling attention to what appears to be an oversight on the part of the Commission in this matter. When the Commission states that this system of the Pennsylvania Railroad in reckoning mine capacity "results in an undue and unlawful discrimination," it does not quote from Section 3 of the law, which, it seems to me, covers the case in point. It is true the word "discrimination" is used in Section 2, but Section 2 applies only to rates and manipulations of rates. Under Section 2, if a carrier by any device gives one rate to one person and another rate to another, it is guilty of "unjust discrimination."

The law on car distribution is expressed in Section 3, which makes it unlawful for any carrier to make or give any "undue or unreasonable preference or advantage." Is it not possible that the Commission upon further consideration of the subject may concede that under Section 3 certain preferences or advantages may be due and reasonable, and that it may be lawful for the railways to exercise a little more discretion in rating of mines and possibly in car distribution? The opinion in this case especially states that the Commission does not feel that its decision is absolutely final, and, as noted above, one exception to its rule is allowed already.

There seems to be no doubt that the decision as it stands will be accepted by the railways, the right of the Commission to regulate such matters having been so expressly confirmed by the Supreme Court in the Illinois Central case.

There are other parts of the decision that are comforting to the railway men who have struggled with this question of car distribution, and especially the statement of the Commission as to the obligation of the carriers in this matter, as follows:

"The utmost obligation that the law lays upon the carrier is to equip itself with sufficient cars, not to meet the hopes and expectations of the owners of a mine as expressed in its physical development, but to meet his actual shipments. A mine rating that is adjusted to the expectations of the operator and altogether ignores his actual requirements might easily result, in a period of car shortage, in giving him cars for every ton of coal that he can actually dispose of, while an adjoining mine, with a small development but a larger demand for its output, would get but a fraction of the equipment that it needs to meet its actual contracts."

Mr. Prouty, in a dissenting opinion, which is as interesting as his opinions always are, emphasizes the conservative tone of this decision by giving his own somewhat more radical views, as follows:

"* * * At times the number of private cars delivered to certain mines has exceeded the quota of those mines * * * In such case it seems to me that the railway is guilty of discrimination. * * * A railroad * * * might and should decline to put private cars into service except upon condition that there shall be no discrimination of this kind."

Mr. Prouty, however, apparently feels that the private car is doomed, as he explains that this may not be a matter of much importance in the present case.

ARTHUR HALE.

WORKMEN'S COMPENSATION FOR INJURIES.*

BY JOSEPH N. REDEERN.

Superintendent Relief and Employment Departments, C. B. & O.

The Employers' Liability Commission of Illinois, consisting of six representatives of labor and six representatives of employers, appointed by the governor under authority of the legislature, has announced a tentative plan of a workman's compensation bill.

The plan proposes payment of three years' wages in cases of death where there are dependents, but in any event an amount not less than \$1,500 nor more than \$3,000—if no dependents, a sum not to exceed \$200. In cases of temporary disability lasting two weeks or more, payment of half wage from first day of disability; in cases of permanent disability, payment of half wage not to exceed eight years, commencing after second week of disability. Where disability is permanent but only partial, percentage of compensation to be reduced proportionately to reduction in earning capacity.

The compensation to be paid for death or disability due to injuries received while at work regardless of any question of negligence, except in cases of serious or wilful misconduct of the employee. The law to apply only to employers of labor who have more than five persons employed at one time. All amounts to be paid in instalments, unless, if proper showing is made, the county court may order amount of compensation due paid in lump sum.

It is not proposed that the employer shall be compelled to make these payments or the employee or his legal representative to accept them. Common law remedies, including trial by jury, are to be reserved to both parties, but if the employer declines to pay the stipulated sums and suit is brought, the employer is not to escape liability by reason of the fellow-servant rule, the assumption of risk, or the contributory negligence of the employee, unless the negligence of the employee be greater than that of the employer, in which event the damages shall be apportioned according to the relative degree of negligence and the burden of proof is placed upon the employer. Acceptance by employee of compensation to bar his right of action, and beginning of suit for damages to bar his right to compensation, except in the case of wilful negligence of the employer or his failure to comply with statutory or municipal safety regulations.

It will be observed from the above that the proposed plan is not a compensation plan at all, as it does not insure to either employer or employee a certain opportunity of settlement, as probably the greater percentage of injuries received are not due to the negligence of employers or the act of a fellow servant, and many injured persons would be unable to establish any legal liability; therefore, an employer who felt he was not legally responsible for the death or injury of one of his employees would not feel obliged to pay anything, or, at least, not the amounts provided for in the proposed law, and, on the other hand, if the representatives of an employee injured or killed considered there was legal liability on the part of the employer the compensation proposed would probably not be deemed sufficient. From the foregoing, and also for the reason it is proposed to introduce again the pernicious doctrine of comparative negligence, it is very much to be feared that the proposed law would greatly increase litigation instead of diminishing it.

With the larger engines of commerce there is an increasing number of serious injuries, largely met, however, by modern surgery, but in some cases the power to remedy is beyond human skill and the disability is permanent and complete; therefore, any plan of compensation should not restrict payments to any period of time.

After an experience in relief department work of some twenty-five years, the writer believes payments of lump sum more advisable than payments in instalments. The payment of half wage to a man injured to such an extent that he can not resume his former occupation is, in most cases, only providing

for the necessities of life. The payment of a lump sum permits him to earn a livelihood along other lines and to remain a respected and useful member of society. Hundreds of our men seriously disabled by disease or injury have made lump-sum settlements with us, engaged in business and been successful. It is seldom we hear of one who was unfortunate in the use of, or dissipated, the money paid him.

It would not be equitable for a compensation act to be compulsory upon the employer but elective with the employee, and this principle is recognized by the Minnesota Liability Commission, which consists of a lawyer, a manufacturer and the state labor commissioner. The Minnesota commission, acting under instructions of the legislature to draft bills providing for speedy remedy in cases of persons injured that would be fair to the employee, fair to the employer and just to the state, have given very careful study to this subject. While details are yet to be worked out, the commission has agreed that the right to sue for damages shall be eliminated and compensation shall be paid in all cases of injuries, except gross carelessness. Also, that the law is to apply to all who work, including agricultural laborers and domestic servants, and that contribution be made by both employer and employee. The Minnesota plan is equitable, but it raises a serious question. The right of a man to claim damages from another for a wrong done is inherent and is generally considered inalienable, but if society takes the right from a man and substitutes something else, the question is whether an individual who is injured has not the right to demand that society shall guarantee to him the substance of its substitute and not let him be dependent upon the financial stability of his employer or his employer's insurance companies. In short, "automatic compensation" as a substitute for the present right of election of remedies possessed by the individual brings sharply before us the question of state insurance.

The claim that something should be done for injured persons and their families is one that appeals to the sympathy of all, but injuries received in the course of employment are not the cause of the greatest amount of suffering and hardship. Disabilities and death from sickness or injuries received while not engaged at regular work cause the greatest suffering. Six railway systems—the Pennsylvania Lines East, the Philadelphia & Reading, the Baltimore & Ohio, the Atlantic Coast Line, the Pennsylvania Lines West and the Burlington—are operating relief departments; they employ over four hundred thousand men—nearly one-fourth of the railway employees in the United States; they are paying out annually some \$4,000,000 in benefits, over one-half of which is on account of sickness or injuries off duty, and yet railroading is considered one of the most hazardous of occupations.

Compensation only payable in cases of injury where the employer is negligent or it is the act of a fellow servant, or reduced compensation where the employer's negligence is greater than that of the injured person, would probably mean compensation in less than half of the cases of injuries received at work and is begging the question confronting the country to-day. Generally speaking, when employers' liability or workmen's compensation is spoken of the public has in mind something like what is termed "automatic compensation"—that is, compensation for any injuries (excepting gross carelessness) received while on the premises of, or on the business of the employer, the employer being compelled to pay the compensation and the employee to receive it. The payments by the railway relief departments, as given above, show, however, that what is needed is some certain and sufficient provision for those members of society (and their dependents) who are physically unable to earn a livelihood from any cause not immoral.

In the railway relief departments, above referred to, the first one of which was established some thirty years ago, the basis is mutuality; the employee carries his protection against disability and death at a very low rate, the companies paying the expenses of operations and guaranteeing the solvency of the funds, so that the cash payments by the companies and facilities furnished about equal the contributions of the members. Acceptance of

* Abstract of a pamphlet.

benefits for minor operators as a release. Had these companies only intended to escape liability for their fault, a plan would have been devised to protect the employees solely against injuries received in the service, but it was believed that helping the employee to help himself and protect himself and family against disability and death from sickness as well as from injuries received either while at work or otherwise, would be of mutual benefit, and the results have satisfied the officers of these companies that their belief was correct. More than fifty millions of dollars have been paid out in benefits—less than one-half of which was on account of injuries received while at work. It may be interesting to read from a decision of the United States Circuit Court of Appeals for the fourth circuit—case of Day vs. Atlantic Coast Line Railroad Company, decided April 16, 1919, this being the latest utterance of the courts upon this subject. The court said:

"The question of the validity of the contract is affected by the fact that the contract, as here made, is not only approved by the State, but also by the Federal Government, and is uniformly applied to all employees of the same. It has been expressly decided by this court, in *A. C. L. R. Co. v. Day*, 190 U. S. 1, 20, in a well considered and amply sustained opinion by Justice Brandeis, in which other later decisions of this court, upon the same contract relied upon by defendant herein was upheld. The learned judge says, 'By a great number of carefully considered adjudications of the courts, both State and Federal, contracts of this character have been upheld and determined not to be against a sound public policy, but distinctly beneficial to the employees.'"

While the general plan of these relief departments would probably not permit small employers to individually undertake the same work, yet legislation might authorize an association of small employers engaged in like industries that would permit any employer and his employees to similarly protect themselves.

The present plan in respect to settlement of claims for injuries, outside of these relief departments, is unsatisfactory and costly to the employee, employer and the state, but it is well, in most questions, to make haste slowly. It is more important to the employee than it is to the employer or to society at large that no move is made that is not practical as well as constitutional, and it is very much to be regretted that the individual states are each in their own way attempting to solve this problem, because chaos will be the result of individual state legislation on this subject, particularly among the employees of large railways

and industrial corporations as well as the corporations themselves. The Burlington system operates in eleven states. On the one hand we find that we should pay a much larger compensation in the case of an employee injured in Illinois than we would in the case of an employee injured to the same extent and under like circumstances in Wisconsin or Minnesota, in all of which states liability commissions have been appointed, and, on the other hand, it is not fair to one of our employees injured in Illinois, that under the law he would be entitled to less compensation than a man injured to the same extent under similar circumstances in Wisconsin or Minnesota.

The writer believes there is a sincere desire on the part of large employers and their representatives to be humane and to do what is just and reasonable, and so far as lies within their financial ability to avoid and relieve distress arising from physical sufferings of their employees; also that they will cordially welcome any law that will alike be fair to the employer, fair to the employee and just to the state, but he believes this cannot be accomplished by having individual action taken on the part of the different states; instead, he believes that the best interests of all will be sub-served by the federal commission, recently appointed by President Taft, being furnished with all possible information upon this subject, both on the part of the employee and employer, and that we should lend our aid to the framing of a federal bill which, when enacted into law, might and should serve as a model for the various states, and thus, in one thing at least, bring about that most desirable of things—uniform legislation.

A NORWEGIAN SINGLE PHASE RAILWAY.

The Thamshavn-Lokken electric railway is a single track meter-gage line some 17 miles long, with double track and sidings at the stations. There are seven stations, including the terminals at Thamshavn and Lokken. It is designed to handle both industrial and tourist traffic. At Lokken there are mines creating mineral traffic, and at Thamshavn is one of the largest timber works in Norway, while the line also passes through a valley which from the scenic point of view possesses many attractions for the large number of tourists who every year visit the country.

The single phase system is employed—this is the first railway



Passenger Train at Thamshavn Station.

in Norway to use that system—power being obtained from a hydro-electric plant from which electrical energy is also derived for lighting Thamshavn and a number of villages, as well as for driving the Lokken mining machinery. The sub-station which serves the road is at Thamshavn, and has a motor generator plant transforming and converting a 15,000-volt, 50-cycle, 3-phase current to 6,600-volt, 25-cycle, single phase, for feeding direct to the overhead conductor. The Westinghouse single catenary system is used with bracket arm construction on wooden poles.

From Thamshavn, on Orkedals fjord, the line runs inland, skirting the river Orkla for some distance, after which it rises to Lokken. The track is laid with 44-lb. flat-bottomed rails (Vignales section) on wooden ties, and has ordinary track rail return, each joint being bonded with 50-sq. mm. copper bonds. From Thamshavn to Svorkmo where the line ceases to skirt the river Orkla, the gradients are easy and there are practically no curves; but from Svorkmo to Lokken there is a rapid rise with sharp curves.

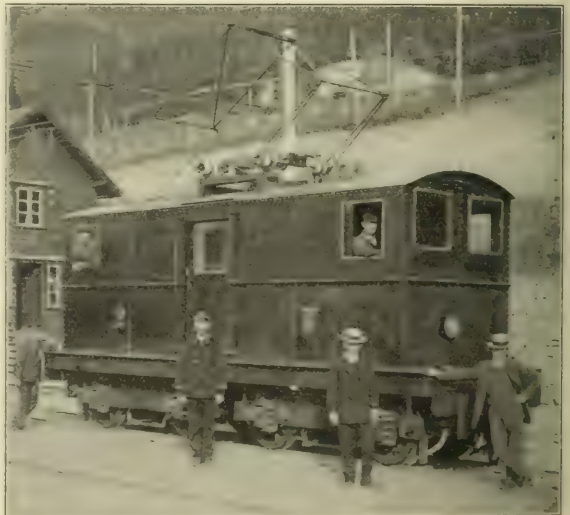
The station buildings are of log construction with turf-covered roofs, and the lighting of these as well as of the platforms is effected from a small transformer in the trolley circuit.

The trolley wire is suspended at 5.5 meters above the track, except under a bridge at which point it is 4.3 meters. A 65-sq. mm. section grooved copper wire is suspended by stiff vertical hangers from a steel cable carried on insulators which are mounted on T-steel brackets attached to wooden poles supported by tie rods. It is nowhere more than 9 in. from the center line of the track, and the spans vary from 150 ft. on the straight sections to 68 ft. on curves. Though no feeder is yet required, there are section insulators fitted for dividing the line into six sections, in readiness for future necessities.

The equipment consists of three 20-ton electric locomotives for freight and passenger trains, and a saloon motor car for special purposes. The locomotives each carry four 40-h.p. Westinghouse single phase, series compensated motors mounted on two trucks. Each locomotive is capable of exerting a tractive effort of 6,500

The saloon motor-car when in running order weighs 23 tons. A special feature has been made of its luxurious upholstery and decoration, and it is, of course, electrically lighted and heated. The car is divided into a vestibule and driver's compartment at each end, with two saloon compartments separated from each other by a short passage. It measures 39 ft. 4 in. long and 8 ft. 6 in. wide. The body is framed with oak and sheathed with teak, carried on a rolled steel underframe supported by two swing bolster trucks, one of which is equipped with two 40-h.p. motors similar to that employed on the locomotives.

The contract for the complete electrical equipment of this road was carried through by the British Westinghouse Electric & Manufacturing Co., through its agents in Norway, the Elektrisk Bureau of Christiania. The locomotive bodies and frames and the saloon motor car were the work of English builders,



Twenty-Ton Electric Locomotive.



Saloon Motor Car.

lbs. at ten miles per hour, and a maximum tractive effort of 8,000 lbs. at starting. They are fitted with non-automatic air brakes, central coupling, and braking gear.

The pantograph bow collector on the locomotive roof collects the 6,600-volt current from the overhead wire, and an insulated cable carries the current to an auto-circuit-breaker, and thence to the transformer which is suspended inside the cab. A grounded metal screen enclosing the high tension apparatus. The four motors are arranged permanently in two groups, with two in each group. Either pair of motors may be isolated separately. The electrically driven air compressor is fitted with an automatic governor and supplies air to a main reservoir, both for the brakes and for working the pantograph bow. A hand pump is also provided for either raising or lowering the bow, should it happen that there is no air available on the locomotive.

the remainder of the rolling stock being constructed by the Skabo Railway Carriage Works, Christiania.

The railway is owned by the Christiania Salvesen and the Christiania Tham's Communications Aktieselskab.

RAILWAY ACCIDENTS IN GREAT BRITAIN IN 1909.

The British Board of Trade has issued its "general report" in which the accident records of the last calendar year are briefly summarized. The principal statistics were printed in the *Railway Age Gazette* of May 27, page 1315. Only one passenger was killed in a train accident in the year. This was on July 2 (see below). Up to that date, there had been none so killed in more than 20 months. The number of passengers injured in train accidents in 1909 was 790. This is low as compared with the average of previous years. The number of employees killed in train accidents during the year was 82, which is equal to one in 10 of those exposed to danger. This average is the same as that for 10 years preceding.

The number of accidents inquired into by the inspecting officers during the year was 21, fewer than ever before. In the year 1900, 61 were investigated, including 48 collisions. Since that time, the number has been gradually diminishing. The salient features of the investigations of 1909 are given in the present report as follows.

Of the 21 accidents to trains inquired into in 1909, only one was attended with fatal results to a passenger or clerk in the

service of the company), viz., the accident to a passenger train on the 24 of July, near Sudbury and Wembley Station, on the London & North Western Railway. One of the wheels of the train was derailed owing to the irregularity, through irregularity, drifting the wheel while the train was passing through there. In accordance with a recommendation of the inspecting officer, the company arranged for the provision of an additional locking bar between the wheel and the facing point at which the accident occurred.

In eight of the other cases referred into, the death of one or more of the company's servants was occasioned, 14 railway servants in all being killed by such accidents. The explosion of a locomotive boiler at Cardiff Docks on the Rhymney Railway in April caused the death of three servants of the company, the same number being injured. The inquiry showed that the safety valves of the boiler, which had been refitted during the previous day, were inoperative, causing the steam pressure to accumulate to a point at which the structure burst. After the accident, the company at once gave instructions that when steam is first raised in a boiler after the safety valves have been refitted, care is to be taken to see that the valves blow off at the proper pressure.

A question of some interest arose in the inquiry into a collision on March 5 between two passenger trains at Tundridge Junction, on the South Eastern & Chatham Railway, whereby two employees were killed. The driver of one of the trains, which was proceeding from Redhill, ran past the junction signals, which appear to have been at danger. An inspector was riding on the engine in order to see that the train ran as nearly as possible to time, and the driver alleged that this had made him over-anxious. The inspecting officer expressed the view that the appointment of a third man to ride on an engine is generally undesirable, and that, when the object is to maintain time, the procedure is of doubtful advantage, unless it is anticipated that technical assistance may be required.

The derailment of a train near Friezland, on the London & North Western Railway, in August, caused the death of an engine driver and fireman and injuries to other persons. While the circumstances of the accident were to some extent conjectural, the inspecting officer came to the conclusion that the type of engine drawing the train, viz., a tank engine with six coupled wheels leading and a pair of radial axle trailing wheels, is not suitable for running at very high speeds, especially round a curve such as the one concerned in this instance, and the company promised that this opinion should receive due consideration. Another case of derailment, which did not cause loss of life, occurred in April to a Caledonian Railway passenger train near Crawford Station. The crank axle broke inside the boss of the left-hand driving wheel of the engine, with the result that the coupling rod also broke and the wheel became detached from the engine; the coupling between the engine and the tender gave way, and the tender and the whole of the train behind it were derailed. The fracture of the axle was attributed chiefly to the abruptness of the alteration in the diameter of the axle at the wheel seat, which has been found to be a cause of weakness in other cases. After the accident, the company gave instructions that all such axles fitted on passenger engines were to be altered forthwith and all new axles are to be made of the improved pattern.

Two of the train accidents inquired into occurred on electrically worked lines. By a collision at Marsh Lane Junction, between Liverpool and Southport, on the Lancashire & Yorkshire Railway, on January 21 a fire was caused, in which a third train, that came to a stand on an adjacent line, was involved.

After the accident fears were expressed by some regular passengers as to the construction of the carriages used on the line, in which exits are provided only at each end. This class of vehicle was adopted by the company as being stronger than that with side doors and less likely to cause delay in leaving stations. The inspecting officer did not consider that, in all the circumstances of this railway, the use of end doors only leads

to extra risk from fire to the passengers. The other accident to an electric train was a collision on December 15 on the Metropolitan District Railway between an empty carriage train and the buffer stop at Ealing Broadway Station, whereby three men and one of the conductors were killed. It appeared that the instructions to the men as to preparing the train and testing the air-brake before leaving the depot had not been properly observed on this occasion, and that there was no air pressure in the train pipe or auxiliary reservoirs, so that the motorman was unable to bring the train to a stand. In view of certain recommendations of the inspecting officer the company arranged to equip all motor cars and single end control trailers with train line air gages on the trailer end, so as to enable conductors continually to observe the pressure on the train line. They also stated that instructions were to be issued requiring motormen and conductors to make reports as to their having inspected and tested the equipment before a train is taken into service; and it was further proposed to give the men regular instruction in the working of the reverse and hand-brakes for use in an emergency.

THE CAMPAIGN AGAINST ACCIDENTS ON THE CHICAGO & NORTH WESTERN.

The management of the Chicago & North Western has entered on a campaign for the reduction of accidents, which is being carried on by methods that probably are unique. A large majority of railway accidents are due to the carelessness or recklessness of employees; most of them would be avoided if employees would give reasonably strict obedience to orders and rules. It is usually assumed that the only remedy for this condition is more rigorous discipline. The management of the North Western has decided that if the number of accidents is to be reduced discipline must be supplemented by action which will bring home to employees the fact that it is greatly to their own selfish interest and to the interest of their families that they shall give stricter obedience to the orders and rules, and shall in an organized way co-operate with the management to eliminate the causes of accidents.

To bring all the employees of the road to a clear and serious appreciation of what accidents have cost, are costing and will cost them, R. C. Richards, general claim agent, has since early in July been delivering addresses at the various division headquarters. There are 17 divisions, and when this article was written Mr. Richards had made addresses at 13 headquarters. He will continue to make them for as long as it seems desirable. Each of the meetings has been attended by the division officers and by large numbers of employees. The attendance of the employees has been purely voluntary, the only thing done to get them to come being to announce the time and purpose of the meetings on the various bulletin boards. Prior to beginning his talks to employees Mr. Richards held conferences with and made talks to the division officers alone.

For the purpose of the campaign against accidents the employees and officers are being organized from the lowest rank in the operating department to the highest. On every division there has been formed a committee of safety, each being composed of an engineman, a conductor, a fireman, a brakeman, a trackman and a switchman, who are appointed by the superintendent. Similar committees have been formed in the various division shops, being appointed by the master mechanics. In the Chicago shops the committee is appointed by the superintendents of shops and the superintendent of motive power and machinery. These committees in the mechanical department consist of one man from each shop. There has also been appointed a committee on safety for the large yards in Chicago, composed of switchmen who are appointed by the trainmaster of freight terminals. The personnel of these committees is changed constantly, one man on each committee retiring and a successor to him being appointed each month. Their duty is to investigate

the causes of accidents, to seek to get their fellow employees to do all they can to remove them, and, when any action needs to be taken which cannot be taken by employees, to recommend it to their superior officers. The purpose of the frequent changes of personnel is to familiarize with and interest in the subject of accidents, their causes and remedies, as many men as practicable, and thereby create among employees as much of the right kind of sentiment as possible. The committees meet monthly.

A central committee to receive the reports and supervise the work of the committee of safety has been appointed, composed of Mr. Richards; S. G. Strickland, assistant general superintendent, and W. J. Towne, engineer of maintenance. Matters requiring action which exceeds the authority of this committee will be referred to the general managers.

The most important work that has been done as yet consists of the talks to employees which have been made by Mr. Richards. His official position has given him an especially good opportunity to study the causes of accidents, particularly to employees, and he has for years taken a keen interest in it. Perhaps no railway officer in the country has devoted more thought to it. Besides being fully armed with the facts, he has a peculiar gift for stating them in such a way as to make a deep and lasting impression on his hearers. If he had not been a railway claim agent he might have been a preacher; and if he had been a preacher he would have shaken the sinners attending revival meetings over the burning pit in a way that would have stimulated them to begin at once bringing forth fruits meet for repentance.

An example of the way he brings home to employees their relation to and interest in accidents is afforded by the use he makes of statistics showing the number of persons killed and injured on American railways, and particularly on the Chicago & North Western, during the past ten years. After giving statistics for the railways of the country as a whole in one of his addresses he continued:

"This North Western railway, that we claim is the best road and has the best men, has done its share of the havoc. We killed in ten years 2,555 people—three regiments of soldiers. Seven hundred and thirty-five of them were your people—were your brothers, your sons, your fathers, your next door neighbors. In ten years we have managed on the North Western to have 735 funerals of employees. Seven hundred and thirty-five times we have had to call on the priest or the minister; and 735 times in ten years we have had to go to these awful funerals. Everybody here has been to them. We go into the house that is darkened by mourning, and we send some flowers or we try to send some message of sympathy, and when we go there we don't know what to say. We try to say something to that poor widow or poor mother or father who has lost a husband or son, and the words stick in our throats. Seven hundred and thirty-five times we have had to do that, we men on the North Western railway!"

At many meetings where Mr. Richards has talked along this line some of his hearers, who perhaps have had relatives or near friends killed in the service, have been reduced to tears, and everywhere he has been able to hold the serious and sober attention of his auditors throughout a talk lasting an hour and a half or two hours. Mr. Richards usually begins his talk with a remark that rather strikingly illustrates the extent of the increase in accidents on American railways. He remarks that the number of men employed, the amount of business handled, and the amount of the earnings of the railways have been increasing rapidly, and that this is especially true of the North Western, but one of the things that has increased out of all proportion to the increase in the number of employees and the amount of business handled is the number of accidents; and he points out that if the earnings of the North Western had increased as fast in proportion to the number of accidents on it, they would now be about \$170,000,000 a year instead of \$70,000,000.

"Think of it," he says, "every third day on the North Western there is one of you men killed, and every 50 minutes there is one of you men injured—not passengers, not outsiders, but employees. Now, it is you men who are paying this awful toll. And don't you think it is time to put a stop to it? The officers can't do it, the laws can't do it, there is no one who can do it but just you; and you are the people who can do it by turning over your hands. And do you know that every time we have one of these accidents the result is an increased risk to the rest of us because some new man who may be incompetent, who may be careless, and who certainly is inexperienced, has to take the place of the man who is injured or killed? We know that the result is going to be that the risk to the other men in the service is going to be increased, and at the same time the efficiency of the organization decreases. This is because the new man is not familiar with our way of doing business. I saw in the paper the other day that they were going to have a great meeting up in St. Paul on the conservation of the forests, of the water power, and of the untilled land. Now, we ought to have a meeting for the conservation of men, because men are much more important than things.

"We see in the papers a great deal of talk about railway accidents, and you would think from what you see and read that every man killed on a railway was killed in a train accident, some collision or some derailment. Now, we men who are working on the railway, who are employees, know that isn't so; that the little accidents that happen every day, that may be happening now over in the roundhouse, that may be happening up in Ishpeming, or in Green Bay, or in Chicago, make this awful risk. These accidents happen because somebody is thoughtless. Rarely if ever are they caused intentionally. It is because we don't think what will happen if we don't do things according to the rules. The first rule in the book of rules says: 'In case of doubt, accept the safe course. Speed must always give way to safety.' And the last rule in the book of rules says: 'Remember, it is better to cause a delay than it is to cause an accident.' Now, that is what the company tells us and it is paying us for our time. Those rules were adopted by men of experience who rose from the ranks and who know from their experience the danger of taking a chance. We ought to have those rules pasted in our hats and we ought to comply with them, and if we would do that we would save 75 per cent. of these accidents the first month."

Mr. Richards relates many specific incidents to illustrate how carelessness causes accidents, citing the examples, among others, of the switchman who kicks a drawbar over when an engine is about 2 ft. from a car and has his foot mashed; of the car repairer who goes under a car without putting up a flag and is killed or injured because someone kicks a car against the car he is repairing; of the conductor who, being ordered to wait on a side track until a certain train passes, fails to ascertain by word of mouth, as the rules require, whether the train that passes is the one for which he has orders to wait, leaves the siding where he has been ordered to wait, and after it is too late to correct his mistake runs into the train for which he had "wait" orders.

Mr. Richards not only clearly and forcibly states the causes of accidents, but he also denounces vigorously the incomplete and often false reports regarding them which are sent in, and gives many specific instances of false reports which have led to trouble. He points out that the road cannot stop accidents unless its employees will co-operate with it in getting at the facts about them. "I remember," he says, "a case on the Madison division a little while ago, where a brakeman got caught between the man killers. We sent him out to inspect the car and he said there were no man killers on it. I don't know whether he ever saw that car or not, but when we sent a man up there they were on the car. Of course, he didn't put them on the car, and we didn't put them on it. Now, we don't want any such lying reports as that. If we didn't want the truth I could

under on the reports myself. I am something of a word pointer myself, and probably I could have done it better than the one reported."

One of the troubles is, he says in his talk, that employees are not familiar enough with the rules. "We ought to take more care in explaining to those younger men in the service the risk in it and what is going to happen if they do not comply with the rules. Why, when I was a little shaver running around the yards in Chicago, when the road was small, I knew nearly all the trainmen that came into the city, and when I would go into the dog houses, the cabooses, the roundhouses and the switch shanties, do you know what I would hear them talking about? They were talking about the rules, getting up hypothetical cases and arguing about them. They were telling about what a good engineman they had on their train and what a good run they had. What do I hear now? What do we all hear? There isn't any talk about the rules. They are talking about some timekeeper that didn't give them that extra 25 miles. They are talking about some 30 cents that's due them that they didn't get. You ought to get your pay; you ought to get every cent your schedule calls for. I get all mine calls for. But above all things you ought to talk about these rules and get them fixed in your minds, and talk about the accidents that happen every day and the causes of them. And the company ought to disseminate such information, so that when accident occurs from some cause similar accidents can be prevented. The company is just as much to blame as you are. It is just about half and half. But the company is trying to do its share now because its officers feel that something has got to be done to stop this awful waste of human life, and you ought to meet it half way and do your part."

It will be noted that the entire campaign is directed primarily to the reduction of accidents to employees. The reason for this is that 80 per cent. of the accidents that happen are suffered by employees, and it is assumed that whatever causes employees to be careful enough to reduce accidents to themselves will so improve the service as to proportionately reduce the accidents to all other classes of persons. It is felt also that

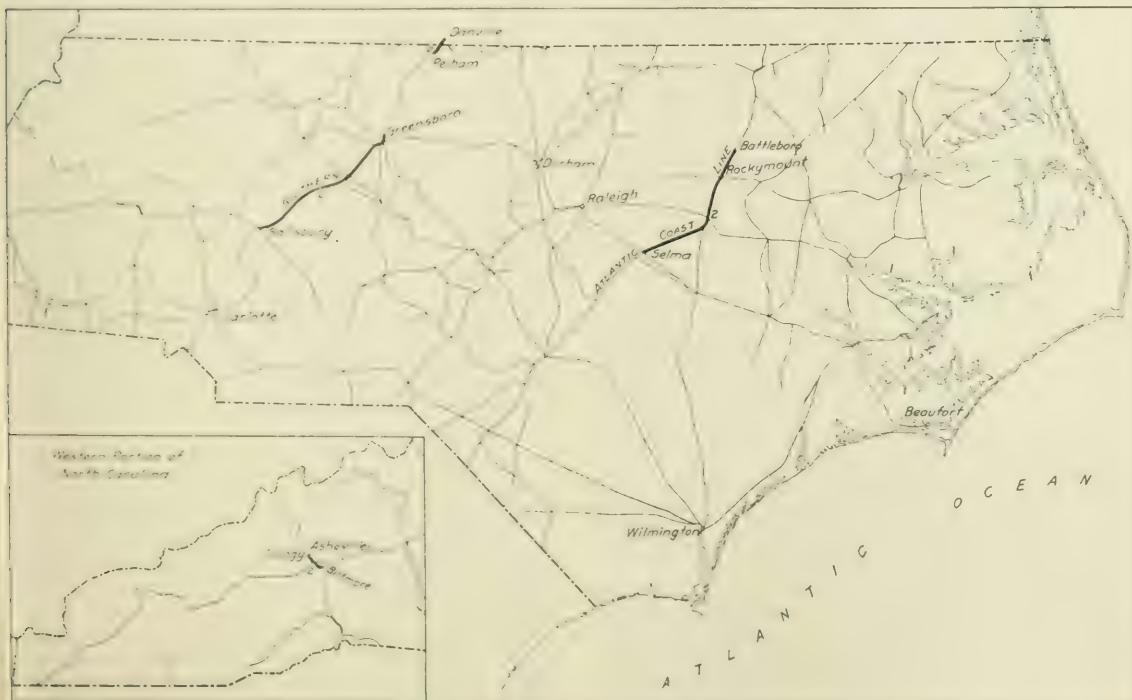
no appeal to employees on the subject of accidents to other persons will be anywhere near so effective as an appeal to them relating to the subject of accidents to themselves.

It is too early yet to judge of what effects, if any, the campaign of the North Western's management for the reduction of accidents is having. All the officers in the operating department have become more or less interested in it and are co-operating in carrying it on. Even more interest, however, is being shown by the employees, who have manifested a gratifying disposition to co-operate with the management in a work which, of course, is mainly for their own benefit. There was a marked reduction in July, 1910, as compared with July, 1909. The number of persons killed on the North Western in July, 1910, was 25, as compared with 37 killed in July, 1909, a reduction of 33 per cent. The number of persons killed in July, 1910, was 781, as compared with 872 in July, 1909, a reduction of 15 per cent. The number of accidents usually increases as traffic increases, but the opposite was true in this case, the traffic in July, 1910, both passenger and freight, being larger than in July, 1909. These figures may have no significance. Data for a longer period will be required to show conclusively what results are being secured. But if the figures have any significance they indicate a marked tendency toward improvement.

DOUBLE TRACK RAILWAYS IN NORTH CAROLINA.

The map of North Carolina, given herewith, is printed for the purpose of showing the location of all sections of railways in the state on which there are two or more main tracks. The termini of these sections are as follows:

NORTH CAROLINA.		
Atlantic Coast Line.		
Selma to Battleboro	No. tracks. 2	Approx. miles. 50
Southern.		
Danville, Va. to Pelham	2	9
Greensboro to Salisbury	2	50
Greensboro, North	2	3
Charlotte to North Charlotte	2	2
Biltmore to Craggy	2	6



Double Track Railways in North Carolina.

Shop Section.

IF you have not yet started to work on your contribution to the engine house kink competition, which closes September 15, it is not too late to begin, although you have less than two weeks to get it into shape. Only two kinks are required to enter the competition. The first prize is \$35 and the second \$20. An extended notice of the competition will be found in the August 5 issue.

A COMPETITION on "The Care and Selection of Machine Tools and Shop Equipment" was announced in the August Shop Number and will close October 15. This is a subject which should appeal strongly to all shop foremen. The papers which are submitted need not use the above title as the subject, but may be on any phase of the question coming under that general head, such, for instance, as the maintenance and care of machine tools, the care and abuse of small tools, how a foreman should select the proper tools to recommend for use in his shop, the care of pneumatic tools, the maintenance of belting, the best way of keeping track and caring for the tools in roundhouses and car repair yards. These are only a few suggestions. As a matter of fact, the general subject covers such a broad field that any or all of our Shop Number readers should be able to participate. Prizes of \$35 and \$20 will be given for the two best articles; such others as are accepted for publication will be paid for at our regular space rates. The article need not be long, but should contain from five hundred to fifteen hundred words.

FIFTY-SIX kinks submitted by ten contestants in the recent shop kink competition, the result of which was announced in the August Shop Number, appear in this issue. These include kinks used in connection with lathes, drilling machines, slotters, shapers, planers, boring mills and milling machines. Also kinks from the erecting shop, boiler shop, smith shop, tool room, car shop and repair yard, and engine house. The number of kinks referring to car repair and engine house work is especially gratifying, indicating, as it does, an increased interest in the work of the Shop Number by the foremen in these departments.

G. H. EMERSON, now assistant to the general manager of the Great Northern, and H. W. Jacobs, assistant superintendent of motive power of the Santa Fe, were among the first to experiment with and extensively adopt oxy-acetylene for welding and cutting purposes in railway shops. Both the Great Northern shops at St. Paul, Minn., and the Santa Fe shops at Topeka, Kan., are equipped with central generating plants for the oxygen and acetylene, which are piped to the different departments in which they are used. The work now being done at St. Paul was described in a paper presented before the Master Blacksmiths' Convention by John Treacy, the blacksmith foreman, and appears on another page of this number. An extensive article on the use of oxy-acetylene at the Topeka shops, prepared by H. W. Jacobs, appeared in the June 17 issue. That the value of oxy-acetylene for use in railway shops is becoming quite generally recognized is evident from the papers on the subject which were read at the Master Blacksmiths' Convention; also by the article by Wm. C. Reyer and R. W. Clark in the August Shop Number and the description of its use, in the Erie car repair shops at Buffalo in the issue of May 6.

The use of a portable plant on wrecking cars for cutting the drawbars between derailed engines and tenders and for other purposes of this kind would seem to possess great possibilities. A most important feature of the use of oxy-acetylene, which has developed gradually, is the reclaiming of various parts of locomotive and car equipment which have become badly worn, cracked or broken. While the saving in the value of the mate-

rial amounts to considerable, the greatest saving is often in the shorter time the equipment is held out of service while the necessary repairs are being made.

THE "old railroader" talks plainly and straight from the shoulder in his article on "How a Foreman Can Promote Shop Efficiency." Many of the bad practices mentioned have been done away with on the more progressive and better managed roads, but they are still far too common. It is in improving such conditions that the ambitious foreman finds his opportunity. In many instances the desired changes may be brought about by good management on his part and without having to appeal to his superiors for additional authority or support. In other cases, such, for instance, as when it is desired to pay a higher rate in order to get an inspector better fitted for the work, it will be necessary to have sufficient data at hand to show good cause for the change. It hardly seems possible that an officer will refuse such a request, if it can be clearly shown to pay good returns within a reasonable time. It would appear that very often such requests are turned down because the foreman fails to make a sufficiently forcible statement of the case to carry conviction. The foreman who usually gets what he wants is the one who goes to his superior with a carefully prepared statement of the case showing as clearly and forcibly as possible the probable results which will follow the proposed improvement. Then, if it is not approved, he goes back to his work—not discouraged, but on the lookout for additional arguments to strengthen his case. At the first good opportunity he takes it up again and keeps at it until he finally gains his point, or is proved to be in the wrong.

IN spite of the extremely hot weather during the middle of August the two mechanical department conventions which were held at that time—the Master Blacksmiths' and the Traveling Engineers'—were more aggressive and effective than some of their sister organizations whose meetings were held under more comfortable weather conditions. The Master Blacksmiths' convention, a report of which appears in this number, held two sessions a day, and the members worked as hard or harder than if they had been on duty in their shops. The attendance was good at all of the meetings right up to adjournment. A rather unique custom followed by this association is the formal reception of new members. As their names are read off they rise and go to one side of the room, after which a recess of five minutes is taken in order to welcome them. Another rather unique practice is that of having the tellers stand about the presiding officers' desk and call out and check the name on each ballot as it is counted. The effect on the audience when the vote was close or when the ballot on the meeting place for next year was being counted was interesting. Probably the most valuable papers presented were those on oxy-acetylene welding and cutting, although the papers and the discussions generally were all good.

FUTURE COMPETITIONS.

IN addition to the engine house kink competition to close September 15, and the one on the care and selection of machine tools and shop equipment to close October 15, three other competitions will be held before January 15, 1911. They were announced at length in the August 5 issue and are as follows:

A competition on car repair kinks will close November 15. Any kink used in car repair shops or yards for either freight or passenger cars, or at terminals in connection with the cleaning or repair of car equipment, may be included. Two or more kinks may be submitted, but the judges will have their decision

on the best two in each collection. The prizes will be \$35 and \$20 for the best two collections. Other collections, accepted for publication will be paid for at our regular space rates.

On December 15 a competition will close on "Increasing Shop Output." The same conditions will govern as for the competition on "The Care and Selection of Machine Tools and Shop Equipment," to close October 15. Tell us how you increased the output of your shop, or department, by improving the organization, rearranging the equipment, or handling it to better advantage. The competition should bring out such articles as a good shop schedule and the result of its installation, a successful shop despatching system, the arrangement and operation of a first class bolt manufacturing plant, the best fluid handling plant, how a car repair yard increased its output by better methods, how a better system of organization and operation was instrumental in improving the conditions at an engine house, or how the same results were secured with the same equipment, but smaller labor costs. These few subjects are presented merely as suggestions. There are at least a hundred more equally as good.

The competition to close January 15 will be on shop kinks and will include any kink used in connection with the repair and maintenance of locomotives or cars of all kinds. The prizes will be \$50 and \$25 for the best two collections of three kinks. More may be submitted, but the award will be based on what the judges consider to be the best three kinks in each collection. In this, as in all the above announced competitions, kinks or articles which do not win a prize, but are accepted for publication, will be paid for at our regular space rates. Contributions may be entered in any of these competitions at any time between this and the closing date.

POSSIBLE ECONOMIES OF HIGH-SPEED STEEL.

AS soon as the mechanical world realized the possibilities of high-speed steel, it was eager to use it, and a common expression in the early days was to the effect that it had so far outstripped the capacity of the old machine tools that it remained for the builders to redesign their tools and make them capable of driving the steel to the limit of its capacity. This, of course, quickly followed in response to the demand and machines of great power were soon on the market, and things were once more in equilibrium. The point was recently suggested by H. I. Brackenbury, in a paper before the Institution of Mechanical Engineers, in England, that possibly it was uneconomical to invest too heavily in machine tools capable of doing a great amount of work, and that it was also possible that the ease and rapidity with which metal could be removed was leading to a waste, not only of the metal so removed, but of the power required to remove it, and that if a greater expense were to be incurred in forging more closely to dimensions, the extra expense would be more than saved in material and power.

The conditions resemble those arising under similar circumstances elsewhere. It is like the use of a bicycle. The rider is apt to travel much farther than is necessary in order to go from one point to another, because it is so easy, and he compares the total effort with that of walking. So we are apt to do more cutting than is necessary because the high-speed steel enables us to do so and still outstrip the time that would be needed to do less work with the old carbon steel. We have not yet become quite so thoroughly habituated to the new order of things that we take advantage of the fact that more power is required to remove a thin wide chip than one of double the thickness and half the width. Also, the power required to drive the tools being imponderable and not discernible by the workman, he does not always pay due regard to the fact that tools with blunt cutting angles require more power than those with sharp cutting angles, to remove the same amount of material. And, finally, we should bear in mind that the total power used for a given cut, including that absorbed by friction in the machine, increases at a smaller ratio than the increase in the cutting speed. In other words, less

horsepower is used per pound of material removed at high speeds than at low speeds.

Mr. Brackenbury emphasized this lack of appreciation of the true economy of the use of high-speed steel by urging that it might well be an uneconomical proposition to purchase a machine capable of a high duty, unless there were to be sufficient work to keep it running up to capacity. For if this were not the case, the overhead charges on a too expensive machine might more than offset its seeming saving, and also, that the fact that a ton of cuttings can be made at a low labor cost by the use of highspeed steel should not make us forget that someone has to pay for the ton of material and the power required to remove it. According to Mr. Brackenbury there is only one way in which the full saving made possible by the use of high-speed steel may be made, and that is by setting aside certain machines for roughing and for roughing only. It is quite unnecessary to replace all or even many of the old machines, which have quite enough power to carry the finishing cuts at good speed, nor is it desirable to use either the same class of machinery or of labor for roughing out as for finishing.

The amount of power required for the driving of high-speed steel has been lost sight of, because of the ease with which the steel apparently does its work, and this in spite of the fact that it was driven home at first by the inability of the older tools to pull the cut. But as soon as the heavier machines were installed, and the maximum cut could be taken, we forgot that the high-power consumption still remained and was an unremitting tax on the engine and eventually the coal pile. The paper referred to cites the following examples of increases of horsepower provided:

Turret lathe for 2½-in. bars increased from	2 h.p. to	10 h.p.
Lathe, 6-in. center	1 h.p. to	4 h.p.
" 10-in. "	2½ h.p. to	10 h.p.
" 14-in. "	5 h.p. to	20 h.p.
" 36-in. "	20 h.p. to	60 h.p.
" 60-in. "	30 h.p. to	100 h.p.
Slotting machines, 12-in. stroke	9 h.p. to	15 h.p.
Special cases of high power are:		
12-in. center lathe.....	50 h.p.	
18-in. center lathe.....	60 h.p.	

The 18-in. center lathe took a test cut on steel, 1½ in. deep with ¼-in. feed and at a cutting speed of 28 ft. per minute, the consumption of power being upward of 80 h.p. In fact, there seems to be no upper limit to the amount of power that can be applied to a machine.

This point of the necessity for saving in power consumption on heavy work is one that cannot be emphasized too strongly. A few years before the advent of high-speed steel, it looked as if the milling machine would drive the planer out of the race for heavy roughing work, as it could do the same amount of work in one-third the time. But the power required is so serious an item that it has been found, with high-speed steel, to be more economical to use the planer, especially in view of the great advance that has been made in the cutting speed of these machines, and this, coupled with the rapidity of the return stroke, which has a range of 90 to 180 ft. per minute, has made the planer a most efficient tool for the removal of metal. On the other hand, while the power put into the milling machine has been greatly increased, it still requires a great deal more for the removal of a given weight of metal, as compared with the lathe or planer. We have already noted that it requires more power to remove a broad and thin chip than a narrow and thick one of the same sectional area. A milling cutter may be compared to a lathe tool with a very long cutting edge removing a thin wide chip with the corresponding increase in power consumption.

So, while high-speed steel has already effected wonderful economies in the labor involved in the performance of machine work, there is still a wide field of investigation open for the determination of the best means of utilizing the power that must be used for driving the tools that do the work, and of so adjusting or regulating the costs of power, labor and overhead charges that they will bear the proper relationship to each other, and their total shall be that of the highest degree of economical operation and the lowest cost of unit output.

MECHANICAL ARTICLES DURING AUGUST.

FOR the convenience of Shop Number readers who may wish to look up mechanical articles that have appeared in the *Railway Age Gazette* since the Shop Number of August 5, the following outline of such articles has been prepared:

The Charcoal Iron Car Wheel. It has been claimed that the cast iron wheels of to-day are inferior to those made years ago. An attempt has been made to locate wheels made according to the practices of 30 years or more ago, and compare the service rendered by them with that of wheels made to-day.—August 12, page 273.

Mikado Type Locomotive for the Atlanta, Birmingham & Atlantic. These locomotives weigh 260,000 lbs. and have a tractive effort of 50,800 lbs. Illustrated. August 12, page 282.

A Machine Shop on Wheels. A brief illustrated description of a traveling machine shop car on the North Coast Railroad, for making repairs to locomotives and other equipment. August 19, page 312.

Vanadium in Cast Iron Locomotive Cylinders. As the result of a two-years' test of a pair of cylinders the New York Central has specified vanadium cast iron cylinders on 183 new locomotives built during the past eight months. The article is an abstract of a paper read before the New England Foundrymen's Association by Geo. L. Norris. Aug. 19, page 312.

The Cambria Steel Works. This article includes a brief study of the development of the Bessemer and Coffin processes of steel treatment; and considers the resources, plants and output of the Cambria Steel Works. Special attention is given to the steel car manufacturing department and to the hospital for employees. August 19, page 316.

Traveling Engineers' Convention. A 4½-page account of the annual meeting at Niagara Falls. Special attention is directed to the reports on fuel economy, education of firemen, superheating and lubrication. August 26, page 330.

Proposed Safety Appliance Standards. A hearing is to be held on these proposed standard before the Interstate Commerce Commission on September 29. To give some idea of the extent of the changes from the M. C. B. standards, the proposed standards for box and house cars are reproduced on page 356 of the August 26th issue. Editorial comments appear on page 343 of the same number.

Letters to the Editor.

SHOULD OIL HOLES ON TOP OF DRIVING BOXES BE OMITTED?

Cardiff, Colo., July 28, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

You might as well shake a red blanket at an enraged bull and expect him to stand still as to expect no expressions of opinion from many engineers and mechanical men on this subject.

In this day, when the mileage and oil account go hand in hand, I am convinced that oil holes on top of driving boxes are not necessary. From my personal experience and observation, the packing on driving boxes becomes a solid mass through mixture of dirt and oil, and unless the packing on the top of the box is changed often, the oil placed thereon is entirely lost; should any of it reach the oil holes, it is apt to carry a certain amount of sand and grit to the journal. Watch the average engineer in oiling his engine. With a long-spout oil can he will dig around on top of the driving box and stir the packing up (he says); in reality he is stirring up the dirt, and incidentally trouble for himself and the operating and mechanical departments.

Then comes the difference in the lubricating qualities of the different grades of oil. Most railways use one grade of oil for driving boxes and another for the machinery, the lubricating oil for journals being of a heavier grade than that for machinery. What is the result when the lighter oil is poured on top of the boxes and the journal is lubricated from the cellar with a heavier grade of oil? If the lighter oil does reach the journal through the oil holes, it will remove the heavier lubricating oil from the journal, and the result expected of the heavier oil in the cellar is lost.

What attention, if any, will be necessary on the part of the engineers and the mechanical force to improve the lubrication of driving boxes?

First, the mechanical department should see that the cellar is well packed with good soft springs wool packing, properly saturated. Then a record should be kept and a systematic ex-

amination made of the cellars on engine trucks and driving boxes. This record and examination to be based upon mileage and service.

Second, the engineer should keep the oil can off the top of the driving box. With the exception of what oil is placed for the shoe and wedge lubrication, oil should not be put on top of the box. Again, close attention on part of the engineer for the danger signal which the journal always hangs out. An engineer should no more run by this signal than any other danger signal. When the journal shows a rise of temperature there is something wrong, and it certainly needs attention.

What good will come of omitting the oil holes on top of the driving box, outside of preventing the heating of the box caused by the stirring process? Engines will be able to make more mileage on a given amount of engine oil, and if proper methods are followed with the packing, which is removed from the cellar, the car or journal lubricating oil will very easily make the mileage and engines will be run within the allowance; yes, and save the railway company money on the investment.

W. E. M'ELDOWNEY,
Division Foreman, Colorado Midland.

NON-FREEZING AIR-BRAKE HOSE.

Ottawa, Ont.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have read with much interest the article on "Tests to Determine the Effect of Low Temperatures on Air-Brake Hose and Gaskets" on page 1254 in your issue of May 20, 1910. Several years ago you published a short article of mine on a non-freezing air-brake hose. I find on looking up my office copy that the tests of this special hose, made to my specification, extended over a period of eighteen months, with splendid results.

Necessity has always been the mother of invention; the serious trouble we were having with the air line on log trains caused me to question the suitability of the regular standard hose for satisfactory service in low temperatures. It was not necessary to make tests with springs to learn how the regular hose acted in a temperature of twenty to thirty degrees below zero. We had the object lesson before our eyes on the trains, and we had the results in hours of delay on each trip, with many skidded wheels to change and generally unsatisfactory conditions. The substitution of the new non-freezing hose for the standard, without making any changes in gaskets, eliminated our troubles at once.

The winter following that during which we tried these on log trains we had ballast trains working during the cold weather, the cars being equipped with the standard hose. To get anything like satisfactory service, the men in charge changed the hose each trip, keeping one set in a warm shanty to dry out ready to be applied before the train went out. This was not good business, and we again tried the non-freezing hose, with success.

The author of the article on page 1254 of May 20 speaks of soaking the hose to secure moisture and seems surprised at the small quantity of water taken up. I am of the opinion that this is not a satisfactory test, as my experience has convinced me that a hose in actual use will take up much more water under pressure than it will from mere soaking. In actual use in low temperature the water is present from condensation, and the pressure will drive it into the hose.

This question of a non-freezing hose is of great importance to railways operating in cold countries, and I trust that it will now receive the attention it deserves. I failed in arousing interest, outside of our own road, when I called attention to the matter some years ago, but I hope Mr. Hatch will be more successful. One of the reasons why I failed was that I could not get a perfectly satisfactory non-freezing hose that would conform in its outside measurements to the M. C. B. standard. My hose was made of much finer material than the regular article, and while it was quite as strong to resist bursting pressure, the wall was much thinner. I think some of us would be glad to know how Mr. Hatch got around this.

E. L. SEVERIN,
Storekeeper, Grand Trunk.

Shop Kinks.

TWENTY-SEVENTH COLLECTION (First Prize).

BY C. J. CROWLEY.

Piece Work Inspector, Chicago, Burlington & Quincy, West Burlington, Iowa.

CHUCKS FOR PLANING CYLINDER.

The chucks, shown in the photograph, Fig. 1, and the drawing, Fig. 2, are made to accommodate all sizes of cylinders from 18 in. to 25 in. in diam. The steps on the cones in the counterbores of the different size cylinders. The set consists of two end and two center chucks. One of the center chucks is made long (the one shown to the right in Fig. 2), since some of the cylinders have frame fits extending beyond the ends of the cylinders. If the frame fits do not extend beyond the cylinders,

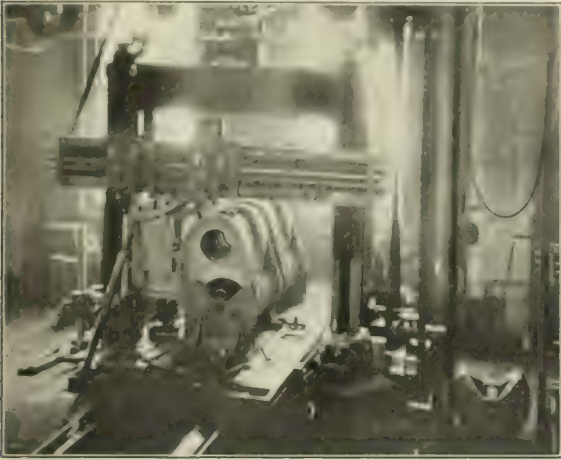


Fig. 1—Cylinders and Chucks in Position on Planer.

a short center is used (about 9 in. wide over all except for the base, which is 12 in. wide), bringing the cylinders closer together and saving considerable time in planing. The gap at the top of the chucks is provided to lighten them, and is also useful in placing the two large bolts which are used to draw the chucks tight against the cylinders. The chucks should have the steps on the cones machined first, after which the center hole should be bored out. They should then be placed on a mandrel and finished to fit the slots in the planer bed. With these chucks, it is possible to set up and bolt a pair of cylinders ready for planing in one and a half hours.

SHAPER RADIAL CHUCK.

This chuck, shown in Fig. 3, was designed to plane the front half of main rod brasses. These are circular in shape, forming

practically one half of a bushing, although some of them have flat sides. The ends of the chuck for this latter type are designed accordingly, as shown by sketch Y. There are many chucks of this general construction, but most of them are heavy

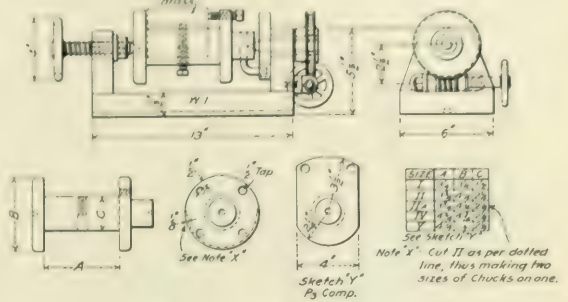


Fig. 3—Shaper Radial Chuck.

and it is necessary to remove the shaper chuck from the table when using them. This chuck is held in the shaper chuck while in use, saving considerable time in changing from one class of work to the other. When planing the brasses for the front end of the main rod, the ordinary shaper chuck is used on the back half; the front half can then be machined in the radial chuck without removing the shaper chuck. This chuck can also be used for other work, such as dies, etc., on either straight or taper work. For taper work a wedge is placed under one end of the shaper chuck.

DRIVING BOX BRASS CHUCK FOR SLOTTER.

This chuck, Fig. 4, is made in three sizes; one for 7 to 7½-in. x 8-in. journals; one for 8 to 8½-in. x 10-in. journals, and one for 9 to 9½-in. and 10-in. x 12-in. journals. There are also three sizes of gages, one for each chuck. The frames of the gages are constructed of ¼ in. steel ½ in. wide. The small piece with the ¼ in. radius, shown at the right in the drawing, is used with the smaller size gage only. The circle of the box is first calipered and the points on the gage set accordingly. The gage is then laid on top of the brass and the cutting tool is set to the gage points, making allowance for the finishing cut. After the radius is slotted, the gage, which meanwhile has been fitted to the box to get the proper angle of the dove-tail, has the small angle piece of ⅛ in. round iron fastened against the middle point of the gage. The projecting arm of the angle piece is pressed against the brass and the dove-tail is scribed. The assembled view of the gage shows it arranged for this purpose. After the dove-tail is slotted to the line, the gage is placed on top of the brass and a scale is held against the dove-tail to check the work. This tool has been used in slotting boxes for several years; but one operation is required

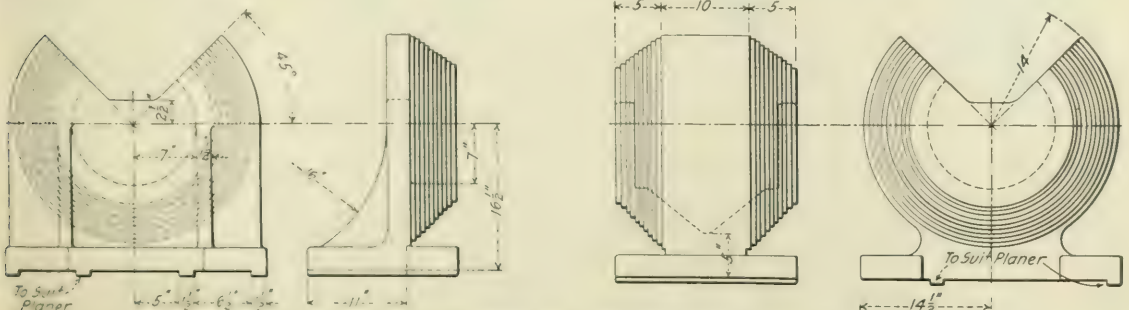


Fig. 2—Details of Cylinder Chucks.

instead of three or four, as when the brasses are turned in the lathe, after which the dove-tail is cut on a shaper or slotter.

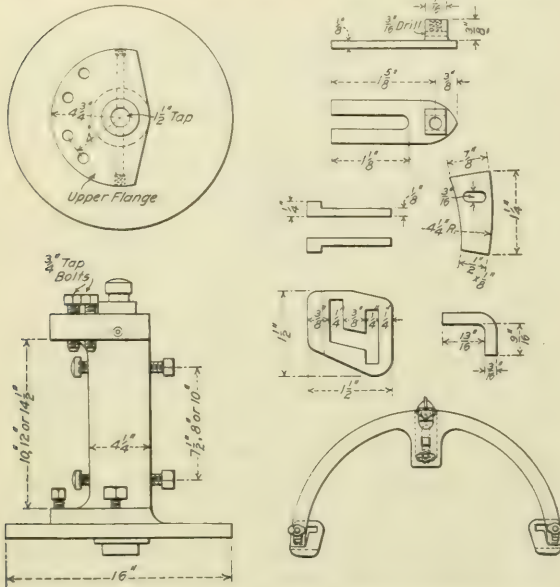


Fig. 4—Driving Box Brass Chuck for Slotter and Gage for Laying Out Brasses.

Brasses are slotted and pressed-in in 35, 40 or 45 min., according to the size, making perfect fits without filing.

CHUCKS FOR DRILLING AND REAMING BUSHINGS.

These chucks, Fig. 5, are bolted to the side of the drill press table. Bushings are usually made from bars of iron or steel, after the stock has been notched a little deeper than the hole to be drilled, the drill cutting off each bushing at the notch. Bushings made in this way cost about half as much as forged bush-

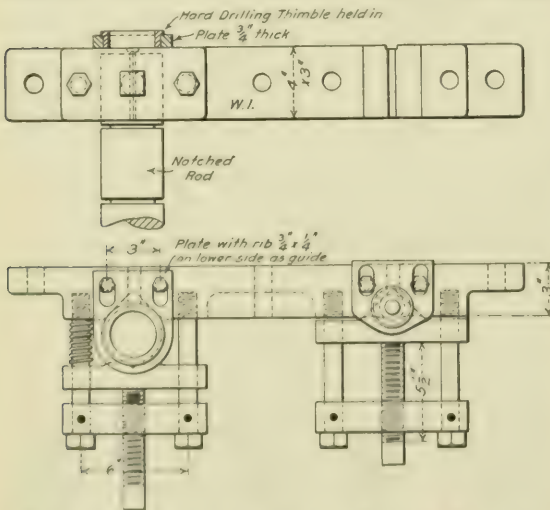


Fig. 5—Chucks for Drilling and Reaming Bushings.

ings or tubing, which means a very large saving, as all the valve motion, equalizers, equalizer fulcrums, spring hangers, air-brake hangers, etc., are bushed, using from 80 to 100 bushings on each engine.

BOLT DRIVER.

A simple driver for a bolt lathe is shown in Fig. 6. These drivers are made in sets for the different sizes of bolts to be

turned. Two holes are tapped in the face plate and studs are screwed in to hold the drivers, so that they may be easily and quickly placed or removed. The driver has many points of advantage over the old style driver, as it adjusts itself to the

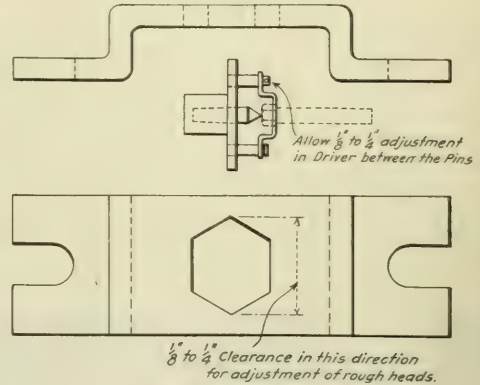


Fig. 6—Bolt Driver.

head of the bolt, provides a double drive and keeps the lathe balanced, which is necessary when running at high speeds. The best way in which to make these drivers is to plane a long bar of steel to shape and cut off the drivers to the different widths desired; hardening will increase their life about 300 per cent.

DOVE-TAILING AND COUNTERBORING TOOLS.

The dove-tailing tool shown in Fig. 7 is for use after a hole is made with an ordinary flat bottom drill. When the end of the dove-tailing tool reaches, and is pressed against the bottom of the hole, the cutter is forced out, making the dove-tail such as is often used to anchor babbitt in crosshead shoes, driving boxes, etc.

The counterboring tool, shown in the same illustration, was designed especially for reaming frame bolt holes of cylinders. As these holes are 18 in. long, they are very difficult to ream.

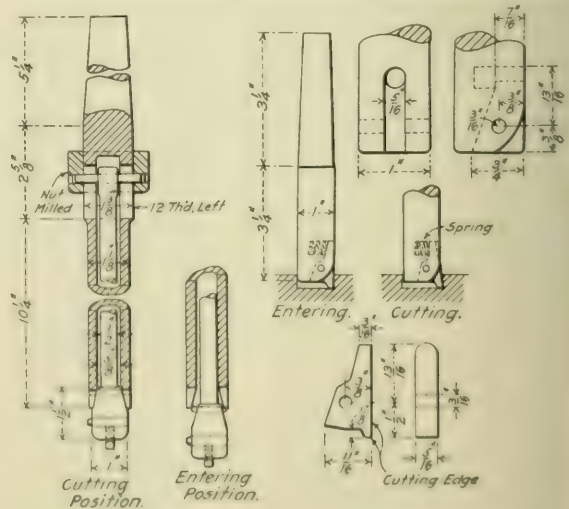


Fig. 7—Dove-Tailing and Counterboring Tools.

With this tool the center of the hole is counter bored for about 6 or 8 in., after which the holes can be reamed in about half the time formerly required. In operation, the cutting tool is first set and fastened with a set screw. The milled nut is then screwed down so that the cutter does not project beyond the body of the tool. The bar is then entered in the hole from the bottom, the motor is started, and the tapered head holding the

cutter drawn up into place by tightening up the milled nut, forcing the cutter into the metal.

ADJUSTABLE CUTTER HEAD FOR DRILLING

The cutter head, shown in Fig. 8, is a simple and strong tool for cutting 6 to 16-in. diam. holes from the solid, after drill-

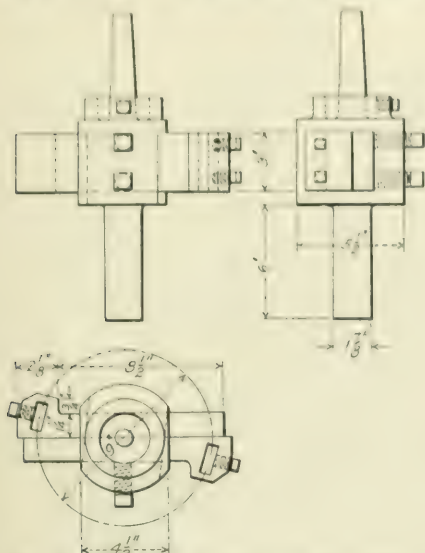


Fig. 8—Adjustable Cutter Head for Drilling.

ing the hole for the center pin. It is a good tool for cutting out side rods, working from either side. This method permits the use of short and stiff tools.

BORING HEAD FOR DRILL OR BORING MILL

The boring head, shown in Fig. 9, has three tools held in place by the bolt in the center. Each tool is tapped at its inner end for a small bolt to provide adjustment as the cutter wears. A sliding gage should be used to grind and adjust these cutters, keeping each set at the same length. Several different sizes

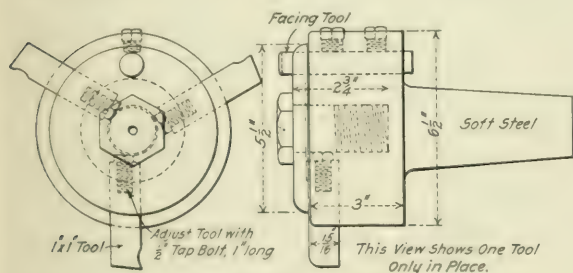


Fig. 9—Boring Head for Drill or Boring Mill.

of holes can be bored by having small blocks to place back of the screws in the cutter head. The head is also arranged for using a facing cutter. It is possible to chuck, bore and face nine eccentrics with 9 in. holes, 3 3/4 in. deep, in one hour.

HOLDER FOR TIRE FINISHING TOOLS.

A holder for tools to finish the contour of tires is illustrated in Fig. 10. The object of the holder is to use steel from stock sizes requiring no machining except on the cutting edge. The dotted line shows the holder as it is made for the use of a tire flange finishing tool. When the tools become dull they are easily and quickly removed and replaced by sharp ones. As the cutter wears it may be moved forward by placing shims behind it. When it becomes too short for use, the steel may be drawn out and used for smaller tools. The clamping plate, shown dotted, may be used to advantage in holding the cutter more rigidly than is possible without it.

CHUCK FOR TURNING SWITCH STAND STEM

The chuck, shown in Fig. 11, is made to fasten on the side of a drill press table, or, where the table is not suitable for this purpose, it may be bolted to an angle iron fastened to the table, and high enough to allow the hook on the switch stem to clear the table. The round block, which fits in the body of the chuck, has a small flange on the outer edge, which keeps the block from dropping out when it is turned. The hole for the milling cutter from dropping out when it is turned. The hole for the milling cutter is located near the outer edge of the block so that any

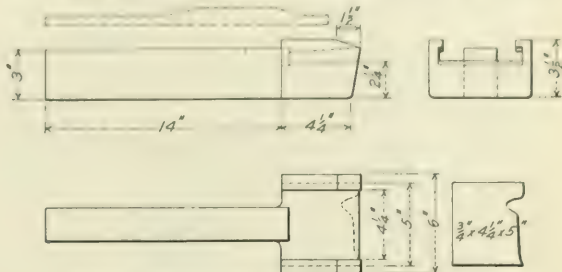


Fig. 10—Holder for Tire Finishing Tools.

throw of switch stem used on a Ramapo or on a quarter arch switch may be obtained. A set screw on the side of the chuck holds the eccentric block in place. When it is set for a certain throw, and a number of stems of the same throw are to be handled, a mark should be made at the edge of the hole in the body of the chuck and on the outer edge of the block. The

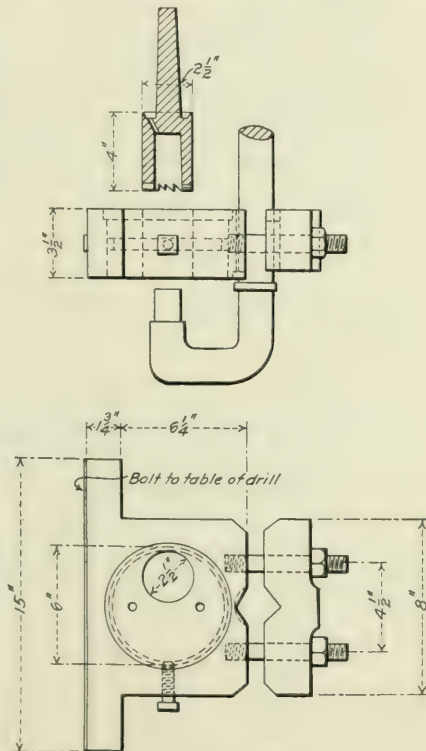


Fig. 11—Chuck for Turning Switch Stand Stems.

milling cutter used with this chuck is cupped out at the top, and a small hole is drilled to the hole in the center of the cutter. This provides for the oil or cutting compound reaching the cutting edge.

HAND CAR WHEEL PRESSES.

The device for pressing on hand car wheels shown in Fig. 12 has a long bar in the center, resting on jack screws to provide

ing, the eccentric is placed in the pocket in the chuck plate and clamped, as shown in the sectional drawing. This chuck can be placed on either a boring mill or lathe and will stand a heavy cut or feed. Eccentrics can be applied or removed rapidly and with little labor. The chuck will not only increase the output of the machine on this class of work but will insure a correct throw to every eccentric turned.

PORTABLE HYDRAULIC PRESS.

A hydraulic press for applying and removing driving box brasses is shown in Fig. 15. This press is used in both the machine shop and the roundhouse with satisfactory results. The entire outfit is mounted on a four-wheel truck. The pump, operated by air pressure from a hose connection to the shop air line, consists of an 8-in. air pump with the air cylinder removed and a piece of pipe fitted with a piston substituted for it. This piston forces the water into the 14-in. cylinder to operate the pressure piston. Water is supplied to the pump and press from a tank located on the truck and is controlled by four check valves and two cut-out cocks. After the water is used it is returned to the tank. The side view shows a driving box brass being applied and the end view a rod brass. In applying driving box brasses, it is necessary to use the extension piece, which,

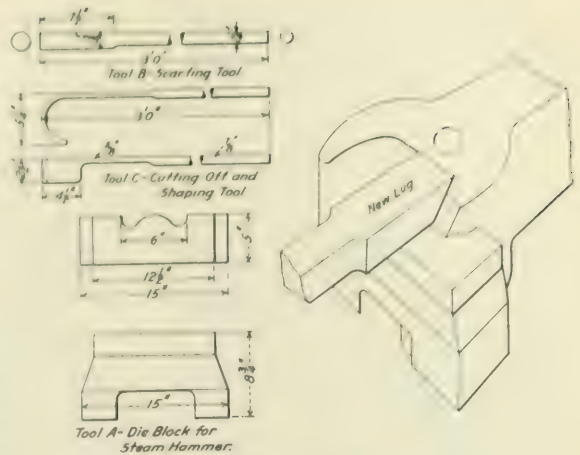


Fig. 17—Welding Tools for Broken Steel Couplers.

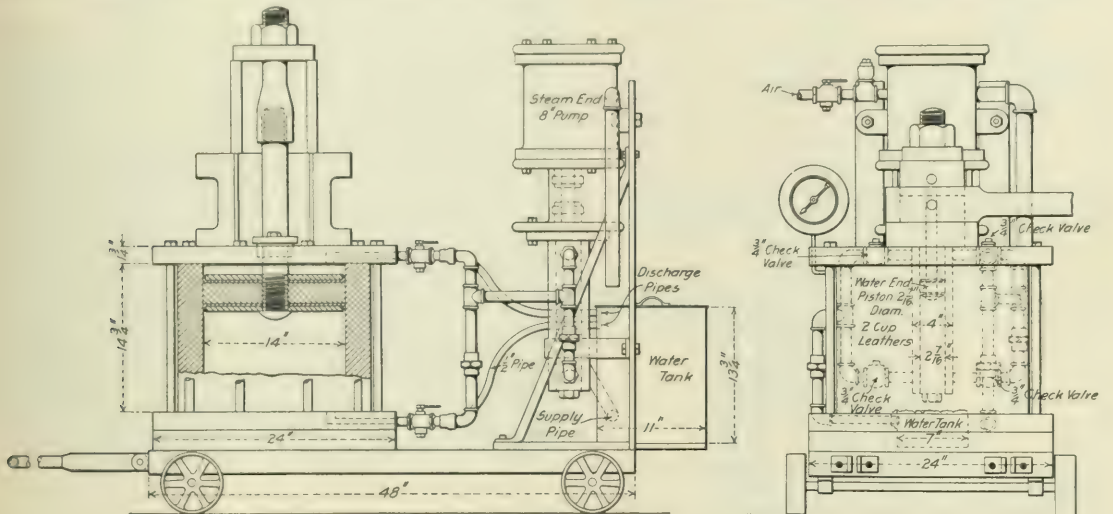


Fig. 15—Portable Hydraulic Press.

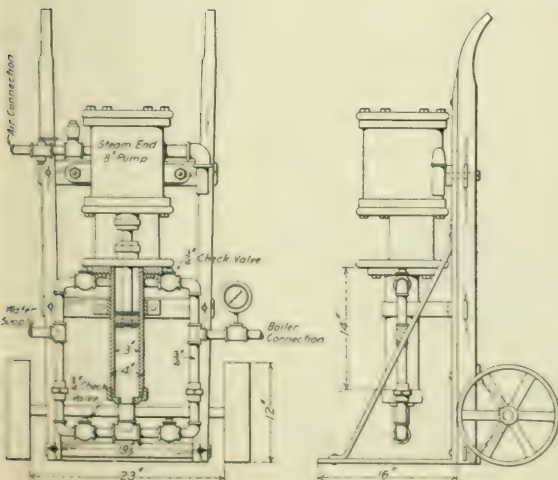


Fig. 16—Portable Hydraulic Testing Pump.

however, is easily removed when handling rod brasses. The press is equipped with a gage showing the number of tons' pressure being exerted. On several occasions the pressure was run up to 40 tons without any leak or apparent damage to the press.

PORTABLE HYDRAULIC TESTING PUMP.

A portable hydraulic pump used in the erecting shop for testing boilers and in the roundhouse for testing steam pipes, valves, cylinder packing, etc., is shown in Fig. 16. The pump is mounted on a two-wheel truck and is made from an 8-in. air pump, the air cylinder of which is removed and a pipe substituted similar to that of the portable hydraulic press above described. Water is supplied to the pump from any convenient shop water line and the pump is operated by air pressure from the shop air line. Water pressure is controlled by four check valves and the amount of pressure is registered on a gage located in the water line to the boiler or steam chest. In testing steam pipes, valves, cylinder packing, etc., the pump is connected to the relief valve in the steam chest; it is connected, when testing boilers, to one of the washout plugs or blow-off cocks in the firebox. This pump has paid for itself many times in locating defects on engines giving unsatisfactory service.

WELDING BROKEN STEEL COUPLERS.

Tools for welding lugs on broken cast steel couplers are illustrated in Fig. 17. This work is done on a steam hammer

successfully and profitably, from \$6 to \$8 being saved on every coupler repaired in this manner. Tool A is the bottom die block for the steam hammer. This block is shaped to fit the inside of the coupler between the knuckle pin lugs; scarfing, welding and cutting off is done on this block. Tool B is used for scarfing, and tool C for cutting off and shaping the new lugs.

The perspective view shows a coupler and a new lug on the die block, scarfed and ready for welding. Sand or a welding compound should be used to insure a good weld. The work is simple and if properly handled no fitting is required to apply the knuckle, it being only necessary to drill the lug for the knuckle pin. Couplers have been repaired in this manner at the Columbus shops for the past two years and without a failure.

AIR-OPERATED PRESS.

The press shown in the drawing, Fig. 18, and in the photograph, Fig. 19, has been in use in the Columbus shops for several years. It is used continually by all departments of the shop in straightening damaged material and for forming new work. All steel car parts, with the exception of the center sills, are handled cold; the center sills, when badly damaged, are heated in a furnace near the press. The press is useful for straightening metal brake-beams, the dies used in this connection being made to do the work without removing the heads or fulcrums. Steel rails, up to 90-lb. sections, may be broken into guard rail lengths by a single blow, using the press as a hammer. The frame of the press is made of four 80-lb. rails, there being two rails to each half. These halves are bolted together with steel tie plates. The two parts of the frame are spaced 4 in. apart with blocks and are held together with through bolts. The face plate is made of cast iron, and is 96 in. long, 60 in. wide and 10 in. high. This plate rests on top of the lower section of the frame, to which it is securely bolted. The top corners of the frame are stayed to the face plate by 1½-in. rods, supplied with

turnbuckles. A guide, made of 80-lb. rails, is placed about midway up of the frame, and also acts as a brace. It guides the piston rod, steel pins being placed to hold it in any desired position.

The cylinder is made of steel tubing, 20 in. in diameter, and is carried on four rollers which run on the top rails of the frame. It is moved across the frame by a wire cable, operated by a hand wheel. The end of the piston rod is made for attaching different shaped dies or shoes. From 90 to 100 lbs. of air is sufficient for most all classes of work, but on several occasions it has been run up to 140 lbs. without damage to the press.

The press has made possible the repair of badly damaged steel-car material which would otherwise be scrapped, and has reduced the cost of repairs to these cars by 50 per cent. Bent couplers, body bolsters, truck bolsters and truck sides are easily straightened under the press and used again. Two men recently straightened 150 brake-beams in eight hours, the work including cutting off the damaged heads and fulcrums.

Credit is also due Chas. Cox, foreman blacksmith; J. M. Plant, foreman machine shop, and H. S. Remington, air brake inspector, for their assistance in devising and making these shop kinks a success.

TWENTY-NINTH COLLECTION.

BY WM. G. REYER,

General Foreman; Nashville, Chattanooga & St. Louis, Nashville, Tenn.

ROD BUSHING REAMER.

The drawing, Fig. 20, shows a reamer for truing solid rod bushings after they have been applied to the rod. It is a handy, adjustable cutter for use on a drill press; the various parts are of mild steel, except the ⅜-in. cutters, which are of high-speed

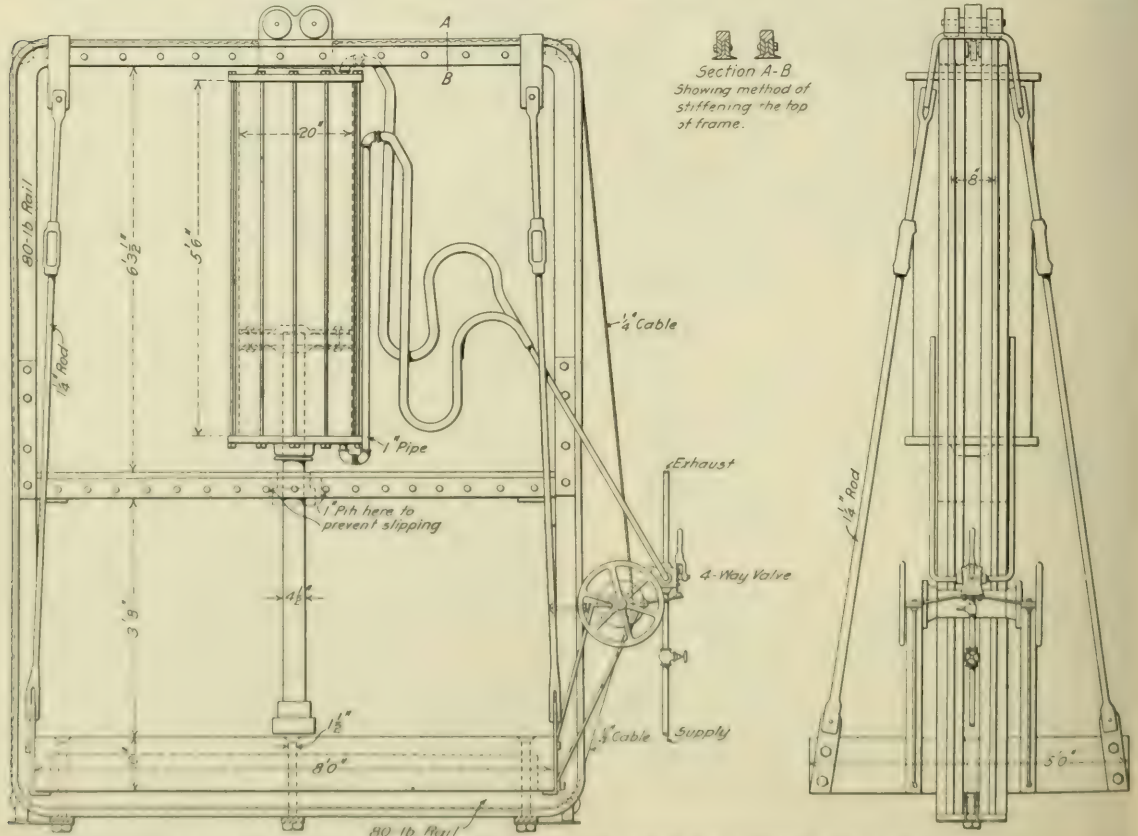


Fig. 18—Air Press for Straightening Damaged Parts and Forming New Material.

steel. Rod bushings are bored to pin size, applied to the rod and then placed on the drill press for turning with this tool. The plunger M is recessed to tighten it and is also shifted to carry the cross bar N, which is rotated by the hand wheel D, taper M backward or forward depending on whether the cutters are to

side of the shoe or wedge is machined with tools having 16 inserted cutters of high-speed steel, $\frac{3}{4}$ in. in section, the cutting points of which make a 16-in. diameter circle. The same fit of the shoe or wedge is made with a tool $10\frac{1}{2}$ -in. in diameter, with 16-in. inserted cutters.

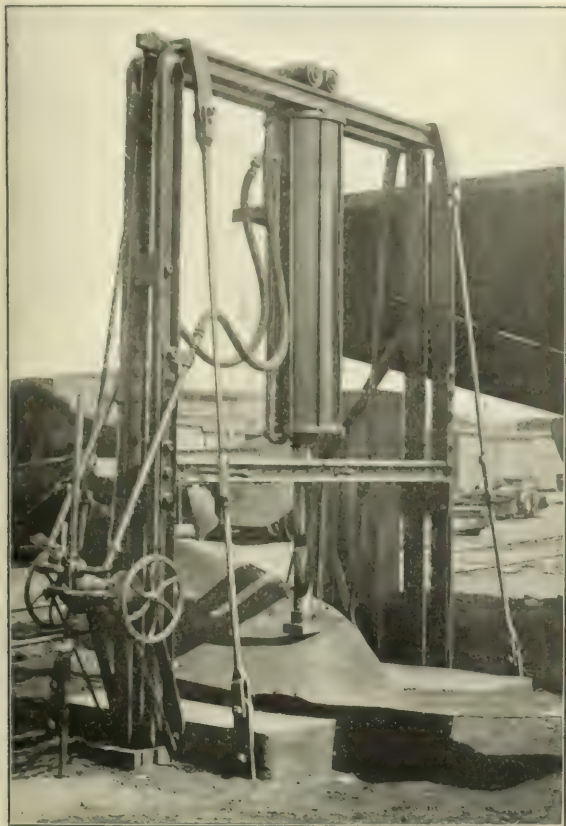


Fig. 19—Air Press Straightening a Damaged Steel Plate. be expanded or contracted. With it and a drill press equipped with an air clamp, a rod may be reamed and handled, floor to floor, in five minutes.

GANG MILLING TOOL.

A gang tool for milling crosshead gibs, shoes and wedges is shown in Fig. 23. This tool is used on a horizontal milling machine, the chuck blocks shown in Fig. 21 being used for holding the work. In milling shoes and wedges with this tool, the out-

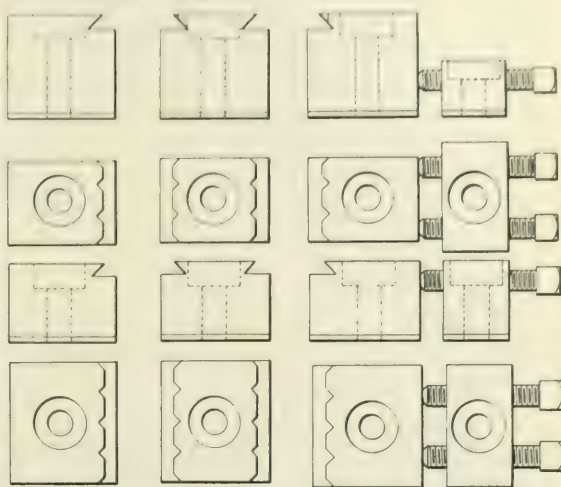


Fig. 21—Chuck Blocks for Shoes and Wedges and Crosshead Gibs.

An adjustable telescopic sleeve is used for gaging the thickness of the flanges. In finishing the edges of the flanges, mills of proper diameter are used by inserting them in the gang head. This edge milling on the flanges, however, is applicable only to shoes.

The body of the outside tools is made of two soft steel forg-

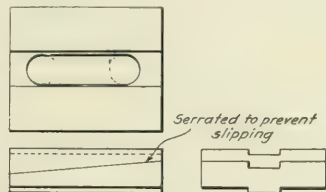


Fig. 22—Adjusting Wedge for Elevating Center Chuck Block in Milling Wedges.

ings; the main, or outside member, has a hub which is bored and key seated for the main spindle, and the inner face is turned at an angle of 45 deg., the angle of the tool. The two pieces are clamped together, using six or eight $\frac{3}{8}$ -in. bolts.

Two of these tools are used at a time, the cutters being ground

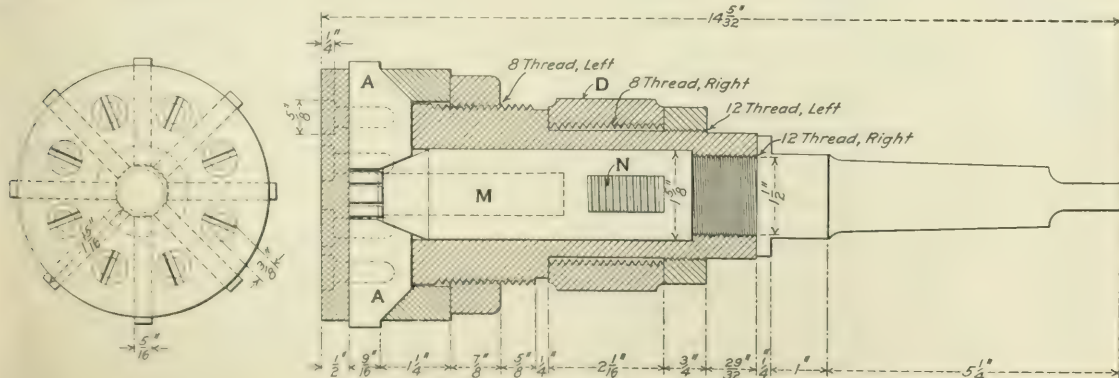


Fig. 20—Rod Bushing Reamer.

right hand on one and left hand on the other, so that they will cut in the same direction. The mill used for cutting out the frame fit has inserted cutters at proper angles to form a spiral. This member is made solid of soft steel, forged from an old locomotive axle and is bored and key-seated to suit the main spindle. The inserted cutters in this head or mill are $1\frac{1}{2}$ in. wide \times $\frac{3}{8}$ in. thick, and of lengths to suit the frame fit required. An adjusting wedge for elevating the center chuck block in milling wedges is shown in Fig. 22.

With this gang miller it is possible to mill a shoe and finish, both inside and outside, in 15 min.

TEMPLATE FOR DRILLING HUB PLATES.

This is a simple device (Fig. 24) and can be made very cheaply of tool steel. The centers, or template screws, are

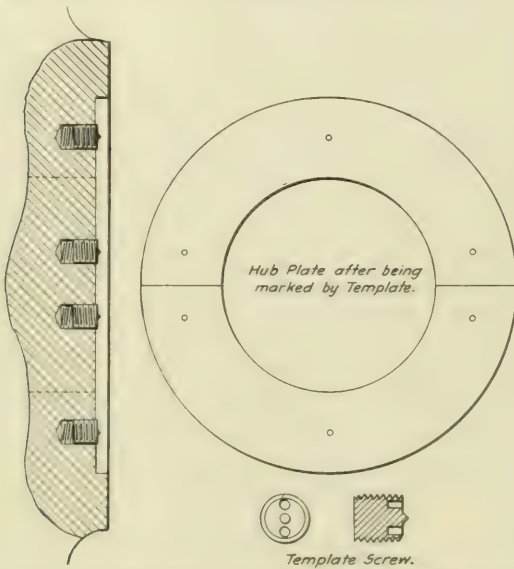


Fig. 24—Template for Marking Centers for Drilling Hub Plates.

screwed into tapped holes in the template. It is placed on the hub plate and tapped with a hammer, thus marking the centers for drilling.

FLUE CUTTER.

This tool, shown in Fig. 25, drills, reams and removes the burrs at one operation, making a perfect hole. It is possible to cut 247 $2\frac{1}{4}$ -in. holes in eight hours. The shank and body are made of soft steel and the center is of tool steel. The cutter,

reamer and burr remover are made of high-speed steel. This tool, with reamer attached, makes tight and perfect application

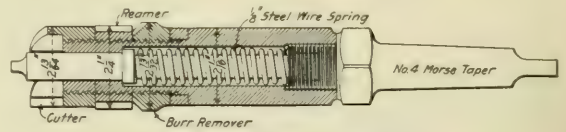


Fig. 25—Flue Cutter.

of the flues possible. It is used on a drill press. The spring in the tool holds the tit in the small hole, guiding the cutter.

FLANGING ATTACHMENT FOR SHEARS.

A useful device for flanging light work in the boiler shop, as shown in Fig. 26, is applicable to any heavy shear in place of the regular blades. This tool has flanged 444 ft. of $\frac{1}{4}$ -in. tank steel in two hours and five minutes. It may be made to flange at any angle, working metal up to $\frac{1}{8}$ -in. thick. It is made of

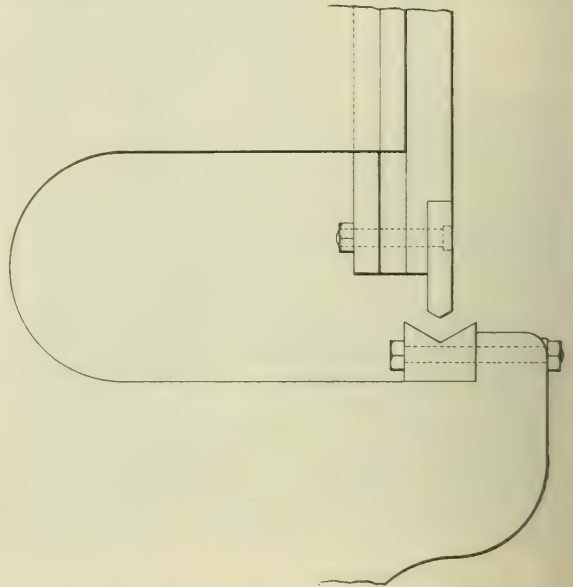


Fig. 26—Flanging Attachment for Shears.

hardened tool steel and may be adjusted to suit any angle or thickness of plate by slipping liners under the lower former. This tool was used on 146 drop-bottom ash pans, requiring flanges top and bottom the full length of the pan. This work

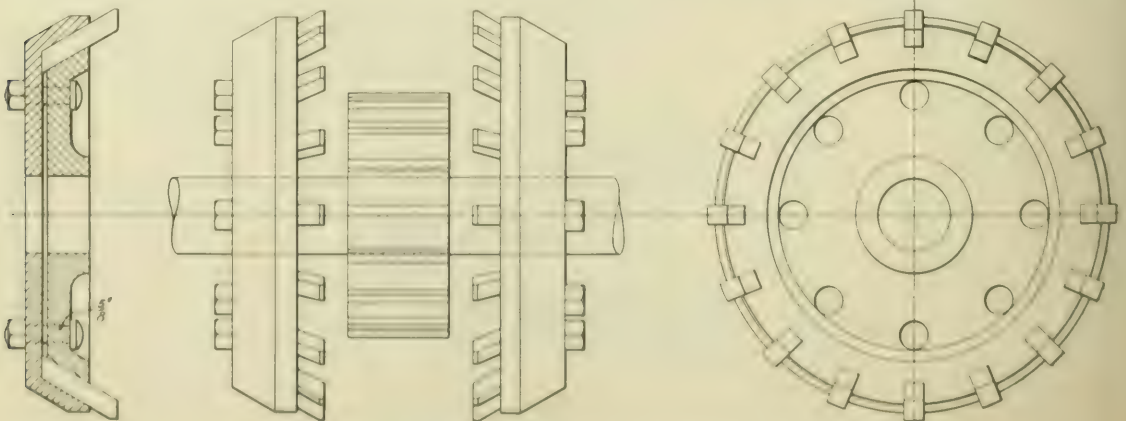


Fig. 23—Gang Milling Cutter for Shoes and Wedges and Crosshead Gibs.

was done with the saving of \$1.85 on each pair. It has also been used in flanging several straight crown sheets and a large amount of car work. The work is all handled cold.

SLOTTER OR LATHE BRAKE.

This device, shown in Fig. 27, enables the operator to stop a machine at any point, thereby saving the time and labor necessary to pull the belt. A substantial brake of this kind is important on a slotting machine. The brake, which is applied to the large step of the cone, consists of an expansion ring of 3-in. x 1/2-in. steel, formed to a circle 1/2 in. less in diam. than the inside of the cone. On the outside of this ring a band of wood fiber is riveted, which latter makes the friction contact. A compression spring and a dog are arranged to apply and release the brake. The block, which is riveted to one end of the band, is slotted to admit a cam or eccentric-shaped dog, keyed or pinned

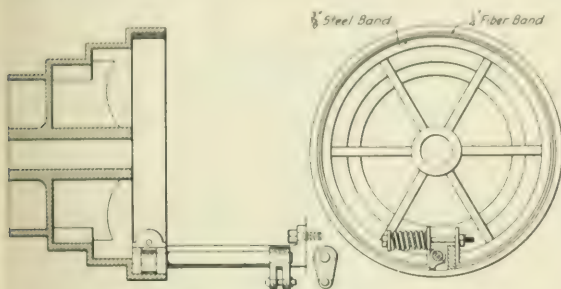


Fig. 27—Brake for Slotter or Lathe.

to the shaft. Through a series of bell cranks and rod connections the hand lever for operating this brake can be placed in any convenient position. The same idea is applicable to wheel lathes by reversing the action or contracting the band instead of expanding it, as the brake must be applied externally to the largest step of the cone.

OLD MAN FOR BOILER SHOP.

A useful tool for staybolt drilling is shown in Fig. 28. It may be very successfully used in wide fireboxes. Two motors may be used at the same time, as two arms are provided. It is easily possible to drill over a wide range without changing.

The shaft, made to suit any size firebox, is of 1 1/4-in.

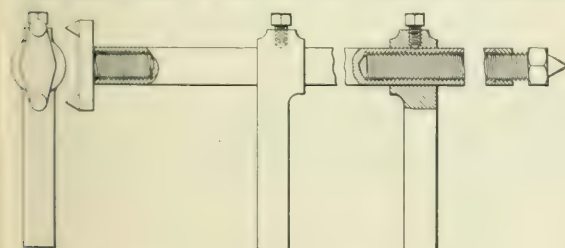


Fig. 28—Old Man for Boiler Shop.

double strength pipe. The double point end is welded in the pipe. The other end screws into the pipe and when adjusted may be securely clamped by the use of a jam nut. Wrought iron arms are slipped on the shaft and secured by set screws.

In the case of a locomotive which went into the roundhouse with 27 broken staybolts in the firebox, this old man was used and the bolts drilled out in an hour and 50 minutes.

THIRTIETH COLLECTION.

BY JOHN V. LE COMPTE.

Assistant Foreman; Baltimore & Ohio; Baltimore, Md.

ECCENTRIC MANDREL FOR BORING MILL.

A rigid mandrel with an adjustable throw, for use in turning eccentrics on a horizontal boring mill, is shown in Fig. 29. The shaft of the mandrel being solid, is adapted only for eccentrics

of a given bore. The eccentric is placed on the shaft of the mandrel and is held from turning by the nut on the shaft. The lug on the bottom of the mandrel slides in a slot in the base, thus providing for the adjustment of the eccentricity by means of the adjusting screw. The base may be graduated to facilitate adjustment to any desired throw. The table of the boring mill is grooved to accommodate the annular boss on the base of the mandrel, which is clamped to the bed through the four lugs shown. After two or three eccentrics are applied to the mandrel, depending upon their diameter

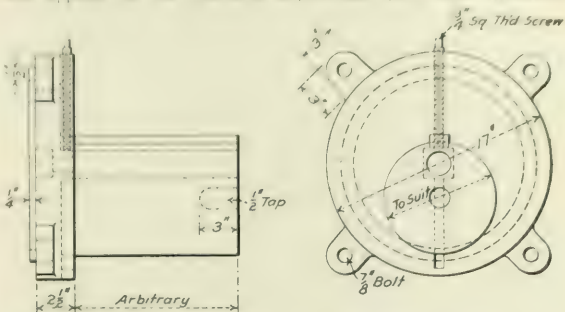


Fig. 29—Eccentric Mandrel for Boring Mill.

and the height of the mandrel, which latter may be made to suit any conditions, a heavy washer is placed over the top eccentric and clamped to the mandrel by a 1 1/4-in. bolt. The following results have been obtained with this mandrel on a 42-in. Gisholt boring mill, using both heads. In a day of 10 hours, 18 eccentrics, 17 in. in diameter, 4 1/2-in. face, with 2 1/2-in. boss, making the width 7 in., were finished. Two eccentrics were applied at a time, making nine separate operations. This method increased the output for this size eccentric by 45 per cent. On another day of 10 hours, 22 eccentrics, 14 5/8 in. in diameter, 4-in. face, and without a boss, were turned. Three eccentrics were applied at a time. This method increased the output for this size eccentric by 54 per cent.

DRIVING BOX BORING BAR.

A double tool boring bar for finishing driving box bearings is illustrated in Fig. 30. The lower end of the bar fits in a bushing in the table of the boring mill. The head carries two tools, one for roughing and the other for finishing, both of which are made of 1-in. square steel. The finishing tool is first applied and about 1/4-in. depth of metal removed in order to get the proper size. The roughing tool is then adjusted to

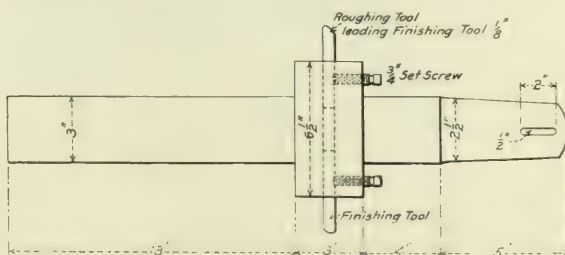


Fig. 30—Driving Box Boring Bar.

leave 1/2-in. to be removed by the finishing tool and set to lead the finishing tool by 1/8-in. This operation therefore roughs and finishes the bearing simultaneously. After the box is finished the tool is moved back to the top and the box revolved once to make sure it has not been moved while the cut was being taken.

Before the box is removed it is moved from 1/4 in. to 3/4 in. away from the center and a cut run through to remove the metal below the horizontal diameter line and at the retaining shoulder, thus eliminating the necessity of any chipping in the erecting shop in order to get the box to fit down over the journal. The entire operation saves about 50 per cent. of the time

formerly required for doing this work. This tool is used on a Niles-Bement-Pond boring mill.

OIL CELLAR BORING CHUCK.

A four-tool chuck for boring oil cellars and grease lubricators is shown in Fig. 31. This chuck was devised to do the work formerly handled by a single tool boring bar used on a

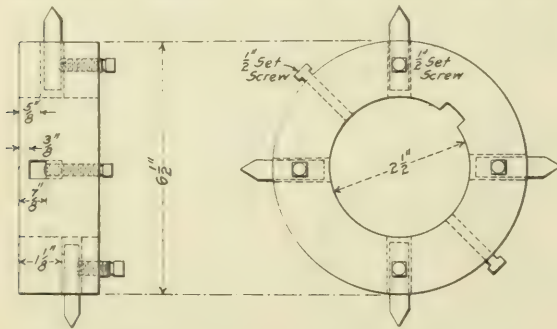


Fig. 31—Oil Cellar Boring Chuck.

horizontal mill. The chuck carries four independent tools made of 1-in. square steel, which are held rigidly in place by set screws and are easily adjusted. The practice is to have the cellar fit within $\frac{1}{8}$ to $\frac{1}{4}$ in. of the journal to prevent unnecessary waste of grease and oil. As the journals are allowed $\frac{1}{2}$ in. limit of wear it may require a cut of $\frac{1}{8}$ in. or more to bore the cellar to fit a new axle. The four cutters are adjusted at different lengths in order that each may do its proportionate share of the cutting. This chuck is of simple design, yet it has increased the output to 25 cellars per day and decreased the cost of this work about 20 per cent.

THIRTY-FIRST COLLECTION.

BY K. J. LAMCOOL,

Special Apprentice; Chicago, Indianapolis & Louisville; Lafayette, Ind.
Credit also due J. S. Naery, Jr., Special Apprentice.

CAR WHEEL AND AXLE HOIST.

An overhead traveling hoist used for loading and unloading wheels and axles is shown in Fig. 32. It consists of two tripods, the legs of which are made of 3-in. gas pipe, and are fitted to

cast iron shoes at the bottom. These shoes rest on blocks of stone 20 in. square, which are let into the ground and set in concrete. The bolts which hold the shoes are let into the stone and leaded. The castings at the top are made to hold the three legs and the ends of the two I-beams, which are 5-in. high and 30 ft. long. These I-beams are trussed on the under side with $\frac{7}{8}$ -in. rods. The trolley has four wheels, 12 in. in diam., and axles $1\frac{1}{2}$ in. in diam. A Y-shape hanger is suspended from the axles and between the I-beams; it is made of $1\frac{1}{4}$ -in. x

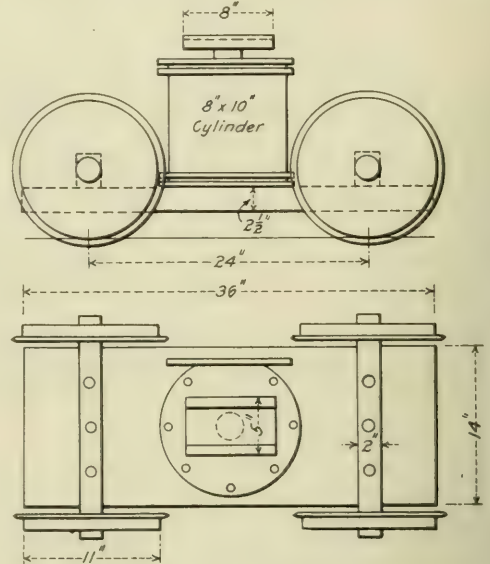


Fig. 33—Lifting Jack for Use at Car Wheel Lathe.

$4\frac{1}{2}$ -in. iron. The air cylinder is 10 in. in diameter and has a 5 ft. stroke. The wheels are stored on a number of parallel tracks, which run at right angles to the yard track over which the wheels are brought to storage. A 20-in. gage track runs from the machine shop, through the center of the storage yard and parallel to the yard track. This divides the storage space into two parts, one of which is used for receiving and the other

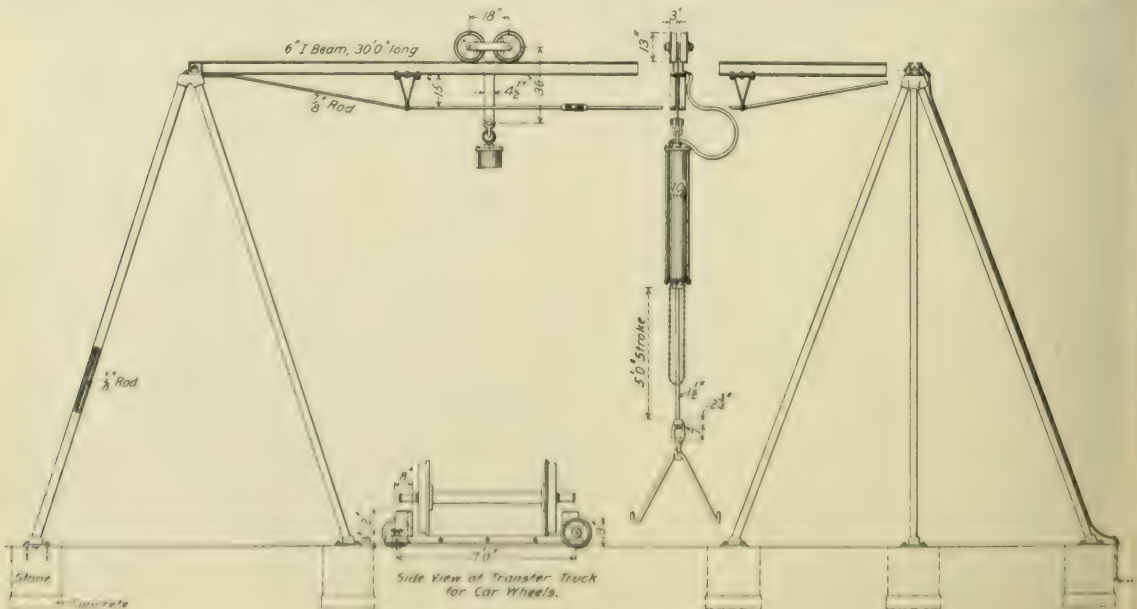


Fig. 32—Car Wheel and Axle Hoist.

for shipping wheels. The wheels are taken from the receiving side of the storage yard to the machine shop and returned to the shipping side of the storage tracks on the small truck shown. With this hoist two men can load or unload a car of from 14 to 18 pairs of wheels in from 15 to 20 min.

WHEEL AND AXLE JACK

The lifting jack, Fig. 43, is for use at a wheel lathe. The 8-in. x 10-in. cast iron cylinder is bolted to a heavy wooden plank. A piece of boiler steel, formed to fit the axle, is carried by the piston rod. Wheels are run in on the 20 in. gage track from the storage yard, mentioned above, and are run over the hoist which elevates them to proper position in the lathe.

OIL BURNER.

Two oil tanks, 12 in. x 33 in., set on two-wheeled trucks, are used in welding frames in position. Four to five gals. of oil

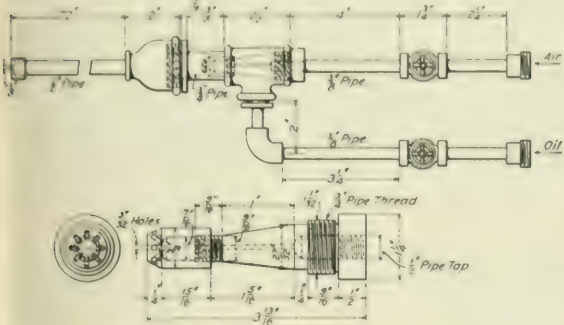


Fig. 34—Oil Burner.

per tank at 180 lbs. air pressure are required to make the average weld. A frame 5 in. x 5 in. and one 2½ in. x 12 in. have been successfully welded in these shops by this method. The drawing, Fig. 34, shows the general design of the burner used.

BORING BAR.

The boring bar shown in Fig. 35 may be used for either cylinders or piston valve chambers. It is operated by an air motor, the spindle being geared to the main shaft of the motor. The feed is operated through the $\frac{11}{16}$ -in. diam. lead screw, actuated by the star wheel. The bar is held in position by the two heads which have shoulders to fit the bore of the piston valve chamber or cylinder. These heads are clamped to the cylinder.

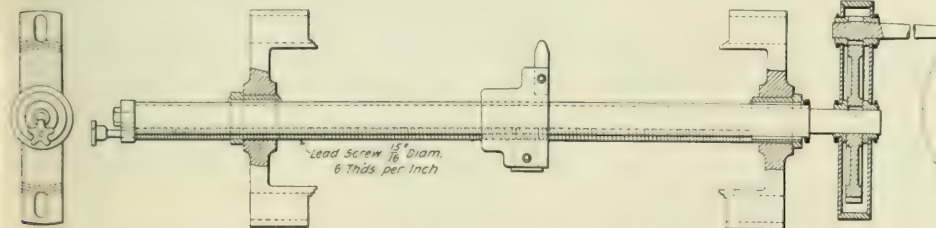


Fig. 35—Boring Bar for Cylinders or Piston Valve Chambers.

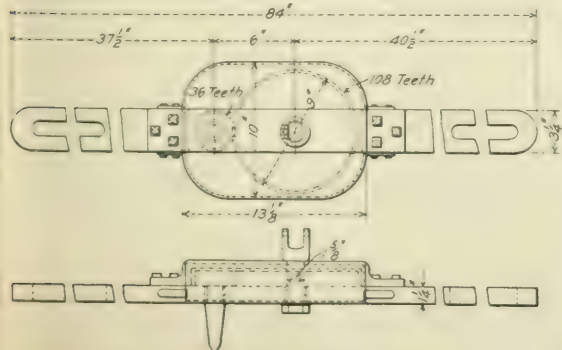


Fig. 36—Gear Box for Flue Cutter.

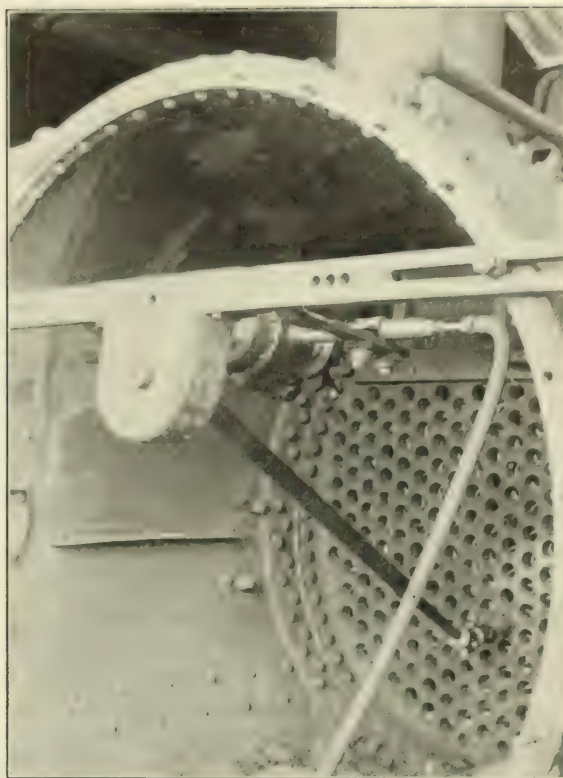


Fig. 37—Apparatus Adjusted for Cutting Flues.

FLUE CUTTING.

The apparatus for driving a flue cutter and the way in which it is applied are shown in Figs. 36 and 37. The gears for reducing the motor speed are in a sheet iron case which is attached to the slotted bar. The bar which transmits the motion

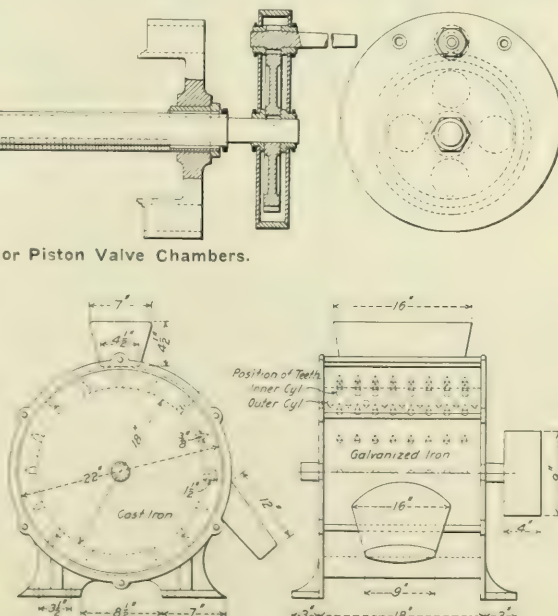


Fig. 38—Waste Picker.

to the flue cutter is in three parts, connected by knuckle joints, thus making it flexible and allowing the cutter to be changed from one flue to another without adjusting the gear box. The machine is operated by an apprentice.

WASTE PICKER.

A waste picker used for repicking the old waste shipped to the main shop from various points on the road is shown in Fig. 38. This device not only loosens up the waste but also removes the cinders and gravel. The cast iron cylinder, 18 in. in diam., carries on its outside 16 rows of $\frac{3}{8}$ in. teeth. The cylinder is inclosed in a galvanized iron casing, which has four rows of teeth which fall between those on the cylinder. Old waste is fed into the picker through the hopper at the top and is discharged through the chute.

THIRTY-SECOND COLLECTION.

BY A. S. WILLARD,
Foreman, Norfolk & Western, Crewe, Va.
LINK BUSHING MANDREL.

A mandrel for turning bushings of various kinds and sizes, especially for motion work, is illustrated in Fig. 39. The nut and sliding portion are removed, the mandrel inserted in the

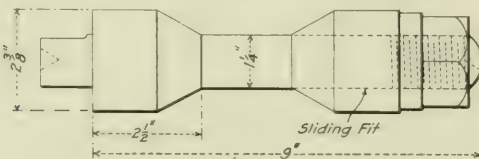


Fig. 39—Link Bushing Mandrel.

bushing, and the sliding portion and nut re-applied and tightened sufficiently to prevent the bushing from turning. The mandrel is made of tool steel and the conical portions are case hardened. The time and labor required for doing this work have been reduced about 50 per cent. by the use of this style of mandrel.

HEAVY DUTY BORING AND TURNING TOOL.

A heavy duty boring and turning tool for use on engine lathes is shown in Fig. 40. It is used in place of the tool post and is clamped to the slide rest by two $\frac{3}{4}$ -in. bolts as shown in the drawing. After the holder is placed in position it is un-

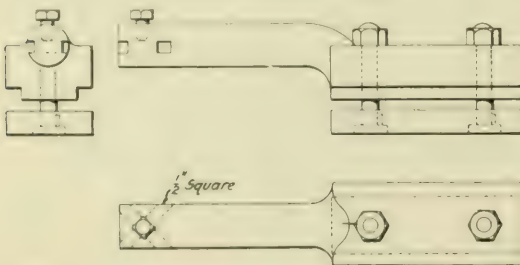


Fig. 40—Heavy Duty Boring and Turning Tool.

necessary to remove it for grinding the cutter, which may be easily removed and replaced by slackening off and tightening the set screw. The cutting tool is made of $\frac{1}{2}$ -in. square tool steel and may be set to bore on either side. The time consumed in turning rod bushings, for which it is used almost entirely, has been reduced about 35 per cent.

PNEUMATIC HAMMER.

The pneumatic hammer, Fig. 41, is especially useful for removing main rod and frame bolts. Air is admitted through the valve A, under the telescopic piston, forcing the head against the bolt. By alternately opening and closing the valve B, air is admitted and exhausted from the cylinder C, projecting the hammer against the anvil, which is in contact with the bolt. This hammer will strike a blow varying from 800 to 1,000 lbs. A great saving is made in both time and material, as a bolt is very seldom damaged when removed in this way.

STUD WRENCH.

A steel tool used for applying and removing stud bolts is shown in Fig. 42. A $1\frac{1}{2}$ -in. hole is drilled in the center of the hinged portion, and teeth are filed along half of the circle opposite the hinge pin. The swinging portion is slotted to re-

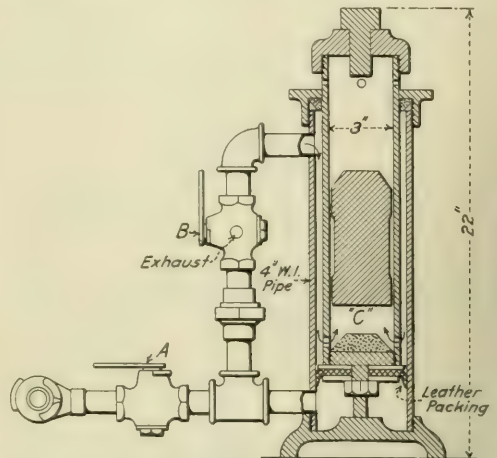


Fig. 41—Pneumatic Hammer for Removing Frame Bolts. ceive the lever, which also has teeth filed on a circular end. The swinging part and the end of the lever which engages the stud are case hardened. The ease with which this tool can

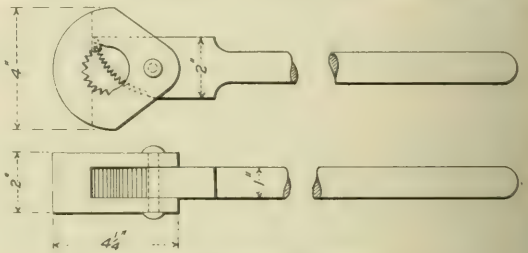


Fig. 42—Stud Wrench.

be adjusted, its simple construction and great strength as compared to the ordinary alligator or Stilson, make it an efficient and useful tool.

STACK CRANE.

The light stack crane, Fig. 43, is made of wrought iron, the trolley rail being $\frac{3}{4}$ -in. x $2\frac{1}{2}$ -in. bar iron, to which is welded a rod 1 in. in diameter that extends back to and down the top of the stack. The trolley rail has a forked end to fit the

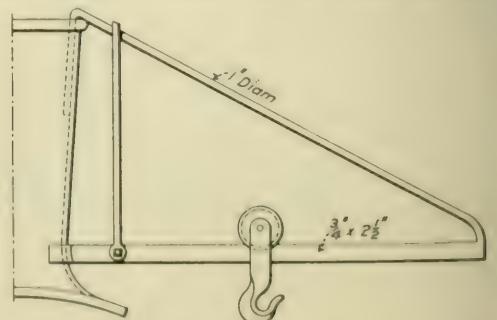


Fig. 43—Stack Crane.

base of the stack and carries a trolley wheel with a suitable hook for attaching a block and fall. This device is used for lifting steam chests, pistons, cylinder heads, etc. It is handled by one man, who can do the work formerly done by three men.

THIRTY-THIRD COLLECTION.

BY C. J. DEERY.

General Roundhouse Foreman, Architects, Engineers & Surveyors, Allentown, Pa., and New York, N. Y.

BLADE BENDER.

A simple blade bender, Fig. 44, can be made at a cost of \$2.25. Instead of employing the old method of twisting and bending with heavy apparatus and using heavy wrenches, this simple kink can be operated with a 12-in. wrench. Special attention is called



Fig. 44—Blade Bender.

to the short bends possible and the close places in which the bender can be operated. The slip yoke is moved along the blade so that an adjustment can be quickly made for a bend at any point. It is a cheap and handy kink for use on eccentric blades, reach rods, lifting arms, etc.

DEVICE FOR RESEATING CHECK VALVES.

This kink, Fig. 45, can be made at an expense of about \$1.50.



Fig. 45—Device for Reseating Check Valves.

The sticking of boiler checks is one of the chief troubles in a roundhouse, and is especially annoying and expensive if it happens when a locomotive is ready to go out. The simplicity of

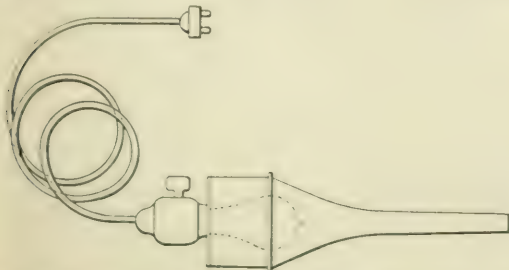


Fig. 46—Device to Facilitate Taking Piston Valve Port Openings.

the device is at once noticeable, both as to its design and its use. The branch pipe is disconnected, the device placed as shown and the handle operated until the scale or other foreign matter, which holds the check valve from its seat, is released and blown out. It often saves the expense of knocking fires and blowing off boilers to repair the check.

DEVICE TO FACILITATE TAKING PISTON VALVE PORT OPENINGS.

Most machinists know what trouble is experienced in taking the port openings on a piston valve locomotive when steam is up. The device shown in Fig. 46, which can be made for 75 cents, greatly assists in this work. An indicator plug is removed and the small end of the device inserted. It is provided with an electric light and the opening can be plainly seen, regardless of the steam. No guesswork is necessary, as is the case when using pieces of tin or wire to catch the openings.

THIRTY-FOURTH COLLECTION.

BY GUY A. ADAMS.

Foreman, Freight Car Shop; Boston & Maine; Concord, N. H.

CLOSE-QUARTER DRILLING ANGLE.

The device shown in Fig. 47 is used for doing close-quarter drilling in connection with the work of splicing sills. That por-

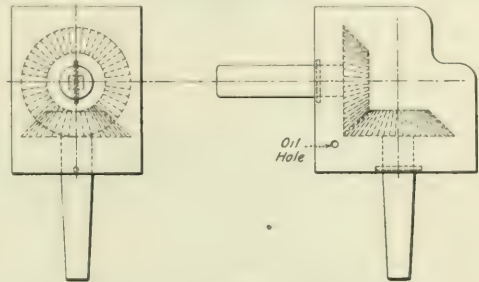


Fig. 47—Close Quarter Drilling Angle.

tion of the sill which remains on the car cannot be reached without some device of this kind. The bevel gears are 1 in. in diameter and enclosed in a light casing. In using, the casing is held in the right hand and the Little Giant motor in the left hand. A short shank is welded on the bit, and is held in the socket of one shaft, while the other is tapered to fit the socket of the motor.

CYLINDER AND RESERVOIR WINDLASS.

A handy device for elevating and holding the air cylinders and reservoirs of freight cars in place for bolting is shown in

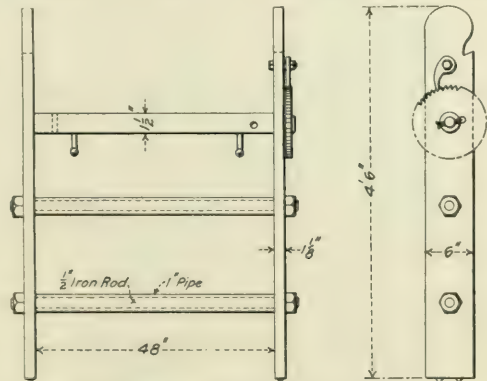


Fig. 48.—Cylinder and Reservoir Windlass.

Fig. 48. The frame consists of two oak pieces, 1 1/2 in. x 6 in. x 4 ft. 6 in. They are spaced about 48 in. apart by pieces of 1-in. pipe and are held rigidly together by 1/2-in. iron rods, which pass through the pipes. The tops of the uprights are rounded off and notched to grip the corner of the side sill. Metal points in the feet of the uprights prevent slipping. The drum of the windlass

consists of a $1\frac{1}{2}$ -in. pipe, at the end of which is a ratchet and pawl. When using, the device is set up at the side of the car, the notches gripping the corners of the side sills. Two pieces of 1-in. rope, about 18 ft. long, are spliced to the two eye bolts on the $1\frac{1}{2}$ -in. pipe. The loose ends of these ropes are fitted with hooks. These ends are passed over the truss rod to the ground. The cylinder, or reservoir, is then placed on the ropes, the ends of which are passed up and hooked over a piece of pipe placed parallel to the side sill to which the cylinder, or reservoir, is to be bolted. This pipe extends from one cross beam to another.

The slack in the rope is taken up and the cylinder lifted to position by using a bar in the holes in the drum. With this device it is easily possible for two men to do the work, which formerly required three.

CENTER AND SIDE-BEARING DEPTH GAGE.

A depth gage for adjusting center and side bearings on trucks is shown in Fig. 49. It consists of a piece of $\frac{7}{8}$ -in. material, 6 ft. long x 6 in. wide. The ends are shaped as shown in the draw-

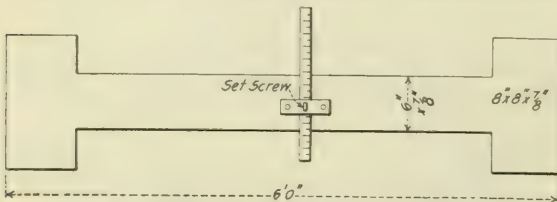


Fig. 49—Center and Side Bearing Depth Gage.

ing. An adjustable scale is located at the center of the gage. In using this device the ends rest upon the side bearings. The scale is then moved into contact with the center plate, indicating the thickness of the liner required.

WINDLASS FOR RESERVOIRS ON NEW CARS.

The drawing, Fig. 50, shows a simple device which is a time-saver in putting up air cylinders and reservoirs on new freight equipment. The drum consists of a piece of $1\frac{1}{2}$ -in. pipe, 10 ft. long, the end of which is provided with an oak crossbar about

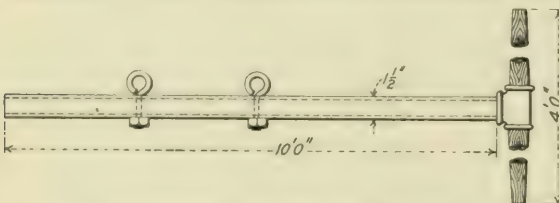


Fig. 50—Hand Windlass for Reservoirs.

4 ft. long. This device is applicable only on new cars and is used before the flooring is laid. It is placed across the sills, and a piece of rope or chain is passed around the reservoir or cylinder, lying on the ground, and fastened to the windlass drum at the eye-bolts shown. By revolving the handle, the cylinder, or reservoir is elevated to position. Using this device, two men can place the cylinders and reservoirs on six cars in 30 minutes.

HANDLE GOUGE

A handle gouge used for cutting channelways for truss rods, on the under side of flooring and across body bolsters or tran-

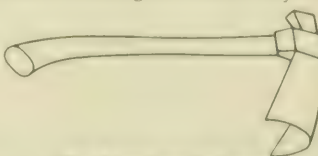


Fig. 51—Handle Gouge.

soms of freight cars is shown in Fig. 51. It is made from an ordinary Dabber's adz, the blade of which is dressed into the semi-circle, as shown, with about $\frac{3}{4}$ in. radius. This tool is very popular, doing the work which formerly was performed with a mallet and hand gouge.

THIRTY-FIFTH COLLECTION.

BY JAMES STEVENSON.

Foreman; Pennsylvania Railroad; Olean, N. Y.

PISTON EXTRACTOR.

A piston extractor of unusual strength and one which will draw pistons without damaging the crosshead is illustrated in Fig. 52. The piston is first drawn back to its striking point. The

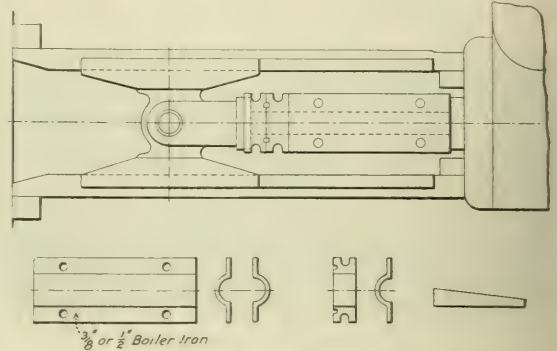


Fig. 52—Piston Extractor.

long two-piece sleeve is applied to the rod, bearing against the packing gland. The two collars are then applied at the crosshead end of the rod. The halves of the collars are held together by bolts. Taper keys are driven in the ways between the collars to draw the piston.

CYLINDER HEAD TRUCK.

A handy truck for handling front cylinder heads and placing them in position on the cylinders is shown in Fig. 53. The cylinder head is placed on the truck with the stud for the cylinder head casing projecting through the slot in the $\frac{3}{8}$ -in. plate. A washer and nut are placed on the stud to hold the head on the

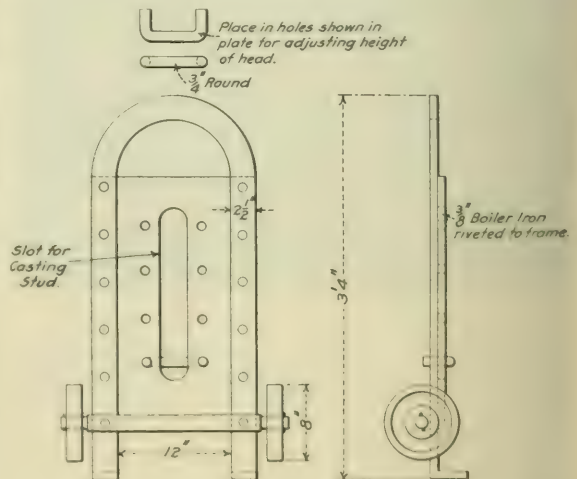


Fig. 53—Cylinder Head Truck.

truck. The head is then adjusted so that when raised the studs will enter it correctly. The truck is lifted to the position shown in the drawing. The head may then be raised to the proper height by using a bar in the slot and held there by placing one of the U pieces in the holes underneath it. By moving the truck forward the head can then be slipped over the studs.

CLEANING SHOP WINDOWS

A method of cleaning shop windows with the aid of an air motor is shown in Fig. 54. A stiff brush is held in the socket



Fig. 54—Cleaning Shop Windows.

of the motor and, after dipping in benzine, is run over the window glass. A soft, dry brush is used for polishing after the glass has dried.

THIRTY-SIXTH COLLECTION.

BY S. S. LIGHTFOOT.

Bonus Demonstrator: Atchison, Topeka & Santa Fe, San Bernardino, Cal.

STAYBOLT CHUCK.

A chuck for applying and removing staybolts with an air motor or wrench is shown in Fig. 55. The chuck is made of machine steel, with hardened tool-steel jaw, or grip, and is designed to handle staybolts up to $1\frac{1}{4}$ in. in diameter. The jaw is set tangent to the center hole, as indicated by the sketch and is provided with both right and left-hand teeth for gripping the bolt in either direction. The jaw is made tapering, with the thick end at the bottom, to take different size bolts. The thickness

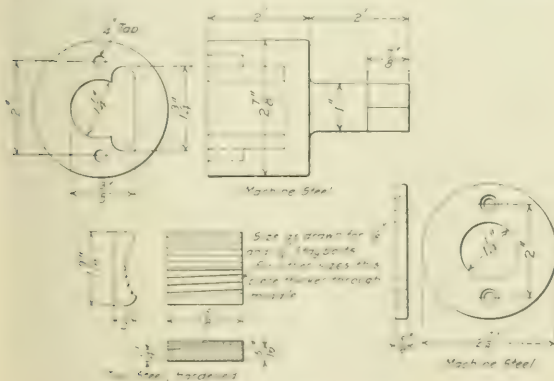


Fig. 55—Staybolt Chuck.

through the center section is varied, according to the diameter of the bolt. A $\frac{1}{8}$ -in. washer attached by two $\frac{1}{4}$ -in. setscrews holds the jaw in place. This chuck is simple, strong and efficient. Its action is positive in either direction and there are no moving parts to break or get out of order. The jaws are interchangeable and are quickly removed and replaced.

GASKET CUTTER

A gasket cutter of special design is shown in Fig. 56. It is turned from tool steel and may be used either by hand, with a special machine, or with an air hammer. The cutting edges are

turned to size and carefully hardened. A coil spring operates the steel plug in the center and also the four $\frac{1}{4}$ -in. pins in the annular space between the cutting edges, for removing the center piece and the completed gasket. A ring with four set screws, having $\frac{1}{8}$ -in. ends bearing on the ends of the $\frac{1}{4}$ -in. pins, is fitted to the cutter, as shown. A steel

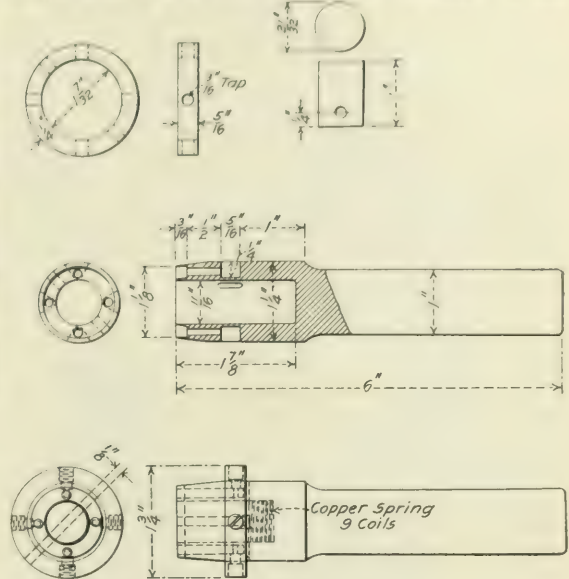


Fig. 56—Gasket Cutter.

plug $\frac{1}{2}$ in. in diameter, is mounted on a $\frac{1}{8}$ -in. pin extending diagonally through the cutter and the ring. Slots are made in the cutter to allow movement of the plug on the pin. When pressure is applied to the tool and the gasket is cut, the plug is forced back against the coil spring. Upon releasing the pressure, the coil spring forces out the plug, the collar and the pins, which in turn push out the center and gasket. As this is automatic, gaskets can be cut very rapidly.

MOLDING GREASE FOR ROD CUPS.

A press for forming solid grease candles or sticks for rod

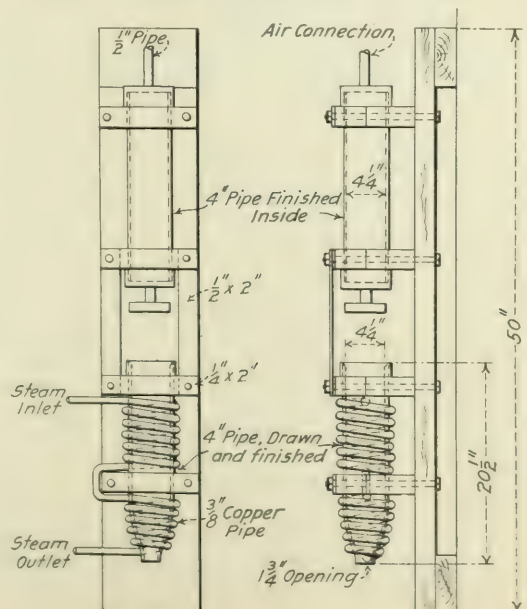


Fig. 57—Press for Molding Grease for Rod Cups.

cups is illustrated in Fig. 57. There are a number of presses made for this purpose, but the one shown has at least one feature which makes it far more efficient than other designs. A 4-in. pipe is finished inside and provided with a piston and forming head. The cylinder is mounted vertically on a 2-in. plank and the usual connections arranged to operate it with air. Just below the power cylinder is a similar cylinder drawn down at the lower end to a 1½-in. opening. Around it is wrapped a coil of ¾-in. copper pipe, forming a steam radiator for warming the former and the grease within. The heat reduces the density of the grease and makes it much easier to mold or form.

PACKING RING EXPANDER AND CONTRACTOR.

A device for expanding or contracting cylinder packing rings is shown in Fig. 58. They are turned to standard sizes and it frequently happens that the nearest size ring does not quite fit the cylinder. In order to make a perfect fit the ring may be altered by the use of this device. Three hardened rollers, 3 in. in diameter, are arranged as shown. The upper roller can be

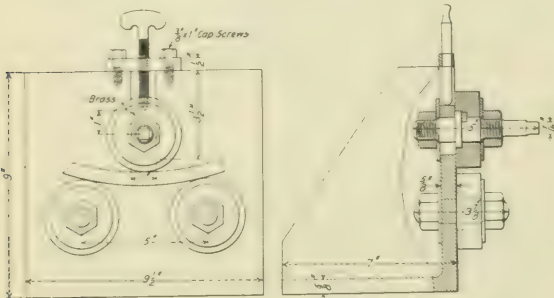


Fig. 58—Packing Ring Expander and Contractor.

adjusted vertically by a thumb-screw, and it is also keyed to a center pin, or shaft, with a square head, so that it can be turned with a crank. If the ring be too large it is placed in the device with the rollers in the position indicated and by adjusting and rotating the upper roller the circumference of the ring may be reduced in a manner similar to that of a boiler sheet in the rolls. Adjustment of the screw gives proper curvature. If the ring be too small, it is placed between the rollers in the reverse position and the circumference enlarged.

TOOL HOLDER.

A shop-made tool holder for use in lathes is shown in Fig. 59. It is made of machine steel for all sizes of lathe tools and designed to hold the tool at the proper angle and form a rigid sup-

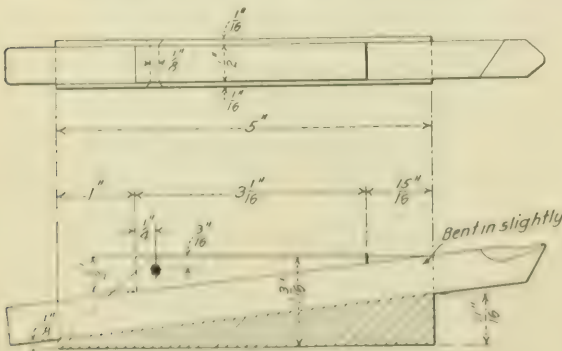


Fig. 59—Tool Holder.

port for the cutting edge. This will allow small-size high-speed tools to be used on heavy work without vibration and chatter. The economy in high-speed steel is also an important point. The

holder is clamped in the tool post and the wedge hinged on a pin is arranged above the tool and clamped down upon it.

PNEUMATIC HOLDER-ON.

A pneumatic holder-on for use in driving rivets and staybolts is shown in Fig. 60. The cylinder is made from a 4-in. pipe, 10 in. long, and is provided with a piston, on the rod of which snaps can be adjusted, depending on the size and kind of rivet or bolt driver. The piston head is fitted with a leather gasket. A ½-in.

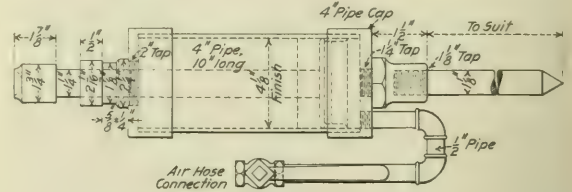


Fig. 60—Pneumatic Holder-On.

air pipe is tapped through the back head and has suitable valves for regulating the air supply. The backhead is provided with a socket for receiving centers of different lengths. This piston receives the impact of the air hammer through the rivet and compresses the air in the cylinder. This causes a reaction of the piston for each stroke of the hammer, and the tool serves the double purpose of holder-on and hammer.

SPECIFICATIONS FOR STAYBOLT IRON.

The following specifications for staybolt iron have been recommended by a committee of the American Society for Testing Materials, and have been submitted to letter ballot for adoption as standard practice by that association:

Process of Manufacture.—All staybolt iron must be hammered or rolled from a bloom or a box-pile having a cross-sectional area of at least 45 sq. in., and not less than 18 in. long, the basis of which must be pig metal and entirely free from any admixture of steel.

Physical Tests.—Tensile strength, not less than 48,000 lbs. per square inch. Elongation, not less than 28 per cent. in 8 in. Reduction of area, not less than 45 per cent. Double bending test, close in both directions without flaws. Nick and break test, a bar, nicked all around to a depth not less than 8 per cent. and not more than 16 per cent. of the diameter of the bar, and broken, shall show a clean fiber entirely free from crystallization. Vibration test, the test bar shall stand a minimum of 6,000 revolutions when subjected to the following vibratory test: A threaded specimen, fixed at one end, has the other end moved in a circular path while stressed with a tensile load of 4,000 lbs. The circle described shall have a radius of ⅜ in. at a point 8 in. from the fixed end of the specimen.

Inspection.—The iron must be smoothly rolled and free from slivers, depressions, seams, crop ends and evidences of being burnt. It must be truly round within 0.01 in., and must not be more than 0.005 in. above or more than 0.01 in. below specified sizes.

Selection of Samples for Test.—The bars will be sorted into lots of 100 bars each, and two bars will be selected at random from each pile. Failure of either of these bars to meet any of the above specifications will be cause for rejection of the lot which the tests represent.

During 1909 attention has been given to the question of electrifying the Chilean government railway between Valparaiso and Santiago, 114 miles. It is proposed to complete double tracking this line before equipping it for electric operation. An Italian company has offered to electrify the line and to take its pay out of the profits in excess of what was earned on the operation of the road by steam. It is thought that this offer may be accepted before the end of 1910.

HOW A FOREMAN CAN PROMOTE SHOP EFFICIENCY.*

BY AN "OLD RAILROADER"

This article will relate largely to the handling of locomotives at terminals in the least possible average time and at the lowest cost for handling, and for running repairs.

Hostlering.—The foreman must commence at the ashpit by selecting good men and training them to handle the engines promptly and to always be on the alert to note the condition in which they are left by the engineers; first, as to water in both boiler and tank; second, as to the condition of the flues and the firebox; third, as to the amount of fire and also the steam pressure. Neglect of any one of these items may cause the needless drawing of fires and consequent handling of dead engines over the ashpit and the resulting delays. They should also report any defect they may find while cleaning the fires, as there is a question whether the engineer or the inspector will report it; they should be careful in the handling of engines to avoid the breaking of bumpers, pilots, etc., and also to see that in the handling of two or more engines when coupled the brakes are not set and the reverse bar of the dead engine is in such a position that there will be no possible chance of flattening tires, as has occurred quite frequently of late with the heavy power. The leading hostler should at all times have his work in such shape that in case a quick move is wanted of any particular engine he can handle it.

Coaling and Sanding.—The men in charge of the coaling station should be selected with great care. In some cases there are three or four kinds of coal to be delivered to the engines, the grade of coal to be used depending on the run. At some terminals from $\frac{1}{2}$ to 2 or 3 tons of coal are dropped off the tender for every engine coaled, and laborers are used continually to gather it up and in shoveling it off of the manholes of the tanks. This is also true of the sand; it is scattered over the guides, driving boxes and valve gear, causing the cutting and heating of journals, etc.

The man in charge of the coaling station can reduce expenses considerably by paying close attention to the ordering of coal and sand. A delay in furnishing it may be the cause of considerable delay and expense, as engines that have to be put in the house without coal and sand will be delayed in getting out, and block the movement of other engines.

Inspection.—The inspection of locomotives as they come in over the ashpit or inspection pit is another important matter. Inspectors should be able to read and write, and should be taken from the most advanced helpers in the department to which they are assigned; they should be well acquainted with their work in order to make an intelligent report. As a rule, at present, any one can get a job inspecting, even if he does not know the front from the back end of a tender or engine; the reason for this is that the pay is small. The natural result is that in a week or so an accident happens, and in order to place responsibility for it the mechanic that had occasion to work on the tender or engine before the failure occurred is held responsible. The inspector does not care, as he can get another job at the same pay as a laborer. The mechanic has to stand a 10-day or longer suspension or is discharged, because of the neglect of proper inspection. The foreman should demand a rigid inspection of every part of a locomotive, from the pilot to the rear coupler of the tender, and when it is done he should see that all repairs are made before allowing the engine to leave the house. He must impress on the foreman under him that the work must be done, and done well. At this point some one will say, "They want the power." This may be true, but I feel safe in saying that no superintendent or trainmaster will demand a broken-down engine, or one that will fail just outside of the yard limits. Right here is where the engine house foreman gets into trouble.

It is a mistaken idea for him to think for one moment that he is doing his duty by giving out a crippled engine when there is a demand for power. If the engine is not ready he should be man enough to say so. If he is a weakling when it comes to an order from the superintendent and sends out a crippled engine, and there is a breakdown, causing delays and possible loss of life, it takes a lot of explaining and at times in order to save himself some one must lose his position.

Reporting an Engine for Service.—Assuming that the engine has reached the roundhouse or repair shop, and that all reports are distributed, the work is now up to each individual foreman. They should all work hand in hand, and not be stumbling blocks in each other's way, as upon the intelligent handling of work reports depends the amount of time the locomotive will be held in the engine house. It seems to be generally understood that when the fire is not out the machinist gang foreman should report the engine ready for service; nine times out of ten he takes no account of other repairs than his own. This method results in the engine being delayed after the crew is on it, due to other work not being done. If the fire is out for boiler work, the boiler foreman gives the time he expects to be done and hardly ever consults any one else as to whether their work is done or not. These are two causes of increased expense, both at the terminal for labor and time of the crew and on the entire division due to delays to other train crews.

Importance of Employing High-Grade Inspectors.—The efficiency of any shop can be promoted by getting good men for inspectors; the foreman should not stand in his own way by using cheap labor on this work. The best men only should be selected, and preference should be given to crippled mechanics who cannot do other work. This holds true also of crippled engineers or firemen, as they know the importance attached to the work and what relation one part of a locomotive bears to another. This cannot be expected of a man just in from the country or mine. It seems to be the rule to hire the latter because of getting them cheap, but the averting of one failure will offset the cost of a dozen cheap men. I am sorry to say it cannot be seen in this light when the management is making reductions. Experience ought to have proven long ago that hiring cheap inspectors, as well as cheap mechanics, is economy at the wrong end.

Value of a Shop Schedule.—The intelligent handling of engines while undergoing repairs in the shop is another matter that the foreman should look into, and never for one day should he fail to keep his foremen acquainted with the dates he has set for getting engines out and of engines that he expects to get in, giving them an idea of the repairs they will require, so that they can look over material on hand and due, and be able to make arrangements accordingly.

Watch the Scrap Bins Closely.—He should also see that no good, serviceable material finds its way to the scrap bins, as this is one of the most fruitful sources of expense, particularly where foreign labor is used for cleaning up the shop. As a general rule they take anything from a cotter pin to a main brass; if questioned it does no good. Their orders are to clean up, and they do it with a vengeance; this results in all small parts having to be fitted up new, which means the running up of charges, both for material and labor, sometimes over 100 per cent. I will venture to say a visit to any scrap bin the morning after a shop cleaning, let it be the regular one or one made when an inspection is expected, will prove that I am stating facts. I had occasion to go by a scrap bin some time ago, and in looking it over saw a blowoff cock, that costs at wholesale close to \$5.50. I knew at the time that these were repaired at a cost of \$1.30 each, or a saving of \$4.20 between the cost of a new valve and a repaired one. I called the foreman's attention to it, and he had the scrap gone over and found 24 valves that were in condition to be repaired. This was a saving of over \$100 in about one hour's time.

Stealing Parts from Other Engines.—Another thing that increases repair costs is a practice that I am sorry to say the

*These are articles submitted in the competition on this subject, which closed April 16. Other articles on the same subject appeared in the issues of May 6, June 3, July 1 and August 5, 1910.

greater proportion of foremen favor—that of taking from one engine parts that belong to another, and, in the majority of cases, saying nothing about it. This is a fruitful source of trouble, expense and unnecessary labor, and at times has resulted in the discharge of good mechanics. The following incident shows how easily a foreman can get into trouble: An engine was reported ready for fire at 6 P. M., so that the night men could have it ready to move by morning. When the day foreman came on, the hostler started to take it out, but found that the left valve stem packing was blowing badly. The gang foreman, when asked to explain, stated that the stem had been trued and new packing and a bushing applied, and that he did not understand the reason of its leaking. The hostler undertook to move the engine again, and then the general foreman, who happened along, said there was no packing in the case. To prove it he ordered the case taken off. There was neither packing, bushing nor vibrating cup. It looked pretty bad for the repair foreman, but the master mechanic, coming by on his morning visit, happened to ask what was the matter, and when told about the trouble, said he had been standing beside the engine when the packing was put in the evening before, and could vouch for it. The three went to the roundhouse office and examined the work reports. They found that an engine of this same class had come in that night and the engineer had reported, "Valve stem packing blowing bad and vibrating cup broken." The work report showed who did the work, and, upon questioning, the man admitted that he took it out of the shop engine and supposed his helper had tightened up the packing case or gland again so it would not get lost. Ten days was the net result for him; it would have been a discharge for the foreman. All of the above material could have been secured at the storeroom in five minutes' time, and with no labor, but the rule is, "Let the other fellow get it"; "I will take this, as all fitting and trying is done, and while I am working taking it off of one engine perhaps a heavy job will be passed up to the other fellow," is the mutual resolve of 80 per cent. of the running repairmen to-day, provided their foremen tolerate it, and the other fellow is afraid to go to the "old man" to make a kick for his rights..

I have seen an engine raised up so a set of spring hangers and springs could be taken out to be used on another engine, simply because it was raining and the men would get wet going to the spring rack. Hangers were taken because they did not want to lay off the holes and chip out the gibs. The above are samples of how expenses creep up, both in labor and material; in tolerating such work no foreman can reduce operating expenses.

Carelessness in Removing and Replacing Parts on Engines.—So much for running repairs. The classified are no better in the majority of shops, as to attention paid to material removed while engine is undergoing repairs. When taken off it is thrown down any place, so it is out of the way. It is not even marked as to the side or location on the engine, and no attention is paid to it until the parts are to be assembled; then everybody gets busy, and if it cannot be found the blame is laid on Smith or Brown, of the repair gangs, and a new piece is ordered and fitted up to replace it. The writer can remember, when learning his trade, that once out and laid had to be accounted for when the engine was being assembled. It was considered nearly a case of suspension if a dozen nuts had to be supplied for cylinder heads or steam chests. Now it is different—you can get all you want, and more, without a question. A nut or bolt that was found cut with a chisel in those days was a rare thing indeed. Look in the scrap bin to-day and you will find them, not by the dozen, but by the hundred. The same is true of bolts of all sizes and lengths. No matter where they are taken from they find their resting place in the scrap bin. Ninety per cent. of them can be made again by re-dressing the length, straightening, etc.

What is and above about engine work is also true, in a measure, of our work. Lately there has been a little more attention paid to bolts, brake levers, etc., than formerly, but still an improvement can be made by any foreman who has his company's interests at heart.

Cleaning Up Wrecks.—The handling of scrap at wrecks and the cleaning up afterward, is also done very carelessly. The practice is for all iron to be loaded in cars and consigned to the local storekeeper, who, upon receipt of billing, as a rule, re-consigns to some general repair station, not realizing that there may be engines and cars waiting at his own station for some of the parts that he is shipping 300 or 400 miles away. It is a rare case where scrap is being loaded for any inspection or sorting to be done in order to retain good material.

The above are places where savings can be effected by intelligent foremen and close attention to details, and if looked after as they should be there would be no reason for the carrying of excessive stock for repairs. The money tied up in material could be used for labor in making repairs. At the least calculation, a reduction of 50 per cent. could be made in stock carried at a good many terminals.

Handling of Material About the Shop and Prompt Attention to Repairs.—The portage of material to and from engines to the various shops for repairs consumes considerable time and labor, and should be done in such a manner that there will be no idle trips. It takes as much time to return to the engine with an empty wagon or truck as it does to bring the material for repairs. It is an easy matter for any foreman, when repairs are completed, to make it his business to get the material out of his way and to the engine to which it belongs. If all would do this there would be far more work done and the labor cost would be reduced in proportion. Each gang foreman should keep posted as to the date set for any engine to go out, but should not try to retard it to that particular date. Let him try to get his work done a day, or even two or three days, earlier. There are some who put it off to the last, and always have the answer, "She is not due out till so and so. I have other work to do"—and it often happens that this work is on an engine due to be out perhaps ten days later. The machine and blacksmith shops are always accused of holding back the work, and on the face of it, at first glance, it appears to be true, but I can say from experience that they are not always to blame. Ninety-nine per cent. of the delays charged to these two shops are traceable to the foremen who are continually grumbling about waiting for material. If they had taken the work to them at the proper time and not given incorrect sizes, the work would have been done and the engine out without any delay. This is another place the foreman can promote shop efficiency.

Give Your Men Credit for Doing Good Work.—As to the making of jigs for duplicating parts or quick handling. A good many are being made in nearly all shops, but in rare cases does the man who devises them get credit for it, and he stops at his first effort. Some one else tries some other kink, with the same result, and he stops. Right here is where the management of our railways are losing ground. The man that does not give a machine a thought gets the credit, and it is spread broadcast over the system, while the man whose brains are in the machine, if I may use the expression, is suspended, or perhaps discharged, if he happens to make a mistake while he is studying on an improvement. If the example of private firms was followed and credit given where due, it would not be long until the effects would be seen. A greasy cap, you will always find, covers more gray matter than a silk hat, but the latter gets the credit.

The Preparing and Handling of Men.—It will be seen that the foreman, no matter what his title, in order to promote shop efficiency must take his men in hand, commencing at the asphalt, and train them as to their duties, bearing in mind that his position is only secure as long as he has their good will. This he can obtain without losing any of his dignity as a master mechanic or foreman. In his dealings with his foremen let him be honest and tell each man his faults, not in public, but in his office and do all his reprimanding at the same place. There is nothing that will be resented sooner than public reprimand or scolding, and this also causes the men who hear it to lose any respect they have for the man that forgets himself and shows his temper in such a manner.

If a man makes a mistake or causes trouble of any kind, have him come to the office, and there call his attention to it. You will have far better results than if the other method is used. Another thing that no foreman should ever do is to out a workman off who wishes to speak to him. If you have not time when he approaches you, it is an easy matter to tell him to call at the office, or, better yet, make a note of it and send for him when you are in your office. He may have something which is to your interest and the company's, and it is your place to hear him, and then you can do as you choose in the matter. These points have been brought out from personal experience, and while, no doubt, they are old to some, they may be helpful to others.

BY O. D. BULLOCK.

General Foreman, Car Department, American Trolley & Street Car Co., San Bernardino, Cal.

The first requisite in promoting shop efficiency is harmony among the foremen. While it is true that the individual effort of any one man can accomplish a great deal, still it will be small in comparison to the results that can be obtained by the best efforts of all the foremen working in harmony. Unless this condition exists, the employer will not be getting what is justly due him, and will be much the loser.

Adequate facilities are also a large factor and contribute much or little, as the case may be, to the general efficiency of the shop, but this is far from being all that is required, for we often see shops with very good facilities that have a very poor efficiency, and vice versa. It therefore devolves upon every foreman to make the most of what he has to work with, and to be able to convince his superiors of the great saving he could make and the additional work which could be accomplished with improved facilities.

To be a successful foreman you must be able at all times to command and retain the respect of the men who are under your charge; if you cannot do this you will hardly be in a position to maintain the respect of your superiors.

It is important that you know just how long it should take to do a certain piece of work, and insist upon having the workman complete it in that length of time, otherwise they will take advantage of you. Every foreman must keep up to date as to the best and most modern methods of doing the work, and see that the best possible facilities he is able to obtain are at hand and in condition for doing the work. The highest shop efficiency can only be obtained by specializing the work, and I have often more than doubled the output of the shop by so doing. This requires a constant study of men to determine what class of work they are best fitted to do, and, when this is determined, to see that they are kept on this particular class of work. The longer and oftener a man does a certain job the better the work and the more proficient he becomes. We often hear foremen say, when the specializing of work is mentioned, that no doubt this can be accomplished in many places, but with them it is impossible. They only think so—there are few if any railway shops where specialization has been brought to the maximum point, and where a greater shop efficiency cannot be obtained by educating more specialists; and there are comparatively few shops where we cannot find mechanics and high-priced men performing work that should be done with cheaper help.

I have put laborers in charge of a competent man and used them to do all the jacking up of cars, or to do all the stripping, and have found within a little time they would do it just as well, save just as much material, and do the work in much less time than the higher priced men. By so doing I was able to have a less number of high-priced men, and the ones I did have were much better satisfied, on account of their not having as much of the disagreeable work to do. On the other hand, the laborers were given an incentive, for by proving their ability they would be advanced when an opportunity presented itself. By handling the work in this manner we are able to reduce the number of men worked as well as to utilize cheaper labor.

The successful foreman continually endeavors to educate the men to use their heads as well as their hands. I have noted many

foremen who were wholly indifferent to this; they seemed to think that a man who was always working hard and in a continual hurry was a valuable one, while some other man, who never seemed to be in any special hurry, was of little use. If they had taken the time and trouble to check up and go thoroughly into the work that was performed, they would have found that the man who always seemed to be in a hurry had not accomplished nearly as much work as the other one had. This is where the value of time studies is apparent. Every foreman should know the quickest and best method to perform a certain piece of work, and insist upon having it performed in that manner, seeing that no time is lost in waiting for material or making unnecessary trips for it. If a man does not make as quick time on a certain piece of work as another do not abuse him, but endeavor to show wherein he has failed and try to prove to him that he should be able to accomplish as much as the other man. The results obtained by so doing will be a surprise to many foremen. Show me a man who for any length of time has been in charge of a number of men, and I can tell to a great extent the kind of men he has under him. All classes of men, to a greater extent than the majority of people believe, absorb the qualities of their superiors, be they good or bad. If a foreman expects a high efficiency from those under his charge he must first attain a high efficiency himself and accomplish what he does with an unassuming manner, and not as a blusterer and a braggart.

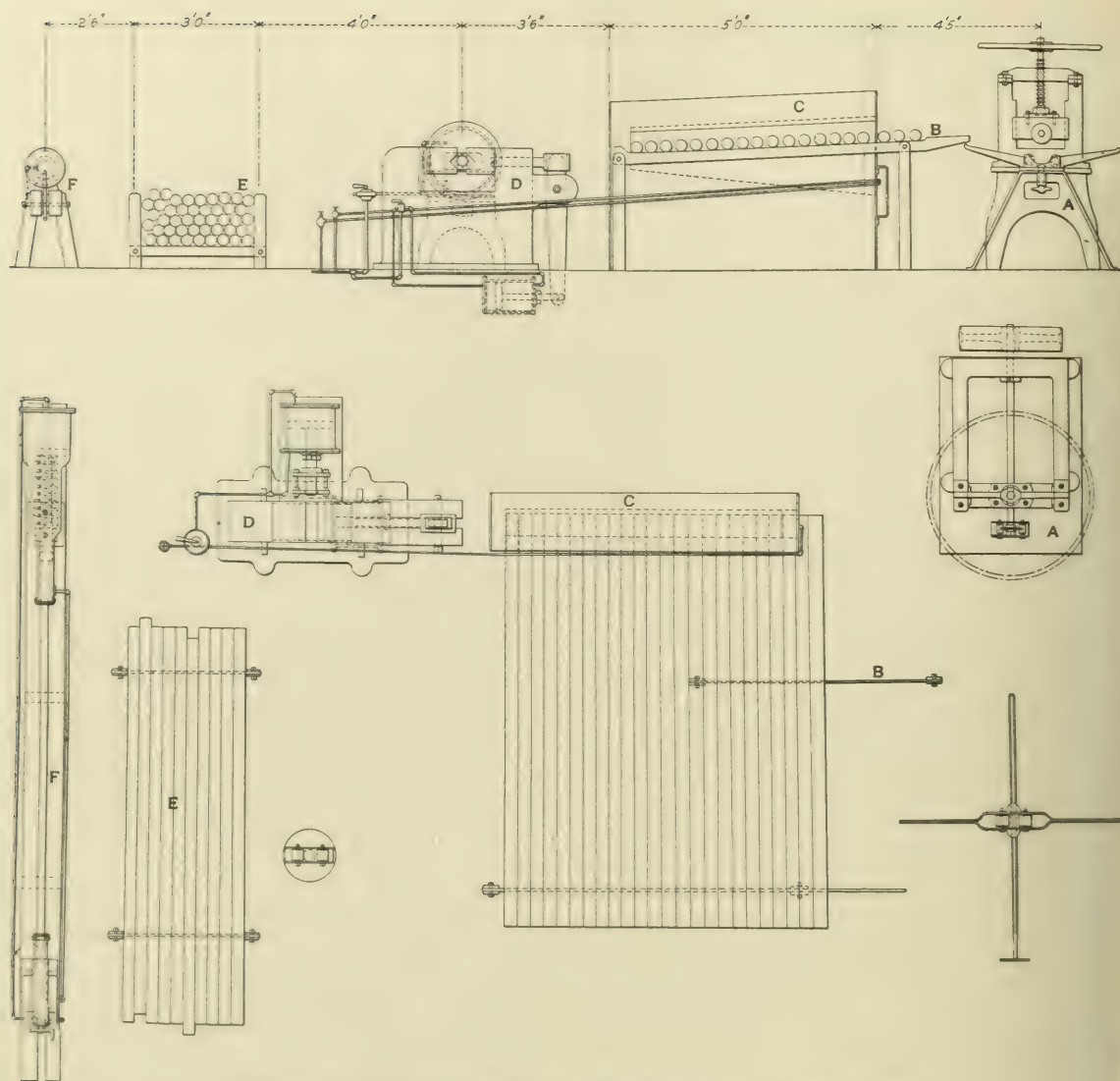
I have noticed that the greatest and most successful railway officials are the most unassuming in their attitude toward their subordinates, and this proves true in every vocation in life. If you are a big man, others will recognize it in a little time, and if you are not, no amount of bluster and grand stand plays on your part will make you one, or give any lasting convictions to others that you are one. No one has a greater opportunity to be a large asset in his employer's business than the foreman. So it behooves every man who occupies this position to be a credit to himself and his employer. If he expects to obtain promotion it is well for him to remember those inspiring lines of Emerson: "If a man write a better book, preach a better sermon, or make a better basket than his neighbor, though he build his house in the woods, the world will make a beaten path to his door."

BY J. T. McSWEENEY.

Smith Shop Foreman, Baltimore & Ohio, Mt. Clare Shops, Baltimore, Md.

How to improve the efficiency and output of one's shop is something that every foreman has to be constantly studying, even to the smallest detail. He should be a reader of good mechanical books and technical journals, such as the *Railway Age Gazette* and others. There is nothing better to keep a man posted on what is going on around him, and he will get many pointers that will be of value to him.

Another way to get good results is to visit other shops and see what they are doing. For instance, the writer, while visiting a large plant in New York state, noticed a furnace that was used in connection with expanding the front end of boiler tubes. It suggested an improvement for his own shop, which was put into effect and not only did away with the services of one man, who was drawing a salary of \$40 per month, but made an actual saving of \$22 per month in the piece work price. The old method of heating, expanding and testing tubes was to cut the tube to length by a gage on the tube cutting machine, after which it was laid on an inclined runway and rolled down to the operator at the furnace. He would take a tube and insert it in one of the three holes in the furnace. The other two holes were filled in the same manner. He would then take the tube in the hole nearest to him and place it a little forward in the furnace, so that it would get hot quicker than the others. When properly heated he would place it in the expanding machine, expand it and lay it on the floor. He would then go back to the furnace, take the tube out of the second hole, put it in the first one; then take the tube out of the third hole and put it in the second one, reach down to the runway, take up another tube, and put it in the third hole and then wait until the first would get hot enough to expand. The operator not only had a hard and laborious task, but his



Arrangement of Tools for Cutting, Heating, Swaging and Testing Tubes.

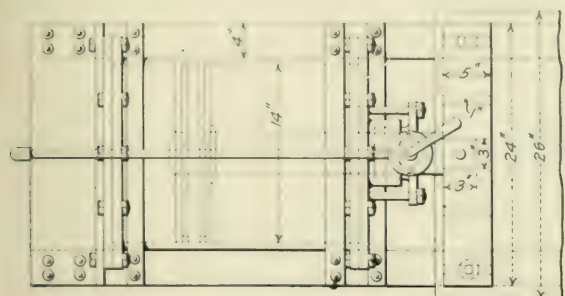
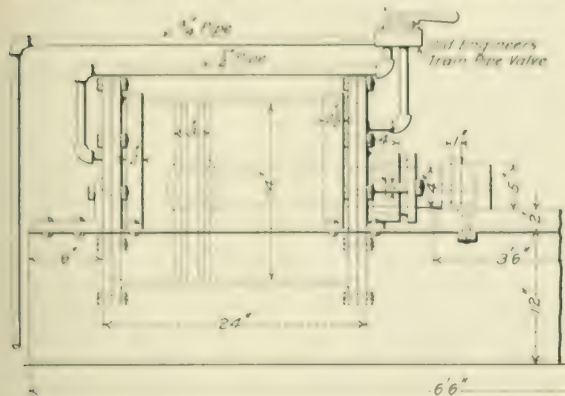
output was poor, on account of handling the tubes many times; then the expanding machine was slow, it being of the old roller type, where the operator had to bring pressure on the rolls by screw power worked by hand, and in order to get the tubes expanded to the proper size it was necessary to use a hand gage. This gage had to be placed on the tube as it was taken out of the furnace. After it had been rolled until the operator thought it was large enough, it was taken out and the gage driven off with a hand hammer. The testing machine was placed 30 ft. out of line with the other tube machinery, making it necessary to have a man carry the tube from the expanding machine to the testing machine and test it.

In improving this condition a new furnace was made of old boiler plates. The arrangement of the new plant is shown in the accompanying drawing. The tube, after being cut to length at the cutter A, is laid on the inclined runway B, down which it rolls into the oil furnace C, after which it is expanded on the expanding machine D, which is of the plunger type, worked on the principle of a bolt-heading machine, with an air cylinder working the side gripping dies which hold the tube while the plunger

comes up and expands it. The crosshead that carries the plunger also carries a gage, and as the plunger pulls out of the tube the gage pulls over it and gages it to proper size. The tube is then laid on the racks E, tested on testing machine F, and laid down ready to be taken away.

The testing machine was brought over in line with the other machinery. You will notice by reference to the drawings that the new furnace, instead of having three small holes as the old one did, has an open slot running the length of the furnace and open at one end, so that when the tube is cut off and laid on the incline it rolls directly into the furnace without any handling at all. As the furnace will hold 25 tubes, and all of them are directly in the fire, there is always one hot and ready to be expanded. As fast as the man who operates the expanding machine takes one out the cutter puts one in, making the heating operation a continuous one. It was found that with this layout the output could be increased 50 per cent., so the piece work price was reduced from 90 cents per hundred to 50 cents per hundred tubes. The testing, by reason of placing the test-

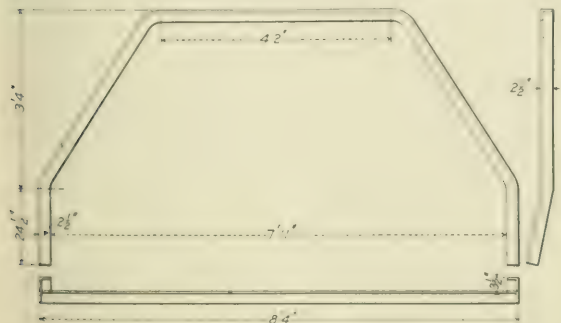
ing machine with the other machinery enabled the piece work price to be reduced from 20 cents per 100 to 10 cents per 100. As we could get only 300 tubes to weld per day at 10 hours, the man who did the expanding could handle the 300 tubes and do the testing also. In summing up, we found that we had increased the output 50 per cent, reduced the piece work price



Pneumatic Bulldozer.

from \$1.60 per 100 flues expanded and tested to \$1.15 per 100, making a saving of 45 cents per 100 flues. As we handle 5,000 flues per month, the saving amounts to \$22. This added to the man's salary who was done away with makes a clean saving of \$62 per month, the result of one shop visit.

There were two bulldozers in the shop, and the demand for material was so great that the two machines could not keep up with it, even though there were 200 formers and dies for them. The formers and dies were of no use without machines to use



Angle Brace for Box Car Ends.

them. We built a small air bulldozer, as shown by the accompanying drawing, of materials from the scrap pile, the total cost being \$30. It is doing the same work that the \$1,000 bulldozer is doing. One of the first jobs performed on the machine was an inside angle brace as shown on the accompanying sketch. It was made of 3/8-in. x 2 1/4-in. x 2 1/4-in. x 16-ft. angle iron and

used to brace the ends of box cars. As the job was done, and hundreds of cars had to be equipped, there was a great rush for them; in fact, they would not wait until formers could be made to bend them. A blacksmith was put on the job and the best he could do was three per day at 10 hours. At a cost of \$1.20, or \$1.40 per brace. After the formers were made and put on the new machine it was found that the output could be increased from three to 24 1/2 per day, and the price could be reduced from \$1.40 to 20 cents per brace, making a clear gain of 2 1/2 per day in output and a saving of \$1.20 per brace. Still they could not be gotten out fast enough, and to meet the demand two men were kept at the machine bending and two at the furnace putting in and carrying the material to the machine. The four men work together and pool the piece work price; they are making 50 of the braces per day of 10 hours. We started with an output of three per day and raised it to 24 1/2 per day, and then to 50 per day. The price was reduced from \$1.40 per brace to 20 cents, making a saving of \$1.20 per brace. As we have bent 2,500 of these braces up to date, there is a total saving of \$3,000 thus far.

WALSCHAERT VALVE GEAR.*

BY BENJAMIN FREY.

Apprentice Instructor, Michigan Central, St. Thomas, Ont.

It is assumed that the reader is familiar with the Stephenson motion and understands the meaning of the different valve events. While the object is to impart a fair general knowledge of the principles of the Walschaert gear, comparison has been made with the Stephenson motion in order to better explain the characteristics, advantages and disadvantages of the Walschaert motion. At present, although there are many different styles of valve gears applied to locomotives, there are practically only two general types used in this country. One is the Stephenson shifting link motion, which was first applied to locomotives in 1843, and until recently was almost universally used in America; the other is the Walschaert radial valve gear, the general form of gear used in Europe since its invention, in 1844, by Egide Walschaerts, of Belgium. Modifications have been made in the original arrangement of the Walschaert valve gear, but the principles of its design have remained the same.

Perhaps one of the main reasons for its increasing popularity among American designers is on account of the mechanical and structural advantages it possesses over the Stephenson motion when applied to heavy locomotives. The tendency is toward larger and larger locomotives, and they naturally require larger axles, eccentrics, eccentric rods, transmission bars, etc. Because of the increased size of these parts there is hardly room enough between the frames of one of the larger locomotives to accommodate the Stephenson gear and at the same time allow for a ready inspection and adjustment of the different parts. The removal of the valve gear from between the frames not only makes it more accessible, but affords an opportunity for a better and more substantial cross-bracing of the frames. Making the frames more rigid tends to reduce the wear and tear on the whole engine, which in turn means a reduction in maintenance expenses. When applying the Stephenson motion to large engines the inertia due to the increased size of the eccentric rods, straps, etc., together with the lateral play of the driving boxes, produces greater wear on the parts, and consequently a disturbing effect on the steam distribution and a tendency to shorten the life of the Stephenson motion. With the Walschaert gear there are no large bearings, such as eccentrics, to wear; all working parts are connected by case-hardened pins and bushings, which reduce the wear to a minimum. The tendency of wear on the Walschaert valve gear is to reduce the lead.

There are more movable parts to the Walschaert gear, but its weight is not usually as great as that of the Stephenson motion. When both of these gears are in the best condition it

*This paper is being used as an introduction to a course on the Walschaert valve gear for machinist apprentices on the New York Central lines.

is generally conceded that the Stephenson motion gives the best steam distribution. When the Walschaert gear is once properly set up, the valves will remain square much longer than those of the Stephenson, and this is a strong point favoring the Walschaert motion, for if the valves of the Stephenson motion do not remain square their better steam distribution is only temporary and the economy of their setting is lost.

The Stephenson link is made to move through wide angles by the influence of two eccentrics. This produces a wedging effect on the link block, strains the gear and causes lost motion. The Walschaert link is only moved through comparatively small angles by the influence of one eccentric, and consequently there is less strain and wear on the parts. Again, the up-and-down motion of the engine on its springs affects the steam distribution of the Stephenson motion to some extent, while with the Walschaert gear this movement has no disturbing effect on the valve motion unless the connection of the eccentric rod to the link is placed at too high a point above the center line of the axles. While the proper location of this connection should be as near the center line of motion as possible, it is generally found necessary to locate it above this line in order to retain the required amount of link block travel and at the same time keep the throw of the eccentric crank within certain limits. Usually, however, the location of this point is not high enough to cause a noted irregularity in the valve's motion unless the track is very rough.

The usual form of Walschaert gear imparts its motion to the

Since lead is a positive detriment to an engine when starting a heavy train, the variable lead of the Stephenson motion in this case would have a practical advantage over the constant lead of the Walschaert motion. Theoretically, the constant lead of Walschaert gear is a distinct disadvantage when applied to locomotives which are to be run at any considerable range of speed, and probably this one point of difference has had a large influence in retarding the progress of the use of the Walschaert gear.

It is still a matter of argument among experts as to whether or not lead as a port opening is really a necessity, for, while many advocate lead, it is still considered by some to be of no advantage, and even to be a detriment. It is generally conceded, however, that when running at low speeds only a small lead is needed, while at high speeds more lead is required. While these conditions are produced by the Stephenson motion, it is admitted that this increase of lead often becomes excessive at early cut-offs. The admission of steam in this case may take place too early and have a tendency to counteract the work done by the steam on the driving side of the piston. The exhaust steam is also cut off earlier, giving more than the proper amount of compression, which is only meant to be great enough to cushion the advancing piston and arrest the motion of the reciprocating parts at the completion of the stroke. Consequently, when these conditions become excessive they are a detriment to the speed of the engine.

The proper amount of lead will vary for different classes of service, and the Walschaert valve gear must be designed to give

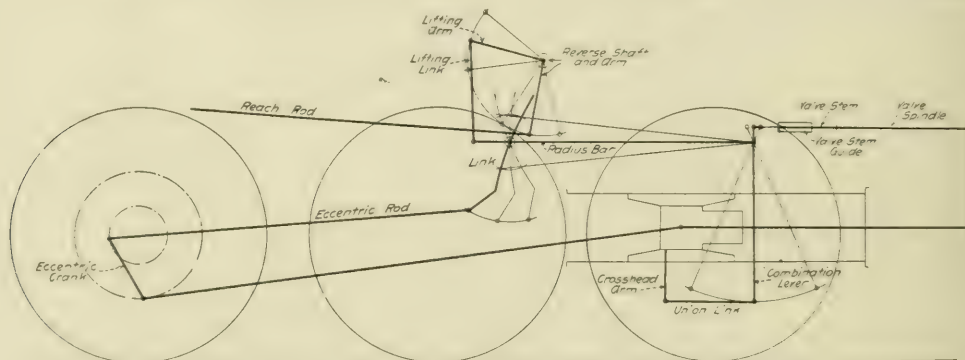


Diagram of Walschaert Valve Gear Applied to Mallet Locomotive.

valve in a more direct manner than does the Stephenson gear, since there is no offset rocker arm to offset the motion and spring. However, some roads have introduced a direct acting offset rocker arm in connection with the gear and have thereby been able to use the same style of cylinder pattern, whether applying the Walschaert or Stephenson motions to their engines.

In addition to the fact that the Walschaert gear is placed on the outside of the engine, it differs chiefly from the Stephenson link motion in that it requires but one eccentric or its equivalent for each cylinder to insure the movement of the valve and the proper distribution of the steam for both forward and backward motions. There are two distinct movements which control the movement of the valve: One from a single eccentric (usually in the form of an eccentric crank) and another from the crosshead. The eccentric throw governs the valve travel and reversing operations, while the crosshead motion governs the lead by moving the valve from its central position far enough to overcome its steam lap and enough farther to give the amount of port opening desired for the lead.

Another point of difference between the two motions is that the Walschaert gear gives a constant lead at all points of cut-off, while the Stephenson motion, on account of the influence of two eccentrics, produces an increase or decrease in lead as the link is loaded up, depending upon whether open or crossed eccentric rods are used; open rods are invariably used when applying this motion to locomotives, and the lead may vary in some cases from blind in full gear to $\frac{3}{8}$ in. open in midgear.

suitable lead for its particular class of service. This should seldom exceed $\frac{1}{8}$ in., as the advantage received from an earlier admission of steam would probably be more than offset by the increased compression and preadmission. Since the lead given by the Walschaert motion is governed by the designer, it follows that no alteration should be made in any of its parts to bring about an increase or decrease in its lead. If desired, however, the lead may be increased at the expense of the steam lap by cutting off the edge of the valve or rings, which would, of course, bring about an earlier admission and allow less expansion of steam. On the other hand, lead might be decreased by using another valve with more steam lap. Lead may also be increased or decreased by changing the distances between the connecting points of the lap and lead lever, but this is not considered good practice. It should be remembered that the valve, strictly speaking, is not a part of the valve gear.

With the Walschaert gear the block moves up or down at the link when the engine is reversed, instead of the link moving up or down on the block, as is the case with the Stephenson motion. The link is made to swing on trunnions through the influence of the eccentric crank. The link block, which may be in either end of the link, in turn transmits this movement to the valve through the radius bar, the forward end of which is connected to the combination lever. This connection between the radius bar and combination lever is supported and guided by the valve stem crosshead, and forms a fulcrum on which the combination lever is made to swing by the action of the

piston crosshead. When outside admission valves are used the connection or fulcrum between the radius bar and combination lever is placed below the valve rod connection, while with inside admission valves this fulcrum is placed above the valve rod connection. Thus it may be easily determined whether an engine with piston valves has outside or inside admission by noting where the radius bar connects to the combination lever.

The lower end of the combination lever is connected to an arm on the crosshead by means of the union link. The combination lever is commonly called the lap-and-lead lever, probably because its object is to move the valve from its mid-position an amount equal to the lap and lead when the engine is on either dead center. The amount of movement that this lever gives to the valve for each stroke is therefore equal to twice the lap plus twice the lead. Since the combination lever receives a constant movement from the crosshead, its action must necessarily remain the same at all positions of the reverse lever, thereby explaining why the Walschaert gear gives a constant lead. The throw of the eccentric crank controls the initial movement of the valve for both forward and backward motions.

The link governs the reversing operations, since it acts as a double rocker arm by controlling the movement of the link block in either the same or opposite direction to that of the eccentric rod, depending on the location of the block in the link. It follows, then, that, unlike the Stephenson motion, this gear may be classed either as a direct or indirect valve gear, depending upon whether the block is located above or below its fulcrum. As a rule, the Walschaert gear is designed so that the link block moves in the lower end of the link when the engine is running ahead. In this case the eccentric crank must always follow the crank pin by about 90 deg. when the engine has inside admission valves or precede the crank by 90 deg. when outside admission valves are used. Therefore, it depends on the position of the eccentric whether the engine will run forward or backward with the block in the lower end of the link.

The exact location of the eccentric crank should be at right angles with the plane of motion or 90 deg. to a line drawn from the point on the link at which the eccentric rod is attached through the center of the driving axle when the engine is on a dead center. Reversing the location of the blocks in the link for one motion makes it necessary to shift the eccentric crank 180 deg., thus determining whether the eccentric crank should follow or precede the main crank by approximately 90 deg.

Most articulated locomotives are arranged so that the link blocks for one engine are at the top of the link while the link blocks of the other are at the bottom of the link when the engine is in position to run. Since all the link blocks must be moved at the same time by the reverse lever, this arrangement was made in order to produce a balancing effect, and thus reduce the strain required at the reverse lever. In this case the eccentric crank of one engine follows while the eccentric crank of the other precedes the main crank, provided both engines use the same style of valves—both inside or both outside admission.

The throw of the eccentric crank is necessarily much greater than the throw of the ordinary Stephenson eccentric, since the Walschaert link acts as a reducing rocker arm and transmits to the valve only about one-third of the throw of the eccentric. The ratio between the link foot radius and the link block radius is about three to one when the block is in full gear position. As the reverse lever is hooked up, the link block is brought nearer to the center of the link and the horizontal movement of the block becomes less; this produces a shorter valve travel, and consequently an earlier cut-off. Therefore, when the block is brought in line with the center of the link it can give no movement to the valve. If in this case the engine were towed ahead, the valve would still receive a movement from the crosshead connection, and the amount of this movement, as explained before, would be equal to two times the lap plus the lead for each stroke of the crosshead. The fact that the crosshead movement controls this part of the valve's movement makes it easier to secure an equal cut-off at each end of the cylinder.

When an engine using the Walschaert gear is on a dead center

the link block may be moved from one end of the link to the other without giving any movement to the valve. It is therefore necessary that the length of the radius bar should be equal to the radius of the link; in fact, it may be said that the length of the radius bar governs the radius of the link.

There are two general forms of lifting devices for the radius bar. In any case, the suspension point of the lifter must be so placed that the link block will travel as nearly as practicable on a chord of the arc described by any point of the link wherever the block happens to be when the link is swung into one of its extreme positions. The above conditions are most closely approximated by a lifter through which the radius bar slides, not swinging with the link. Practically the same results may be obtained by a properly suspended hanger, although the link block slip will be more in the backward than in the forward motion. In setting up this motion it must be remembered that the positions of the link blocks must be the same on both sides of the engine, regardless of the position of reverse lever.

Unlike the Stephenson gear, the Walschaert motion will not admit of experimental changes or readjustments in the round-house or on the road. There is no part that can be lengthened or shortened outside of the general repair shop, and even then there should be no necessity for alterations in the motion work. The proportions of the various parts of the Walschaert gear cannot be determined experimentally, nor should any change in setting the valves be made unless the effect of the change is known in advance. In setting up this valve motion much more dependence is placed upon the accuracy of the machining operations and in the checking up of the frame and cylinder measurements than is permitted by the Stephenson motion, which allows itself to be adjusted to compensate for certain irregularities in the machining or erecting of the different parts. Therefore, assuming that all work has been properly done, it is a much simpler matter to set the valves of the Walschaert gear than those of the Stephenson. It is also much easier and more convenient to repair the Walschaert than the Stephenson motion.

It is claimed by some that the Walschaert gear has some objectionable features which are overcome by some of the new pin-connected outside gears which use no link. Again, it is claimed that when rounding curves the Walschaert gear is subject to disturbances that tend to produce irregularity in the valve motion. However, it is well to remember that the Walschaert gear not only meets the requirements of modern locomotive design, but can be as easily applied to locomotives of odd design, in which case the Stephenson motion would probably require the addition of complicated parts, which would add considerable to its weight. On some types of modern locomotives, the Mallet compound for example, it is absolutely necessary to use an outside gear, owing to the space between frames being entirely taken up by the pipes and supports of the boiler.

A consular report says that the President of Brazil recently laid the corner stone of one of two 32,000-h.p. electric power stations which are to furnish the motive power for an electric railway between the port of Victoria and the city of Itabira, in the state of Minas Geraes. The railway will be about 400 miles long, and will tap one of the greatest sources of Brazil's wealth in iron ore. One of the large waterfalls on the river Doce will furnish the power for one of the stations, and a large waterfall on a tributary stream, power to the second station. At Itabira connection will be made with the Central of Brazil, with which it will have mutual traffic agreements. It is expected to thus land at least 3,000,000 tons of ore annually at Victoria at an estimated cost for transportation of about four mills per ton-mile. About 250 miles of an existing steam railway are to be utilized for this railway, the gage to be changed from narrow to standard. The electrical equipment is to be furnished by a British concern, the entire project being financed by British capital interested in the development of the iron-ore deposits.

MASTER BLACKSMITHS' CONVENTION.

The eighteenth annual meeting of this association was held at Hotel Cadillac, Detroit, Mich., August 16, 17 and 18. W. W. McLellan responded to an address of welcome by a representative of the mayor of Detroit and J. S. Sullivan to an address by Eugene Chamberlain, chairman of the freight car pool of the New York Central Lines. G. W. Kelly, president of the association and master blacksmith of the Central Railroad of New Jersey at Elizabeth, N. J., commented in his address on the development of the association and the value of its work. The secretary's report showed a membership of 283 and a balance in the treasury of \$556.78.

OXY-ACETYLENE WELDING.

John Treacy (Gt. Nor.): Some three or four years ago experiments were begun on the Great Northern with oxy-acetylene. These experiments were at first confined to boiler work and were carried on under the supervision of the superintendent of motive power, Geo. H. Emerson. Proving successful, a system was evolved whereby the work could be carried on on a large scale. The department selected to do the work was the tin and copper department, and the results have shown that this was a wise selection, the work being nearer akin to soldering and brazing than any other branch of mechanics. A gas generating plant was constructed and pipe connections were made with all pits in the boiler and erecting shops. A force of men was then trained to do the work, for much depends on the skill and reliability of the operator, and careless work at any time means failure.

To repair a crack in a firebox or other sheet, the crack is V'd its entire length, and through the sheet, the groove being cut to a 45 degree angle. The filler used to do the welding is $\frac{3}{4}$ in. round best Swedish iron. The torch is applied, heating the sheet and the filler, the melted iron dropping into the groove until it is filled up, when the torch is again passed over it melting the surplus metal off and making a smooth solid weld. The average rate at which this kind of welding is being done is one foot per hour. The pressure at which the gas is used is four and one-half pounds for the acetylene and twelve pounds for the oxygen, which proportion has given the best results. The same method is followed in putting in a whole or a half side sheet, or a patch of large or small dimensions.

The quality of the filling material is considered of much importance and every bar is tested before using, the selection of Swedish iron for the purpose being made after experimenting with vanadium and other kinds of steel, as well as with the best makes of American iron. Seams welded in this manner are said to stand a test up to 90 per cent. of the original strength of the sheet.

As a cutting agent oxy-acetylene is wonderful, a plate $\frac{5}{8}$ in. thick being cut at the rate of 26 ft. per hour, the cut being as clean as if done with a saw. The firebox is cut in pieces and taken out in a marvelously short time. In cutting, acetylene is used at four pounds and oxygen at sixty pounds pressure. As the work progressed its scope broadened until now it is put to every conceivable use. Cracks in mud ring corners are welded, worn places on boiler sheets are filled up to their original thickness, stay-bolt holes are filled, re-drilled and tapped out to their original size; small cracks in engine frames are welded up, cracks in link and motion work are welded, and any and all jobs with cracks or worn parts are taken care of.

To illustrate how this work has grown in volume, we are now making six hundred track leveling gages of a new design. The material used in making the carriage frames is of five-eighths and one inch steel bicycle tubing, and the six hundred frames will require a total of twenty-seven thousand welded joints. The oxy-acetylene is doing a better job on these than brazing. For cast iron welding a flux is used, the formula of which is as follows:

One lb. borax and 1 lb. boron
One ounce of potash (K₂CO₃)
One lb. of soda (Na₂CO₃)

15 parts
10 "
3 "

The mixture must be pulverized and thoroughly mixed and kept perfectly dry in a glass jar or bottle.

The difficulty in welding cast iron is due to the carbon or graphite contained in it. The flux is used to offset the effect of this. In addition to the flux when welding cast iron, a filler or solder is prepared of sticks or rods of cast iron, rich in silicon. The rods are about $\frac{3}{8}$ in. in diameter. The work done on cast iron consists of repairs of broken parts of machinery, the filling up of blow holes or other defects in cylinder and other castings, cracked spokes in driving wheels; we have even welded in new spokes in driving wheels where they have been altogether broken out, in fact, to such an extent has this work grown that there are five men now employed welding and cutting. That the work is a big paying proposition has been proven beyond the shadow of a doubt, and that its possibilities are still greater is also certain. I am indebted to Fred Conrath, foreman of the tin and copper shop, at St. Paul, Minn., for the data contained in this report.

George O. Hartline (L. S. & M. S.): The oxy-acetylene method of welding or the fusing together of metals by a torch having a temperature of 6,000 degrees Fahr. has made considerable progress in locomotive repair and manufacturing shops. Copper, brass, iron, or steel may be fused together readily. Railways are using oxy-acetylene plants for various purposes, including welding of machine parts—castings that would be expensive to reproduce and might hold the machine out of service a long time waiting for new parts. We repair and save a number of air pump cylinders that crack in the steam and exhaust ports and weld foundry flasks cheaper than they can be patched. We also weld blow holes in steel castings that show up after the castings are partly machined.

The question of successfully and profitably welding old firebox sheets by this method is an open one. In my opinion, sheets crack from excessive strain, crystallization, age, mud burns and various other causes. Back tube sheets often fail from the continued and repeated strains due to re-rolling or re-prossering the tubes. Is the condition of the old sheet going to warrant our welding a patch during general repairs, or should we apply new sheets and have the assurance of an engine that will run in all kinds of heavy service from one shopping to another? Our experience in the welding of cracks in back tube sheets has been that the welds will not stand the severe strain caused by the flue prosser. A few cases lasted three months, others less than a week. We are now experimenting on several patches welded on side sheets, where the mileage of the engine would not warrant a new firebox. I am unable to say how successful this will be, though the patches stood 250 lb. test pressure.

The cost of cutting out fireboxes has been greatly reduced by the use of the oxy-acetylene torch. This is done by cutting the two side sheets and crown sheets forward of the door sheet flange, also cutting out the corners of the fire sheets, so as to give a better opportunity to drive the mud ring down. Portable plants are used with wrecking cars for cutting apart the drawbar between the engine and the tender of locomotives that are derailed; also cutting apart of other heavy iron bars or rods.

P. T. Lavinder (N. & W.): Some very unexpected results have been successfully obtained in the welding of machinery and of parts of locomotives, including truck frames, wheel centers and boiler sheets, hitherto handled by much more expensive means. During the short period we have had the plant we have done quite a variety of work. Our machine was primarily purchased to see if we could not recover locomotive flue sheets by welding cracks developing in the bridges. Several experiments were made, the utmost care being given to the expansion that we realized would surely take place and possibly disturb the weld; while a number were successfully welded, the adjacent bridges broke down as we advanced from one bridge to another. Experiments were made in the direction of heating a large portion of the sheet, but without success.

While this represents practically the only work in which we have been unsuccessful, the fact remains that the plant has several

times paid for itself on account of the other ones to which it has been applied. The cutting out of a section also, cutting the renewal of the entire side of hot patches at any one, is now being done very quickly and successfully by oxy-acetylene. A section of a firebox sheet having a cutting edge of 7 ft. 6 in. was cut out in a little more than a quarter of an hour, costing in labor about 6 cents, whereas by the old process of cape chiseling, it would probably have cost \$1.75. The condition of the cutting edge was as good, if not a little better than if it had been done by hand. A successful job of welding a patch in the lower portion of a firebox next to the mud ring was made, the patch being about 5 in. wide by about 6 ft. long, or nearly the length of the firebox.

A most interesting article appeared in the *Railway Age Gazette* of August 5, written by Wm. G. Reyer and R. W. Clark, general foreman and boiler shop foreman of the N. C. & St. L., who seem to have given the subject a great deal of thought. Their reference to the necessity for a corrugation in welding patches in boilers to take care of the expansion where patches are applied to boiler sheets is a matter of the greatest importance; in fact, the work cannot be successfully accomplished without the employment of such means.

We have been successful in repairing such parts as cracked jaws and flanges in fluted locomotive side rods, cracked rocker arms, eccentric jaws, lift shaft arms, valve stems, shaft hangers, spokes in cast iron pulleys, rims of pulleys, engine truck frames, welding lugs in throttle valve chambers and steam pipes. With equal success we have taken care of many broken parts of machinery that would otherwise have to have been removed.

While we believe that there are going to be a great many other opportunities to make use of the oxy-acetylene in cutting, welding and repairing, it resolves itself into a commercial proposition; that is to say, will the work last as successfully as if done in the old fashioned way? We believe it will. Furthermore, everything seems to indicate that where the welds are carefully executed they have equal strength. The next feature, therefore, is the cost of labor, material and time. We have not kept an account in sufficient detail of the repair operations we have had the opportunity to handle, but it is evident it is proving economical.

G. M. Steward (Pennsylvania): We have experimented considerably and have made fairly good success in welding the car roofs on steel passenger cars. We do this with a butt weld. Underneath the welded part the roof is supported by a T iron, formed to the contour of the roof. The sheets are riveted to the T, leaving the edges about one-sixteenth apart, then welded. We have also experienced a great saving in the manufacturing of our window frames. These are pressed out of $\frac{3}{8}$ in. steel and welded in the corner. This is done by having a cast iron frame made the proper size of the window; the sections are clamped to it with about one-sixteenth between the edges and then welded. We also use the welding apparatus on nearly all parts in the interior of the car that do not run below $\frac{1}{16}$ in. in thickness. We have had difficulty where we tried to weld anything thinner than this. We have made several experiments on heavy material, having one engine in service with a patch on the firebox that required 74 in. of welding to complete the job.

C. J. Fackler (Am. Car & Fdy. Co.): We build steel passenger cars exclusively at our plant. We pay an oxy-acetylene operator from 22 to 25½ cents an hour. Our metal runs from 1-64 to $\frac{1}{2}$ in. thick. All of the window sills are welded. We know from actual experience that it costs us not less than a dollar an hour to do this welding. If you are burning off metal it will cost \$1.50 an hour, because the torch is running continuously. There is no limit to the welds that can be made with oxy-acetylene. We make them eight feet long and do not think anything of it.

G. F. Hinkins (West. Air Brake Co.): Oxy-acetylene welding is a great deal like the treatment of high speed steel. Ninety per cent. of the welding depends upon the man behind the gun.

Any variation in the pressure of the oxygen has a pronounced effect on the flame. Such variations are produced by the irregular working of the oxygen reducing valve, variations in the temperature of tip expanding orifice, or particles of metal adhering to the tip, thus causing an excess of oxygen. The surplus oxygen combines with the metal and causes porous, weak, brittle welds; it also delays or prolongs the time to make a weld, due to waste of metal by oxidation. An insufficient supply of acetylene will produce an irregular contact of the molecules. Acetylene welding is an art, as much as tool dressing. Any blacksmith can dress and temper a tool in a way, but it requires an expert to dress and temper a tool the right way. It is so with an acetylene welder. A poor or incompetent welder wastes labor, burns excess gas and does a bad job. You can no more tell the average man how to do this work than you can tell him how to shoot and hit the mark. He has got to get there by close application, observation and with a deep interest in his work. We have hired what were supposed to be experienced welders, but on trial they were puddlers. That is, they puddled their work instead of making a scientific weld.

On repairs such as castings or broken parts of machines, the weld may be porous and yet be sufficiently strong to answer the purpose; but a porous weld never would do on a generator or storage reservoir that is tested at 400 pounds hydrostatic pressure; after 300 lbs. air pressure it would leak like a piece of gauze. For reservoirs of this nature the weld must be close, dense and compact as glass.

FROGS, CROSSINGS AND SWITCHES.

J. Geo. Jordan (T. & N. O.).—We have a place we do this work just outside of the blacksmith shop, 20 ft. wide, 75 ft. long, with flooring and a shed roof over it, and have special men broken in for the work. The longer you keep men on this class of work the cheaper you can do the job, as they will get to be experts. We have templates to lay the holes off for the different frogs, but the planing is by measurements. If a frog point is worn down too low at the point, you will find the guard rails worn down at the same place, and the frog comes to you for repair on account of the point being broken, or one of the guard rails is broken. My motto is to scrap the entire frog, as you never can make a first-class job on a worn-out frog. If a point should break on a good frog, you can split the point and weld a piece of steel in, and make as good a frog out of it as ever. If one of the guard rails breaks you can put another in its place at very little cost. If a switch point breaks off at the point, or is worn down, all you can do is to make a short point out of a long one. I do not approve of making a new frog out of an old rail partly worn, as the rails get very hard and crystallized. If you have to bend such rails you had better heat them, or you will break a good many in the bending machine. New frogs constructed out of second-hand rail will break much quicker than those made of new rail.

Other Papers.—Wm. F. Stanton, of J. A. Fay & Egan Company, read a paper on A Short History of the Development of Frogs and Switches. Other papers on frogs, switches and crossings were presented by T. F. Keane, of the Ramapo Iron Works; Wm. Nicholson, foreman blacksmith at the Angus shops of the Canadian Pacific, and Nap Fournier, of the Ramapo Iron Works. Mr. Keane directed attention to the value of manganese steel rolled rail for use in frogs, crossings and on curves, etc.

THE TREATMENT OF HIGH-SPEED STEEL.

L. J. Brunner (N. Y., N. H. & H.).—The secret of the successful treatment of high-speed steel is extreme care in heating, both in forging and hardening. The trouble with a great many tool dressers (especially those of the old school) is that they do not heat the steel hot enough. We follow as closely as possible the rules given by the various makers, and obtain very satisfactory results. For forging, we heat slowly through and through to a good yellow heat and forge till the tool reaches a cherry color, then re-heat and continue in the same manner until the tool is finished, when it is laid in a dry place until cold. It is then ground to shape and is ready for hardening. In all heat-

ing it is essential to maintain a good bed of fire between the steel and the blast pipe to prevent the blast from reaching the steel. Extreme care should be exercised in hardening and only the cutting edge should be heated to a good white heat, but not so hot that the point will fuse. When the proper heat is reached, the tool should be removed from the fire as quickly as possible and immersed in oil, which should be placed as near the fire as convenient. The tool must be kept in constant motion while in the oil, remaining there until it becomes black, and then removed from the oil to the air blast, which should be allowed to blow on the cutting edge until cold.

Sometimes a tool dresser will get a little careless and try to rush a tool. He may get it to the proper heat, but heat it too rapidly, with the result that it will develop cracks after it is hardened, and if these cracks are slight they may not be noticed. If this should happen with a large 3 x 1½-in. tool, such as is used on a tire or wheel lathe, it might cause serious breakage of the lathe, by reason of the point breaking off and getting wedged between the tire and the body of the tool.

When a tool is put in service and does not stand up as it should, the blame is immediately placed on the blacksmith, when as a matter of fact, it is often ruined by the man who grinds it. I have seen instances where tools were properly forged and hardened, but were spoiled by the machinist through grinding them on a dry, glazed emery wheel and dipping them in water whenever they became hot from the friction of the wheel. High-speed steel will not stand up under such treatment as this.

Every shop that uses high-speed steel to any extent should have a furnace with a pyrometer for recording the temperature.

J. B. Hassett (Erie).—My experience has been that if the instructions issued by the manufacturers for the treatment of their steel are followed and care taken in heating, forging, grinding and hardening of the tools, good results are sure to follow. In our shops at Susquehanna we have very little waste, for when a tool becomes too short for one class of work, we forge it down to the next and so on down to the smallest size. We have had no trouble in annealing this steel. If we have a number of pieces to anneal we pack them in a case hardening box, in powdered charcoal, and place the box in the case hardening furnace at the same time that we put in the case hardening box, and heat both boxes to the same degree of heat. We remove the case hardening box and let the annealing box remain in the furnace to cool off. If we have only a few pieces to anneal we heat on the top of a piece of hot iron and cover with powdered charcoal or air slacked lime. If the pieces are very large we place another piece of hot iron on top of them before covering, so as to retain the heat for a longer period. Steel annealed in this way can be machined to any desired shape. For hardening we use both compressed air and oil. In my opinion the best results for most tools are obtained from the use of compressed air, although for such tools as twist drills, reamers and the like, which require the drawing of temper after hardening, oil is probably the best.

Discussion.—A. Bennett, of the Chicago, Milwaukee & St. Paul, in a brief communication, stated that he had successfully used rock salt and water for hardening. Other members said that tools treated in this way developed small checks or cracks on the cutting edge. C. Watson, of the Illinois Steel Company, stated that his company had tested 17 different kinds of high speed steel. His experience was that the farther high speed steel was kept from water the better. To get the best results a pyrometer must be used in order to heat the tool to the proper temperature. The air used for tempering at the Illinois Steel Company is cooled by circulating through a coil of pipe in a tank of ice water. Several members emphasized the necessity of carefully following the instructions of the steel manufacturer in treating the high speed steel. Most of the trouble is caused by not doing so. Mr. Stanton, of J. A. Fay & Egan Company, spoke of his success in working high speed steel tips on iron or machine steel. The weld is made under a hydraulic press with a lathe, welding plate.

TOOLS AND FORMERS.

Arthur Stockall (Intercolonial).—It is better to have two simple tools to make a piece of work than one complicated and expensive tool, with the danger of breaking the material. The formers for the bulldozer can be made cheaper and more conveniently with cast iron reinforced with hardened steel at the places where there is much wear. When the steel becomes worn it can be removed and a new piece put on. Where possible, the roller tool should be used as the best means to save material and power. Then there is a tool that can be used to make a lot of work, such as freight car steps, carrier irons for passenger cars and all work where a double bend is required, or a good square corner is needed. I mean a tool with a hinge so that it will move back far enough to allow the iron to be put in, and far enough apart to let the ram come down to square up the crown or middle of the work, thus making a good clean square job that no one need be ashamed of.

In all cases where cutting or punching hot material is necessary high speed self hardening steel is the stuff. It costs more to put it in, but "Oh my, how slick it does its work," and what a relief to the burdened foreman and joy to the worker. No more running water, no more burning and peeling of dies, or punch, or cutter, and consequent bending and breaking of tools, with the machine on the hog half of the time and the tool maker swearing and the workman grumbling.

Tools for Bolt Heading, Etc.—I used to think at one time that mild steel was good enough for this work, and I tried it thoroughly. It was not satisfactory. It would burr up in spite of all I could do. "Case harden it," said my boilermaker. This I did, with the result that usually the block would warp or bulge in the middle, and in grinding this out the case hardening would be gone. Then I heard a fellow say cast iron chills were fine and cheap. "Good for you," thought I, and tried this, and I found that the blocks would chip and split in two, and chilled tools in my opinion are a waste of time: good, clean cast iron tools are superior to any of the other above-mentioned for durability and economy. They can be put in and used with a little grinding, and when used up can be sold for scrap for more than scrap soft steel. But I think that self-hardening or a good water tempering steel is best for this work; it costs more, but lasts longer and does better work while it does last. For machine forgings of all sorts a good hard, tough cast steel is the best.

Steam Hammer Tools.—A dense grained cast steel top and bottom die of about .30 point carbon is used. For swages, a good hard soft steel is the best. For forming blocks use cast-iron with a wrought iron band around it to keep it from splitting and you have a tool that will make almost anything.

C. K. Abbott (St. L. S. W.).—Fig. 1 shows a tool for punching slots in the split wedges so commonly used to draw tight bolts out of engine frames. This tool simplifies the job of making these wedges, and a good stock is kept on hand instead of having to hunt the place over for one. Fig. 2 is a tool for punching out half rings for center castings. These rings may be punched out of any scrap material flattened to the right thickness.

Fig. 3 is a tool for finishing up the edge of blacksmith flatters and swages, after they have been flattened down in the usual way. Put the flatter in the block and the edges are sheared off at the same heat by means of two square pieces of steel underneath, and a flat piece of steel on top. A is a block with a square hole in the center, large enough for the largest size flatter we wish to make; they should be loose in the hole. BB are pieces of steel (not hardened), and there should be several sizes on hand so that different size faces may be made. C is the flatter in place ready to receive the blow of the steam hammer. D is a piece of steel ¾ in. thick with a small handle. E is a handle to pick up the blow by. After the swage has been sheared two short pieces of round iron are placed where the blocks BB were and another piece of round iron the size

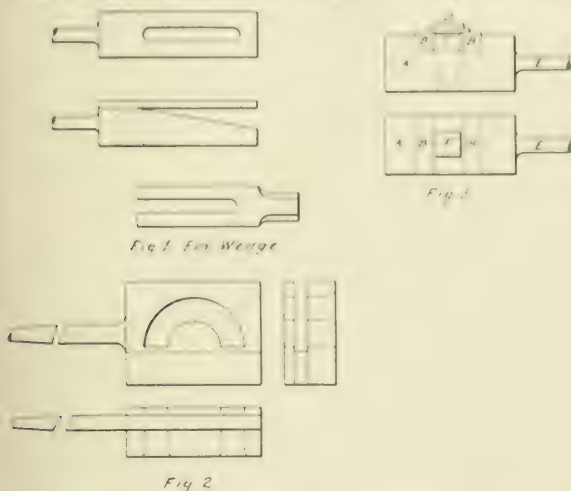
the swage is to be made is placed on top, the same as D in the former operation. A light blow and the swage has been made all but punching the eye.

A good way to make split keys is to take iron the thickness the key is to be made, double over enough to make the key, being careful to have an even heat, flatten and punch at the

a washer; these punches are in daily use in our shop.

L. J. Brunner (N. Y., N. H. & H.). Sketches of several tools were submitted by Mr. Brunner from which the three following were selected for reproduction:

Fig. 4 is a device for cutting iron, cold, under the steam hammer. For anyone who has no shear such a tool is indispensable. The shop I had charge of when I designed it had no shear and all the iron had to be cut off on the anvil, which



Devices Used in the Smith Shop of the St. Louis Southwestern.

steam hammer, having different size punches for different keys.

Punches for punching round holes all sizes from 1 in up to as large as the hammer die will admit of, with deep throat, serves two purposes, namely, that of punching a hole and making

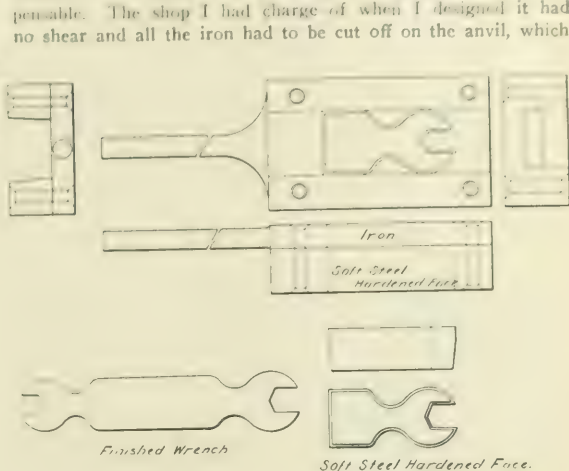


Fig. 5—Punch and Die for Making Wrenches.

was a slow and laborious task. With this tool I could cut off 2-in. round with one blow and 6 x 1-in. with two or three blows under an 800-lb. hammer. I had three sizes; one for 2-in. round, one for flat and one for 1/2 in. to 1 1/4 in., as shown

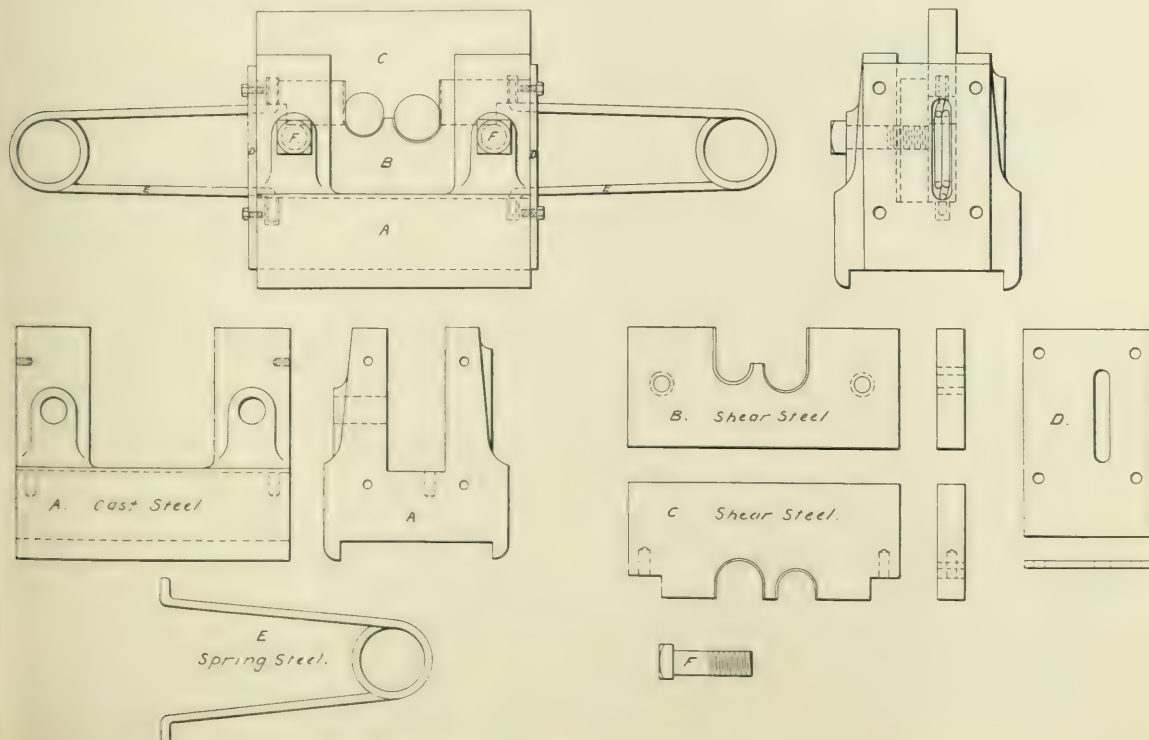


Fig. 4—Device for Cutting Iron Under a Steam Hammer.

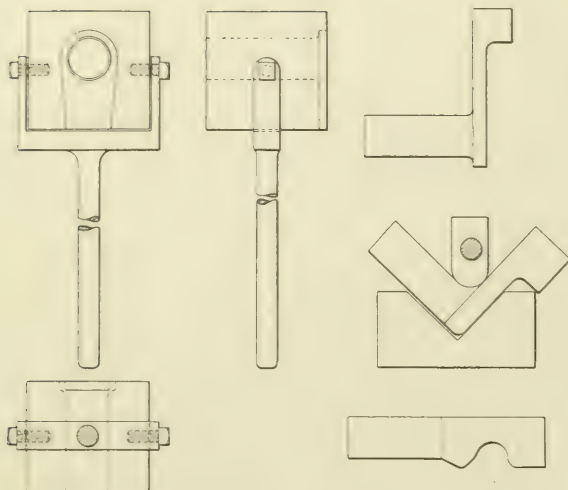


Fig. 6—Tools for Forging Rockers.

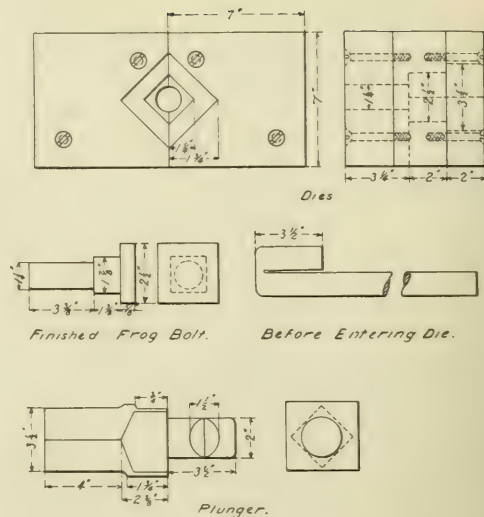


Fig. 7—Dies for Forging Frog Bolts.

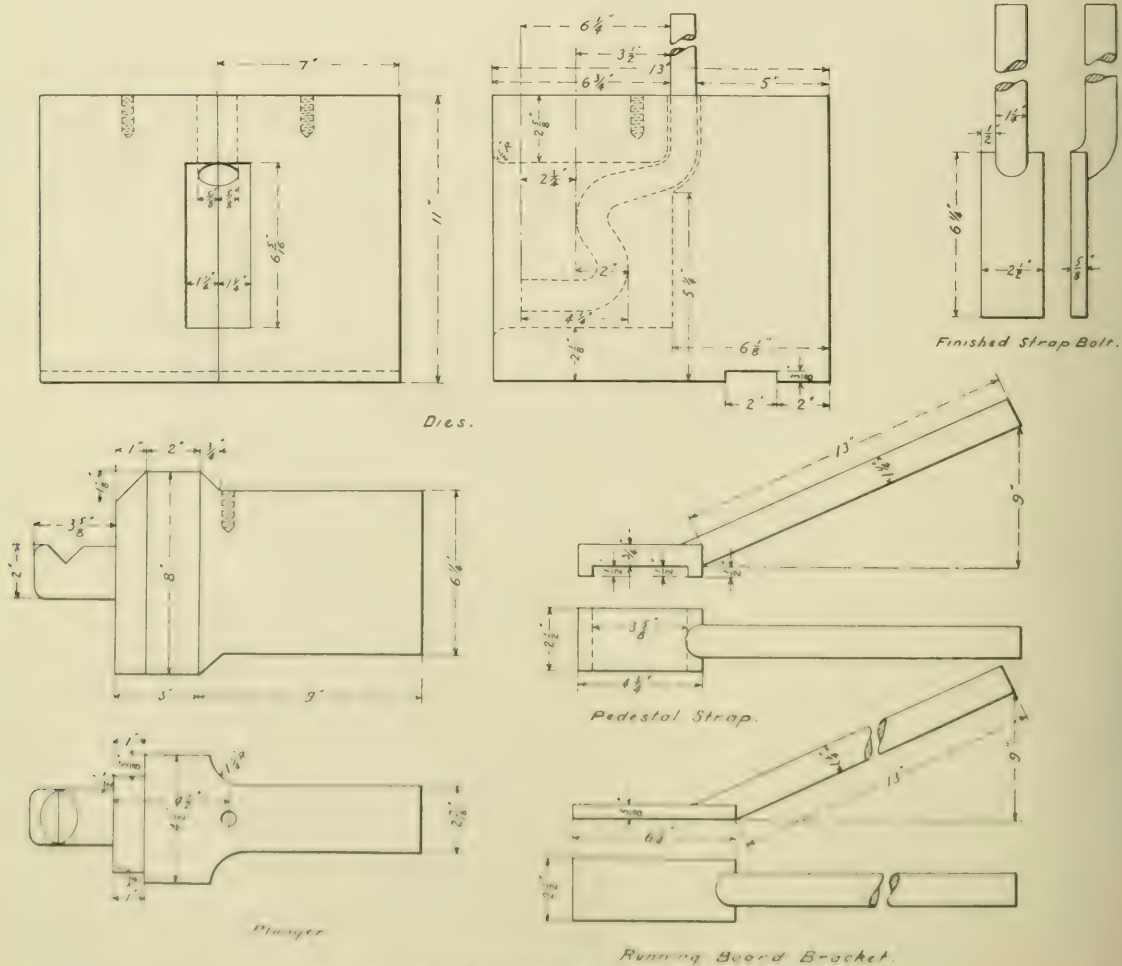


Fig. 9—Dies for Forging the Foot on Pedestal Straps.

in the sketch. The body is a steel casting made to fit the width of the hammer on which it is to be used, with gibs on each side to prevent it from sliding. The blades are made of shear steel.

A handy tool for punching out wrenches under a steam hammer is shown in Fig. 5. By having dies made to fit all sizes of nuts any combination of double ended wrench can be made very quickly. Stamp out the large end first, using stock the same width as the opening in the die, then reverse the end and draw down to the width which the other end is to be, calculating the amount of stock necessary in the center for drawing to the required length. This style of tool can be used to ad-

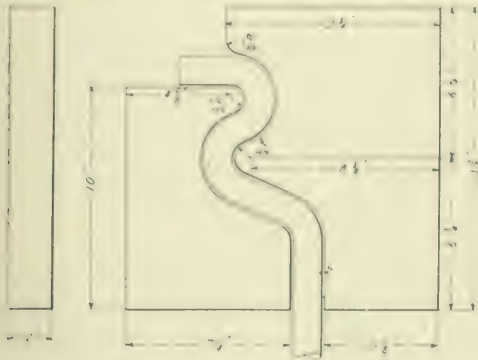


Fig. 10—Dies for Bending Forging for Strap Bolt Before Forging.

vantage for a number of jobs, such as spring hanger gibs, rod strap gibs, tamping bar ends, etc.

The tools for making rocker arms are shown in Fig. 6. Splendid results are obtained from rockers made in this way, since the grain of the iron runs in the right direction for res-

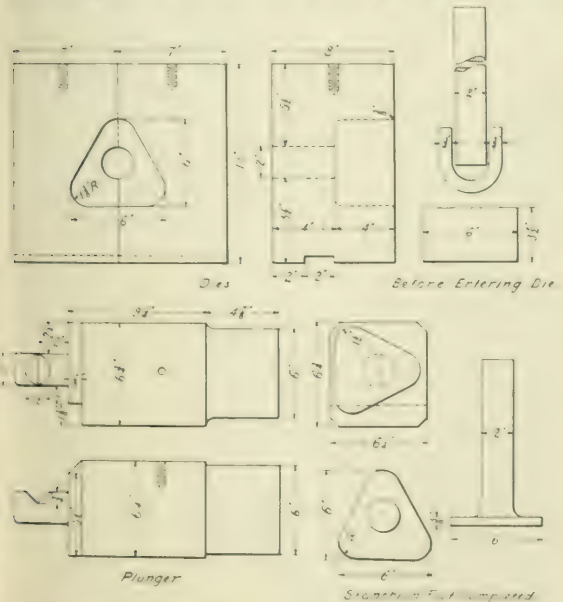


Fig. 11—Dies for Forging a Stanchion Foot.

sisting the strain on the arm. They have but one weld, which is in the center, at which point it is a rare occurrence for them to break. It requires but three heats to make each end. The body of the arm is drawn down to fit the hole in the block in

the first heat. In the second heat it is checked down for the arm and bent in a V block as shown, and is completed in the third heat. It is then welded in the center with a male and female weld, the results being a very reliable arm made with the least possible number of heats.

G. W. Kelly (C. R. R. of N. J.).—Dies for making a spring frog bolt on a 3 in. Ajax forging machine are shown in Fig. 7. One end of a bar of 1½ in. round iron, about 4 ft. long, is heated to a welding heat. It is then cut three-fourths through, 3½ in. from the end, with a hot cutter and bent over as shown, after which it is placed in the die and welded at the same heat. Engine cab ventilator bolts are made in the same way.

Spring hangers of charcoal iron are forged by the dies shown in Fig. 8, which also shows the material before and after being placed in the dies. Strap bolts and brace ends are made from 1½ in. round iron by the dies shown in Fig. 9. The dies for bending the material before placing it in the forging machine are shown in Fig. 10. The dies for forging stanchion feet for car floats are illustrated in detail in Fig. 11.

TUBE WELDING.

John J. Roach (F. & R.).—After cleaning the tubes in a rattler in our shop they are taken to the cutting-off machine and both ends are cut off 1 in., the capacity of the machine being 70 tubes per hour. It is operated by one man and consists of two rollers on the bottom and a knife at the top, controlled by a pneumatic device. They are then placed on the testing machine, which has a capacity of 60 tubes per hour, and are tested at 350 lbs. per sq. in. This is done previous to

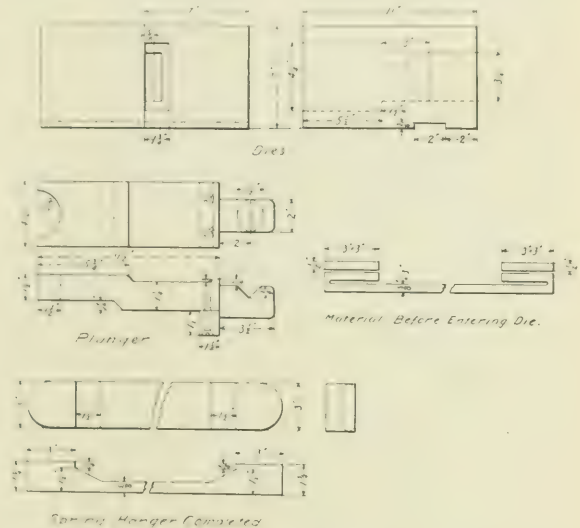


Fig. 8—Dies for Forging Spring Hangers.

welding, so as to have the percentage of leaks at new welds kept down to the lowest possible point; also for the purpose of throwing out tubes condemned at old welds, thus saving time and material. They are taken to the scarfing machine, which has a capacity of 100 tubes per hour and is handled by one man. An air chuck holds the flue while the plunger having a taper reamer, 3 in 12 in., is applied by air and inserted to a depth of ½ in., the tubes then being ready for welding.

The welding outfit consists of a Ferguson oil furnace and a McGrath air hammer having a capacity of 50 2¼-in., 65 2-in., 75 1¾-in. or 80 1½-in. tubes per hour. This machine is operated by one welder and two helpers. One helper places the tubes in the furnace and the other supplies stock and takes care of the finished flues. These are taken to the cutting-off machine, where they are cut to gage (capacity 80 tubes per hour). It has two rollers and a knife; also a grinding device to remove scale from the end that fits in the tube sheet. The

machine is operated by two men; one looks after the cutting-off knife, the other the grinder. The tubes are carried to a swelling and annealing machine, operated by one man, the flues being swelled to proper size for the front fly sheet; this machine has a capacity of 75 tubes per hour. They are then placed on trucks ready to be taken to the shop and be applied to the boilers.

Safe ends are scarfed on a scarfing machine, having a capacity of 90 tubes per hour. It has an air chuck to hold the ends, and uses a plunger having a 4-in. cutter, taper 3 in 12 in.; this is operated by air power and requires only one operator.

SPRING MAKING AND REPAIRING.

H. D. Wright (Big Four).—Manufacturing springs by machinery is the only way to handle them when large quantities are to be made. It would pay any company with 100 engines to put in a spring plant with modern machinery, for there is a saving of from 50 to 75 per cent. On the L. & N. at South Louisville they enlarged the spring plant and I am sure that T. H. Curtis, superintendent of machinery, would not have allowed F. F. Hoeffle, general blacksmith foreman, to do so if there had been no saving in it.

When you receive the steel make a test right away with each size and that saves trouble of tracing back requisition numbers, car number, when it was shipped and received; for as a rule the store department does not care to be bothered shipping back any inferior stock. We are generally asked to do something else with it, but don't let it get into your spring steel rack.

Welding on Clips.—There is a possibility that the steel may be overheated, and even if it has been brought to a welding heat it does not refine it any. I have watched the breakage of welding clips and most of them are broken from $\frac{3}{4}$ to 1 in. back from where the scarf is welded down.

Drawing Out Plates.—They should be either rolled, drawn out on an oval tool under a steam hammer, or on an oval die under a Bradley hammer; if drawn by hand, be sure that the face of the sledge is smooth and has no sharp corners on it. Flat dies under both steam or Bradley hammers leave creases, and if the rolls are not properly adjusted on long tapers, they will also cause creases. These things should be watched and avoided as creases are breaking points. After the main plates are made, all plates are nibbed, trimmed and are then ready to set and temper. In setting springs I generally leave the first and second plate stand off from $\frac{1}{8}$ to $\frac{1}{4}$ in., giving them a gradual taper to the top plate, leaving no set in the top plate, and seeing that every plate is properly fitted to each other.

Tempering is the vital point in a spring. I try and get the plates in the oil with as uniform a heat as possible and a bright cherry red heat; then we draw them back, and if you will watch real close when you put the plates back to draw, you will see the oil begin to check. At this time take the plates out of the furnace, give them a light tap with the hammer and all of the scale will fall off and your plates are blue from one end to the other. Don't dip them in the oil again, lay them down and let them cool off. They are easily fitted with what little heat there is in them.

Setting. It is best to test the spring before the bands are put on. You save bands sometimes and the time knocking the bands off and putting them on again.

Making Bands.—The forging machine is the most satisfactory for making bands, both for quantity and economy. When the bands are pressed on by hydraulic pressure it is not good practice to cool them off, for it puts too much strain on the band. It does no harm, however, to cool them off when pressed on with machinery. In putting them on by hand give the spring maker help enough so that he can get them knocked down and into the water as soon as possible, for they will not be any too tight at the heat.

These are methods that I have followed in spring making both with modern machinery, and where I had nothing but a sledge, and my trouble with springs is the least thing I have in my shop. Opinions differ in regard to the tempering oil. I

have found but little difference. We use fish oil. I have not received just the right answer on durability of the springs that are tempered by compounds mixed with water to recommend it. There are too many differences in the composition of the water.

John J. Keller (Purdue University).—Last summer I was called upon to investigate the spring question in a large wagon and automobile concern. They were rolling down the ends and drawing them in an oil furnace and letting them lie for quite a while. Some they took out at black heat and some at white heat for tempering. We tested a number of the springs and found that the excessive heat, or the uneven heat and high temperature caused the trouble with them. If you heat a spring above the critical temperature you get a porous spring notwithstanding any treatment you may give it afterwards. A piece of steel will not harden until you get to a certain temperature, but when you get beyond it you open up the grain of the material. If a spring is too hard, what treatment would you give it? It can be treated, but my advice is to be careful and do not get your spring above the critical temperature. If you do get it above, allow it to cool down below the critical temperature and bring it up gradually again; you restore that material to a certain extent.

Arthur Hughes.—On the T., St. L. & W., if a car rides a little hard the conductors say it is the fault of the springs. I spoke to the master mechanic and asked him if he would not send for a barrel of graphite paint and we painted the leaves after they were cold before we banded them; we found that it kept the rust out from between the leaves, and the conductors say that after a car has been out a month or six weeks it rides much easier.

Discussion.—Several members make springs without drawing the ends. They stand up as well as the others and are easier to make.

FRAME MAKING AND REPAIRING.

Geo. Hutton (N. Y. C. & H. R.).—After discussing the best method of making an iron frame Mr. Hutton referred to the repairing of frames as follows: In repairing or the welding of broken parts of frames some blacksmiths seem to think that cast steel frames will not stand such a high heat as iron frames, when making welds, and that if we heat it as we do iron it will be burned. It is a well known fact that we can heat cast steel frames for making repairs just as high as iron and not destroy the material, because in the manufacture of cast steel frames it has gone through a much higher heat than we can give it in a forge. The failures at welds made on cast steel frames are the result of underheating instead of overheating, as many of us think. The thermit process I have not had any experience with. Oil welding I have had good success with, both on the Michigan Central and at our shops at West Albany. We use the oil weld wherever we can get expansion and contraction.

James Beattie (K. C. So.).—Not having a surplus of motive power, when an engine comes in with broken frame repairs must be made on the frame without removal, if it is at all possible, in order that the engine be gotten into service quickly. The roundhouse foreman sends in a slip that reads: "Eng. No. — has broken frame. What can be done?" Then, in my judgment, if repairs can be made without removal, the next query is: "Can we have the engine for train No. —?" Our plan of working is this: The mechanic drops one part of wheels and loosens the frame where necessary, so it may be opened at least one inch, whether at the backbone, the lower brace, or the leg. If in the backbone we place two bars of 3 x 6 in. across the frames wherever we can get a good butt, and extending outside a sufficient distance so that the tie rods of 1½ in. round iron may be clear of heat. We insert a piece of good iron 1 in. thick with the grain in the right direction, and projecting at least one and one-fourth in. all around frame; then we fit the brick work, leaving as large a space as possible so the heat may taper off gradually; otherwise, if the brick is too close, the frame will waste at the edge of the brick. We have two small portable furnaces on wheels; one is placed on a straight track outside of

engine, the other on the inside to run sideways on an inclined track to the bottom of the pit. We locate these furnaces close to the brick work and place a twenty-gallon tank on the running board to supply the fuel, which is kerosene oil. After all preparations are made the frame is welded in from forty-five to fifty minutes. If the time extends over sixty minutes the frame is wasting. We then tighten the tie rods until the frame goes back to the frame marks, and remove the furnaces. The frame will show an increased area as far as heated and without any waste whatever.

If the break should occur in the leg the opening up will produce a curvature in the lower brace and will throw the leg out of line. This can be easily remedied by applying a rack between the jaws, immediately after welding. I am not a believer in butt welding under ordinary conditions, or in shop practice, but I believe that it is the best weld possible on a frame without removal. We have had excellent success welding on the above plan.

W. C. Seefeldt (Chi. Gen.).—This subject has been written about and talked about at every convention since the formation of the association and most of us have returned home with the inner edge of the soles of our Sunday shoes gone from marking on the floor or ground has particularly best way of making and repairing a frame. Still the subject is before us as interesting as ever. We realize that it is not meant for us to question the design or manner of fastening to the cylinder and the boiler, but from the results of certain designs and manner of fastening, it certainly seems that more thought was given to make and put them together so they would break the easiest rather than otherwise. We believe that a frame properly designed and made by the best method and then fastened to the cylinders and boiler properly is no more apt to break than is the boiler.

In repairing we make no distinction between a wrought iron and a cast steel frame. Oil welding in many places is giving good results, but many have condemned oil simply after their first trial. The more we use thermit, the more uses we find for it. It certainly is the easiest way yet found and if properly done will be found as strong if not stronger than before broken. Oxy-acetylene has possibilities seemingly unlimited, but as yet is in an embryonic state.

J. W. Riley (Lehigh).—Very often a blacksmith foreman is called upon for his advice in patching a frame. I have a patch which I have applied a number of times in the past three years without a failure. Of course this kind of a patch cannot be applied in certain places, but where it can, it is all right and can be placed without removing the wheels. The job can be done in about eight hours, as the pins and plates can be forged and the plates drilled on one end while holes are being drilled in the frame.

THE USE OF SCRAP.

L. J. Brunner (N. Y., N. H. & H.).—There are hundreds of jobs that come into the blacksmith shop that can be made from old material, and answer the purpose fully as well as if made from new stock. In large plants where the scrap of the whole system, or from several divisions, is deposited, a good intelligent man, one who is familiar with car and locomotive work, should be stationed at the scrap bin to look over and sort all good material that finds its way into the scrap heap. It is surprising to see the thousands of good pieces that are found here that can be saved and put into service again with little or no labor. I have talked with a number of men who claimed that it did not pay to use old material. I maintain that it does pay, and pay well, if good judgment is exercised in its use. If the cost of labor to make it available is greater than the cost of new material; or if old material is allowed to enter parts requiring new material, then it is poor economy, but if properly handled a great deal of money can be saved annually.

To illustrate: Previous to the time I took my present position, there was very little if any old material used at this point. As soon as possible I inaugurated the system of utilizing scrap iron and steel for all purposes where it could be done advantageously. When I began to instruct the men as to what I

wanted done some of the older hands got astonished, but I soon educated them to the point where they knew as well as I did what parts could be suitably made from old material, and the system has worked very well ever since. As soon as I got the system well established, I kept a record for my own information for one year, which showed that I had used 445,000 lbs. of old iron and steel during that period, and had rescued thousands of good parts that required very little labor to make them serviceable. When the difference in the price of the old and new material is considered it is no idle claim to state that this did pay. The extra cost of handling the scrap is very little as the man in charge of the scrap bin picks out everything he sees that he thinks is useful and lays it to one side; whenever I have a little spare time I look it over and have the laborer that wheels out the scrap from the shop bring back a load with him each trip and store it in a large bin conveniently located outside the shop.

PIECE WORK.

Thos. M. Ross (B., R. & P.).—When introducing piece work in a shop care and judgment should be used in getting up the first schedules to be put into operation, as much of the future success depends upon getting the right start. It should first be used on work with which the men are familiar and for which the facilities for handling are good; it is then much easier to proceed with the more difficult operations. Confidence must be maintained and the men convinced that you intend to be fair with them; this can be done by the foreman taking the proper amount of interest and demonstrating by the men's own work that they will be the gainers in the end and in this way securing their co-operation.

In getting up schedules and creating piece work prices we must be governed by the conditions surrounding the work and the facilities provided for handling it after it has been delivered to the workmen. In a well equipped shop you may be able to do certain lines of work for a great deal less than in other shops, and at the same time the workingman will work harder and still make more money. The system of timing workmen to ascertain the cost of performing different operations is one which calls for the use of good judgment; the foreman must take into consideration the condition of the material (if on repair work) and also the ability of the men or man doing the work, some taking more readily to one class of work than another, and also the willingness of the workmen and their ability to shirk when on work not already covered by piece work.

The proper distribution of piece work among the workmen is very important in that if any favoritism is shown it will sooner or later cause dissatisfaction among them. In case some man may have a bad run of work in which he may do his best and still not be able to make out, it is up to the foreman to see that he gets on a line of work in which he can make up his loss on the bad job and be made to forget his troubles. I have in use in my shop a system of keeping account of the earnings of my men by which I am enabled to so divide the piece work that all are getting as near their share as it is possible to give them. This shows the workmen that I am playing square with them and they do the same with me. We average 85 to 90 per cent. piece work.

Piece work has a tendency to develop the inventive genius in workmen, as when given a certain price for doing a job he begins at once to look for a quicker and easier way of doing it and excellent results are sometimes secured. Have your prices right, be fair with your men and have conditions the best you can and piece work is a success, otherwise it is a failure.

George F. Hinkens.—Establishing a piece work system is not a difficult job; it is a business proposition; all that is required is absolute fair play to the company and the men. There is not a foreman in this room but likes appreciation from his superior officer. If any of you have brought out a new stunt that saves money for your company and your master mechanic or superintendent speaks of it in praiseworthy terms, it makes you feel like doing some more, and then some. That is human nature.

Your master mechanic knows when a word of praise is worth a dollar, and when it produces a swelled head. Your master mechanic or superintendent has confidence in you; if he did not have, he would not have you. Now you play the game the same way. Have confidence in your men or, rather, have men that you have confidence in. More than all, if any of your men do a good job and in quick time, show your appreciation of the fact by telling them so. You know your man and know whether it will swell his head or stimulate the best and the good in him.

If appreciation was a salable or commercial article you would find that 50 cents worth would bring one dollar in results. Too often a deserving man is expected to take for granted the praise for his efficient work, while if he commits an error he hears from it in ten minutes. Any foreman deserving peace of mind must stand honest criticism. Quoting James Whitcomb Riley's opinion: "He who does his best, gets more kicks than all the rest." It is a good thing to be called; it shows up whether you are bluffing or holding a good hand.

I do not care whether you call it piece work, contract work, premium plan or bonus system, it all amounts to the same thing. It is only a question of how much product can you get for a stipulated amount of money, and how much your company is willing to pay. A man can do as much work for \$1 as he can for \$5. A shoe dealer can sell a \$5 pair of shoes for \$1. Now this is a case where there is a money loss in either case. Now, you can give a man \$5 for \$1 worth of labor, and you can give \$5 for a \$1 pair of shoes. This is also a case where there is a money loss in either case. Now, if the seller and the buyer understand their business there will be no money loss in either case, but it will be a business transaction and one that will be satisfactory to both parties. Selling shoes is for profit; buying shoes is also for profit, if you wish to get full service as to wear and tear.

Piece work is also for profit, it increases production and at lower than day work cost. It means less men and less machinery to get out a given amount of product. It is a profit to the workman, as he makes a profit over his day rate. Not only that, he must make good any inferior work, as that is in the agreement. Piece work is the only right and just way to work; an industrious man is rewarded for his efforts. Furthermore, there is no dispute about how much work a man should do in a given time. The price is set with justice to both parties, and it is up to the man to make good. It is not so with day work. Day work will always cause more or less misunderstanding between the foreman and some of his men, as to what constitutes a day's work. It is a source of friction. My men, all of them, want piece work simply because they need the extra money, and my company wants the product.

There is no benevolence about it, it is simply a business transaction. As to the best method for setting piece work prices, that is up to you. Piece work, however fine in principle, will not work automatically. You must use good management and be guided by sound business judgment. Herman Schneider, dean of the college of engineering, University of Cincinnati, aptly puts it when he says, "A knowledge of the limitations, the weaknesses and group subtleties of men is as requisite as a similar knowledge of material."

CASE HARDENING

Chas. A. Slenker (Long Island).—We have been experimenting with several different compounds, including the R. C. compound, and finally decided to use it. It is much cheaper at first cost and just as good the second time without adding new material, therefore, reducing the cost considerably. It only requires eight hours to harden a set of lathe tools to 3 in. in depth and at least a good case. The surface obtained is a great deal harder than with other methods.

Discussion.—Papers were presented by Edward Ford, C. M. & St. P.; M. Thompson, C. & N. W.; C. A. Miller, Ia. Cen.; Wm. Denslow, Penn. Trans.; and Wm. Price, C. & R. of N. E. Nothing particularly new was brought out.

A. W. McCaslin (P. & E. E.).—Some time ago I visited a shop that was considered above the average in its management;

the blacksmith operating the big fire was making what should have been a side V weld in a main frame; the lay-in piece was a perfect shape and size for a butcher's cleaver. This is no exaggeration, neither was it a weld.

You will pardon me when I say that many of us do not give this weld the consideration we should. It is usually made to an angle of 90 degrees, owing to the fact that the lay-in piece requires no preparation; any old piece of square iron can be thrown in. This weld will shear in the making or in its reduction, and sometimes separates in straightening under the steam

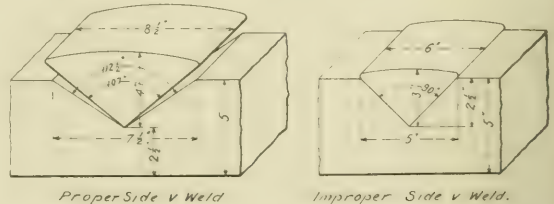


Fig. 12.—Proper and Improper Methods of Making a Side V Weld.

hammer. It is more difficult to heat up at the point of the V than when the angle is less acute (wider across the top of the V).

We have another shop in mind that has what they term standard tools for preparing this weld. The top tool for forming the V cavity is made to an angle of 112½ deg., and the tool for forming the lay-in piece at an angle of 107 deg. This weld will have a lap of 7½ in. when the point of the V reaches the center of a 5-in. square bar, and of course, will carry out proportionately in a less or greater depth in different sizes of iron to be welded this way. The lap is ½ or 2½ in. greater than the cross section of the bar to be welded, and 2½ in., or 50 per cent, longer than the 45-deg. angle weld in the same size bar. The ½ and ¾-deg. mentioned above have no significance other than to be exact. These tools are easily forged and will answer for several sizes. You will note the difference in the degrees of angles in the V cavity and the lay-in piece; this permits the lay-in piece to drop to the bottom of the V cavity without shearing. The shop has many lay-in pieces of various sizes in stock.

An inferior weld is serious enough, but there is nothing in our business that adds as much to the number of failures or breakages as does the lack of fillets. There is scarcely any part of a locomotive that will not accommodate a good fillet, yet this fact is often disregarded and many avoidable breakages occur.

Election of Officers.—The following officers were elected: President, John Connors, A. & W. P., Montgomery, Ala.; first vice-president, F. F. Hoeftle, L. & N., Louisville, Ky.; second vice-president, J. T. McSweeney, B. & O., Baltimore, Md.; secretary and treasurer, A. L. Woodworth, C. H. & D., Lima, O.; chemist, G. H. Williams, Boston, Mass.

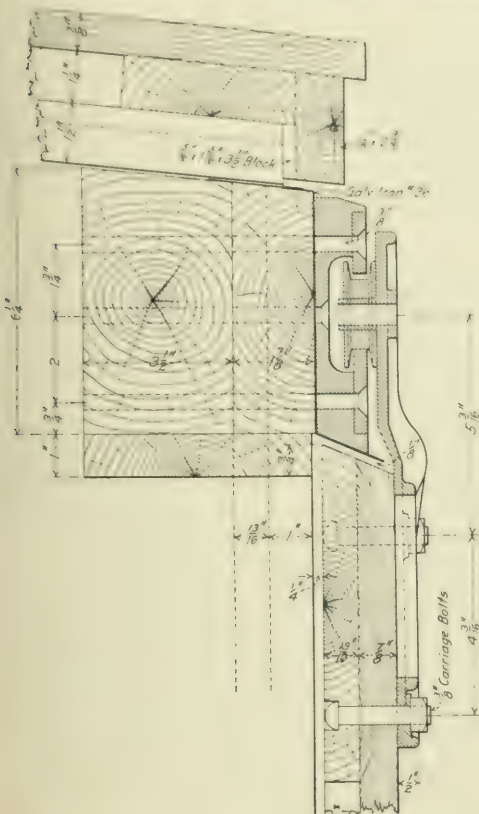
The place of meeting for next year was discussed and the names of three cities were selected, one of the three to be decided upon by the executive committee. The cities were Toledo, Boston and Denver. The secretary's salary was increased from \$200 to \$250 per year.

Exhibitors.—The following supply companies had exhibits in the hotel: Ajax Manufacturing Company, Cleveland, Ohio; Beaudry & Co., Boston, Mass.; Crucible Steel Company of America, Pittsburgh, Pa.; Goldschmidt Thermit Company, New York; Halcomb Steel Company, Syracuse, N. Y.; National Machinery Company, Tiffin, Ohio; Newhall & Co., Detroit, Mich.; Clemens Restem Company, Philadelphia, Pa., and the United Engineering & Foundry Co., Pittsburgh, Pa.

The convention closed on the 18th, and on the 19th a large number of the members, many of them with their wives, went to Tiffin, Ohio, as the guests of The National Machinery Company. The company had an exhibition over 50 bolt, nut and forging machines—both belt and motor driven—on which demonstrations were made.

BOX CAR DOOR FIXTURES.

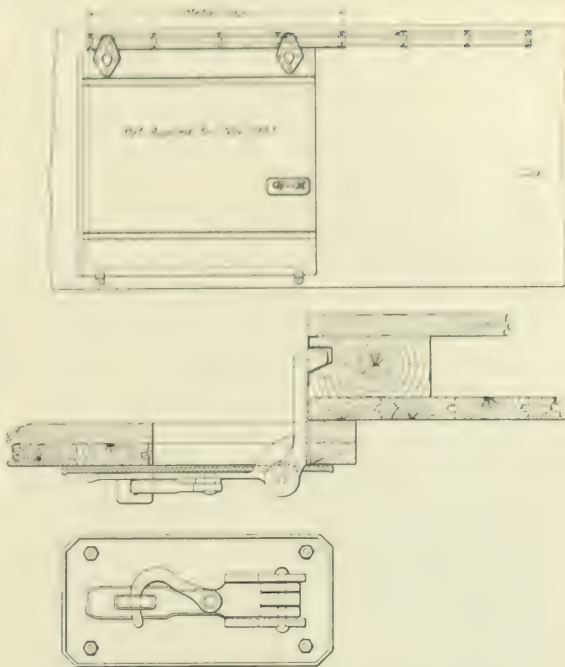
A box car, equipped with special door fixtures designed and patented by B. H. Hawkins, master mechanic, C. G. Anderson, general foreman car department, and J. McAllister, former chief foreman, all of the Delaware, Lackawanna & Western, at East Buffalo, N. Y., has been in service for about two years, with excellent results. As shown by the drawing, the door is hinged at its top edge and a piece of No. 26 galvanized iron, placed underneath the spacing blocks, extends over it with about $\frac{1}{8}$ in. clearance. All moisture is thus effectually kept out of the car, and the usual door cap, which is expensive to maintain and not at all attractive in appearance, is done away with. The bevel at the top of the door also prevents it from falling out at the top, even if the door hangers are removed; also, if the door should become loose at the bottom it can only swing out about 9 in. A double door track is fastened to the spacing blocks and the side plate by bolts with countersunk heads. This double rail prevents the door from "locking" and catching. As its construction



Arrangement of the Door Track and Hangers.

such that the rails cannot spread apart, there is no danger of the door sagging down. The track upon which the sheaves operate is only $\frac{3}{8}$ in. wide and any snow or ice which may gather on it cannot obstruct the roller, but is easily cut away by the action of the sheave on the narrow rail and pushed aside.

Another important feature is the locking mechanism. This, contrary to the usual custom, is placed at the rear end of the door. To lock the door a handle, projecting backward along the side of the car, is pulled forward 180 deg., thus forcing the latch into the post door, as shown in the sectional view. The taper on the latch and the pocket in which it fits are such that the door is pulled tightly against the side of the car and the front end of the door is forced against the door post. The door is stiffened by the



Application of the Car Door and Details of the Lock.

two 1 x 1 x $\frac{1}{8}$ in. angles, which extend across it below the hangers and the lock. These fixtures may be applied to any box car door and are known as the Reliable door track and lock.

A CONSOLIDATION LOCOMOTIVE REPAIRED IN RECORD-BREAKING TIME.

On Wednesday, June 28, at 7.30 a. m., engine No. 1236 was taken into the Springfield shops of the St. Louis & San Francisco at Springfield, Mo., for a general overhauling. The engine was pulled out of the shop ready to couple to the tender and fire up at 5 p. m. the same day. It was backed off the transfer table and coupled to the tender at 5.15 p. m. The following description of how the work was handled is taken from a bulletin issued by G. W. Lillie, superintendent of shops.

Engine No. 1236 is one of the heaviest consolidation type locomotives on the Frisco. An idea of its size and capacity may be gained from the following data:

Children	22 in. x 30 in.
Drivers	57 in. x 57 in.
Floors	386 sq. ft. length, 11 ft. 63 in.
Weight on drivers	187,000 lbs.
" on truck	20,000 "
" of engine	207,000 "
" of tender	148,400 "
" total	355,400 "
Boiler pressure	200 lbs.
Firebox	68 in. x 108 in.
Traction effort	43,300 lbs.

It is the practice at large eastern shops to have standard material worked up ahead of time to facilitate repairs and get the engines through the shop quickly, returning them to revenue service with the least possible delay. It was partially to demonstrate the value of this policy and also to demonstrate the efficiency of our organization, the loyalty of our men, and to fittingly wind up the first year of operation that this record was made.

New driving boxes, driving box brasses, shoes and wedges, rod brasses and bushings, pistons, rods and crossheads were fitted up beforehand ready for the final machine work necessary after the engine was stripped. New knee brackets for the top guide were made up and ready; also front sections of side rods which had a new style front end, and four new crank pins.

It is impossible to double up on the boiler work to the same extent as on the machine work, and in order not to hold up the other men at the finish we opened up the front end and cut out the old flues the day before and had a set of flues ready to apply on the morning of the test. We attempted to keep a record of the time taken to perform the various operations, but some were lost in the hurry. The following is a log of the test, as far as we were able to get it:

Work commenced.....	7:30 a.m.
Front cylinder heads.....	Off at 7:38 a.m.; back at 10:45 "
Links (Walschaert).....	Off at 7:38 a.m.; back at 12:00 noon.
Steam chests, covers, casings and valves off.....	7:40 a.m.
First valve back from planer.....	8:15 "
First steam chest cover back from planer.....	8:50 "
Started to face valve seats.....	7:55 a.m.; last one finished 9:00 "
Second steam chest cover back from planer.....	9:15 "
Steam chest closed and port marks taken.....	Left, 9:58 a.m.; right 10:10 "
Brake rigging down.....	7:45 "
Smokestack off (old style).....	7:48 "
New stack and base on (base laid off and drilled).....	10:15 "
Air pumps.....	Off at 8:00 a.m.; back at 11:59 "
A stuck bolt in left main rod strap delayed unwheeling 25 mins.	
Engine lifted off wheels by crane.....	8:28 "
Engine clear of running gear.....	8:33 "
Engine on steel blocking.....	8:35 "
Side rods off.....	8:40 "
Boxes and cellars off.....	8:43 "
Driving tires $\frac{7}{8}$ -in. wear and sharp flanges:	
First pair driving wheels in lathe (large lathe).....	8:48 a.m.; out 9:59 "
Second pair in lathe (small lathe).....	8:53 a.m.; out 10:53 "
Third pair driving wheels in lathe.....	10:02 a.m.; out 10:56 "
Actual time turning, 40 mins.	
Fourth pair driving wheels in large lathe.....	11:07 a.m.; out 12:00 noon.
Four new crank pins applied. Last one in at.....	10:37 a.m.
First driving box bored in 16 mins.	
First pair driving boxes fitted (filed); start.....	10:25 "
Cellars up on these boxes.....	10:35 "
Spring rigging down.....	8:45 "
Spring rigging up complete.....	11:10 "
Began putting up new ash pan.....	8:45 "
Finished putting up new ash pan.....	10:05 "
Binders down.....	8:05 "
Binders started to put up.....	8:40 a.m.; finished 9:30 "
Shoes and wedges laid off at.....	10:30 "
All back from planer.....	11:35 "
Binders up after wheeling, and wedges set.....	3:50 p.m.
Right piston pulled.....	8:50 a.m.
Left piston pulled.....	9:00 "
Right piston in place (new).....	10:20 "
Left piston in place (new).....	10:25 "
Cylinder heads on with casings; striking points taken, right.....	10:50 "
Cylinder heads on with casings; striking points taken, left.....	10:28 "
Tumbling shaft down.....	8:58 "
Tumbling shaft back, bearings trued up and holes bushed.....	1:10 p.m.
Started hanging lower guide.....	Left, at 9:15 a.m.; finished 10:15 a.m.
Started hanging lower guide.....	Right at 9:10 a.m.; finished 9:55 "
Sixteen new guide bars applied.....	
Link brackets.....	Off at 8:30 a.m.; back with new bushings 11:02 "
Both links up.....	12:00 noon.
Valve motion connected up complete.....	4:50 p.m.
Injectors.....	Off 8:00 a.m.; back, 1:00 p.m.
Brake valve.....	Off, 8:00 a.m.; back, 9:30 a.m.
Lubricators.....	Off, 8:00 a.m.; back, 1:08 p.m.
Whistle.....	Off, 8:00 a.m.; back, 9:30 a.m.
Pump governor.....	Off, 8 a.m.; back, 9:30 "
Steam and air gages.....	Off, 8:30 a.m.; tested and back 10:00 "
Boiler checks ground in. Gage cocks repaired.	
Throttle box removed and ground to stand pipe.	
Throttle valve ground to box. Lost motion taken out of throttle rigging. Throttle lever repaired.	
New gaskets applied to dome cap and steam chests.	
Relief valves repaired. New piston and valve stem packing applied.	
Began putting flues in boiler.....	7:30 a.m.
Started to roll flues in front end.....	1:30 p.m.
Finished pinning and rolling flues in front end.....	1:30 p.m.
386 flues, time, 2 hrs. and 35 mins.	
Started beading back ends.....	10:37 a.m.; finished 11:15 a.m.
Lifted engine off blocks.....	1:15 p.m.
Wheels placed.....	1:10 "
Left down on wheels.....	1:05 "
Delayed on account of trouble connecting up engine truck equalizer and spring hanger.	
Brass and steel rods.....	3:50 p.m.
Pressure on boiler, 254 lbs., 9 flues to reboil.....	3:10 "
Water out of boiler.....	3:00 "
Boiler coming out of reboil.....	2:43 p.m., all hand 3:00 "
Boiler filled with water, and being up.....	4:20 "
New scale front end and connection applied with hammer and sled on pipe.	
Dome casing set.....	3:25 p.m.
New gasket.....	4:40 "
Front end door closed.....	4:00 "
Front end door open.....	4:10 "
Boiler coming complete, fire side in 11 mins. time.....	2:37 "
Boiler coming complete, right side in 13 mins. time.....	3:00 "
Left side in 14 mins. Started, 3:46 p.m. done.....	3:55 "
Right side in 14 mins. Started, 4:31 p.m. done.....	4:45 "
Boiler out of shop, washed and watered.....	4:50 "
Engine pulled out of shop to its transfer table.....	5:00 "
Engine going in on track for fire.....	5:15 "
Engine back to shop for reboiling, no water down on engine at night.....	5:00 a.m.

Following is a partial work report of repairs made:

Trunk cap removed; gasket and
 Rubber put on; 254 lbs. pressure.
 Water and pins removed. Holes outgassed.
 Pressure on boiler.
 Main steam valve and connection
 and boiler door tested; removed.
 480 flues, 2 hours 35

Smokebox front patched. (No new casting on hand.)
 Smokebox door repaired.
 Smokebox netting repaired.
 Petticoat pipe renewed.
 New stack and base.
 Number plate repaired.
 New grates and bearing bars.
 New Rock Island ash pan and rigging.
 All brass fittings overhauled.
 Safety valves repaired.
 Whistle rigging overhauled.
 Gage cocks repaired.
 Cylinder cocks and rigging new.
 Relief valves new.
 Steam gages and connections; cab fountain, lubricators, injectors, and injector throttles overhauled.
 New air pipe connections.
 Two new feed pipes and hose.
 Two new piston heads. Rods repaired.
 Cylinder packing new. Valve stem packing new.
 Slide valves planed. Seats faced. Yokes repaired. Stems turned up.
 Balance strips repaired.
 Steam chests have new gaskets. Covers planed.
 Crossheads and pins new. Gibs new.
 Guides (2-bar) overhauled. 16 new guide bolts applied.
 Two new style knee brackets applied to upper guides.
 Right wheels removed and tires turned.
 Right new driving boxes, brasses and cellars.
 Right new shoes and wedges. Also new wedge bolts.
 Four new crank pins applied.
 Three new driving springs applied.
 New pilot.
 New seat boxes and cushions.
 Air brakes overhauled. No. 6 N. Y. pump overhauled.
 All air brake parts on engine and tender cleaned and repaired.
 Bell and bell-ringer repaired.
 Sand box and sanders repaired.
 Electric headlight overhauled.
 Running boards and cab riveted to brackets.
 Engine and tender painted.
 Tender—Tank repaired. New side boards applied; also standard co gates and new steps.
 Tank frame repaired. New steel center casting applied at front end of frame.
 Tender trucks overhauled. New column and journal box bolts.
 New cast wheels on $5\frac{1}{2}$ in. x 10 in. journals.

INTERIOR FINISH OF PASSENGER CARS.

In commenting on the tendency toward improving the sanitary conditions of passenger coaches, *The Painters' Magazine* has the to say from the standpoint of the painter: "The form, design, balance and all that sort of thing, in which cut-up work and ornamental features galore have until recently predominated, have been gradually abandoned. This has come about without revolutionary manifestations, and the plain, simple finish, bereft of ornament, has for some years been gradually developing. No class of car department employees are better satisfied with the change than the painters. The car surface, clad in elaborate carvings and heavy with ornate wood embellishments, offered work in the filling and bringing up of a tedious and protracted nature, which every experienced wood finisher shuns as he would the measles. Moreover, all such work is doubly expensive—nearly so—as compared to the cost of fetching the plain surface along through to the finish. Added to this evidence adverse to the ornamental wood interior comes the cost of keeping the finish clean and neat. To renovate a surface cut and carved into ornamental terraces, as a great many interiors up to a recent date were worked out, not only requires considerably more material of a rather expensive kind, but the labor is augmented in a majority of cases at least one-third.

"None of these surfaces can be made as sanitary as they cannot be cleaned as thoroughly, as the plain surface. Therefore, the situation on the whole promises healthier and more accommodations and affords a better prospect for all present and contemplated."

FOREIGN RAILWAY NOTES.

The new railway of Costa Rica provides that the sale, lease or transfer of a railway concession before becoming valid is subject to the approval of Congress.

The Central Railway of Brazil has been extended to Pirapora, on the San Francisco river, about 624 miles from Rio Janeiro. The Central Railway now has 1,078 miles of line in operation.

General News Section.

At Lille, France, on Monday of the week, Louis Broget, an aviator, took up with him in his aeroplane five passengers, the total weight sustained by his machine, including the passengers, was 271 lbs.

The wheat improvement "special" train of the Pennsylvania, running this week in Indiana under the auspices of agricultural experts connected with the Purdue University experiment station proved very popular.

The Western New York Car Demurrage Association, of which W. Bradley is manager, is to be dissolved on October 31. The association, which is a party to eight or more demurrage suits, has given notice of withdrawal from all of them.

The Atchison, Topeka & Santa Fe has placed a standard 70 H. P. Green gasoline motor car in service between Houston and Beaumont, Tex., a 90 mile run. The intention is to assist in the development of residence sites and serve a summer resort car midway. No immediate increase in equipment is contemplated.

On the Jamstown & Franklin division of the Lake Shore & Michigan Southern, trains are now run on the right hand track, changing the left hand running, which has long been in vogue. The right hand running is now the rule throughout the track lines on the Lake Shore, except on the eastern end.

The Chicago, Milwaukee & Puget Sound, which suffered seriously from the disastrous forest fires of last week, announces that trains will probably be run through by September 7. A number of wooden bridges were burned down, but the total loss of the company are said to be \$275,000, far less than the loss which have been mentioned in press despatches.

The arrival of the first through passenger train of the Western at Oakland, Cal., on August 23, was made the occasion of a great public celebration at that place. Oakland is the western terminus of the track of the W. P., being situated just across the bay of San Francisco from San Francisco. The train's arrival at the Oakland station was accompanied by such blowing whistles and other noises as commonly mark the coming in of a new year. Addresses were made to a large crowd by Walter Mackay, president of the chamber of commerce and chairman of the general reception committee; by Mayor Mott; by John P. Irish, and by Max Thelan, representing the Western's legal department.

A rear collision of eastbound passenger trains on the Grand trunk, two miles east of Durand, Mich., on the night of August 11, at 11 o'clock, six or eight passengers were killed and five passengers and two trainmen were injured. The wreck took fire and some of the passengers were burned to death. The leading car was No. 14. It had been stopped on account of the brakes failing, and the engineman and fireman of that train, who were on their engine, were badly injured. The following train was No. 4, which leaves Chicago 45 minutes behind No. 14. The car of No. 14 was the sleeping car and in this were most of the victims. This car was totally destroyed by fire. The reports indicate that the flagman went back a sufficient distance, that his light and his torpedoes were both disregarded.

The New York Central has bought lands costing approximately \$1,000,000 adjacent to its freight yard on the west side of New York City, on which is to be put up a building for the use of the American Express Company. The tracts bought are between 2d and 3d streets and Tenth and Eleventh avenues, east west of the new Pennsylvania passenger terminal. The express business to be transferred to this location from the Grand Central Station embraces all that is sent to and from New York or the New York Central in full carloads. This constitutes a large share of the express business done over the New York Central and it is run largely in trains composed wholly of express cars. Between the new station and Spuyten Duyvil, these trains will run over the N. Y. C. west side freight line. The tracks now used by the express company at the Grand Central Station will have to be abandoned to make way for the enlargement of the yard, and for its business which is handled

on passenger trains, the express company will probably find temporary quarters in a new location near the Grand Central.

Two ticket sellers of the Delaware, Lackawanna & Western at Hoboken, N. J., have been arrested for selling tickets a second time, returned to them by brakemen, and for altering the number of tickets, so that in counting for sale they could find out what the tickets had been sold for. The discovery of the embezzlement in connection with the tickets which were resold was made by a boy who swept out the office and who had noticed that tickets were sold on which the numbers did not correspond with the regular series on sale for that day. The embezzlement in connection with the alteration of the stubs was made possible, it is said, by the discovery that in the auditor's office the stubs were not carefully compared with the tickets taken up by the conductors. The detectives say that the embezzlements may amount to several thousand dollars.

Telephone Train Despatching on the Virginian Railway.

As heretofore announced, the telephone has been adopted extensively by the Virginian Railway for use on train wires. Between Roanoke, Va., and Deepwater, W. Va., the apparatus has been installed and is now in use. The line wires are of copper, weighing 210 lbs. to the mile. The despatcher on this division is at Princeton, W. Va., and therefore has 97 miles of the line west of him and 96 miles east. At stations where an operator is not always in attendance, the telephone is fixed in a cabinet which has a door opening outside of the building (as well as one inside) so that a conductor can at any time reach the telephone and speak to the despatcher. The rest of the main line of the road will be equipped with telephones within a very few weeks. The despatchers say that the telephone lines work so well that their work is greatly simplified; "it is like taking a vacation." There is no trouble in hearing a watch tick over the line between Fagg, Va., and Page, W. Va., 157 miles.

New Laws in Texas.

The Legislature of Texas has passed, by overwhelming majorities in both houses, the bill providing that when a railway becomes bankrupt and goes into the hands of a receiver, the receivership shall not be terminated until the new company assumes the outstanding obligations of the old one. This bill has been rushed through at the demand of lawyers representing claims amounting to, it is said, over \$2,000,000 against the International & Great Northern, which is advertised to be sold under foreclosure September 14. The bill was strongly opposed on the ground that it was retroactive and confiscatory, putting heavy charges ahead of mortgaged bonds.

On Tuesday of this week the Senate reconsidered the bill and adopted an amendment, the effect of which is to relieve the second mortgage bondholders of the International & Great Northern from the burden of unsecured debts of that road contracted more than two years prior to the present receivership. The Gould family's loan of \$4,000,000 is unsecured and is not validated under the amendment. The Senate then passed the bill as amended.

The Legislature of Texas, at its special session, passed on Saturday last the bill requiring railways to erect buildings or sheds for the protection of car repair men and painters. The penalty for violating this law is not more than \$100 for every ten days.

Trial of Alleged Illinois Central Grafters.

F. B. Harriman, formerly general manager; Charles L. Ewing, formerly general superintendent, and John M. Taylor, formerly general storekeeper of the Illinois Central, were arraigned before Judge Bruggemeyer, of the municipal court of Chicago, on August 26, and put on trial on the charge of having participated in frauds against the road in connection with the repair of its cars by various car repair concerns. Theophil Reuther, a locomotive engineer of the Illinois Central, who was associated with H. C. Ostermann in the organization of the Ostermann Manufacturing Company and was for a time a director in this com-

pany, testified that one day in 1907 Ostermann told him that he had ordered two or three barrels of paint from the stores of the Illinois Central to be used in the repair of the cars of his company and had received six or seven more barrels in the same car. He testified that Ostermann on another occasion showed him a car loaded with scrap iron from Illinois Central cars which had been repaired, which, he said, would be sold. Reuther said he protested against this way of doing business as dangerous, but Ostermann replied that "Taylor would take care of that." The witness described a stockholders' meeting in 1907 at which Taylor was present. A certificate for 1,500 shares of stock in the Ostermann company had been sent to Taylor, in return, Ostermann told Reuther, for Taylor's getting the Illinois Central to use the Ostermann company's grain doors on its cars. Taylor sent this certificate back. Ostermann then sent him 2,000 shares, which he kept. At the directors' meeting in question, Reuther was ousted as a director and, according to the witness, Taylor was elected to succeed him. A few weeks after the 2,000 shares of stock had been given to Taylor, the witness testified, Ostermann told him that he was going to send Taylor 2,000 more shares. He also testified that 2,000 shares each were given to Harriman; Joseph E. Baker, then superintendent of the car department; William Renshaw, then superintendent of machinery, and the late Ira G. Rawn, then vice-president of the Illinois Central.

Squealer at Ballinger.

The heading of this item is from the *Galveston News*. It does not refer to affairs in President Taft's cabinet, but to the "Hog-train" run by the Gulf, Colorado & Santa Fe for the instruction of Texas farmers. About 200 Rannels county farmers greeted the train at Ballinger and heard the lecture on "Hog Culture" by Professor Frazier. Interest in raising more hogs is growing among the farmers and quite a number of them are arranging to raise hogs on a larger scale.

Proposed Employers' Liability Legislation in Illinois.

Reference was made in the *Railway Age Gazette* of August 12, page 287, to the proposed employers' liability legislation in Illinois. Neither employers nor employees seem to be pleased with the proposed measure, which has been drawn by a special state commission. A representative of the building contractors of Chicago said that he would favor a plan of industrial insurance by which the building contractors would pay one-half of 1 per cent. of their weekly pay-roll into a fund for insurance to be administered by the state. Figures compiled for the Chicago & Eastern Illinois Railroad indicate that in one year the proposed law would cost this company \$80,000 more than the average sum annually paid in damage claims under existing laws. Officers of the South Side Elevated of Chicago estimated that the operation of the law would increase payments on personal injury claims 40 per cent. A number of labor leaders who appeared before the commission vigorously opposed the proposed law. One of them said that it is not money that the working men want, but safe places to work; "they want to make it so expensive for employers to kill their workmen that every safety appliance known to science will be installed."

Turkish Railway Receipts.

Deputy Consul General William Smith Lyte, of Constantinople, reports the receipts of Turkish railways from January 1 to April 10, 1910, and the increase thereof as compared with the same period in 1909, as follows:

	Receipts.	Increase.
European Turkey	884,028	802,631
Constantinople Railroad	768,195	109,380
Bagdad Railroad	18,062	41,218
Salonica Railroad	11,776	88,177
Angora Railroad	114,148	20,403
Adana Railroad	24,132	5,994
Samsun Railroad	563,461	212,622
Sivas Railroad	191,494	12,086
Yedigöller Railroad	36,189	2,036
Mossana Railroad	69,806	15,268
TOTALS	\$2,811,931	\$396,733

The receipts on the Salonika Bagdad line were influenced to a large extent by the sums paid for the transport of troops. On the other hand, the Anatolian lines to Angora and Konia were not affected by such military transport, and yet show an

increase of 35.8 per cent. and 21.8 per cent., respectively, during the period under consideration. On the small section of the Bagdad line open to traffic there is also an increase of 27.9 per cent.

This general increase in the traffic receipts has continued since the end of April, and according to the latest published statements of the Anatolian and Oriental railways, the total increases as compared with last year, from the commencement of the year to the end of May on these two railways, amount in round figures to \$110,000 and \$180,000, respectively.—*Wall Street Journal*.

Master Car and Locomotive Painters' Association.

At the 41st annual convention to be held at St. Louis, Mo., September 13-16, the following papers will be presented:

"Will the Use of Oil or Emulsion Car Cleaners Extend the Shopping Period of Exterior Varnished Surfaces of Passenger Equipment?" "How Should It Be Used to Obtain the Best Results?" By H. N. Butts, New York Central; J. T. Houser, Cumberland Valley, and John B. Ayers, Utica & Mohawk.

"Is It Economy to Keep a Practical Painter in Roundhouses to Look After Them Generally?" Discussion to be opened by A. J. Bush, Delaware & Hudson.

"Quality versus Quantity in Shop Output." By Charles A. Cook, Philadelphia, Baltimore & Washington.

"Is it Possible for the Painter to Overcome the Difficulty Caused by the Effect of Steam Heat, in Passenger Coaches, on the Glue Used in Holding Veneer?" By Charles E. Coop, Boston & Maine; B. E. Miller, Delaware, Lackawanna & Western; and A. S. Baldwin, Barney & Smith Car Co.

"Considering the Health of the Workmen, Should We not Seek a Suitable Substitute for White Lead for Exterior Painting?" Discussion to be opened by J. H. Pitard, Mobile & Ohio.

"Report of Test Committee." By W. O. Quest, Pittsburgh & Lake Erie.

"Organization of the Paint Shop Force on a Piece Work Basis in Detail, With Reference to a Specific Daily Output of Repair Work; also Shop Management Practically and Clerically to this End." By H. H. Hefelfinger, Pennsylvania, and W. E. Estabrook, Delaware, Lackawanna & Western.

"The Best Method of Treating Structural Aluminum on Interiors of Steel Passenger Cars." Discussion to be opened by John Gearhart, Pennsylvania.

"Inert Pigments: Their Use and Abuse." By Anderson Polk, Lowe Bros. Co.

"Does the Practice of Repeatedly Coating with Body Color Affect the Burning Off Period?" By R. J. Kelly, Long Island; O. E. Wilkins, Norfolk & Western, and Melton J. Amery, New York & Quebec.

"Rushing Cars through the Shops for Paint and Varnish, and Claims for Damages by Passengers for Soiled Clothing and Shoes; Remedies." Discussion opened by J. T. McCracken, Interborough Rapid Transit.

"An Ideal Railway Car Paint Embracing Construction, Convenience and Shop Location." By W. O. Quest, Pittsburgh & Lake Erie.

"Canvases Roofed and Maintained." By Dr. E. W. Powers, Erie; John F. Lenfersick, Pennsylvania, and George R. Kinsey, Baltimore & Ohio.

Roadmasters' and Maintenance of Way Association.

The twenty-eighth annual convention of the Roadmasters' and Maintenance of Way Association will be held at the Great Northern Hotel, Chicago, September 13-16, 1910, being called to order at 10:30 a. m. on September 13. The following subjects will be discussed at the meetings:

Proper Care of Track Material and Tools.

Cattle Guards.

New and Improved Appliances, including Ties.

Standard Switch Target.

Rail Fastenings, including Insulated Joints.

Tie Plates and Rail Anchors.

Paper on Treated Timber by J. L. Single.

Paper on subject to be selected by himself, by W. M. Camp.

Topical questions for discussion: (a) Dressing of Gravel Ballasted Track. (b) Paying of Ditches. (c) Length and Size of Ties. (d) How to Drain the Midway of Double Track, Whether by Surface Ditches or by Tile Drains. (e) Should the Gauge on Curves be Readjusted to the Side of the Rail Head and by Moving Wheel Rail. (f) Quality of Track Labor.

The officers report a greater increase in membership this year than in any past year and a large attendance is expected. James Sweeney, roadmaster, Denver & Rio Grande, Salida, Colo., is president, and Walter E. Emery, chief engineer, Peoria & Pekin Union Ry., Peoria, Ill., is secretary.

American Railway Bridge and Building Association.

The twentieth annual convention, which was scheduled to be held at Fort Worth, Texas, October 18-20, 1910, has been changed to meet at Denver, Colo., on the same dates.

American Association of Railroad Superintendents.

The meeting of the association for this month will be held in St. Louis, Mo., September 9-10, instead of on the 16th, as previously announced.

Traffic News.

The St. Louis, Brownsville & Mexico, controlled by the St. Louis & San Francisco, now maintains, with its connections, regular through freight service between New Orleans and the coast of Mexico, crossing the Rio Grande by the new bridge at Brownsville.

The Traffic Club of Chicago had an outing at the Exmoor Country Club on August 25. J. W. Penderhale won the 100 yd. golf championship cup and H. Gower was runner-up. There was also a baseball game. The next outing of the club will be held at the Exmoor Golf Club the latter part of September.

Bates & Chesebrough, shipping agents, of San Francisco, announce that in October they will begin running a direct steamship line from that city to connect with the Panama Railroad, using three steamers, and that they will have one connecting steamer on the Atlantic to run to New Orleans, Charleston and New York.

The New York, New Haven & Hartford has issued revised demurrage rules to go into effect October 1 in which the free time for loading and unloading cars will be 48 hours, thus ignoring the Connecticut law requiring an allowance of 96 hours, which at present is the rule very generally throughout Connecticut, Rhode Island and Massachusetts. The new rules follow the national code.

Following its successful suits against the Pennsylvania state law, the Pennsylvania Railroad has now restored passenger fares throughout its lines in that state to the basis of 2½ cents a mile, except on the Bedford division. This rate was restored on the main line in February, 1908; but on the Northern Central, the Allegheny Valley and the P., B. & W., the two-cent rate has been continued until now.

The shippers at Spokane, Wash., are not the only shippers who are dissatisfied with the rates proposed by the Interstate Commerce Commission in the transcontinental freight rate cases. The traffic bureau of the Salt Lake Commercial Club has also made a protest, which will be heard by the Interstate Commerce Commission September 6. It is contended that rates to Salt Lake should be made very much lower than those proposed by the commission. The bureau takes the rates made by the carriers to the Pacific coast as a basis and practically contends that the rates to Salt Lake should be no higher in proportion to distance.

Louis D. Brandeis of Boston has been engaged as counsel for the commercial organizations of eastern cities to represent the shippers in the freight rate inquiry, which the Interstate Commerce Commission will resume in New York on September 7. The cities represented in this combination of organizations are Boston, New York, Philadelphia, Baltimore and Richmond. D. O. Ives of Boston, chairman of the united organizations, is going to Spokane September 13 to present arguments at the hearing in that city when protests are to be made against the recent decision of the Interstate Commerce Commission in the Spokane freight rate case.

The Illinois railway commission on August 27 issued an order requiring drastic reductions in express rates in that state. Its order is effective October 15. Chairman Berry issued the following statement regarding the order:

"Express tariff No. 1, promulgated to take effect Oct. 15, 1910, will establish a uniform scale of maximum rates on merchandise per 100 lbs., thus removing great inequalities in such rates.

"The commission's tariff provides for a maximum rate of 40 cents per 100 lbs. on merchandise for distances up to 30 miles, whereas, with a few exceptions, the express companies' minimum rate is 50 cents. The commission's tariff provides for maximum graduated charges on packages weighing less than 100 lbs. The commission's tariff does not provide a specific basis for making rates between points reached by one express company where two or more railways are used."

(BROOK ASSOCIATION.—I. M. Nelson, 53 State St., Boston, Mass.
 AMERICAN ASSOCIATION OF DEMOCRATIC OFFICERS.—A. G. Thompson, 3240
 10th Pl., Belmont Heights, June 19, 1911; Niagara Falls, N. Y.
 AMERICAN ASSOCIATION OF GENERAL ENGINEERS AND LOCOMOTIVE EN-
 GINEERS.—R. E. McLean, 1001 1/2 Centre, E. Phil., Mich.
 AMERICAN ASS'N. OF LOCAL FREIGHT AGENTS ASS'N.—G. W. Thompson,
 1001 1/2 Centre, E. Phil., Mich.
 AMERICAN D. & R. RAILROAD SUPERINTENDENTS.—O. G. Fether, Gateway
 Bldg., Cincinnati, Ohio, Sept. 9, 1911; St. Louis.
 AMERICAN RAILWAY AND LOCOMOTIVE W. J. Allen, 24 Park Pl., New York
 City, annual, N. 16, St. Louis, Mo.
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lundy, C. &
 O. R. R., 1001 1/2 Centre, E. Phil., Mich.
 AMERICAN RAILWAY ENGINEERING ASS'N.—J. May, N. Y. E. H. Field,
 1001 1/2 Centre, E. Phil., Mich.
 AMERICAN RAILWAY & LOCOMOTIVE ASSOCIATION.—G. L. Stewart, St. L. S. W.
 Ry., St. Louis, Mo.; May 9, 1911; Detroit, Mich.
 AMERICAN RAILWAY MASTER MECHANICS ASSOCIATION.—I. W. Taylor, O.
 & N. R. R., 1001 1/2 Centre, E. Phil., Mich.
 AM. RAILWAY & LOCOMOTIVE ASS'N.—O. T. Harroun, Bloomington, Ill.
 AM. SOCIETY OF LOCOMOTIVE MAKERS.—J. T. Harbison, 1001 1/2 Centre, Phil.
 AM. SOCIETY OF CIVIL ENGINEERS.—W. H. Allen, 24 Park Pl., New York
 City, annual, 1st and 2d Tues. in July and Aug.; annual, 1st and 2d Tues. in
 Nov. 19, 1911; New York.
 AM. SOCIETY OF ENGINEERING CONTRACTORS.—J. J. Hamer, 13 Park Row,
 New York, annual, Sept. 25, 26, 27, St. Louis, Mo.
 ASSOCIATION OF CHICAGO ENGINEERS.—W. W. Rice, 29 W. 29th
 St., N. Y.; annual, Dec. 6, 9; New York.
 AMERICAN STREET AND INTERURBAN RAILWAY ASS'N.—H. C. Daneker, 29
 W. 30th St., New York; Oct. 10-14; Atlantic City.
 ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dear-
 born St., Chicago, April 26, 1911, New Orleans, La.
 ASSOCIATION OF RAILROAD TRAVEL AGENTS.—J. R. McSherry, C. & E. I., Chi-
 cago, May, 1911; Montreal, Can.
 ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Colegrove,
 I. C. R.R., Chicago; annual, Sept. 27-30; Chicago.
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135
 Adams St., Chicago; June 19, 1911; Boston.
 ASS. OF TRANS. & CAR. ACCIDENT INVESTIGATORS.—J. C. Gentry, 24 Park Place, N.
 York, 1st and 2d Tues. in July and Aug.; annual, 1st and 2d Tues. in Nov.
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal,
 Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
 CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St.,
 Montreal, Que.; Thursdays; Montreal; annual, last week January.
 CAR FREIGHTMAN ASSOCIATION.—CHICAGO: Aaron Kline, 841 North 50th
 St., Chicago, 2d Monday in month; Chicago.
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Fri-
 day in January, March, May, Sept. and Nov.; Buffalo.
 ENGINEERS' SOCIETY OF PENN.—F. R. Dasher, Box 704, Harrisburg, Pa.
 ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton
 Bldg., Pittsburgh, 1st and 3d Tues. in month, Jan. 17, 1911; Pittsburgh.
 FREIGHT CLAIM ASSOCIATION.—W. F. Taylor, Ry. Fred. & Pot. R.R.,
 2001 1/2 Centre, Phil., Mich.; 2d Monday, June 21, 1911; E. Phil., Mich.
 GENERAL SUPERINTENDENTS' ASS'N OF CHICAGO.—H. D. Judson, 209 Adam
 St., Chicago; Wednesday preceding 3d Thursday; Chicago.
 INTERNATIONAL MASTER ROLLER MAKERS' ASSOCIATION.—HARRY D. Vought, 95
 Liberty St., New York; 1st and 3d Tues. in month; New York.
 INTERNATIONAL RAILWAY CLUB.—B. L. Allen, 1001 1/2 Centre, Phil., Mich.
 INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan,
 D. & I. R. Ry., Two Harbors, Minn.
 IOWA RAILWAY BRIDGE BUILDERS ASS'N.—A. I. Woodworth, Lima, Ohio.
 INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain,
 11 Brussels, 1911, Berlin.
 IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d
 Friday in month, except July and August; Des Moines.
 MASS. CAR. FREIGHTMAN ASSOCIATION.—I. W. Taylor, Old Colony Bldg., Chicago.
 MASTER CAR AND LOCO. PAINTERS' ASS'N OF U. S. AND CANADA.—A. P. Dane,
 B. & M., Reading, Mass.; annual, St. Louis, Sept. 14-16.
 NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.;
 2d Tuesday in month, ex. June, July, Aug. and Sept.; Boston.
 NEW YORK RAILROAD CLUB.—J. C. Rogers, 95 Merril St., New York; 3d
 Friday in month, except June, July and August; New York.
 NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues.
 after 2d Mon., ex. June, July, August; St. Paul and Minn.
 NORTHERN RAILWAY CLUB.—L. K. Kennedy, C. & M. St. P., Duluth; 4th
 Saturday; Duluth, Minn.
 OREGON RAILWAY CLUB.—Christopherson, Barker Bk. Second Wed.
 RAILWAY CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas
 City; 3d Friday in month; Kansas City.
 RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa., 4th Friday
 in month, except June, July and August; Pittsburgh.
 RAILWAY SIGN ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Beth-
 lehem, Pa.; annual, Oct. 11-12; Bethlehem, Pa.
 RAILWAY STEAKERS' ASS'N.—J. P. Murphy, Box C, Collinwood, O.; annual,
 May, 1911.
 RICHMOND RAILROAD CLUB.—F. O. Robinson; 2d Monday; Richmond.
 ROADMASTERS' AND MAINTENANCE OF WAY ASS'N.—Walter E. Emery, P. & P.
 U. Ry., Peoria, Ill.; annual, Sept. 18-16; Chicago.
 ST. LOUIS RAILROAD CLUB.—B. L. Allen, 1001 1/2 Centre, Phil., Mich.; 2d
 Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
 SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station,
 Chicago; Oct. 25 and 26; Hotel Chamberlin, Old Point Comfort, Va.
 SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. &
 W. R. Ry., Montgomery, Ala.; annual, Oct. 20; Atlanta.
 SOUTHERN TRANSPORTERS' R. B. Clark, Ala.; 1st and 2d Tues. in
 Atlanta; 2d Thurs. in March, July, Sept. and Nov.; Atlanta.
 TOLEDO TRANSPORTATION CLUB.—L. G. Macomber, Woolson Spice Co., To-
 ledo; 1st Sat.; annual, May 6, 1911, Toledo.
 TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; 1st Sat. after 1st
 Wed.; annual, Dec. 13.
 TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last
 Tuesday in month, except June, July and August; New York.
 TRAIN DESPATCHERS' ASS'N OF AMERICA.—J. F. Mackie, 7042 Stewart Ave.,
 Chicago; annual, June 20, 1911; Baltimore.
 TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R.,
 East Buffalo.
 WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Win-
 nipeg, Man.; Monday, except June, July and August; Winnipeg.
 WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago;
 Wednesdays, except July and August; Chicago.

REVENUES AND EXPENSES OF RAILWAYS.

[illegible]

(一) 第一、二、三、四、五、六、七、八、九、十、十一、十二、十三、十四、十五、十六、十七、十八、十九、二十、二十一、二十二、二十三、二十四、二十五、二十六、二十七、二十八、二十九、三十、三十一、三十二、三十三、三十四、三十五、三十六、三十七、三十八、三十九、四十、四十一、四十二、四十三、四十四、四十五、四十六、四十七、四十八、四十九、五十、五十一、五十二、五十三、五十四、五十五、五十六、五十七、五十八、五十九、六十、六十一、六十二、六十三、六十四、六十五、六十六、六十七、六十八、六十九、七十、七十一、七十二、七十三、七十四、七十五、七十六、七十七、七十八、七十九、八十、八十一、八十二、八十三、八十四、八十五、八十六、八十七、八十八、八十九、九十、九十一、九十二、九十三、九十四、九十五、九十六、九十七、九十八、九十九、一百。

Chicago Hearing on Proposed Increase in Freight Rates.

Examiner Brown and Hilliard began taking testimony at 10 o'clock on Monday last in the proceedings regarding the reasonableness of advances in freight rates to which the carriers have been asking the consent of the Interstate Commerce Commission. In opening the hearing Mr. Brown said that it would relate to the general question of whether the carriers are entitled to make advances in rates and not to the question of the reasonableness of any of the specific advances which they propose to make. J. L. Norton, general attorney of the Atchison, Topeka & Santa Fe, said that the roads would first put in testimony tending to show the conditions of the individual roads, which seem to their management to justify advances and later to put in evidence relating to the general question of advances. E. P. Ripley, president of the Atchison, Topeka & Santa Fe, was the first witness called by the railways. The following is an abstract of Mr. Ripley's testimony:

Railway rates should be raised for two reasons. First, because they are too low per se, as measured by any reasonable standard; and, second, because the railways need more money properly to develop their facilities. The commodity rates covered by the tariffs in question in these cases have been forced down to a point that is unreasonable, measured either by the value of the service to the shipper or the cost of the service to the carrier. The carriers as a whole have not had much control over rates. Carriers individually could have resisted reductions, but the competition of community with community, shipper with shipper and carrier with carrier has made effective resistance impossible. The railways have been particularly helpless to resist the demands for reductions of rates made by shippers controlling a large volume of traffic.

The Santa Fe has been perhaps reasonably prosperous compared with other roads, yet its net earnings in the past 15 years have been only 4.16 per cent. on its capitalization. Its earnings during the past ten years have been better than they were in the preceding ten years, yet in the last ten years they have earned only 6 per cent. on its capitalization, and the capitalization does not equal the reproduction value of the property. The Santa Fe has earned as much as 13 per cent. in 12 months on its common stock, but this was in a year when it was extremely prosperous, and last year it earned on its common stock only 8.8 per cent. If it is to keep abreast of the times in the matter of improvements and maintain its credit, it must earn more than this. It is a little embarrassing to say that the road has not maintained its credit. Probably it has done as well as other roads, and yet it has had to sell its bonds for \$2,000,000 less than their par value. There never has been a time when there have not been demands on it for expenditures which were two, three or four times as much as was available. It never has appropriated one-half as much money as the different department heads have desired to spend. The road ought not to have to sell its bonds at a discount. It ought to have earnings enough to encourage public confidence that its dividends will be maintained, so that instead of issuing bonds it could sell its stock at par. The Pennsylvania Railroad has not issued any bonds for years. When it wishes to make improvements it issues stock to pay for them. There are certain improvements which should be made from earnings rather than from capital.

These include such improvements as elevation of tracks, the construction of expensive stations, etc. Every town along the line wants a good station. Improvements of this sort must be made in one of two ways; either from money raised by the sale of securities or from earnings. If they are made with money derived from the issuance of securities, the securities become a permanent charge on the property. It would seem that improvements of that sort ought to be paid by the present generation instead of being imposed as a burden on posterity. The railways of England have followed the practice of charging all improvements to capital and the consequence is that they have their capitalization so high that they can hardly earn a return on it. A railway should also earn enough in excess of its interest and dividends to provide against the obsolescence of the different parts of its property. Many railways are at the point where facilities which a few years ago were adequate to the demands of their traffic must now, or very soon, be replaced. The railways entering Kansas City, for example, are spending \$20,000,000 on a passenger station and terminals there. The railways entering the Dearborn street station at Chicago

will build a new station. The South Western is spending millions on a station at Chicago on which it may still be able to earn a return. The one thing is that the Pennsylvania Railroad in New York. Within the next five or six years the railways ought to spend sixty or seventy millions in Chicago. Then the railway must be able to earn enough in years of prosperity to provide against the lean years. The reasonableness of its rates should not be judged entirely by the return which it can earn on them in the best years.

The advances in rates which are involved in this hearing really amount to very little. They would not bring to the Santa Fe enough money to do one-tenth of the things that it ought to do. On the other hand, the effect on consumers would be negligible. There is not a family in the United States that would see the difference in its expenses. It is doubtful if the advance in these rates would make a difference of a dollar a year in the expenses of any family in the country, for the freight rate does not affect the price of a great many commodities. Shoes, clothing, etc., are sold regardless of the freight rate. They bring the same price at the door of the factory in New York as they do in San Francisco.

The main standard of the reasonableness of the rate is the value of the service to the shipper—what has sometimes been called "what the traffic will bear," having regard to the freest possible movement of commodities and the imposition of the least possible burden on the producer and consumer. The middleman can take care of himself. In the application of this principle of charging no more than the traffic will bear, the railways have been making some rates which are much below the average cost of the service. The public is apt to think that because the railways can make some rates so abnormally low they ought to make all the rates equally low. But the railways are able to make some rates so low, not because they cover the total cost of the service, but because if those rates were not made low the freight would not move at all.

The railways have accomplished great economies in operation. They have rebuilt their tracks, enlarged their cars and engines, and improved their operating methods. But all these things have not enabled them adequately to increase their profits. Some of the improvements they have made have actually increased their expenses and reduced their profits. For example, in order to work the automatic coupler, cars have to be pushed together so very hard that a great deal of damage is done to freight by the rough movement. The loss and damage claims on the Santa Fe are \$1,000,000 a year, and the great increase in them has been largely due to the use of the automatic coupler. One of the largest increases in our expenses has been the recent advances in wages. They already amount to \$2,000,000 a year on the Santa Fe, and if we granted all the other demands on us they would amount to \$2,500,000 more.

A railway, in order to maintain its credit and meet the reasonable demands of the public for good service ought to earn on its stock double the amount that it pays in dividends. For example, if it pays 6 per cent. dividends it should earn 12 per cent. on its stock, the extra 6 per cent. being used for improvements in the property which will earn no return. There is hardly a railway in this country that is built as it ought to be built. We do not like to depreciate our own property, but the best roads in this country west of the Allegheny mountains are very far short of what they ought to be to give the public the service it has a right to demand, or would have the right to demand if it paid for it.

The Santa Fe has put about \$40,000,000 of earnings into the property in the last 15 years which has not been capitalized. Of this, the sum of 23 millions has been written off and has absolutely disappeared. In addition to that the sum of \$3,000,000 has been received from land sales, which also has gone into the property and been written off. The \$8,000,000 discount on the sales of our bonds has also been written off.

It is difficult to say what the limit of our economies is and it is difficult also to say what the limit of our expenses will be. There is danger of obsolescence in everything we own. We do not know when we shall have to throw away our locomotives and substitute electricity or some new power. We have practically 2,000 locomotives, representing an investment of \$40,000,000, and the development of some new power might make it necessary for us to scrap all of them.

Examiner Brown: I recollect as you went along you stated

that about all of the western roads would have to be rebuilt. Does that mean that the life of a railway is about 50 years?

Mr. Ripley: Some of the western roads have been built longer than 50 years. They have been in constant course of rebuilding ever since they were built. The railway of 50 years ago would not carry anything now; it would not be considered equal to a contractor's plant for running gravel trains. The railways have been built and rebuilt several times.

Mr. Ripley referred to the great increases in the expenses of railway materials that have taken place. He said that theoretically the larger cars that have come into use reduce railway expenses, but practically in many cases they do not. It is doubtful whether it has been wise to increase the size of box cars beyond 80,000 lbs., because the practical unit of sales as to many items is the carload and there has been a great indisposition on the part of the shipping public to increasing the minimum carload; so, in many cases, the roads are obliged to use for a 15-ton load a car which will carry 40 tons. The Santa Fe's taxes are 100 per cent, heavier than they were 15 years ago. They were \$250,000 more in the last fiscal year than in the preceding fiscal year, on account of the new corporation tax. The total increase in taxes for the year was over \$400,000. Another item in the increase in expenses is the cost incurred by the road in being regulated by the 13 states and the national government under whose supervision we are. It costs the Santa Fe about \$150,000 a year to be regulated.

The investment in the property of the Santa Fe in 1896 was \$372,000,000, and at the close of 1910 it was practically \$580,000,000. The income applicable to interest, dividends and improvements grew from \$6,000,000 in 1897 to \$32,000,000 in 1910. The percentage of income on investment in property grew from 1.57 per cent. in 1897 to 5.58 per cent. in 1910, and in no year has it exceeded 6.31 per cent., which figure it reached in 1907. Only twice in 15 years was 6 per cent. reached.

J. H. Atwood, counsel for some of the shippers, raised the question whether a reduction in the rates would not increase the traffic, and thereby increase the earnings, while advances in rates would have a tendency to reduce the amount of traffic. Mr. Ripley said that the rates on all commodities except the more bulky and less valuable are so low that a reduction in rates would not increase the movement in traffic. The rate on citrus fruit from California being specifically mentioned, he said it amounted to about six cents on a dozen oranges, and that if the rate were halved there would not be one orange or lemon more shipped, assuming, of course, that corresponding reductions in the rates on oranges were made from other sections.

Mr. Ripley said that the gross earnings of his road for the fiscal year, 1910, were about \$10,200,000 greater than in the preceding year; while expenses increased about \$12,000,000. He was questioned as to whether the increase in expenses was caused by charging to operation items that should have been charged to capital, and mention was made of \$700,000 for relining a tunnel and \$703,000 put into the fuel reserve fund. Mr. Ripley contended that all such items should be charged to operation. He explained that an increase of \$500,000 in maintenance of way and structures was made necessary because not enough was spent for these purposes in 1909. Thus far in the present month (August) the gross earnings have fallen off \$750,000 from the figures of last year. Items of expenses, which must be met in the coming year, warrant him in the belief that the net earnings will not more than pay the 6 per cent. dividend on the company's common stock.

James Peabody, statistician of the Santa Fe, presented a number of tables of figures relating to taxes, tonnage, damage to live stock, injury and damage to persons, wear and tear on cars and numerous other matters. Under the head of necessary expenses for the years 1911 and 1912 Mr. Peabody declared that the Santa Fe would require the expenditure of \$66,500,000, the items of expense including: Track elevations, \$3,500,000; second track, \$15,027,314; new rails, \$6,947,492; new stations, \$4,685,171; terminal yards, \$1,317,937; regading, \$5,473,639; ballast, \$5,914,088; and various other improvements and betterments ranging from \$1,000,000 to \$1,000,000.

The Grievance of the "Tap Lines."

Lumbermen from Missouri, Texas, Louisiana and Arkansas met in St. Louis on August 25 and organized the Western Short Line Railroad Association. The lumbermen in question all own

logging roads which are used exclusively for the transportation of lumber from the forests and the mills to connections with standard railways. Forty-two of these so-called tap line railways are represented in the association. The railways have heretofore given these lines divisions of the through rates. The ruling of the Interstate Commerce Commission that the payment of divisions to any road which is not a common carrier is illegal, caused the principal railways in the Southwest to announce that they would cancel these divisions at various dates in September. The purpose of the Western Short Line Railroad Association is to take up with the Interstate Commerce Commission and the railways the question involved and see if some arrangement cannot be made under which they can continue to get their divisions. It is announced also that "the tap line and lumber interests will conduct a campaign of publicity, and the public will be educated in the matter of freight rates."

There are indications that the lumbermen will not take a unanimous stand regarding the matter. G. F. Thomas, traffic manager of the Arkansas Lumber Manufacturers' Association, while attending a meeting of the Stave Manufacturers' Association in Chicago on August 23, said flatly that a thousand large lumber mills in the South and Southwest have been getting rebates from the railways in the form of divisions of the through rate. He said: "The methods used are simple. Each big mill owner builds a short railway from his mill to the nearest point on a trunk line. The only purpose of this road is to haul the company's lumber out of the woods, although sometimes it carries a small amount of freight. The owners of the mill organize the road as a separate corporation and then make an agreement with the trunk line whereby the same rate is quoted from the company's mill to Chicago or some other market as is made from the junction point. The trunk line divides the profit with the mill; or, ostensibly, with the short lumber line. The mill by this means gets a rebate of from 1 to 4 and even 6 cents per thousand feet of lumber shipped."

It seems probable that the lumber concerns which do not own small railways, and, therefore, do not benefit by this practice, will send representatives to Washington to commend the action of the commission in abolishing it.

The Freire Valley Railroad Company, a tap line in Arkansas, has brought suit in the federal court of the western district of that state to restrain the Chicago, Rock Island & Pacific from canceling the through rates it has made in connection with this tap line. Judge Rogers heard arguments in the case and took it under advisement.

Iowa Commission Condemns Rigid Distance Tariff.

The Iowa Railway Commission in its annual report which has just been filed with the Governor recommends the adoption of legislation to enable the commission to make the intrastate rates in Iowa more flexible. The views expressed by the commission are a virtual admission that the distance rate theory, which has been applied by the legislature of that state in a more thoroughgoing manner than by the legislature of any other state in the country, has broken down. The commission says in part:

"The first principle which ought to be applied by an Iowa rate-making body, and which ought to be and which always has been in the mind of this commission in every rate adjustment, is that every Iowa industry should be protected to the utmost limit of the power of this board. The commission believes that if the doctrine of protecting home industry is good for the nation it is good for the state. Every manufacturing interest in Iowa should be fostered and encouraged, and Iowa shippers should not be placed, in any respect whatsoever, to any disadvantage as compared with a shipper who lives outside the state. If this principle is correct, and we believe it is, this board should use its power and its influence in building up home industries to the end that the raw material produced in Iowa should be manufactured at home, thus giving employment to Iowa labor and investment for Iowa capital.

"It is the opinion of this board that if the rigidity of the Iowa distance tariff could be lessened to some extent and it were given flexibility at the discretion of the board, in many instances industries could be fostered in this state which would tend greatly to uphold without any injury whatever to those which already exist or to the people of Iowa."

Referring to the long and short haul section of the Iowa Law, which has been rigorously enforced, the commission says:

"The legislature has made some attempts to amend this section of the law as to enable this board to permit the making of rates by carriers which are prohibited by the section under such conditions as to prevent any unjust discrimination. Owing to the peculiar situation of Iowa in the general rate structures of the country, many conditions arise which demand an adjustment of rates within the state to meet conditions over which the state authorities have no control. Where these adjustments can be made without disturbing the general rate structure within Iowa, the board, after investigation, should have authority to permit the railway companies to do so. It is probable that sections 2145 et seq. would have to be considered in any such amended statute, but the commissioners believe this could be taken care of without detriment to carriers and certainly to the advantage of the shipping public in Iowa. The board respectfully suggests that this should be considered by the next general assembly."

INTERSTATE COMMERCE COMMISSION.

William J. Meyers, statistician for the New York Public Service Commission, Second District, has been appointed statistician in the office of the Interstate Commerce Commission at Washington.

STATE COMMISSIONS.

John J. Murray has been appointed Traffic Inspector for the New York State Public Service Commission, Second District, succeeding George V. Horgan. Mr. Murray was in the service of the Erie Railroad for 12 years and for the last nine years has been an inspector of freight, for classification purposes, of the Trunk Line Association.

The Texas railway commission has issued an order revoking an order which had been made by it prohibiting the railways from advancing charges to shippers. The commission revoked its former order because the attorney-general gave a ruling holding that there is no statute which prohibits the railways from doing this, provided they extend the privilege to all shippers alike.

W. C. Wishart has been appointed chief of the Division of Statistics and Accounts, New York State Public Service Commission, Second District, Albany, N. Y., succeeding William J. Meyers, who has resigned to go to Washington. Mr. Wishart was formerly assistant secretary of the Corporation Commission of North Carolina, and for two years past has been an examiner the Interstate Commerce Commission.

A petition sent this week to the Interstate Commerce Commission asking for a general investigation of the rates of all the principal express companies, because of their excessive and extortionate rates, is signed by 124 boards of trade and other commercial organizations. The Merchants' Association of New York, the Boston Chamber of Commerce and similar bodies in San Francisco, New Orleans, Philadelphia and Baltimore are among the leading signers. The majority appear to be from eastern cities.

The New York Public Service Commission, Second district, has appointed Carl E. Pelz, of 244 Warburton avenue, Yonkers, civil engineer of grade crossings to supervise the work on behalf of the state for the elimination of grade crossings of the New York Central & Hudson River Railroad in the so-called electric zone in the county of Westchester. The compensation has been fixed at \$2,400 a year. The commission has appointed John W. Andrews, at present a factory inspector in the employ of the State Labor Department, as assistant inspector of electric railways at a salary of \$1,500 a year.

The Amaga Railway of Colombia, which is to connect Medellin with the Cauca river, is reported to be under active construction. The property belongs to a Colombian company, capitalized at \$1,000,000, and during 1910 the company expects to place orders for 1,000 tons of rail of the Vignole type.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Lewis Neilson, secretary of the Philadelphia Railroad, has been appointed also secretary of the Northern Central and various other subsidiary companies of the Pennsylvania Railroad, as previously announced in these columns. Mr. Neilson was born at Florence, N. J., on September 30, 1860, and entered the Academy of the Protestant Episcopal Church in 1870 and the University of Pennsylvania in June, 1877, from the college department of which he was graduated in June, 1881. He entered the service of the Pennsylvania Railroad in June, 1881, as weighing clerk, and was soon made assistant receiving clerk. He filled various positions in the cashier's department and the following year was promoted to stenographer. His next position was



Lewis Neilson.

in the office of Captain Jno. P. Green, then fourth vice-president, as stenographer. In December, 1885, he was promoted to chief clerk in that office, and two years later he was appointed chief clerk to the secretary, and then for about one year he was assistant secretary *pro tem*, in addition to performing the duties as chief clerk. He was then appointed assistant secretary of The Pennsylvania Railroad and the Philadelphia, Wilmington & Baltimore. In June, 1898, he was appointed to the same position on the Philadelphia & Baltimore Central. Mr. Neilson was elected secretary of the Pennsylvania Railroad and of the Philadelphia, Wilmington & Baltimore in January, 1901, to fill the vacancy caused by the death of John C. Sims. He succeeded Mr. Sims also as secretary of the Philadelphia & Baltimore Central and the Junction Railroad companies. He became the superintendent of the Employees' Savings Fund on June 1, 1906.

L. L. Scherer, general claim agent of the Chesapeake & Ohio at Richmond, Va., has had his authority extended over the Chesapeake & Ohio of Indiana.

W. R. Alderger, traffic manager of the Tonopah & Tidewater at Los Angeles, Cal., has been elected also a director and vice-president of the Oakland Traction Co.

Operating Officers.

J. W. Roberts, assistant car accountant of the Vandalia, has been appointed car accountant, with office at Terre Haute, Ind., succeeding H. G. Sleight, retired.

F. E. Miller, superintendent of dining service of the Missouri, Kansas & Texas, with office at St. Louis, Mo., has resigned to engage in private business.

John Matthews has been appointed telegraph manager of the Gulf, Colorado & Santa Fe, with office at Galveston, Tex., succeeding W. M. Knowd, assigned to other service.

The office of J. A. McCrea, general superintendent of the Long Island Railroad has been transferred from Long Island City to the new Pennsylvania Station, Eighth avenue, New York City.

J. M. Scott, until two months ago a division superintendent of the Cincinnati, Hamilton & Dayton, has been appointed a trainmaster of the Kansas City Southern, with office at Mena, Ark.

J. P. Lathrop has been appointed an assistant superintendent

of the St. Louis & San Francisco, with office at Francis, Okla., succeeding J. F. Hickey, resigned to accept service with the Missouri, Kansas & Texas.

John S. May has been appointed superintendent of the Buffalo & Susquehanna Railroad and the Buffalo & Susquehanna Railway, in charge of maintenance of way and structures and of transportation, with office at Galeton, Pa.

C. C. Riley, superintendent of transportation of the Kansas City Southern at Kansas City, Mo., has been appointed general superintendent in charge of transportation, with office at Kansas City, and the position of superintendent of transportation has been abolished.

F. L. Fay having resigned as car accountant of the Bessemer & Lake Erie, to go into other business, the position has been abolished. All communications heretofore addressed to the car accountant should in future be addressed to J. S. Matson, superintendent, Greenville, Pa.

The following officers of the Chesapeake & Ohio have had their authority extended over the Chesapeake & Ohio of Indiana: C. C. Walker, general superintendent transportation; J. S. Stevens, superintendent telegraph, and G. S. Sipp, car service agent, all with offices at Richmond, Va.

Traffic Officers.

H. S. Waggaman has been appointed a traveling freight agent of the Houston East & West Texas, with office at Houston, Tex.

Charles D. Simonson has been appointed special agent, freight department, of the Rock Island Lines, with office at New York.

W. P. Overbay, traveling passenger agent of the Missouri, Kansas & Texas at Chicago, has been transferred to Detroit, Mich.

J. T. McKenney, city passenger agent of the Northern Pacific at Duluth, Minn., has been appointed a district passenger agent, with office at St. Paul, Minn.

A. L. Crow, city passenger and ticket agent of the Missouri, Kansas & Texas of Texas at Galveston, Tex., has been appointed a district passenger agent of the Missouri, Kansas & Texas, with office at Chattanooga, Tenn.

A. B. Burke has been appointed a traveling passenger agent of the Canadian Pacific, with office at Boston, Mass., and N. R. Des Bresay has been appointed a traveling passenger agent, with office at St. John, N. B.

Eduardo Castro has been appointed general agent in the traffic department of the National Railways of Mexico, with office at Mexico City, succeeding G. R. Hackley, resigned to accept service with the St. Louis & San Francisco.

J. J. McCormick, district freight solicitor of the Union line of the Pennsylvania Lines West at Wheeling, W. Va., has been appointed agent at Cleveland, Ohio, succeeding H. E. Prindle, retired. C. D. Howe succeeds Mr. McCormick.

Phil K. Gordon, Pacific coast passenger agent of the Southern Railway at San Francisco, Cal., has been appointed general agent in the passenger department of the Galveston, Harrisburg & San Antonio, with office at San Francisco. He will represent also the Southern Pacific lines in Louisiana.

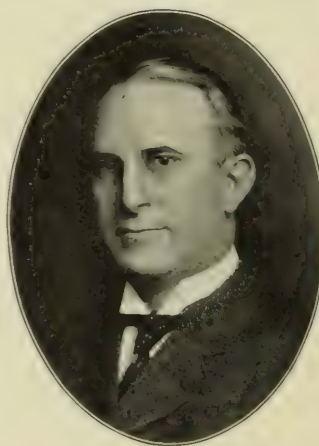
Guy S. Harner has been appointed district passenger agent of the New York Central & Hudson River, the Boston & Albany and the West Shore at Springfield, Mass., and J. E. Sweeney, city passenger agent at Worcester, Mass., has been made district passenger agent at Worcester. F. G. Chapin succeeds Mr. Sweeney as city passenger agent.

Benjamin L. Bugg, who has been appointed traffic manager of the Norfolk Southern, with office at Norfolk, Va., was born in 1869 at Palo Alto, Miss. He received a high school education and began railway work as a telegraph operator in 1887 on the Florida Railway & Navigation Co., which was reorganized as the Florida Central & Peninsular in 1890, and is now a part of the Seaboard Air Line. In 1891 he went to the Georgia Southern & Florida, and about four years later left that company to go to the Central of Georgia. He was appointed general agent of the Old Dominion Steamship Co. at Norfolk, Va.,

in 1907, which position he held at the time of his recent appointment as traffic manager of the Norfolk Southern.

Andrew L. Ellett, general western passenger agent of the Chesapeake & Ohio at Cincinnati, Ohio, has been appointed an assistant general passenger agent of that road and the Chesapeake & Ohio of Indiana, with office at Cincinnati. The following officers of the Chesapeake & Ohio have had their jurisdiction extended over the C. & O. of Indiana: H. W. Fuller, passenger traffic manager, with office at Washington, D. C.; Thornton Lewis, general western freight agent of the C. & O. and manager of the Kanawha Despatch at Cincinnati; W. F. Hite, assistant general freight agent at Huntington, W. Va., and W. D. Upshur, assistant general freight agent at Richmond, Va.; W. L. Divine, general import freight agent, O. N. Seely, commercial agent, and O. N. Spain, traveling passenger agent at Cincinnati; S. G. Beckley, general eastern agent of the Kanawha Despatch at New York; W. S. Bronson, assistant general passenger agent at Richmond, and H. S. Calcutt, superintendent of dining cars at Covington, Ky.

L. F. Vosburgh, assistant general passenger agent of the New York Central & Hudson River, the West Shore and the Boston & Albany, at New York, has been appointed general passenger



L. F. Vosburgh.

agent, with office at New York, succeeding Gerrit Fort, whose resignation has already been announced in these columns. Mr. Vosburgh began railway work in 1893 as assistant night ticket agent of the Lake Shore & Michigan Southern, and two years later he was promoted to assistant ticket agent at the La Salle street station, Chicago. He was appointed city passenger agent of the Lake Shore & Michigan Southern in 1897, and in 1903 was promoted to general western passenger agent (Chicago). Three years later he was made general eastern passenger agent of the New York Central Lines (New York), and on February 1, 1910, he was promoted to assistant general passenger agent, which position he held at the time of his recent appointment as general passenger agent.

Engineering and Rolling Stock Officers.

E. F. Tegtmeier has been appointed master mechanic of the Nebraska and Colorado divisions of the Rock Island Lines, with office at Goodland, Kan., succeeding D. H. Speakman, resigned.

G. W. Russell, master mechanic of the New York, Philadelphia & Norfolk at Cape Charles City, Va., has been appointed general equipment inspector, reporting to the superintendent. J. L. Cunningham succeeds Mr. Russell, both with offices at Cape Charles City.

F. H. Alfred, formerly assistant to the president in charge of the engineering department of the Cincinnati, Hamilton & Dayton, whose appointment as general superintendent has been announced in these columns, will continue in charge of engineering matters.

The New York, Philadelphia & Norfolk has been divided into two supervisor's divisions. F. C. Young has been appointed supervisor of division A, with office at Cape Charles, Va., and U. F. White has been appointed supervisor of division B, with office at Salisbury, Md.

The following officers of the Chesapeake & Ohio have had their authority extended over the Chesapeake & Ohio of Indiana: J. F. Walsh, general superintendent motive power, T. M. Ramsdell, master car builder, Charles Stephens, signal engineer, and

J. M. Staten, general inspector of bridges all with offices at Richmond, Va.

Charles F. Brinset, whose appointment as division engineer of the New York, Philadelphia & Norfolk, with office at Cape Charles, Va., has been announced in these columns, was born on December 3, 1881, at Elizabethtown, Pa. Mr. Brinset was educated in the high school of his native town and at Franklin and Marshall academy. He began railway work on April 9, 1900, as a rodman on the Pennsylvania Railroad, remaining in the construction department for about two years & then he was appointed rodman in the maintenance of way department at Philadelphia. He was appointed transitman in March, 1903, and from September of the same year until April, 1907, he was assistant supervisor of the Amboy division, the Monongahela division and the Philadelphia division. He was appointed supervisor of the Delaware division of the Philadelphia, Baltimore & Washington in April, 1907, which position he held at the time of his recent appointment as division engineer of the New York, Philadelphia & Norfolk.

Purchasing Officers.

F. S. Wynn, assistant secretary of the Southern Railway at Washington, D. C., has been appointed purchasing agent, with office at Washington. Mr. Wynn will report to H. B. Spencer, vice-president.

B. T. Jellison, purchasing agent, and R. L. Morris, general storekeeper, of the Chesapeake & Ohio, have had their authority extended over the Chesapeake & Ohio of Indiana, both with offices at Richmond, Va.

OBITUARY.

Percy F. Gaines, since 1906 general freight agent of the Pere Marquette, with office at Detroit, Mich., died in Detroit on August 21.

William P. Jenkins, formerly general freight agent of the Delaware, Lackawanna & Western and later traffic manager of the Northern Indiana until that road was discontinued in 1906, died in Chicago on August 23.

John J. McVean, member of the American Society of Civil Engineers, and formerly for many years chief engineer of the Chicago & West Michigan and the Detroit, Grand Rapids & Western, now a part of the Pere Marquette, died on August 21 at his home in Grand Rapids, Mich.

Charles Talbot Porter, honorary member of the American Society of Mechanical Engineers, died on August 28 at his home in Montclair, N. J., at the age of 81. Mr. Porter was awarded the John Fritz medal last year for his work in advancing the knowledge of steam engineering and in improvements in engine construction. He was the first to recognize the advantages to be derived from making a crank shaft turn at a high number of revolutions whereby the weight of the motor per horse-power is reduced. It is from the development of this thought that we have the modern design of motor for self-propelled vehicles and for the aeroplane. Mr. Porter was born in 1829 and has been out of active business since 1890. In 1867 he installed the only high-speed engine exhibited at the French exhibition.

FOREIGN RAILWAY NOTES.

All railways operating in Costa Rica, whether organized abroad or not, are considered Costa Rican companies, and are subject to all the provisions of the new railway law.

The railway from Arica, Chili, to La Paz, 250 miles, is now being built by an English firm of contractors, who have about 2,000 men at work near Arica. Rails have been laid on 4½ miles of line, and grading has been done on about 25 miles additional.

A general transportation law has been enacted by the Congress of Costa Rica. The law regulates the transportation of passengers and freight on land and sea, specifies the form of bills of lading, defines obligations and rights of shippers and consignees, and prescribes detailed rules for the transportation of live animals and perishable produce.

Railway Construction.

New Incorporations, Surveys, Etc.

ALBERTA & GREAT WATERWAY.—According to press reports, plans have been made to start construction work at once on this line. The plans call for a line from Edmonton, Alb., north to Fort McMurray, on the Athabasca river, with a number of branch lines, in all about 350 miles. W. R. Clarke, president; J. A. L. Waddell, chief engineer, Kansas City, Mo. (Aug. 12, p. 294.)

BALTIMORE & OHIO.—This company has decided to put in a sixty car siding at Seymour, Ind.

BUFFALO & NORTHERN.—An officer writes that this company has completed its organization, with headquarters at Buffalo, Harper county, Okla. Surveys are being made from Buffalo east via Palace, Charleston, Saltfork, Fairvalley and Haskew to Avar, 60 miles. About half the survey is finished and grading contracts will probably be let in 60 or 90 days. There will be a large bridge over the Cimarron river and a few small trestles. E. M. Best, president; F. C. Platt, secretary, Buffalo, and E. Tilleux, chief engineer, Hutchinson, Kan. (Aug. 26, p. 372.)

BUFFALO, ROCHESTER & EASTERN.—The New York State Public Service Commission will hold a hearing at Albany, September 21 and 22, to further consider the application of this road for a certificate of necessity for the construction of its proposed line from Buffalo, N. Y., to Troy, paralleling the New York Central. It is expected that the New York Central, the Delaware & Hudson and other companies will present statements controverting the assertions of the promoters of the B., R. & E. that the lines now serving this territory do not afford prompt and efficient service.

CANADIAN PACIFIC.—This company has opened for operation an extension from Shawinigan Falls, Ont., to Grand Mere, 5.35 miles.

CAPE CHARLES RAILROAD.—See New York, Philadelphia & Norfolk.

CHATTANOOGA SOUTHERN.—An officer writes that as soon as the line is located and right-of-way secured, a connecting line is to be built to the Rome & Northern Railroad from a point at or near Harrisburg, Ga., on the Chattanooga Southern, to Trion. It is understood that the Rome & Northern is to build from Gore to Trion, and that connection will eventually be made with the Seaboard Air Line to provide a new short route between Chattanooga, Tenn., and Atlanta, Ga. (Aug. 26, p. 372.)

CHERRYVALE, OKLAHOMA & TEXAS.—An officer writes that a contract has been given to the Continental Construction Co., Caney, Kan., to build a section of this line from Caney, south-east via Wann, Okla., Delaware, Nowata and Vinita to Silver Springs, Ark., thence south to Fayetteville, about 150 miles. The work will be light. The line will have 1 per cent. grades, with 6 degs. of curvature. There will be three steel bridges. Grading has been finished on 10 miles. S. M. Porter, president, Caney; B. J. Dalton, chief engineer, Lawrence. (April 15, p. 1015.)

CHICAGO, AURORA & DE KALB.—This company has begun the electrical operation of its line from Aurora, Ill., west to De Kalb, 31 miles. This was formerly a steam line. The work of electrifying the road was carried out by the company with its own forces. (March 18, p. 749.)

CHICAGO GREAT WESTERN.—According to press reports, this company will build a 24-mile cut-off from Mason City, Iowa, northeast to Osage. The line will connect the Dubuque & Minneapolis division with the Hayfield & Council Bluffs route.

CLEVELAND SHORT LINE.—An officer writes that contracts are about all let for building this belt line around Cleveland, Ohio, from a point near West Park, seven miles west of Cleveland, east, thence northeast to Collinwood, 19.05 miles. The line is in operation from the western terminus east to the southeastern section of Cleveland on 9.68 miles. A section of the line from this point passes through southeast Cleveland under the main streets, also under the tracks of the Pennsylvania Lines, the Erie and the

Wheeling & Lake Erie, through double-track tunnels, 40 ft. below the surface. The work is heavy and includes grade separation of 32 highways and streets. The contractors are the Robert Grace Contracting Co., J. C. Carland & Co. and H. E. Culbertson & Co., all of Cleveland. The line will furnish interchange facilities between all railways entering Cleveland. Work was started in May, 1906.

CLINTON & OKLAHOMA WESTERN.—This company, which operates a line from Clinton, Okla., to Butler, 21.5 miles, is said to have secured \$750,000, to be used for building an extension westward into the Texas panhandle. The proposed route is up the Washita river to Gem City, thence via Cheyenne, Okla., to Canadian, Tex.

COEUR D'ALENE & PEND D'OREILLE.—An officer writes that work is now under way by the company's men building an extension from the main line of the Spokane International at a point 25.5 miles from Spokane to Coeur d'Alene, Idaho; also a line from Corbin, on the Spokane International. Track has been laid on 7.9 miles on the Coeur d'Alene branch. Maximum grades will be 1.4 miles and maximum curvature 10 degs.

COLUMBUS, URBANA & WESTERN ELECTRIC.—Arrangements are said to be made to begin construction work on an extension from Fishingers, Ohio, north to Dublin, about 10 miles, as soon as the right-of-way has been secured. Material has been arranged for, and the work will be pushed to completion.

DANVILLE & WESTERN.—An officer writes that surveys have been made for an extension from Leaksville, N. C., southwest to Madison, 12 miles. The company has not yet decided to build the extension.

DENVER, LARAMIE & NORTHWESTERN.—This company, operating a line from Denver, Colo., north to Greeley, 56 miles, has projected extensions aggregating about 200 miles. It is understood that the company will continue the extension to the Elk Mountain coal fields of Wyoming, 216 miles from Denver. There are two general plans under consideration for building extensions west beyond Elk Mountain.

DULUTH, WINNIPEG & PACIFIC.—An officer writes that contracts for putting up steel bridges were to be let September 1, and additional contracts are to be let about September 15. The company is building from Duluth, Minn., north to Virginia, 74.4 miles. Foley, Welch & Stewart, St. Paul, Minn., are the general contractors. There will be 12 steel bridges aggregating 1,750 ft., eight trestles and one 500-ft. tunnel. In addition there will be one 30-ft. stone arch and another of 45 ft., also a roundhouse, and car and locomotive repair shops. The principal revenue of the line will be derived from carrying ore and lumber. (Feb. 25, p. 129.)

FREDERICK RAILROAD.—An officer writes that contracts have been let for building an extension of one mile in Frederick, Md. The work includes two 25-ft. span bridges of 1-beam construction. The company plans to electrify the line from Frederick to Thurmont, 17 miles.

GRANTS PASS & WESTERN.—Incorporated in Oregon, with \$500,000 capital by the Harriman interests, to build from Grants Pass, in southern Oregon, southwest to Crescent City, in Del Norte county, Cal., 70 miles. The incorporators include J. P. O'Brien, Portland, Ore.; C. G. Sutherland and J. G. Wilson.

GULF & MAGNOLIA NORTHERN.—An officer writes that contracts will probably be let during the next 90 days for building an extension from Hope, Ark., west via Columbus to Horatio, 55 miles. This extension is eventually to be continued from Horatio northwest to Haleyville, Okla. Contracts are to be let about the same time for an extension from Magnolia, Ark., southeast to Junction City, 37 miles. The plans call for a further extension of this line to Monroe, La. The work will average about 5,000 cu yds. a mile. (Aug. 26, p. 372.)

HALIFAX & EASTERN.—This is the new name of the Nova Scotia Eastern, which was organized to build about 235 miles through the central district of Nova Scotia, opening up and uniting several industrial centers and joining them to the New Glasgow and the Pictou coal fields. The line is to connect the Intercolonial Railway on the north with the deepwater harbor, called Canso Harbor, on the south, also with Dartmouth harbor near Halifax, on the west and the straits of Canso on the east. Construction work is to be started by September 1, and

the entire line finished and in operation within three years. If the company fails to carry out this program it will forfeit the Canadian Government subsidy of \$6,400 a mile. The original directors included J. R. Stratton, Peterboro, and J. W. Grier, Montreal.

INTERNATIONAL & GREAT NORTHERN.—This company has under consideration the question of building a branch from Cotulla, Tex., southeast to Corpus Christi, about 125 miles. It is said that the plans for constructing the line are as yet only tentative, and that no definite action will be taken until after the road passes from its present receivership and is reorganized on a sound basis.

LOUISIANA & ARKANSAS.—An officer writes that an extension is to be built from Jena, La., to Jonesville, 25 miles. A further extension will eventually be built to Natchez, Miss., about 25 miles.

MCPHERSON, WICHITA & ARKANSAS.—See Midland Valley.

MIDLAND VALLEY.—Under the name of the McPherson, Wichita & Arkansas, final surveys have been made, it is said, to build an extension of the Midland Valley from Arkansas City, Kan., northwest to McPherson, 120 miles.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—According to press reports, this company has been granted a certificate permitting it to build a line in Superior, Wis., from its present terminal to the ore docks. Permission was also granted to build the Tomahawk Bay route, an extension of the line to the proposed plant of the United States Steel Corporation.

MISSOURI, OKLAHOMA & GULF.—Track laying has been started on the remaining section of eight miles south of the Red river in Texas to complete the line to Denison. The grading has been finished and it is expected to have the line in operation early in September. (Aug. 5, p. 263.)

NEW YORK, PHILADELPHIA & NORFOLK.—An officer writes that this company is building a short branch at Cape Charles, Va., under the name of the Cape Charles Railroad, extending from Bender's connection, where it leaves the main line of the N. Y., P. & N., to Townsend cross road, 6¼ miles.

NOVA SCOTIA EASTERN.—See Halifax & Eastern.

OREGON ROADS.—Plans are being made, it is said, by A. Lovegren, Preston, Wash., to build a line from the Oregon Electric Railway, at Forest Grove, Ore., to the Patton valley district.

OREGON TRUNK RAILWAY.—This company has filed amended articles of incorporation in Washington, which show that the lines to be built are as follows: From a connection with the Spokane, Portland & Seattle, opposite a point near Celilo, Ore., south along the Des Chutes river to Klamath Falls; also from a point in township 35 south, range 7 east, in Klamath county, west to the city of Medford, 70 miles. A branch is also to be built from a point in section 9, township 18 south, range 12 east, southeasterly through Crook county to a point in township 26 south, range 33 east, in Harney county, 155 miles. The company is also permitted to build other branch lines and extensions. (Aug. 12, p. 297.)

OSAGE WESTERN.—According to press reports, work has been started at Billings, in Noble county, Okla., eastward through Fairfax, towards Pawhuska and Bartlesville. The company was organized to build from Enid, Okla., east to Vinita, 178 miles. R. H. Hoss, president, Fairfax, and E. J. Noonan, locating engineer, Muskogee. (April 1, p. 918.)

PENSACOLA, MOBILE & NEW ORLEANS.—An officer writes that all the contracts have been let for building from Pensacola, Fla., northwest to Mobile, Ala., 60 miles. Grading has been finished on 30 miles. Henry McLaughlin, Pensacola, has a grading contract for work on a section of 10 miles, and C. W. Merritt, Pensacola, is said to have a grading contract for work from Loxley, Ala., to Mobile Bay. E. McLaughlin, president, and L. G. Wilkinson, superintendent of construction, Pensacola. (July 29, p. 206.)

TEMPLE NORTHWESTERN.—An officer is quoted as saying that track laying is to be started and grading work will be pushed on the first section from Temple, Tex., northwest to Gatesville. Work was started early this year by D. J. Grigsby, Temple. The plans call for a line from Temple northwest to Benjamin, in Knox county, about 210 miles, air line. W. J. McDaniel, president, and W. B. Dozier, chief engineer, Temple. (April 29, p. 1115.)

Railway Financial News.

HOUSTON & GREAT NORTHERN.—It was announced last week in Houston, Tex., after a meeting of the stockholders of this road, that the whole of the stock and bonds of the company had been sold by J. M. West and R. C. Duff to William Carlisle, of Atchison, Kan., former owner of the road. The road extends from Trinity, Tex., southeast, 34 miles, to Livingston, on the Houston, East & West Texas. It has three locomotives, two passenger cars and 74 freight cars. It is said that the sale of the road has been hastened by the expectation that in consequence of the decision of the Interstate Commerce Commission concerning allowances to short lines on lumber shipments, the revenues on this line would be reduced, unless the ownership of the property were transferred to parties not interested in property shipped. The regular annual meeting of the stockholders, which had been postponed until August 26, resulted in the election of officers for the ensuing year as follows: William Carlisle, Atchison, Kan.; J. M. West, Houston, Tex.; James W. Orr, Atchison, Kan.; C. J. Rogan, Oklaheka, Tex.; Leroy Trice, Kyle, Tex.; R. C. Duff, Houston, Tex.; S. E. Barnes, Trinity, Tex.; J. L. Thompson, Houston, Tex.; Thomas Waties, Houston, Tex. At the meeting of the board of directors the following officers were elected: William Carlisle, president; J. M. West, vice-president; S. G. Guerrier, assistant to president and assistant secretary; G. W. Pennell, vice-president; C. J. Rogan, vice-president and general superintendent; James W. Orr, general counsel; W. S. Bartlett, secretary and treasurer.

BUFFALO & SUSQUEHANNA.—The receiver of the road is doing everything in his power to better the condition of the properties. It is believed that before the road can be a really paying proposition much must be done in the elimination of curves and the reduction of grades. In order to bring about these needed improvements there must be further retrenchment on the part of the management. The problem of equipment is another the management is obliged to face. The future of the property remains still a problem. The properties must prove their earning power before the question of a sale can be seriously considered.—*Wall Street Journal*.

BUFFALO, ROCHESTER & PITTSBURG.—The New York State Public Service Commission, Second district, has authorized this company to buy the stock of the Silver Lake Railway, 1,200 shares, par value \$100, and to issue consolidated $4\frac{1}{2}$ per cent. bonds to the amount of \$120,000 in exchange. The B., R. & P. is required to purchase the whole of the stock or none. The Silver Lake is an extension of the Silver Springs branch of the B., R. & P. It is seven miles long, from Silver Springs to Perry.

CHICAGO & MILWAUKEE ELECTRIC.—The following committee has been organized to prepare a financial plan: Andrew Crooke, chairman; George M. Reynolds, Frank A. Vanderlip, John M. Gibson and E. B. Osler.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—The New York Stock Exchange has listed \$3,000,000 refunding mortgage 4 per cent. bonds recently sold. These bonds are part of \$5,300,000 refunding mortgage 4 per cent. bonds authorized by a supplemental mortgage of April 1, 1910, in lieu of \$5,300,000 5 per cent. refunding bonds reserved under the mortgage of April 1, 1897.

DETROIT, TOLEDO & IRONTON.—The bondholders' protective committee, of which Alvin Krech is chairman, has published a notice to bondholders in which it says: "In the event of the deposit with the Young committee of any of the notes of the railway issued for Ann Arbor stock in accordance with the terms of the Young deposit agreement, it would be the duty of that committee to enforce the validity of all collateral pledged as security therefor; and as the \$5,000,000 bonds [the legality of which bonds is now being tested in the court] constitute part of this collateral, it manifestly will be the duty of said committee to enforce the validity thereof." The committee, of which J. A. Young is chairman, has published a statement in which it says: "All of the \$5,000,000 bonds referred to are held by the United States Mortgage & Trust Co. as part collateral for a series of notes of the Railway com-

pany. The validity of the title of bond has been on trial in a suit in the United States Supreme Court at Detroit and is now awaiting the decision of the court. None of these bonds has been deposited with the reorganization committee, and no disposition can be made of them until their validity has been established. The reorganization committee has not taken, and does not contemplate taking, any action to enforce their validity."

GREAT NORTHERN.—Clark, Dodge & Co., White, World & Co. and Blodgett & Co., all of New York, are offering \$2,946,000 Great Northern-St. Paul, Minneapolis & Manitoba consolidated mortgage 4 per cent. bonds of 1893-1933. These are part of a total authorized issue of \$50,000,000, of which \$13,344,000 are 6 per cent. bonds, \$21,220,000 $4\frac{1}{2}$ per cent. bonds, and \$5,715,000, which includes the present issue, are 4 per cent. bonds. The present issue has been made to retire an equal amount of prior lien bonds, including \$2,881,000 Dakota extension 6 per cent. bonds maturing November 1, 1910. The 4 per cent. bonds will therefore be secured after November 1, 1910, by a first lien on 2,549 miles of road at the rate of about \$17,000 per mile. The issue closes the mortgage.

INTERNATIONAL & GREAT NORTHERN.—It is reported in Austin that the receivership sale of the road, which is set for Sept. 15, will be postponed until April next. The object of the proposed postponement is that some arrangement may be made for paying the unsecured claims outstanding. These claims aggregate about \$1,000,000. (See Texas Legislation under another head.)

IOWA CENTRAL.—Brown Brothers & Co., New York, are offering \$154,000 car trust 5 per cent. certificates of the Iowa Central at prices to yield about 5.20 per cent.

LONG ISLAND.—This road has been authorized by the New York State Public Service Commission, Second District, to issue its 4 per cent. ten-year gold debenture bonds to the Pennsylvania Railroad Company to the amount of \$2,000,000, in payment of moneys advanced by the latter company which the Long Island used for the acquisition of property and the construction of additions and betterments. Main line improvements between Winfield and Dunton, which the applicant asked authority to also reimburse the Pennsylvania Company for, are left for future decision by the commission.

MANISTIQUE RAILWAY.—The Union Trust Co., Detroit, as trustee of the second mortgage bonds due July 1, 1919, is to sell the property of the Manistique Railway, under the provisions of the general railway law, at auction on September 28 at Munising, Mich. The road runs from Grand Marais, Mich., to Wilman, 53 miles, with 20 miles of branches and 13 miles of sidings and spur tracks. There are \$75,000 second mortgage 6 per cent. bonds, dated July 1, 1909, now outstanding. The amount said to be due is \$76,125. The foreclosure is subject to the first mortgage of 1897-1902, under which \$35,000 bonds are now outstanding.

QUEBEC & LAKE ST. JOHN.—Holders of the prior lien first mortgage and income bonds, at a meeting held in London, August 8, approved the conversion of the bonds as suggested in the circular of July 29. (Aug. 12, p. 295.)

It is said that Liang Shih-yi, director of the Chief Railway Department in Peking, has been in charge of the following 10 railways: Peking-Hankow, Peking-Mukden, Chengtung Taiyuan, Tao-Ching, Pienliang-Loyang, Pinghsiang-Hsiangtan, Peking-Kalgan, Shanghai-Nanking, Kowloon-Canton and the West Mansolea. According to his statement only two of these lines, the Peking-Hankow and the Peking-Mukden, realized profits last year. The result of investigation shows the following losses for different lines: Shanghai-Nanking, \$605,000; Chengtung-Taiyuan, \$363,000; Tao-Ching, \$60,500; Pienliang-Loyang, \$363,000; Peking-Kalgan, \$90,750; West Mansolea, \$9,075. These are approximate figures. The Pinghsiang line realizes a profit, and the receipts for the Peking-Mukden line last year were about \$6,655,000, and the Peking-Hankow about \$5,808,000. For these two lines, after deducting the expenses and interest, there is a net profit of \$5,445,000, which, after making up the above deficiencies, leaves about \$3,932,500. This amount in the near future will be devoted to the construction of additional railways, for which there is a demand.

Supply Trade Section.

The Hanna Locomotive Stoker Co., Cincinnati, Ohio, has been incorporated with a capital of \$500,000. The incorporators are W. T. Hanna, Clara Stannus, Theodore W. Meader, John Middlehof and John M. Balage.

M. A. Beck, for a number of years chief engineer of the Pawling & Harnischfeger Co., Milwaukee, Wis., has been made consulting engineer and representative in the Milwaukee district of the Toledo-Massillon Bridge Co., Toledo, Ohio.

The plant of the Youngstown Car Manufacturing Co., Youngstown, Ohio, with the 13 acres of land surrounding it, has been sold to Wilkoff Bros., large scrap iron dealers. A foundry and a plant for making a patent concrete steel bar will be started by Wilkoff Bros. and the manufacture of cars will be discontinued.

The Highland Iron & Steel Co., Terre Haute, Ind., has bought the works of the Blue Island Rolling Mill & Car Co., Blue Island, Ill., for \$90,000. The deed was filed in the recorder's office at Chicago, August 25, and is signed by F. H. Niles, president, and F. S. Foragher, secretary of the Blue Island Rolling Mill & Car Co.

W. H. Marshall, president of the American Locomotive Co., New York, has been elected a director and member of the executive committee of the Railway Steel-Spring Co., New York, succeeding S. L. Scoonmaker, resigned. F. F. Fitzpatrick, vice-president of the latter company, has been appointed also to the executive committee.

The Marion Shovel & Dredge Co., Marion, Ohio, has been incorporated, as mentioned in the *Railway Age Gazette* of Aug. 26. The officers are John D. Owens, president; Clifford Owens, David Evans and George B. Christian, Jr., vice-president; A. E. Cheney, secretary and general manager; George D. Copeland, treasurer, and Harry Barnhart, chief engineer.

The Improved Block Railway Signal System of Hammond, Ind., has been incorporated with a capital stock of \$50,000. The object of the corporation is to promote the "Improved Block Railway Signal System" and establish a shop. The principal place of business is Hammond, Ind. Charles D. Anderson, Howard Rose and C. S. Beneppe, directors.

E. S. Hand, formerly installation engineer of the Mississippi Wire Glass Co., has acquired an interest in the Pennsylvania Wire Glass Co., successors to the Continuous Glass Press Co., with works at Dunbar, Pa. The company's executive offices are in Philadelphia, with a branch office at 100 Broadway, New York, where Mr. Hand makes his headquarters.

The directors of the Lackawanna Steel Co., New York, at a regular meeting last week authorized the expenditure of about \$800,000 for the immediate construction of an additional merchant mill at Buffalo, N. Y. This is in keeping with the board's policy of further diversification of the company's products, and will enable it to distribute more of its steel among consumers in its natural territory. It is expected that the new mill will be ready for operation about July 1, 1911.

The Isthmian Canal Commission will receive bids until September 9 for an oxy-acetylene welding and cutting plant, cold-rolled steel, bronze, driftbolts, copper gaskets, lock washers, screws, valves, cocks, steam whistles, water gages, water-gage glasses, hose nozzles, pipe fittings, slip scrapers, chain blocks, grindstones, saws, vises, peavies, cold chisels, reamers, foundry brushes, horse brushes, headlight burners, lantern globes, door catches, buckles, cups, steel tapes, rules, twine, rubber valves, engine oil, coke, etc. (Cir. 601), and until September 19 for lumber, dredging sleeves, hose, suction pipe, brake shoes, road machines, lanterns, etc. (Cir. 602).

TRADE PUBLICATIONS.

International and Shipping Directories—The Union Switch & Signal Co., Syracuse, Pa., has just issued a catalogue and price list covering its interlocking and signaling devices.

Denver & Rio Grande—A new coast-to-coast map has been issued, drawing particular attention to the new Western Pacific, the extension of the Denver & Rio Grande, from Salt Lake City to San Francisco.

RAILWAY STRUCTURES.

CHICKASHA, OKLA.—The Chicago, Rock Island & Pacific is receiving bids for a passenger station 32 ft. x 200 ft., to cost \$35,000.

CINCINNATI, OHIO.—An ordinance authorizing the Union Depot and Terminal Company of Ohio to build a union depot has been signed by Vice-Mayor Galvin. An ordinance which was passed June 29 was vetoed.

DALLAS, TEX.—The Houston & Texas Central will ask bids at once, it is said, for putting up a new freight house in Dallas to cost about \$40,000.

DOVER, DEL.—An officer of the Pennsylvania Railroad writes that it is the intention of the company to build a new passenger station in Dover, also a passenger tunnel. The detailed plans have not yet been finished, and bids are not yet asked for the work. It is proposed to put up a brick station 35 ft. x 100 ft.

DULUTH, MINN.—See Duluth, Winnipeg & Pacific under Railway Construction.

FREDERICK, MD.—See Frederick Railroad under Railway Construction.

FORT WILLIAM, ONT.—A contract has been given to Carter, Halls, Aldinger Co., general contractors of Fort William, it is said, for the construction of the new Canadian Pacific car shop. Ground has been broken, and test pits were dug for the foundation of the shops, which will be located in the yards near the overhead bridge. The structure is to be 50 x 170 ft. (April 22, p. 1069.)

FULTON, ILL.—The Chicago & North Western will build a roundhouse and machine shops to cost \$75,000.

GILLUM, ILL.—The Big Four has given a contract to A. Yauger, Pekin, Ill., to build a four arch concrete bridge at a cost of \$30,000.

HARTFORD CITY, IND.—The Pittsburgh, Cincinnati, Chicago & St. Louis is having plans made for a brick passenger station to cost \$15,000.

INDIANAPOLIS, IND.—Plans for new freight terminals for all of the divisions of the Pennsylvania lines entering Indianapolis have been approved. Immense freight houses and extensive tracks will be built on South street. The expenditure, including the real estate, will approximate \$4,000,000.

JOLIET, ILL.—Plans are being made for a union station to cost \$75,000.

MATTOON, ILL.—The Big Four will build a roundhouse containing 30 stalls. It will be equipped with the direct vacuum return steam heating system, boiler wash-out system, drop pits, new ash pits and coaling station. (Aug. 5, 1910.)

NEW YORK, N. Y.—See an item in general news in regard to the New York Central & Hudson River.

OMAHA, NEB.—The Chicago, Burlington & Quincy has given a contract to T. S. Leake & Company, Chicago, to build the new freight house. (June 10, p. 1440.)

OGDEN, UTAH.—The Ogden Union Railway & Depot Co. has approved plans for an annex to the present union depot. The building will cost about \$100,000, and will be used for baggage and express purposes.

READING, PA.—The Philadelphia & Reading will build a new steel bridge, it is said, over the Schuylkill river at Mill Creek Junction, near Port Carbon.

ROANOKE, VA.—The Virginian Railway is building a five stall roundhouse with shop annex at a cost of \$30,000.

ST. LOUIS, MO.—The Missouri, Kansas & Texas has given a contract to the Murphy Construction Co., East St. Louis, Ill., to build a brick roundhouse at Gimblin road. It will contain 15 stalls and cost \$40,000.

VICTORIA, B. C.—The Virginian Railway is building a five stall roundhouse with shop annex at a cost of \$30,000.

Late News.

The items in this column were received after the classified departments were closed

Not only the New York, New Haven & Hartford but also the Boston & Maine and other New England roads, will, on October 1, adopt revised car demurrage rules, reducing the free time from 96 to 48 hours.

The Texas Legislature on August 31 finally enacted the bill validating the claims of creditors against the International & Great Northern. The bill was passed in the House as it came from the Senate, and will become effective upon receiving the Governor's approval. It validates approximately \$2,000,000 of unsecured claims against the International & Great Northern Railroad which will have to be assumed by the purchasers of the road this month. As passed, no claims will be allowed which were incurred prior to two years before the road went into the hands of a receiver.

At the hearing before the special examiners for the Interstate Commerce Commission at Chicago on Wednesday it was said that probably the railways would seek to compel the shippers, who oppose the advance in freight rates, to declare how much they profit on the different commodities under consideration and the return they enjoy on their invested capital. One prominent railway man declared that the roads might well ask the shippers what their profits are on the commodities affected by the proposed increase in freight rates so that the commission may know whether they are or are not seriously disturbed by the increase which they are fighting. F. O. Melcher, second vice-president of the Rock Island, testified concerning increased expenses due to advances in the wage scale and increased cost of operation. He said that the road does not get more efficient labor by reason of the increased wages. No change is likely to restore any part of the wage increase unless the road can get more for hauling freight. "In the fiscal year just closed," said Mr. Melcher, "the gross earnings increased \$5,300,000 and the operating expenses increased \$5,500,000." Legislative measures had increased the cost of operating. "I do not object to the safety appliance law," said Mr. Melcher; "it was a good thing, but it does not save money. We have to have as many men on a train now as before the automatic brake was installed. The hours of labor bill was a proper bill, but has required more men and an increased expenditure. Other required regulations have been good, but they all cost money. Altogether, I should say that the increased volume of traffic has not kept pace with the increased cost of operation."

The New York State Public Service Commission, Second district, has assumed jurisdiction over the operations of telephone and telegraph companies. All telephone companies, corporations, associations, partnerships or persons owning or operating any telephone line in the state for profit whose property is in excess of the value of \$10,000 will come under the jurisdiction of the commission. All telegraph companies, however, are within the jurisdiction of the commission. The new law is very similar to that which has been in force during the last three years concerning other public service corporations. Telephone and telegraph companies are required to afford adequate service at just and reasonable rates, and discrimination in favor of any particular person or corporation and in giving any unreasonable preference of any kind is prohibited. No free or reduced service or free pass or frank can be given except to the employees of the corporation and their families and persons engaged in certain lines of charitable work. The corporations are required to file with the commission schedules showing rates, rentals and charges for services, also all contracts and agreements in writing between companies affording telephone and telegraph service relating in any way to construction, rentals or use of lines of telephone or telegraph companies. The companies are required to file each year an annual report which is a public record and may be examined at the office of the commission upon request. Out of about 1,200 telephone companies in New York 115 will come under the jurisdiction of the commission, all of whom have property in excess of \$10,000. The commission has opened a New York office in the Metropolitan tower.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The *Car and Steel Company* has ordered one 14-wheel switching locomotive from the American Locomotive Company.

The *Pittsburgh, Sharon & Northern* has ordered from the Baldwin Locomotive Works two consolidation locomotives in addition to the two mentioned in the *Railway Age Gazette* of August 5. The four engines are for December delivery.

CAR BUILDING.

The *San Antonio & Aransas Pass* is in the market for four passenger cars.

The *Mexico Northeastern* is said to be in the market for 200 logging cars. This item is not confirmed.

The *Dold Refrigerator Car Line*, Wichita, Kan., is in the market for 50 steel underframe refrigerator cars.

The *El Paso & South Western* is said to be in the market for four postal, three baggage, two mail and two chair cars. This item is not confirmed.

The *Chicago, Milwaukee & Puget Sound* is reported to have authorized the building of 250 logging cars in its company shops. This item is not confirmed.

The *Michigan United Railways*, Jackson, Mich., reported in the *Railway Age Gazette* of July 15 as being in the market for 30 city cars, have placed this order with the J. G. Brill Co., Philadelphia, Pa. The trucks were ordered from McGuire-Cummings Co., Chicago.

The *National Railways of Mexico*, as reported in the *Railway Age Gazette* of July 15, have ordered 1,600 box, 500 gondola, 100 tank, 150 flat and 150 stock cars from the American Car & Foundry Co. The flat and stock cars are for delivery during September, the box cars beginning in September, the gondola cars during October and November, and the tank cars during October. The flat cars, 40-ton, will be 36 ft. 9 in. long, 9 ft. 3 in. wide, 3 ft. 9½ in. high, over-all measurements. The stock cars, 40-ton, will be 36 ft. long, 8 ft. 5½ in. wide, and 7 ft. 6½ in. high, inside measurements, and 8 ft. 7½ in. wide and 12 ft. 9½ in. high, over all. The box cars, 40-ton, will be 36 ft. long, 8 ft. 6 in. wide, 7 ft. 6½ in. high, inside measurements, and 37 ft. 10½ in. long, 8 ft. 7½ in. wide and 12 ft. 9½ in. high, over all. The gondola cars will be of 50-ton capacity and the tank cars will be of 12,500-gal. capacity. The following special equipment will be used to all cars where required, except as noted:

Bolsters, truck	American Steel Foundries; Keystone
Brakes	Westinghouse
Brake-beams	Buffalo Brake-Beam Co.
Couplers	Simplex
Draft gear	Miner
Dust guards	Security
Journal boxes	Symington
Roofs	Corrugated iron
Springs	Railway Steel-Spring Co.
Trucks	Andrews type
Wheels	33-in. cast iron

The following refers to the tank cars only:

Bolsters, truck	Metal
Draft gear	Union Draft Gear Co.
Dust guards	Harrison
Trucks	Arch bar
Wheels	33-in. double plate

IRON AND STEEL.

The *Pennsylvania Lines West* are in the market for an additional 700 tons of structural steel.

The *Elgin, Joliet & Eastern* has ordered 200 tons of structural steel from the American Bridge Company.

The *Boston & Maine* has ordered 175 tons of structural steel from the New England Structural Steel Company.

General Conditions in Steel.—Activity in the steel market seems to be due to small quantity orders only, as far as new business is concerned. A heavy volume of specifications against existing contracts is reported, but as this has been the condition for some time, mill operations will show a shrinkage unless a buying movement sets in soon. Railway buying continues

to be for immediate requirements only. By the first of the year the Bethlehem Steel Corporation, it is said, will be producing pig iron at a rate of 900,000 tons per year. This increase is due to the construction of new mills within the last few years. At its Bethlehem works this company is employing about 12,000 men, which is the largest number ever employed at the plant.

SIGNALING.

The New Orleans & Northeastern is to begin soon the erection of automatic block signals over a large portion of its main line.

The Indiana State Railroad Commission has sent out a letter



Heating Boiler.



Piping in Shop.

Winslow Heating System; Bettendorf Shops.

to the roads of that state requesting them to advise what progress they are making toward the introduction of block signals. As the time limit approaches the commission is anxious to see some effort being made to carry out its order.

The Pennsylvania has appointed signal apprentices from Lehigh University, Sheffield Scientific School and Pennsylvania State College. The Pennsylvania now has in service 20,725 signal functions, worked by 8,792 levers. The number of functions is almost three times what it was in 1902.

Mr. Patenall, signal engineer of the Baltimore & Ohio, reports that one of the lamps in his signals, which are automatically lighted on the approach of trains, has been in operation regularly for over four years. This lamp was put in service August 1, 1906, and the filament burned out on August 5, 1910. It was lighted and extinguished, automatically, 73,200 times. The lamp was a 2-c.p. 11-volt, and was purchased at an electric supply store. It was on signal No. 94, at Elkridge, Md. In comparison with oil or other methods of lighting signal lamps, he thinks that the performance of this lamp is well worth recording. It never failed to light up properly. The automatic lighting of lamps on automatic signals in this territory operates in conjunction with the normal danger system of signaling, as set forth in the Patenall and Driscoll patent, but the lighting system can be applied with the normal clear system of signaling.

A Gas Heated Boiler.

In the heating plant of the Bettendorf Axle Company, Bettendorf, Iowa, a vertical water tube boiler is used. There are two annealing furnaces in these buildings, and the waste gases are

utilized to assist in heating the boiler. The boiler was set between the furnaces with a gas duct leading to it from each furnace, with a damper and separate stack to deflect the heat from the boiler when it is not desired to pass through it. An auxiliary oil burner is also installed for use when additional heat is required.

In the illustration this boiler is shown with the hot well, in which a feed pump is installed to return the water of condensation to the boiler. The main carries a 70-lb. pressure, maintained by a pressure regulator near the boiler, and each branch line carries a pressure of two pounds, maintained by separate regulators. The sizes of the leads and the low pressure mains are so proportioned that a slight pressure is carried in the top pipes of the radiating coils with atmospheric pressure or partial vacuum in the lower pipes. This gives a supply of steam at sufficient pressure at two extreme points on the low pressure mains to permit the use of gravity heating systems and cast iron radiators for an outside general office building and a testing laboratory. The heating plant was designed and installed by the Horace I.

Winslow Company, Old Colony building, Chicago, to whom we are indebted for the illustration and description of this economical method of heating.

D. & L. Throttle Rod Stuffing Box and Plastic Packing.

The accompanying illustrations show a new design of throttle rod stuffing box, with which a plastic packing is used.

It is claimed that this plastic packing, as used in this stuffing box, is leak proof, and that the box can be repacked when the boiler is carrying a full head of steam. When applied for the first time, however, the engine should be dead. Reference to the illustrations shows that a brass nut is screwed down after the storage chamber is put in place. This chamber is held in position by the shoulder, and is made a snug turning fit with the nut. A port in the bottom of the chamber may be made to coincide with the port in the main casting, or, by giving the chamber a half turn, the port is closed. When packing for the first time, the port is turned to the open position and the packing forced in by aid of the plunger. About four tubes are required to fill the stuffing box.

In repacking, it is necessary first to close the port in the storage chamber so as to prevent any escape of steam. The chamber is then filled, the plunger replaced, after which the port is opened and the packing forced in by screwing down on the plunger. It is suggested that about a teaspoonful of valve oil should be added with each stick of new packing and that the packing should be oiled about once a month to assure an easy working rod.

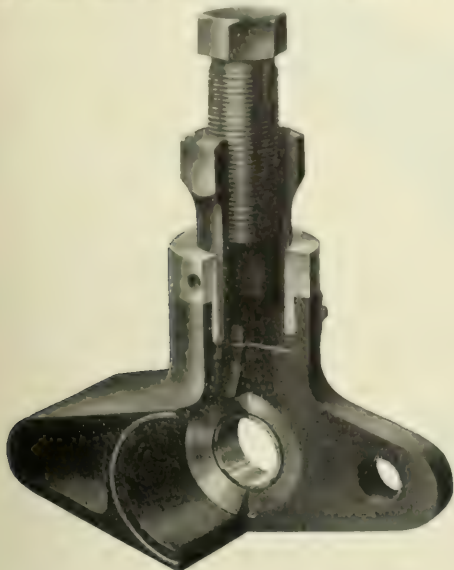
The stuffing box conforms in design to those generally used,

so that replacement is easily accomplished. For use on old power with throttle rigging of odd design, the D. & L. stuffing box can be especially made.

Following are claims made for this stuffing box and packing:

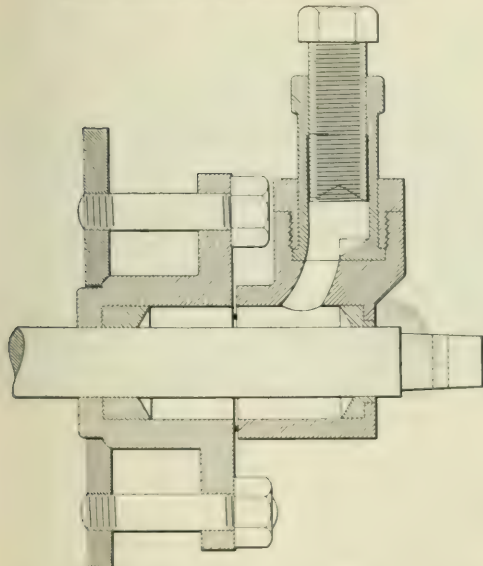
Adaptability to old as well as new power without any change in throttle rod or connections.

Saving of time required to pack throttle, both in labor and in expense.



D. & L. Stuffing Box.

Quarter removed to show interior arrangement.



Cross Section of D. & L. Stuffing Box.

be engine in service. The engineer can carry packing in the seat box and pack throttle when necessary.

Throttle handles operate 50 per cent. easier than with other throttle pack-

ages.

Long life of packing due to thorough lubrication.

Minimum wear upon throttle rod.

The complete avoidance of delays to motive power caused by an occasional oversight of the condition of the throttle packing.

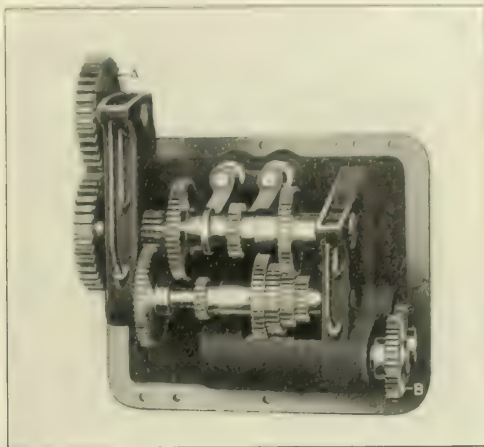
One size packing for all size throttle rods.

This stuffing box and packing is sold by the Union Machine Co., St. Paul, Minn.

Shop Equipment.

New Cincinnati Cone-Driven Miller.

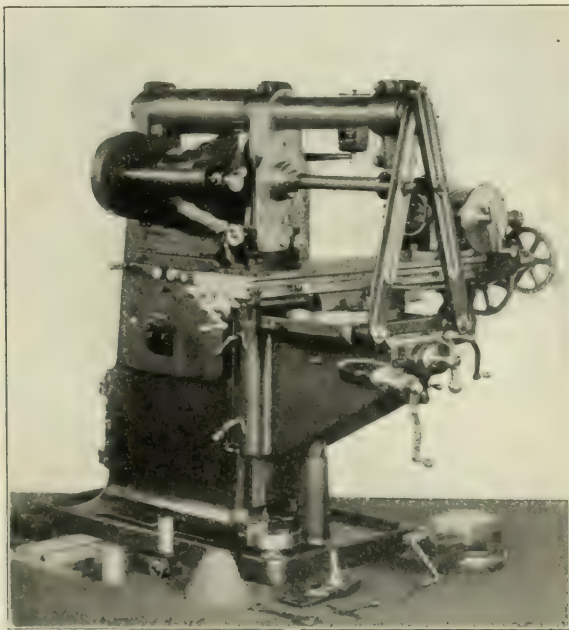
A portion of the milling work in every shop is light and can therefore be handled on a modern cone-driven miller as fast and as accurately as on the more highly developed single-pulley



Driving Gears of Cincinnati Miller.

type machine. The Cincinnati Milling Machine Co., Cincinnati, Ohio, has redesigned its entire line of cone-driven millers for this class of work, and the illustrations herewith show the more important improvements that have been made.

The column is very similar to that used on this company's high power machines. It is a symmetrical box section, having



New Cincinnati Cone-Driven Miller.

straight lines, and is sufficiently large to contain the entire feed-drive mechanism. The feed changes are all obtained from a single group of mechanism which is mounted in the column at a point high above the floor, bringing all the levers within easy reach, and the index in plain sight, of the operator. The

feed mechanism provides 16 feed changes from .007 to .3 per revolution of the cutter. All of these changes are obtained through 12 gears located between the housings.

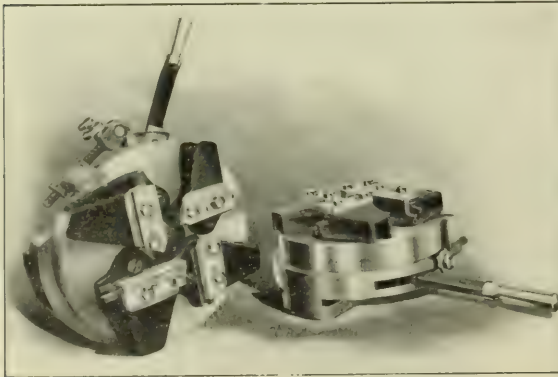
The design provides simplicity, with handiness in operation. The machine is driven directly from a face gear which meshes with the gear A. Power is transmitted through the change gears to the gear B which drives the universal joint shaft. All of these 16 feed changes are obtained by the three levers shown on the box. The feed index, mounted above the levers, indicates the exact lever position for each rate of feed.

The most striking feature of this design is the tumbler construction. This tumbler is made in the form of a cylinder, of large diameter, which supports the tumbler shaft and gear and is itself supported in the frame of the feed box. This construction prevents bending the tumbler shaft and vibration in the tumbler. The operating lever projects through a hole in the feed box in the usual way, but as this opening is closed by the tumbler, the inside mechanism is protected from the dust.

Stationary Die Head for Pipe Threading.

The illustrations herewith are of a stationary die head and parts for pipe threading, as manufactured by the Landis Machine Co., Waynesboro, Pa., using the Landis type of die with a manually operated die head.

The die head is made especially for use on pipe-threading machines in which the pipe revolves while the head remains stationary. The head and the die holder are made of steel. The head can be mounted on a carriage of any standard pipe



Landis Stationary Die Head.

machine and handled in the same manner as the other styles of head. The chasers for these die heads can be made to good advantage of high-speed steel, in which case they require no annealing, re hobbing or retempering. Sharpening of the die is accomplished by grinding the ends of the chasers and resetting them to the correct cutting position in the holder. The heads are made in standard sizes to take work up to and including four inches. One of the great advantages of this die head is

that one set of dies will cut all diameter pipes of the same pitch. The heads are graduated for setting the dies to the different diameters, and are opened and closed by hand, using the lever shown. When in the closed position the die is rigidly locked, but opens and closes freely.

The chaser holder illustrated is for use where

not necessary to cut very close to the shoulder. The mill clamp which holds the chaser also protects it in case the pipe should split. The clamp extends down over the throat of the die and is rounded out near the cutting point so as to act as a guide for rough ends. When a twist occurs in the pipe, most

of the strain is thrown on the clamp, thus protecting the die and lessening the possibility of breakage. In case of threading close to the shoulder, a clamp made flush with the front edge of the chaser only is used, thus permitting the die to run close up against the shoulder, as in threading short nipples, etc.

It is claimed that this die admits of cutting speeds from 25 to 100 per cent, higher than the hobbled type of die. The rake can be ground to suit the quality of the material in the pipe, as a great deal of the merchant pipe used is very stringy and tough.

Advantages in this head are in the life of the dies, the higher cutting speeds, and the flexibility of the die to meet the different qualities of material. All dies are made interchangeable, and if one chaser of a set becomes worn before the others, this single one can be replaced.

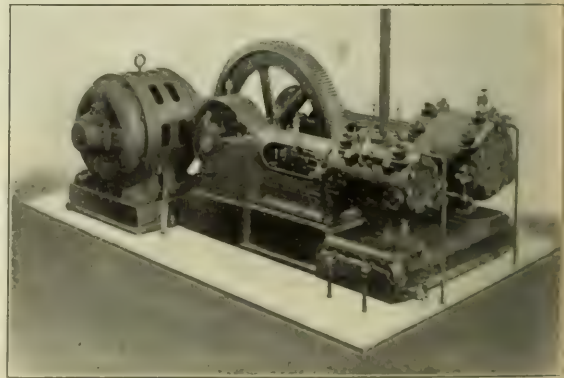


Chaser for Landis Die Head.

Motor Driven Air Compressor.

A good example of the simplicity, convenience and efficiency of electric motor drive is the application shown in the illustration, 50-h.p., a.c., Westinghouse, type MS mill motor, direct-connected to a two-stage air compressor, manufactured by the Chicago Pneumatic Tool Company, Chicago. The compressor has a 14-in. low pressure, and a 9-in. high pressure air cylinder; an 11-in. stroke and a mechanical valve. This valve, which is connected with the high-pressure cylinder by a 3/4-in. pipe, stops the compression when the air has reached a pressure of 85 lbs.

The air is used in operating the interlocking switches in the



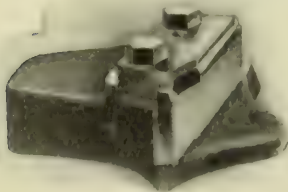
Motor Driven Air Compressor.

yards of the Union Railroad, near Bessemer, Pa.; the riveters, drills, etc., used on the repair tracks, and for testing the air-brakes on the cars. The compressor runs 24 hours every day; during this time the switches are in operation continuously, and the repair men work 10 hours a day. During the summer, box cars are painted with a pneumatic sprayer.

The Westinghouse motor runs at 725 r.p.m. on a three-phase, 25-cycle, 440-volt alternating current. The compressor runs at 175 r.p.m.

A. F. Coulter, general car foreman of the Union Railroad, is quoted as authority that this equipment has been in continuous operation for six months with no attention except that for occasional cleaning and oiling.

The receipts from 1,605 miles of Union government railway in operation in 1909 amounted to \$9,080,292, comparing with \$8,625,211 in 1908. The operating expenses on these lines were greater than the gross earnings.



Chaser In Holder.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY (EXCEPT SUNDAY) BY
THE RAILROAD GAZETTE COMPANY, 381 FIFTH ST., NEW YORK.

CHICAGO: Plymouth Bldg. CLEVELAND: Williamson Bldg.
LONDON: Queen Anne's Chambers, Westminster.

W. H. BOARDMAN, *President*
E. A. SIMMONS, *Vice-President* HENRY LEE, *Secretary*
The address of the company is the address of the officers.

EDITORS

W. H. BOARDMAN, <i>Editor</i> .	ROY V. WRIGHT	B. B. ADAMS
SAMUEL O. DUNN,	ERNEST McCULLOUGH	W. E. HOOVER
<i>Western Edit. Mgr.</i>	G. L. FOWLER	F. F. LESTER
BRADFORD BOARDMAN,	WILLIAM FORSYTH	F. W. KRAEGER
<i>Eastern Edit. Mgr.</i>	S. W. DUNKING	H. H. SIMMONS
	CLARENCE DEMING	

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada.....	\$6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies.....	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49. FRIDAY, SEPTEMBER 9, 1910. NUMBER 11.

CONTENTS

EDITORIAL:

Editorial Notes.....	447
New Employers' Liability Laws.....	448
The Census and the Railways.....	449
Improving Service By Investments from Earnings.....	449
New Books.....	450

LETTERS TO THE EDITOR:

Accident Records—Correction.....	450
Junction Cards at Interchange Points.....	450
The Station Agent's Unpleasant Work.....	451
Identification of Trains.....	451

ILLUSTRATED:

Double Track in South Carolina.....	455
Device for Marking Tare on CANS.....	455
Reinforced Concrete Depot.....	459
New York Central Combustion Buffet, Baggage and Mail Car.....	460
Strengthening Old Trestles on the Wabash.....	461
Wages, Prices and Freight Rates.....	466
Converted Automobile Motor Car.....	468
Mallet and Pacific Type Locomotives; Carolina, Clinchfield & Ohio.....	460

MISCELLANEOUS:

Transportation and Traffic In Italy.....	452
Wood Preservation and Creosote Production In Europe.....	456
Food's Manual for 1910.....	460
Employers' Liability in New York State.....	460
The Car Demurrage Barriers.....	467
The Chinchow-Aigun Railway.....	470

GENERAL NEWS SECTION:

.....	471
-------	-----

SUPPLY TRADE SECTION:

.....	484
-------	-----

THE Union Station in Washington, the new Pennsylvania Terminal in New York, and the new Northwestern Station in Chicago are splendid examples of the tribute railways feel they must pay to large cities. For some years the architecture of stations and the attention given to station grounds in suburban residence towns have been improving. But the towns and smaller cities remote from centers of population have usually had to get along with station buildings of low cost and mean appearance. As people usually appreciate whatever a railway does to improve the looks of their town, it is good policy to regard architectural appearance as well as durability when erecting new stations.

The present policy seems to be to erect more substantial buildings, but having repairs and doing away with the necessity of painting and high insurance rates should not also be considered. Many solid and substantial appearing brick and stone stations are so homely that the local citizen is apt to wish they were not so fireproof. The town of Grand Prairie, Tex., has barely 300 inhabitants, yet the Texas & Pacific has seen fit to spend there over \$6,000 in the erection of a handsome station of reinforced concrete, with concrete floors and metal roof, which is described elsewhere in this issue. This gives the people a kind of civic center, and is apt to cause them to have a friendlier feeling toward the road. It is good business for the railway in that it will be saved maintenance expenses, and the need for replacement will not come so soon as if the building were of more temporary construction.

THE only possible criticism that can be made of President Taft's appointments of members of the commission to investigate the question of public control of the issuance of railway securities is that he did not give at least one of them to a practical railway man. The selection of President A. T. Hadley of Yale as chairman of the commission is peculiarly happy, for Dr. Hadley has been recognized for many years as the leading authority on railway economics in this country. Professor H. B. Meyer, one of the members of the commission, is another distinguished authority on railway economics and has acquired great practical knowledge of railway regulation as a member and chairman of the railway commission of Wisconsin, which is one of the ablest of the state commissions. F. N. Judson, of St. Louis, another member, is the author of an authoritative book on the law of interstate commerce. Walter L. Fisher is one of the ablest lawyers and most public-spirited citizens of Chicago. Frederick Strauss will contribute to the strength of the commission both by his knowledge of economics and his practical experience as a banker. Some of the men on the commission have been strong advocates of the extension of government regulation of industry. Others have expressed rather conservative views upon the subject. Regardless of their present or past views no one familiar with their careers can have any doubt that they will approach the investigation and the consideration of their subject without any interested bias and that their report will be a fair and able document.

OFFICERS of the Trunk Lines have decided that from January 1 all divisions of through freight rates with short terminal and industrial railways shall be abolished. This is in accordance with the decisions of the Interstate Commerce Commission in the cases of the Star Grain & Lumber Co. and the Crane Iron Works, where such allowances were held to be virtually the same as rebates to the shipper, the shippers being the owners of the short railways. It was voted some time ago to make this change August 1, but postponement was decided on because of the strong protests from the short lines. Some of the gossips seem to be worried over the possible dire results of this change in the method of making rates on freight forwarded by shippers who have short railways of their own. It is declared that, in some cases, these short railways cannot be operated except at a loss. Again, it is said that the only way out will be for the strong railways to buy the industrial lines outright. But why not simply adopt, as the published rate from the junction to destination, the same amount that the railway has all along been receiving for that part of the service? It is as simple as A, B, C. Possibly there might be a slight collision with the long and short haul law in some cases; but if that law has been defied by these excessive allowances for 20 years—as has been the case, undoubtedly, in some instances—why should not the defiance be continued? Possession of a privilege for 20 years has often been treated by the courts as presumptive evidence of rightful possession. Seriously, however, the fact remains, after all the discussion about technicalities, that the "top line" deserves compensation for all the useful work that it does and that the money for

this compensation ought to come out of the "ultimate consumer" of the lumber or other merchandise. If the short line has been allowed only a fair sum, the shipper must henceforth allow the same sum and add it to the price which he charges for the lumber "free on board" the actual railway. If this results in raising his price so that some competitor gets the business away from him, who is to blame? Not the Interstate Commerce Law, surely; nor can it be the railway that has been accepting too small a percentage its own service.

THE description in this issue of the use of concrete to preserve the metal in an old trestle and at the same time so to increase the strength of the structure as practically to make it new will interest engineers. One of the subjects given great attention at the International Railway Congress this year was that of strengthening old bridges, for the continually increasing train loads are a matter of concern to men charged with the maintenance of structures. The work done on the Wabash in converting old wrought iron trestles into trestles of reinforced concrete is said to have cost fully \$40,000 less than would have new steel trestles designed for present day loads with proper allowance for increases during the lifetime of the structure. It is believed that the reinforced trestle will be fully equal to the work of carrying the traffic for many years to come. The laboratory tests on a specimen column showed the strength to have been doubled by the addition of the wire-wound concrete envelope, but this, of course, does not prove that the strength of the trestle has been doubled. In the connections of a tower bent many indeterminate stresses are produced, so that it is practically impossible to say what is the real strength of a trestle designed strictly as a reinforced concrete structure. In the case of the Danville, Ill., and the St. Charles, Mo., trestles, we have metal structures designed as such and with all connections made precisely as though protecting concrete had not been thought of, as, of course, it had not been at the time the trestles were erected. The strength of the verticals has been practically doubled by their envelopment in wire-wound concrete, but the exact effect upon the struts and braces remains to be seen. In the meantime the stiffness of the structure is wonderfully increased. The work was done without interrupting traffic and the effect that would be produced on the concrete while it was setting, by the passage of long and heavy trains, caused some concern. An examination of the finished work shows that the surface is very smooth and the work is first class. While the work was in progress news was received of the organization in England of the Improved Construction Company, licensed under the Jagger patents to make concrete products on a vibratory table. The inventor, Mr. Jagger—a name singularly fitting for such a process!—claims that when freshly made concrete is placed upon a platform to which is imparted "a horizontal vibratory motion combined with a suddenly arrested rocking movement," the material rapidly solidifies and squeezes out all excess moisture and air, together with all deleterious, partially dissolved substances which generally rise to the surface of setting concrete and are known by the generic term "laitance." The description of the motion of the platform in the Jagger process is similar to the motion imparted to a high trestle by a train passing over it. If the Jagger process is really efficient in producing dense concrete of good quality, there need be no fears of the quality of the concrete used in strengthening old iron or steel trestles. A similar process has been used in the United States for casting concrete fence posts. The Phoenix column is not ideal reinforcement for reinforced concrete columns, so that a wire helix is necessary, but latticed columns should be excellent. The experiment on the Wabash having proven successful it is not too much to expect that in the future other trestles, at present carefully watched, may be converted into structures of reinforced concrete. This will mean a new lease of life and a discontinuance of maintenance charges, for concrete does not deteriorate with exposure to the elements, does not burn and never needs paint. How well it will stand up under long continued vibratory stresses remains to be seen.

NEW EMPLOYERS' LIABILITY LAWS.

THE employers' liability laws of the state of New York, as recently amended, put on steam railways a new and heavy burden—if the amendments stand the test of constitutionality. Building contractors and many other classes of employers, especially those not possessing large capital and doing business on the most extensive scale, are hit much more severely than the railways, so we may expect very prompt action to test the new laws in the courts.

We give an abstract of the laws in another column, omitting, however, the optional compensation feature which seems little likely to find favor with any employer. (This feature, not applicable to railways, provides that an employer, by making a contract with an employee—a thousand contracts if you have a thousand men—may arrange to pay him half pay while injured, for not exceeding eight years, or give his widow approximately three years' pay, if the employee is killed; and thereupon be exempt from the ordinary liability for damages.) The legislature has modified the fellow-servant rule by making all bosses the same as vice-principals; has changed the rule concerning assumption of risk by an employee, so that continuing at his work after a risk is known, does not throw this burden on him, if the employer could have known of the danger by reasonable care; has placed on the employer the burden of proof of contributory negligence; has amplified the list of negligent defects for which the employer is liable; and for certain dangerous occupations has made compensation compulsory, regardless of liability or blame. If, for example, a brakeman falls off a car and is killed, or a track laborer is knocked down and killed by a locomotive, 1,200 days' pay is due the widow "and no questions asked."

This last provision (concerning dangerous occupations) is the most radical of the lot. The intent of this provision is as we have stated it; but (assuming that the amendments are not wholly nullified at once by conflict with the constitution) there will be litigation on innumerable points. For example, is a trackman who carelessly steps in front of a locomotive taking a risk which is necessary or inherent in his work? Does a telegraph operator who causes a collision have "control" over a brakeman killed in the smashup? The employer may not be liable for compensation for an accident if the workman is chargeable with serious and wilful misconduct. Stepping in front of an engine or falling asleep on the edge of the roof of a freight car may not be wilful misconduct, though it certainly is serious misconduct; but that little word "and" exempts that careless employee. The definitions of dangerous occupations are full of opportunities for legal disputes, especially as to whether an injured employee had been working on, or only near, the dangerous work specified.

Many corporations now take out insurance policies to cover all their liabilities on account of accidents. Under the new law these may be worse off than those which stand their losses directly, for the insurance companies will have to raise their rates by percentages based on guesswork, and they will naturally give themselves the benefit of all doubts. The insurance men estimate that the accident burden will be increased by these laws as much as 75 or 100 per cent.

The constitutional questions are obvious, and many lawyers feel sure that they will prove fatal to the acts. Why give the right of compensation to a man who falls off a steel bridge but not to one suffering the same accident at a wooden bridge? Where is the justice in imposing on a builder of a \$10,000 dwelling using 20-ft. scaffolds, the same liability as that imposed on big contractors engaged in putting up skyscrapers, whose semi-monopoly gives them a chance to recoup these losses? How can liability be equitably imposed on the New York Central, on its electric lines, because it is a "steam" road, while the Interborough's parallel line is exempt because it is not "steam"?

That the new laws were made wholly in the interest of employees, with only perfunctory or forced consideration of employers' interests, is obvious on the face of the statutes. The employee has the choice of two remedies when he has been injured

at his work, he may claim a moderate sum as "compensation," regardless of who is to blame, or he may sue in the courts for a larger sum, if he thinks a larger sum can be got by charging negligence against the employer. The employer, on the contrary, has no choice. Of course, no such wholly one-sided proposition would have passed so easily had it not found favor in high places. This whole movement only carries out the proposition, voiced by Mr. Roosevelt, President Taft and others, that as regards repairs and maintenance a man in a shop should be put on the same basis as a machine in the same shop. On the surface this looks extremely simple, but before the principle is embodied in American laws generally there will be an enormous amount of litigation which will be far from simple. One unfortunate feature, from the employers' viewpoint, is that when a manufacturer has found a perfect machine he may buy any number of duplicates of it; whereas, the possession of a perfect artisan often affords little or no aid in securing other perfect men. It is necessary to wait till they grow up; and the growth of good men is often hindered by the labor unions.

THE CENSUS AND THE RAILWAYS.

THE conspicuous fact disclosed by the final returns of the census of 1910 is the great growth of the population of the cities as compared with the country as an entirety, and yet more as contrasted with rural populations outside of the far western states. It is a subject that has much food for reflection in a number of directions—sociological, political and economic. It is in this last category, however, that it bears on the railways, and in several suggestive and interesting forms. Mutations of working populations mean also industrial perturbations affecting the volume both of consumption and production, which, in time, affect radically railway freight traffic. More directly also do the variations of population reflect the passenger business, saying nothing of express and mails, the former of considerable importance in railway returns.

Speaking in general terms, a city—and the same is true of the factory town—is the consumer of low class freight large in volume. It takes coal, cotton, wool, breadstuffs, lumber, ore, and metals in their secondary stage from the ore. It sends out the higher classes of freight in the form of finished products in wood, metals and the textiles, but in diminished volume as compared with consumption, securing, of course, a higher freight rate. For purposes of illustration, just here, one may almost take that small corner of the country represented by New England and consider it, with its extensive urban and factory populations, as one great city. Apart from its quarries and the great potato crop of northern Maine, it takes practically nothing for railway business out of the ground. It consumes a vast amount of raw material, much of which reaches it by rail. But at least two-thirds and probably more of the cars that take in the raw material return empty, the rest being loaded with profitable high class freight. Theoretically the growth of eastern cities during the last decade, which may be roughly estimated at nearly or quite one-third, means the preservation of the old ratios of ingoing and outgoing freight business and the absolute increase of both—a good thing for the railways. Practically there may be seen two forces disturbing the ratios—one the ocean export business; the other the competitive growth of factory business, with its high class freight at the inland cities west and south. Atlanta, Birmingham, Chicago, St. Louis, Cincinnati and Detroit, with long railway radiations toward all points of the compass, get, as compared with the eastern city, new significance in this era of urban growth, especially in their relation to home and local markets.

That the eastern cities under such railway traffic conditions have so well held their own in expansion of population is somewhat remarkable. It is, perhaps, explained in part by their interception of the flood of foreign immigration, which still seems to hold to the city rather than the country. But, whatever the cause it remains true that the swift growth of

far inland cities and their progress in manufacturing already affects railway rates. The eastern manufacturer demands as low a rate as possible both on ingoing and outgoing freight, not merely as a phase of human nature, but as a factor in holding the inland market for factory goods west and south. In connection with the growth of cities both eastern and inland this is a branch of the subject into which we may yet see the question of tariff duties on raw material enter as an intensified political influence.

Simpler in its elements is the bearing of the rapid growth of American cities on railway passenger business. Theoretically urban population should rise upward in something like even ratios with the increase of passenger traffic, though varying, of course, with localities. During the last census decade it would probably have done so but for certain extraneous disturbances. On the one hand there have been during the ten years, in response to the public demand, somewhat exceptional enlargement of train service and station facilities, especially at large terminals. On the minus side have been the expansion of the competitive electric lines, the use of long-distance telephone and the incoming of the automobile. All three are more potential in the case of city populations than in those of the country regions, though they exist in both. But, of the three, the rival street railway and the long-distance telephone have already largely spent their competitive power. The automobile has not done so yet. But any estimate of its effect on passenger business of the railways must be reckoned in what may be called "short distance" values as a feeder. Like the electric lines, it may be a long-distance rival, but at the same time a lateral that brings the steam railway station miles away within the old walking distance measured in time. On this point, as related to variations of populations, we shall know more with the census of ten years hence.

Ere long the full returns for all the municipalities of the land of more than 10,000 inhabitants will be at hand, and later we shall know not only what the passenger business of the railway is as compared with ten years ago, but also, in a rough way, the character of the railway business in terms of raw and finished material and of rural and city products. In both quarters the comparisons and contrasts promise to be instructive.

IMPROVING SERVICE BY INVESTMENTS FROM EARNINGS.

SEVERAL of the witnesses who testified for the railways in the rate advance hearings at Chicago last week, and especially Mr. Ripley, put much stress on the need for an increase in railway earnings to enable the roads to give the public the better transportation service that it demands. This demand of the public for better service is perfectly justifiable. When any man says that the rates of American railways are, or ever were, excessive, he talks nonsense. But those who criticize the service of American railways have a case. The service of most of our roads is inferior to what it ought to be. It ought to be more convenient. It ought to be more adequate. It ought to be safer. In order to make it safer, much track ought to be straightened and strengthened; much second track ought to be built; thousands of miles of block signals ought to be installed, and thousands of grade crossings ought to be eliminated. In order to make it more convenient, hundreds of stations ought to be replaced with better and larger ones, and the operation of both freight and passenger trains should be made speedier and more dependable. In order to make it more adequate, more miles of line, more trackage of all kinds and more equipment ought to be provided. As Mr. Ripley said, while railway men do not like to depreciate their own property, they recognize that "the best railways in this country west of the Allegheny mountains are very, very far short of what they ought to be to give the service that the public requires and has the right to demand, or would have the right to demand if it paid for it." As all kinds of traffic can move freely on existing rates, and

could on substantially higher rates, the question of service is a great deal more important in this country than the question of rates.

It will be conceded on all hands that the facilities of the railways should be improved and increased. But those who agree most harmoniously on this point are apt to disagree most widely on how the necessary expenses for doing this should be met. Mr. Ripley stated his views very clearly. Improvements may be roughly divided into two classes—those which increase the earning capacity of a road in proportion to their cost, and those which do not. To the latter class belong the handsome and expensive passenger stations which every city is demanding. For example, the new union passenger station at Kansas City will cost \$2,000,000 or \$3,000,000. A station which would serve adequately all purely transportation purposes could be built, Mr. Ripley estimated, for \$200,000. All of the rest of the expenditure is a tribute paid by the roads to the public-spirited ambition of the people to beautify their city and will not increase the earning capacity of the railways a dollar. The elevation of tracks in cities is very desirable, because it promotes public safety. It also to some extent serves the convenience and reduces the expenses of the railways. But the amount it costs greatly exceeds the purely economic benefits derived from it. Mr. Ripley contended that improvements which do not increase the earning capacity of the railways should be paid for mainly or wholly from earnings. If a railway is paying 6 per cent. dividends it should be allowed to earn 12 per cent. on its stock, the extra 6 per cent. to be applied on improvements which will benefit the public but will not increase the road's earning capacity.

It is evident that improvements have got to be paid for whether they increase the earning capacity of a railway or not. Improvements which do increase earning capacity may be and ought to be capitalized, because the increase in earning capacity which they cause will afford the means of paying interest and dividends on the increased capitalization. On the other hand, the improvements which do not increase earning capacity ought to be paid for out of earnings, because really, in the long run, the expenditures on them are simply a part of the expenses which it is necessary to incur to make and keep the property on a basis where it can serve the public and earn an adequate return for its stockholders. If improvements of the kind in question cannot be paid for out of earnings, they either cannot be made or they must be paid for from the receipts of increased capitalization. If they are paid for from the receipts of increased capitalization the burden imposed upon the public, in the long run, will be greater than if they are paid for from current earnings. Take, for instance, the case of a station which costs \$2,000,000, and which, at the rate at which this country grows, may be obsolete in 25 years. Interest at 5 per cent. would in 20 years equal the total expenditures on it, and at the end of the time the bonds which were issued to raise money to pay for it would still be outstanding. The construction at the end of the time of another station which might cost \$6,000,000 or \$8,000,000 would involve an additional increase in capitalization, on which additional interest and dividends would have to be paid. The result of such maneuvering would be to increase the capitalization of American railways, as it already has increased the capitalization of the railways of England, to a point where it would be practically impossible to earn a return on it.

The explicit adoption by the regulating authorities of the policy of letting each railway earn enough in addition to reasonable interest and dividends to pay out of earnings for all improvements which do not increase earning capacity would not only prevent an excessive increase in capitalization, but would also add to the value and stability of the securities, both bonds and stocks, which were issued. It may be said that there is no certainty that after the roads had spent earnings on the property they would not capitalize them. But past experience has shown that badly managed roads are as apt to distribute

stock dividends which represent no investment in the properties as they are to capitalize earnings which have been put in the properties, and that, on the other hand, well managed railways are apt not only not to capitalize improvements which have no earning capacity, but are apt also not to capitalize some improvements which have earning capacity. The amount of earnings invested in the properties without being capitalized has been in the past much larger than the amount that has been capitalized. And with public sentiment as it now is in this country, the extent to which watering of stock—or anything that might invite condemnation as such—will be carried in future seems very apt to be pretty small.

NEW BOOKS.

Coal Mines. By B. R. Rose. Rockefeller Building, Cleveland, Ohio. 278 pages; 6 in. x 9 in.; leather. Price, \$5.00.

This publication is intended for the use of coal consumers, to enable them to locate readily any particular coal from the bituminous and semi-bituminous mines in states east of the Mississippi river. The main classification is by states, at the head of which is a list giving the different coals and the counties in which they are mined. The counties of each state are arranged alphabetically, with the coal companies, names of mines, veins, thicknesses, daily capacities and railway connections given in each case.

The Settlement of Labor Disputes.

This is the sub-title of the September number of the *Annals of the American Academy of Political and Social Science* (Philadelphia). In this number of the magazine 200 pages are filled with 19 articles on the subject named. These are given under four heads: Special Problems; Methods of Settlement; The Law of Labor Disputes in the United States; The Law of Labor Disputes Abroad (Canada, New Zealand and Germany). The authors who figure in this series are: Samuel Gompers, Walter Gordon Merritt, Margaret A. Schaffner, J. Wallace Bryan, Cornelius J. Doyle, Joseph Krauskopf, D.D., Ethelbert Stewart, T. L. Lewis, Frank Julian Warne, Ralph Kendall Forsyth, T. D. Nicholls, James W. Van Cleave, Truman S. Vance, C. O. Pratt, John Lundrigan, Robert Luce, F. A. Acland, Paul Kennaday and Harris Weinstock.

Letters to the Editor.

ACCIDENT RECORD—CORRECTION.

New York, Chicago & St. Louis Railroad Co.,
Cleveland, Ohio, Aug. 29, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I note in your issue of August 19, page 313, report of train accidents, that you show a collision on this line July 20 at Chicago, in which one person was killed and one injured. This report is incorrect. We have no knowledge of any such accident at this office.

A. W. JOHNSON,
General Manager.

JUNCTION CARDS AT INTERCHANGE POINTS.

Pueblo, Colo., Sept. 3, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

One of the changes taking place in the railway world is the consolidation of mechanical and transportation car records at points of interchange. It has its opponents, but it is being tried at a few places, and improved service has resulted. Some of the good things secured are a reduction in expense, the ending of duplication of work, prompt interchange reports, a distinct time of delivery, a consistent check on car numbers and initials, the furnishing of the same data to the delivering and receiving

lines, a reduction of from 75 to 90 per cent in the volume of traces, and a more general feeling of harmony between the two departments because of the dual responsibility. And there are still other benefits. No resultant delay has been encountered so far as mechanical inspecting has been concerned, not has the physical record of the car been impaired. This co-operative plan has commendable features in such great number that it may well be considered as one of the advisable, progressive measures of the day.

During the recent annual convention of the Car Accounting and Transportation Officers, at Colorado Springs, Colo., J. R. Kearney, superintendent of car service of the Baltimore & Ohio, following the report of the Committee on Joint Inspection and Interchange, suggested the practicability of the issuance of junction cards from the central office at cities where such offices have been installed and are in working order.

Experience here at Pueblo with the consolidated bureau suggests that Mr. Kearney's idea is entirely practical. That there could be a valid objection to this plan at points equipped with a well organized interchange bureau seems impossible, because the interchange data furnished by that central office are the authority upon which the car accountant now issues the junction card. Suppose the Rock Island delivers a Southern Pacific car to the Santa Fe at Pueblo for western movement. The Southern Pacific people are compelled to wait until our interchange sheet journeys to Chicago, where the junction card is issued by the Rock Island car accountant; then the card has to travel back through Colorado on its way to San Francisco. Had this junction card been issued concurrently with the interchange report, as suggested, the car owners in San Francisco would know of its whereabouts practically as soon as the Rock Island car accountant in Chicago. Under the present system a week at the very least would elapse before the owner could possibly receive this information. Had this particular car been loaded with a commodity that required a fairly good forwarding movement, it could have been at any one of two or three Southern Pacific connecting points before its owner had been advised that the car had left Rock Island rails. Thus the whereabouts of a car at the very door of its owner is not available to him because of the present system of issuing junction cards.

Another good feature of the suggested plan would be its tendency to decrease car balances. I have in mind an owner, "X," charging a connection with 95 of his cars when the connecting line's tally showed 32 of X's cars in its possession. What superintendent of car service can locate his cars from such statistics? Of course we will admit that there will always be more or less of a discrepancy in car balances on account of mileage from interchange points, and possibly from lack of a uniform time for tallying, but the suggested plan will at least reduce the discrepancies.

It is understood that some have objected to the plan because of possible errors in car numbers and initials, claiming the car accounting officers fortify against these errors by comparison with the car's previous movement on its line. The fear is also expressed that there would be an increased expense for post cards. Grant that where the interchange report is so unreliable as to need verification in the car accounting office before the junction card may be safely issued, it would clearly be unwise to omit that precautionary measure. But why not have reports that are correct? Are they not cheaper in the end? By specializing in this branch of work, the bureau can and does verify the interchange data while the eye is still fastened on the car rather than leaving it for the over-burdened car accounting office to do after the car is a thousand miles away. Since, therefore, the bureau's interchange report when rendered has been verified and is correct, in what way can it be unsafe to use that data in promptly notifying the car owner (whether a private line or a railway) to what railway his car has been delivered? And by no means is it a settled fact that the expense

for postage would be increased assuming the post is vital when measured against the time that would be saved.

One thing is certain the junction card could leave the bureau office as soon as the interchange took place and pattern, theoretically, on a tangent to the car owner. And why not let the advice to the owner go from Pueblo to San Francisco direct and cut out the 2,000-mile trip from Pueblo to Chicago and return?

At any rate let us try the idea in a small way, and then decide whether to abandon or extend it, as its merits deserve.

E. C. ROBERT.

Manager, Pueblo, Colo. Inspection and Interchange Bureau.

THE STATION AGENT'S UNPLEASANT WORK.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE.

In your issue of August 26 you have something to say of station cleanliness. It appears to me that neither the Baltimore & Ohio nor Mr. Paine has discovered the true reason for the difficulty in keeping stations clean; nor have you. The station agent is the representative of a large corporation. He must know something of the working of each department and its relations to the organization as a whole, and to the public. He must be a man of somewhat general education and capable of transacting the business of the company on an equal plane with other business men of the community. A man who can successfully do these things dislikes in the extreme to make himself a janitor and scavenger for all the town bums and drunks who loaf around his depot. He may have the "energy" suggested by Mr. Paine, but if he has any personal pride or dignity he will dislike being called from a back room, when covered with dust and dirt and ill-smelling water, to figure out a summer trip for Mrs. Home Banker, a very particular old lady.

The only way to maintain clean stations is to clean them regularly. An old box car, two or three men, a tub of water, a few brooms, disinfectants, and such appliances, carried on local trains from station to station would work wonders by the expenditure of a few hours at each station, and would cover quite a territory in sixty days. That would be about three times as often as most stations are cleaned under the present system of circulars from the superintendent's office. This same gang could also make minor station repairs, such as putting in broken window glass, repairing locks, and replacing loose boards in the platform. The expense of maintaining such a crew would be many times repaid by the good will of the agent and the community.

AGENT.

IDENTIFICATION OF TRAINS.

Chicago, August 27, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The subject of train identification is one which materially affects safe operation and is worthy of discussion. Most methods now in use employ the engines' numbers or conductors' names, or train or engine numbers displayed on the cupola of the caboose. These leave much to be desired. It is rather curious that with all the attention that has been given to the standardization of train rules and other items of operation, the roads in general still depend largely on chance and guesswork in this important matter. While many roads have adopted some sort of device, the majority depend on the crude methods of identification in use 50 years ago.

The Train Despatchers' Association has given this subject some consideration, and in its 1909 convention adopted the report of the Committee on Train Rules on the desirability of some method for providing positive identification. It does not appear, however, that this action has produced any result, possibly because of the fact that the Train Despatchers' Association is not regularly affiliated with any of the "legislating" organizations of officers.

While there has always been need of some better system, the

necessity seems to increase with the specialization of service, and higher speeds in both passenger and freight service. It is true that with the advent of double track there has been a reduction in meeting points, but this has been more than offset by the abandonment of schedules and the substitution of extras in double-track operation. And under the extra system, simple train numbers have given place to lengthy designations such as "Extra West 7669," rendering identification more difficult and increasing the liability of error.

The necessity for more distinctness in indicators is being recognized in many ways, and a great deal of thought and money has been expended on the improvement of headlight numbers, signal lamps, semaphore arms and the like.

I remember when, as a telegraph operator at an interlocking tower, I was reprimanded for running a "fast freight" in behind a couple of slow drags, due to an error in identification. My excuse was that I "supposed" the fast freight to be behind a train of coal; but the coal train had slipped in on a blind siding to let the fast train by. The fast train got stuck for a passenger, and the delay was 40 minutes. I was told that "supposing is not railroading"; but I knew from experience that if my supposition had proved correct, it would have been merely "good judgment."

It is told of a "student" of railroading who observed an odd numbered engine going east, while his time card said eastward trains bore even numbers, that he propounded the query, "Why don't they run their even engines East, and their odd engines West?" This led to the suggestion by a more practical man that the engine numbers be disregarded so far as train movements are concerned.

As a basis from which to work out a uniform system of identification, I would suggest the following plan:

Affix to the front of the engine an identification device equipped with lights and supplied with changeable number and letter stencils that would provide a clearly visible identification signal either in daylight or at night. This could also be used as a classification signal, and as a "schedule fulfilled" signal, which is also something that is badly needed. As an additional check this device could be duplicated on the cupola of the caboose.

The train numbers, whether scheduled or extra, should be as short as possible, to avoid confusion in identifying rapidly moving trains.

Extra trains, instead of bearing the engine numbers, should be assigned by the dispatcher from a series that would not conflict with scheduled numbers, the odd and even extras to conform to their direction. Work extras that might run in either direction on one order could be given alphabetical designations such as "Extra A," etc.

This is certainly a matter of sufficient importance to engage the attention of the Committee on Train Rules of the A. R. A. The theory on which such serious thought has been expended on the Standard Code of Train Rules is that where there is room for doubt there is danger; and if there is any point in everyday operation in which there is a larger element of doubt than in the question of train identification, it has escaped my notice in some 17 years of railway service.

TRANSPORTATION.

[There appears to be a decided difference of opinion among railway officers as to whether train indicators are necessary; but there ought to be no difference as to the desirability of making the indicators, if they are used, large and easily readable under the most unfavorable conditions, day or night. As a measure of safety, indicators should be more and more useless, year by year, for with the extension of the block system the engine at the front end and the markers at the rear become the only "indicators" necessary. The class of a train is immaterial. As a matter of convenience, however, for station men, trackmen and men in charge, at other trains the most complete identification is desirable. What degree of care and expense is justifiable to accomplish this?—Editor.]

TRANSPORTATION AND TRAFFIC IN ITALY.*

BY LOGAN G. M'PHERSON.

The area of all Italy is 114,409 sq. miles, about 6,000 sq. miles less than that of Great Britain and Ireland. The northern part, bordering Switzerland and Austria, has attained a considerable development in manufacture. The central reach of the peninsula is divided longitudinally by the Apennine Mountains. On either slope of the range are farms. Agriculture and the raising of fruit are prosecuted to the south in the plains of Calabria and on the Island of Sicily.

In northern Italy are lakes Maggiore, Como, Lugano and Garda, which are navigable, but the traffic is principally of passengers, the freight boats carrying only from 5 to 40 tons each.

The rivers of Italy are little used for navigation except the Po and the Adige and the few other streams in the plain between the Apennines and the Alps, all of which flow into the Adriatic. The Po is navigable for 368 miles, a much larger reach than is available on any of the other rivers. The Arno and the Tiber, flowing into the Mediterranean, are used but for short distances, as are also a few other unimportant streams in Tuscany and the Campania, farther south.

In the construction of artificial waterways Italy was in advance of the other countries of Europe, canals having been built in the eleventh and twelfth centuries, mainly to connect the rivers and lakes of northern Italy. At about the same time Venice was improving her rivers and building canals, as were Bologna, Ferrara, Padua and Modena. A network of waterways was thus formed throughout northeastern Italy, which was used not only for navigation but for drainage, irrigation, protection from inundation and production of power. Two smaller canals were built tributary to the Arno and the Tiber, but they have never been of a great deal of use. The existing canals are substantially the medieval network. As their depth rarely exceeds six feet and the water is mainly used for other purposes, they are in but small measure available for navigation. The traffic has been decreased in the last fifty years, being estimated at present as about 5,000,000 tons. The navigation is principally by boats drawn by animal power, although in recent years a few boats have been placed in use that are propelled by steam or gasoline engines. The waterways leading from the higher ground were once largely used for the floating of lumber, but in the last thirty years this has greatly diminished, the traffic going principally by the railways.

The total length of the navigable waterways of Italy is about 2,000 miles, of which the rivers and canals of northern Italy connected with the Po constitute nearly 1,500 miles, and the navigable canals about one-third of the entire length. The control of the waterways is under the ministry of public works, exercised through the director general of waterways. The state bears the expense of maintenance of the waterways that are of general navigable use, and also aids the provinces in the maintenance of purely local waterways, which is also shared by various associations of those particularly benefited.

No tolls are charged for the use of lakes and rivers; tolls are charged under special laws for the use of certain canals. At the time of the introduction of railways attention was directed toward the development of these enterprises, the waterways for a time almost disappearing from the budget. Capital expenditures have never been resumed to any great extent, but the expenditure borne by the government for maintenance averaged about \$240,000 per year from 1874 to 1901.

At the time of the introduction of railways Italy was occupied by a number of separate states. The first railway in the peninsula was built under concession of the Neapolitan government in 1836. It extended for but 32 miles, from Naples to two towns in the vicinity, and was not completed until 1860. In 1837 concession was granted for a line between Milan and Como, which was completed in 1849. These lines answered the purpose of pleasure travel rather than any commercial need. In 1842 the

*A preliminary report to the National Waterways Commission.

kingdom of Naples entered upon the construction at state expense of a line extending for about thirty miles to Caperta, where was the king's palace; and to Capua, the site of an important fortress. Another road undertaken by the State was completed for about 20 miles.

Railways really intended to answer the needs of commerce were first begun in Tuscany and Lombardy, under the auspices of the Austrian government, then the sovereign of these provinces. The first line was that covering the 180 miles from Milan to Venice, completed in 1857. It was begun under a concession, but taken over and completed by the government, which desired its construction for military ends. Austria also built directly another line or two in its Italian provinces and then brought about an agreement between the different states for the concession to a private corporation for a line through central Italy. The concession was for 100 years, the company was granted exemption from taxes and duties, as well as a guarantee of 3 per cent. interest on the capital, the amount of which was not stipulated. Because of the unsettled conditions due to the Crimean war, the company was unable to obtain capital and in other respects demonstrated its incompetency. The governments concerned conceded the lines to another company, which by the time of the war of Victor Emmanuel and France with Austria had made much progress. Parma and Tuscany had also made concessions for lines to private companies, which in many cases were unable to carry out their contracts, becoming bankrupt and applying to the states, which made further concessions. Piedmont granted a concession to a private company for the building of a line between Turin and Genoa, which was opened in 1854. To other lines the state of Piedmont extended pecuniary assistance, in some cases by way of capital subscription, in others by guarantee of interest and in other cases by taking over the lines and agreeing to operate them for 50 per cent. of the revenue. The state of Rome also made concessions to private companies which were delinquent, often engaging in speculation instead of construction. This in one case led to the disappearance of the cash, which was followed by the chief culprit being sent to jail. The company was saved from bankruptcy by the government, which desired railway communication with two neighboring provinces which it had just annexed.

The Italian kingdom thus found its railways in various tangles. At the meeting of the first Italian Parliament, in 1860, there were in operation in the whole of Italy 1,308 miles of railway and another 1,245 miles were in course of construction or under concession. The lines were mostly in small and incomplete systems that were not connected one with another. The new government, therefore, to unify the railways, found it necessary not only to continue the existing projects, but to connect the different systems. Because of the different conditions under which they had to be constructed and of the different companies and concessionaires that still had rights to be respected, this was of exceeding difficulty.

Guarantees made by the Austrian government to the lines in Lombardy were continued and further privileges accorded which permitted the extension of the lines. Further concessions were made to other private companies. Within two years from the installation of the new government 257 miles of new lines had been constructed. In its anxiety to assure the people that it intended to provide for their needs, the government made many unfavorable concessions, some of which it was later obliged to take over and complete. For example, English capitalists who had obtained a concession for lines in the province of Genoa were unable to carry out the contract and forfeited 500,000 francs (\$100,000) which they had deposited as guarantee.

By 1863 lines were completed to a length of nearly 2,200 miles, and others were projected or under construction for nearly 2,600 miles, calling for a capital of not less than \$200,000,000.

Because of the political and financial conditions in general and because the concessions had been distributed among a great number of companies, capital was very difficult to obtain, securities being often negotiated at far less than their face value. The government finally decided that it would be better to combine all

the projects toward unification of the entire Italian railway system. A company was formed for the purpose, but there was ceded to it only a fraction of the lines, difficulties arising in connection with the transfer of the others. Other projects proposed for the cession of the state lines to private companies were likewise without success.

A commission was finally appointed to devise a plan. Its report, favoring the purchase of the lines, brought about a long discussion in Parliament, which resulted in the law of 1865. This provided for the cession of the railways to four companies. The Company of Northern Italy took the lines of Lombardy, Piedmont and Venice; the Company of Tuscany the lines of Tuscany, the Roman provinces and Liguria; the Southern Company the lines to the south of Rome as far as Calabria; the Victor Emmanuel Company the lines of Calabria and Sicily. The Sardinian railways were ceded to a fifth and separate company. This was a very expedient arrangement for the government, as it brought in \$40,000,000 in cash at a time when it was badly in need of money and would have been obliged to increase its outstanding loans upon very unfavorable terms.

The various lines had been so distributed that there would be a certain competition between one system and another. Although the building of lines by the state had practically been brought to an end, the government continued to assume a certain responsibility in helping the private companies to meet their obligations under previous contracts.

It was hoped that the arrangement would endure for many years, but these hopes quickly fell because of the inherent weakness of two of the companies, and because of the financial stress imposed by the war of 1866 with Austria. The companies could not obtain needed additional capital. The government was called upon for subventions not yet due, but which it was obliged to pay, as it could not afford the national discredit that would follow upon the ruin of the railway.

The company operating the lines in Sicily and Calabria could not meet its obligations and the concession was annulled by the government in 1867. The company operating the lines in the Roman provinces and Tuscany next got into trouble. In 1868 the state relieved it of further responsibilities in connection with the Ligurian Railway and bought back other portions of the lines that had been ceded to it. Inasmuch as the government could not raise the \$9,000,000 required to complete this purchase it turned the lines over to the more prosperous company of the north. The company operating the lines to the south of Rome had also become involved, making necessary heavy drafts upon the national treasury. In the face of increasing disaster to one company after another, expedient after expedient was adopted by the government until finally in obedience to growing popular sentiment that the ownership and control of all the railways should be vested in the state, it determined in 1875 to repurchase the lines, even including those in the north of Italy that had been fairly prosperous under the concessionaire company. In 1876 the greater part of the Italian lines that but eleven years before had been ceded to private corporations were again in the hands of the government, and negotiations subsequently completed with the Austrian government secured to it complete ownership of the northern lines. At this time there were about 5,000 miles in operation.

The lines of the peninsula were divided longitudinally into two systems, the Mediterranean and the Adriatic, the Sicilian lines being operated separately. One ministry after another took up the question of the extension of the railway system, and in 1879 a law was passed authorizing the expenditure of \$252,000,000 for the construction of supplementary lines which were to be operated by private corporations. A project brought forward in 1879 for the cession of the Mediterranean and Adriatic companies to private corporations was finally consummated under an arrangement whereby the government received a rental of \$9,000,000 a year.

The government had made and continued to make large appropriations for the supplementary lines. These had been badly surveyed. A multiplicity of offices had been created and filled

with incompetent incumbents whose conflicting opinions led to general mismanagement. Construction had been inaugurated that vastly exceeded the appropriations and there was finally a general investigation. In 1884 revisions were made in the plan of operation of the Mediterranean and Adriatic systems, and capitalists of Sicily were brought into the administration of the lines of that island.

The matter of extending aid to the railways came up at every session of parliament. One appropriation after another in which the participation of provinces and communities was enlisted was made for repairs and improvements and for the purchase of rolling stock. By 1899 the governmental subvention to the supplementary lines amounted to from \$1,200 to \$1,500 per mile, but with all the assistance that they received these lines were not completed and a royal commission was appointed to devise ways and means.

Large expenditures had also been made upon the lines in Sardinia, for the construction of the Mt. Conis, St. Gothard and Simplon tunnels and the approaches thereto.

The capital expenditure given by the government as having been made up to June 30, 1903, was \$980,000,000. This covered 10,320 km., making the average over \$95,000 per mile. The total expenditure of the government for initial capital, guarantees of interest and subventions to this time amounted to very nearly \$1,300,000,000, not including the payment to be made in annual instalments until 1954 of the \$600,000 due to the Austrian government on the purchase of the railways of Lombardy. The annual payments for which the state had made itself responsible on account of the railways approximated \$50,000,000, which was about one-seventh of the annual revenues of the kingdom. As an offset, by way of taxation on transport, upon the holders of railway bonds, upon the salaries of railway employees, and from savings by transportation performed gratis or at reduced rates on government account, the state received an estimated annual total of over \$20,000,000. To meet its obligations in connection with the railways it has had to resort to financial operations which occasioned severe loss. For example, one issue of securities of a face value of \$200,000,000 brought less than \$126,000,000.

The situation was going from bad to worse. Although the concessionary companies had paid dividends that in some cases had been as high as 7, and in others as low as 3, per cent, they had been able to do so more by the aid of the government than by the earnings. On April 22, 1905, a law was passed providing for the resumption by the government of the lines of the Mediterranean, Adriatic and Sicilian companies and of certain minor lines. This law decreed a provisional organization to take effect July 21, 1905. On July 7, 1907, was enacted the law for the organization of state operation of the railways not granted to private corporations, which is substantially that in effect at this time. It provides that lines may be taken over by the state when their concessions have expired by royal decree upon advice of the Council of Ministers and with the approval of parliament. In other cases the assumption of state operation or the extension of corporate operation is to be authorized by special enactment.

It was desired to make the administration of the railways free from political as well as financial influence. They were, therefore, placed under the direction of a director general, who is appointed by the king upon nomination of the council of ministers. There is a council of administration, composed of eight members chosen in the same manner. Two are high railway officers, three high officials of the state and three citizens of administrative capacity. This council approves proposals for extensions, purchases and contracts; authorizes litigation; directs the disposition of rolling stock and track and station adjustments at junction points. It passes upon appointments, promotions, increases of salary, dismissals and retirements. As the minister of public works has the power of veto at the actions of the railway administration council, it is evident that the freedom of the railway administration from political influence is nominal rather than actual.

The director general passes upon proposals and contracts and

decides other matters in which the amount involved does not exceed \$1,000, \$2,000, or, in some cases, as much as \$10,000.

There are two assistant directors general, having prescribed duties. There are twelve central bureaux, each in charge of matters pertaining to a particular line of administration. The immediate operation is conducted through ten divisions, each in charge of a division director, each of whom has three assistants, dealing respectively with matters pertaining to traffic, operation and maintenance. Changes in the tariffs are made by royal decree upon the recommendation of the minister of public works after they have been agreed to by the ministers of the treasury, agriculture and industry following the deliberation of the council of administration. After a tariff has remained in effect a year it is presented to parliament to be enacted into law. Special and temporary reductions in rates are allowed under contract with individual shippers by the director general, with the approval of the minister of public works and the agreement of the minister of the treasury.

A general board of traffic works out the details of propositions for changes in rates and gives advice upon all subjects submitted to it by the minister of public works and by the administration of the railway. This board is composed of three representatives of the state railways, who are appointed by the railway administration, of functionaries of the various ministries chosen by the minister of public works; of representatives of the steamship companies, the tramways, the chambers of commerce, the agricultural societies, the railway employees, the political press and eight other members chosen by the minister of public works because of their expert knowledge in connection with railways.

There is also a traffic board connected with each of the ten directions which studies matters and makes recommendations in connection with the local tariffs, the local time-tables and the needs of the local traffic.

When the state came into control of the railways in 1905 it made great reductions in the passenger fares, introducing the tapering tariff. It also made considerable reductions in the freight rates.

For the last year of operation by the companies in 1904-05, covering 7,510 miles, the total receipts were 357,466,038 lire (\$71,493,208); the total expenses, 291,887,831 lire (\$58,377,566), leaving the net revenue 65,578,207 lire (\$13,115,641). During the first year of exploitation by the State (1905-06), covering 7,000 miles, the total receipts were 351,993,309 lire (\$70,398,662); the total expenses, 291,702,735 lire (\$58,340,547); the net revenue, 59,290,574 lire (\$12,058,115). For the year 1907-08 for 8,345 miles the total receipts had increased to 473,128,768 lire (\$94,625,154); the total expenses to 429,769,944 lire (\$85,953,989), leaving a net revenue of 43,358,824 lire (\$8,671,756). The proportion of operating expenses to receipts increased from 68 per cent. in 1903 to 74 per cent. in 1908. The cabinet that went out of office toward the close of 1909 owed its failure partly to the fact that it had proposed a general increase in the tariffs of the railways.

Under the different regimes by which the railways have been conducted the freight tariffs have attained a complexity with whose intricacies, but few even of the railway officials are familiar. The underlying scheme perhaps resembles more nearly that of Belgium than any other country. The simplification of the tariffs is one of the tasks that confronts the railway administration. In its scheme of accounts the government does not charge to the railways the cost of the existing plants. They assume, however, the interest on \$106,000,000, the amount in which the government was indebted to the private companies and which was included in the payment made by it at the time of purchase.

It is argued by the supporters of state operation that the companies in the last two years of their existence allowed plants and equipment to deteriorate, ran but few trains and at slow speeds, gaining large profits because of the great volume of business, the whole of which they were not able to handle; that the state has increased the number and speed of trains and radically improved the service, to the general satisfaction of the people, while having to face the increased cost of materials and supplies that has pre-

valued in Italy as well as in other countries. Those opposed to state operation claim that it is bureaucratic and inefficient, that the number of employees has been increased far beyond any need, that the purchases of material and expenditures generally have been utterly beyond reason, and say that with a vastly increased equipment the net earnings should have increased instead of diminished.

As the needs of the Italian population are simple, their consumptive capacity is low. Because of this and the fact that the self-sufficiency of the community has prevailed throughout this country as elsewhere in Europe, the development of interior traffic has been a slow process. Imports and exports come and go through the seaports, of which there are so many that long hauls by rail are exceptional. The development of manufacturing in northern Italy and of the growing of fruits and vegetables in the south, as well as the production of wines, are, however, bringing a change in this respect, the sending of the products of the farms and vineyards to the north and the manufactures of the north to the south creating a reciprocal flow of traffic. The balance, however, is greatly in favor of the south, a large proportion of the cars sent north returning empty. To encourage the marketing of fruits, vegetables and wines in the northern countries of Europe the Italian railroads have made especially low rates on such shipments which are now generally carried in through cars to the places of destination. The cars in use for the most part have a capacity of 10 to 15 tons, attempts to introduce 20-ton cars not having met with success.

DOUBLE TRACK IN SOUTH CAROLINA.

The eighteenth state to be dealt with, in our series of maps of double track railways, is South Carolina, which is shown in the accompanying drawing. The only lines of more than one track



Double Track Railways in South Carolina.

that we can find are the following, double track: Atlantic Coast Line, Charleston to Ashley Junction, 6 miles; Southern Railway, Charleston to ———, 6 miles, and Spartanburg to Spartanburg Junction, 2 miles.

DEVICE FOR MARKING TARE ON CARS.

On the Atchafalaya, Toledo & Santa Fe the tare is marked on freight cars by means of metal figures instead of by painting, and the new method obviates the delay incident to painting and also saves the cost and bother of switching to the painters' track. The method was described by Mr. Mosely, assistant general



Metal Numbers for Marking Cars.

freight agent of the road, at the recent meeting of the Association of Transportation and Car Accounting Officers at Colorado Springs. The device consists of a metal holder, 8½ in. wide and 7½ in. high, nailed to the side of the car. The light weight of the car, together with the name of the station at which the

weighing is done, and the date, is then set up in metal figures in an interchangeable filler which is inserted in the holder, and all of the letters and figures show through the openings made in the metal holder.

The scale ticket bearing the information from which the filler is set up is made in triplicate, and one copy is placed within the filler, where it is protected from rain, and goes with the car; thus it is possible at any time to compare the marks on the car with the ticket, which is the original record. Additional information regarding special conditions under which the car was weighed, such as wet weather, can also be noted on the scale ticket.

The light weight marks with the ticket hidden behind them are made secure from tampering by sealing with a self-locking progressively numbered seal or by the ordinary car seal, the wire or strip being

fastened through the holder and the interchangeable filler.

With this device the light weight marks may be placed on cars without delaying them. The weighmaster may set up in advance the station symbol, the number of the month and the

year, leaving only the first three tare weight figures to be set up after the weight has been ascertained. This process requires but a few seconds time; and as soon as the holder has been sealed the car is ready for service, eliminating entirely all delay incident to switching to the paint track, the painting out of



Marking a Santa Fe Freight Car.

the old numbers, the application of the new marks and the detention necessary for drying. In addition to this, the possibility of error is greatly reduced because of the fact that the stenciling is done in conjunction with the weighing, and the responsibility is centered in the authorized weighmaster, eliminating the present divided responsibilities existing between the station and the car department employees.

NOTES ON WOOD PRESERVATION AND CREOSOTE PRODUCTION IN EUROPE.*

BY E. A. STERLING.

The first comprehensive manual in English covering the preservative treatment of wood in a broad and practical way, and embodying the results of both American and European experience, is yet to be written, so we must depend for the present on the fragmentary information available.

To discuss even the fundamentals of the timber-treating business would lead beyond the limits of a brief paper, and in addition would be a recapitulation of what is already familiar to most engineers; so the author will try to confine himself to actual observations made while in Europe last fall, and these even will be very incomplete, for the whole field could not be covered short of several years' investigation.

The preservative treatment of timber is almost universally practised throughout Great Britain and all the countries of western Europe; the most intensive application of the work being in England, France, and Germany, although much treated material is used in Belgium, and the work is being taken up on a large scale in Italy, Norway, and Sweden. The material treated includes railway ties, mine props, construction timbers which are exposed to the weather, fence posts, telegraph poles, grape stakes, etc.

The Germans probably have more to teach us than any one else, for they have experimented with a greater number of

preservatives and processes and are still working more or less along experimental lines. The French roads, on the other hand, have perhaps achieved the most substantial results, since they have long been advocates of straight creosote and have injected into the wood all that it would hold. The English roads have also been consistent users of creosote, and although they have experimented with other preservatives, the general practice has changed but little in recent years. Out of a total of 70 treating plants in the western countries of Continental Europe, 47 are in Germany, 14 in France, and 9 in Belgium. Of this total, 14, or 20 per cent., are railway plants, the remaining 56 being under private control, although much of their work is done for the railways and for the government telegraph and postal services. By countries, the 9 plants in Belgium are all private, while 6 out of the 47 in Germany and 8 out of the 14 in France, or 12 per cent. and 58 per cent., respectively, are owned by the railways.

It is known that Europeans have been achieving definite results in timber treatment for half a century, and it is therefore rather disappointing to find the mechanical equipment at their treating plants far inferior to the newer and better equipped plants in this country. Owing to the cheapness of labor, they have not learned to use mechanical devices to facilitate the handling of material in and out of the cylinder and in the yard, and practically everything is still done by hand in a way which in this country would appear slow and laborious. Their cylinders, as a rule, are small, and the doors heavy and cumbersome and slow to operate. The machinery is usually in keeping with the cylinders, and the pumps, etc., rarely have the capacity of those in this country. In one respect, however, their plants excel American, in that the buildings are usually of substantial brick construction and the heads of the cylinders are entirely shut off from the operating room.

The railways of Germany are naturally the largest consumers of treated material in the empire, and their policies reflect the general tendencies of the country. Nearly all of the roads are owned and operated by the states, and consequently there are a number of separate railway organizations, all controlled to an extent by a central committee which insures through traffic arrangements and somewhat uniform policies, although each road is independent in matters relating to wood preservation. The Prussian State Railway is the largest and most influential, and in the maintenance of some 25,000 miles of track uses from four to five million ties annually, about 40 per cent. of which are of metal. In the whole of Germany about eight million ties are consumed yearly, about 70 per cent. being wood.

It is in connection with the preservation of sleepers by the Prussian State Railway that the most striking recent change in policy has taken place. Zinc chloride, either alone or in mixture with creosote, has been extensively used, but during more recent years the full-cell process with straight creosote has been practically the standard, and many ties treated in this manner are now in track after twenty-five to thirty years' service. Despite these excellent results, however, an open-cell treatment of less certain value is being substituted for the full-cell process, the prime motive being the saving in initial cost resulting from the use of smaller quantities of creosote per sleeper. This so-called open-cell process adopted is covered by the Reuping patent, and although sound in principle and of practical application, it has not been thoroughly tried out from the standpoint of eliminating decay.

The Prussian State Railway has only two plants under its direct control, one at Northheim and the other at Zernsdorf; but there is a total of twenty-six plants in the state of Prussia which do work for the state railway.

Much of the railway treating work is done by the Rutgerswerke, a large corporation which owns and operates fourteen treating plants in Germany and several tar distilling works, as at Rauxell, Berlin, and Mannheim-on-the-Rhine. This company originated the so-called Rutgers process, which is a treatment with a mixture of zinc chloride and creosote, and for several years treated sleepers and other timbers by this method and also

* Paper presented before the Engineers' Club of Philadelphia, February, 1919.

with zinc chloride alone. It was found, however, that the zinc chloride, either in mixture with creosote or separately, leached out rapidly, failed to give adequate protection from decay, and from the railway standpoint was unsatisfactory, because it caused the corrosion of spikes, plate, and rails in contact with it. Since their own process proved unsatisfactory, the Rutgerswerke has acquired the right to use the Reuping patent, and is rebuilding several of its plants so as to treat by this process. The Prussian State Railway, in turn, has accepted the Reuping treatment, and practically all of their work is being done by the Rutgerswerke. Although the Reuping patent has been in force only six or seven years, the Prussian State Railway engineers seem to have concluded that this treatment gives as deep a penetration as is possible by any method, is permanent, does not corrode metal which comes into contact with the treated wood, and that the saving in oil—and therefore in cost—justifies the change on grounds of economy as well as efficiency. Beech ties which were treated with 36 to 49 kilos [79 to 88 lbs.] of creosote by the full-cell process are now to be given a treatment of 16 kilos, while pine ties will be impregnated with 7 kilos, although 18 and 9 kilos, respectively, were recommended by the Rutgerswerke.

Another treatment which has been used to considerable extent in Germany, and of which little has been heard here, is the so-called creo-air process. This process eliminates the initial air-pressure, and the amount of creosote desired per cubic foot, plus what will be drawn out by the final vacuum, is forced in. The pressure is then released, the oil blown back, and the oil which remains in the outer layers of the woods is distributed by an air-pressure running up to 175 pounds.

In addition to the two plants owned and operated by the Prussian State Railway, the state railways of Bavaria control one treating plant at Kirchseeon; the roads of Saxony, one at Walkwitz and another at Falkenstein; and the Wurtemberg Railway, a plant at Zuffenhausen. Creosote is coming to be the standard preservative of all of these plants, as well as at most of the private plants, although mercuric chloride and zinc chloride are still used to some extent.

The plant of the Bavarian State Railways, at Kirchseeon, near Munich, has a capacity of about 600,000 ties a year, most of which are Scotch pine received by rail from the north, since Kirchseeon is in a Norway spruce region and very few treatable ties are produced locally. Occasional shipments of beech and oak are received, but they make up a very small percentage of the total. The creosoting equipment consists of three cylinders, each about 6 ft. in diameter, one being 40 ft. in length and holding five cylinder cars, and the two others about 32 ft. long and holding four cars. Two of the cylinders are side by side and are operated by one set of machinery, while the third is in another part of the yard and is operated separately. An interesting feature of the single cylinder is that the boiler is directly underneath it, the aim being to utilize the heat from the boiler in helping keep the cylinder warm. The mechanical equipment, from the American standpoint, is quite inadequate, one feature being the absence of oil-pressure pumps of any considerable size; while all of the machinery was found to be out of date and of insufficient capacity for rapid and effective work. All of the ties are thoroughly air-seasoned before being treated, and the hewn hardwoods are run through a primitive adzing machine operated by hand, in order to surface the portion of the ties under the oil. The average treatment requires about four hours, and the process consists of an initial vacuum, followed by the introduction of the oil; then an air-pressure of two atmospheres, which is held for about half an hour; the pressure is then dropped to zero, followed by another air-pressure of nine atmospheres, which is held for two to three hours; while at the end a slight vacuum is produced. The name of the process could not be ascertained, and it is likely a local treatment based on the experience at this particular plant. In addition to the pressure creosote treatment, a small number of ties were being treated with mercuric chloride by a non-pressure process, the solution

being placed in a long series of open tanks into which the ties were introduced and kept submerged for about 24 days.

The most interesting features of the Kirchseeon plant are in connection with the yard, which is large, well laid out, and provides storage capacity for nearly 1,500,000 ties. A distinctly up-to-date feature was the use of an electric moving platform running transversely across the yard and bisecting all of the narrow-gauge yard tracks at right angles. The cylinder cars are loaded at various points in the yard, run down to and upon the moving platform by hand, and transferred bodily to a point near the treating cylinders; then on to a turntable, where they are turned and run upon a track leading to the cylinders. Here, in striking contrast to the electric platform, is a hand windlass with which the trains are pulled in and drawn out of the cylinders. Two sawmills are located in this same yard and are operated in connection with the plant. Pine timber which comes from northern points is received in the log and these little mills saw this round material into sleepers and lumber. The close utilization practised in these sawmills would be a revelation to our lumbermen, every piece of wood being converted into some usable material; even fine inner bark was being shredded and shipped away for packing purposes. As a final provision for getting the most out of everything, a large dry kiln is maintained, in which lumber which would suffer from air seasoning is taken care of.

The plant of the Rutgerswerke at Custrin, near Berlin, is equipped with three cylinders, each about 6 ft. in diameter and 30 ft. long. This is one of the plants which has been equipped for the use of the Reuping process, and most of the charges are given this open-cell treatment; although the creo-air process is occasionally used. The capacity of the plant by the Reuping treatment is about 3000 ties per day, the time required to put through a Reuping charge being about one and one-half hours, as against one and one-quarter with the creo-air process. Ties are treated for the Prussian State Railway and telegraph poles for the Imperial Post-office Department. The timber used is practically all pine, which is rafted down the Oder or Wartha rivers from the Baltic region. The ties are transferred rapidly from the river to the yard by a pair of endless chains, corresponding to the jack chains in a sawmill, which operates up the river bank at an angle of about 30 degrees and drops the ties into cars at the edge of the yard. In the yard the ties are piled by the 1 x 7 system and allowed to remain until thoroughly seasoned. The dimensions are 6½ in. x 10½ in. x 8 ft. 10 in. for No. 1 ties, and 5½ in. x 9½ in. x 8 ft. 10 in. for No. 2 ties. The treatment by the Reuping process penetrates the sap entirely, but forces no oil into the heart; while the creo-air process does not even completely penetrate the sap. In the treatment of the seasoned ties, the aim is to leave in about 7 kilos of oil per tie by the Reuping, and about 6 kilos by the creo-air process. The yard at Custrin presents no features of particular interest, the cylinder cars being transferred to the cylinder on a small moving platform drawn by a horse. The movement of the trains in and out of the cylinder is by means of a steam hoist and cable. All of the ties are surfaced before treatment and cut to a uniform thickness under the rail by a machine which automatically adjusts itself to any minor variations of thickness between the two ends of a tie.

The Rutgerswerke two-cylinder plant at Stendel was one of the most interesting visited. The mechanical equipment is better than at most of the European plants, and the results obtained in the treatment of beech—which is the only species used—are excellent. The air-seasoned beech ties are treated by the so-called "double Reuping" process, the absorption being about 16 kilos per tie and requiring about seven hours for each charge. The penetration by this process is practically complete for about two feet on each end of the tie, while a cross-section from the middle of the tie usually shows only two or three small spots which have not been touched by the oil. It is noticeable that the penetration was somewhat more complete in ties which had been treated and stored in the yard for some weeks than in those which had just come out of the cylinders; this being due

to the gradual absorption of the oil by the untreated portions upon cooling.

It is quite generally admitted, even by the advocates of the Reuping process, that conclusive data regarding the relative value of the full- and open-cell treatments are not available, because the latter has not had the test of time. In order to hasten decay and obtain quicker comparative results, a very interesting "fungus pit" is maintained at Stendel, in which conditions favorable to the decay of test pieces of treated and untreated wood are created, and definite series of experiments are carried on to determine the relative efficiency of different processes. The decay chambers are underground in what amounts to a cellar with concrete walls and floor, underneath a small brick building which is used for a museum and laboratory. This cellar is partitioned off into four small rooms, one containing the heating apparatus, another being used for the propagation of various species of fungi, and the other two as test rooms. The temperature in the decay pits is maintained at from 63 deg. to 70 deg. F., and moisture is provided for by pockets in the concrete wall and also by keeping a stream of water flowing between the concrete wall and a false wall of brick. The wood-destroying fungi are propagated in zinc-lined boxes on small blocks of wood, which are used as needed for infection purposes by placing them in contact with the test pieces in one of the other rooms, the fungi on the infected pieces developing through the dissemination of spores or by the direct growth of the hyphal threads. The conditions produced in this way are so favorable to the decay of wood that untreated pine rots entirely away in seven or eight months, thus giving comparative results as between treated and untreated woods, and between different methods of treatment, in a very short time.

In France there have been no recent changes in the methods of treating railway timbers, the full-cell process with creosote being exclusively used, although for some years zinc chloride and other mineral salts were in favor. Open-cell processes and metal ties are condemned by most of the railways, and the conclusions are probably sound, because based in most cases upon actual experiments. The French state railway some years ago made extensive experiments in reducing the amount of creosote used per tie, but it was found that the ties decayed more rapidly, and the cheaper treatment was abandoned. Similar experiments have been made by the Paris, Lyons & Mediterranean with the same results, and the sentiment seems to be that the injection of large doses of oil will be the most economical in the long run, although the initial expense, of course, is materially higher. The latter road owns and operates two plants and uses the product from three private plants. The State Railway of France owns three plants; the Northern Railway of France, three; and the Eastern Railway, one.

The experience of the Paris, Lyons & Mediterranean is, perhaps, typical, this road using about 1,000,000 creosoted ties per year, mostly of beech, although small quantities of oak and pine are used. Creosote is the only preservative considered, and no untreated ties are put in the track. Their No. 1 sawed ties are 6 in. x 8½ in. x 8 ft. 8 in. The untreated ties, delivered at the treating plants, cost about 85 cents for beech and from 60 to 75 cents for oak and pine. With a 20 to 30-lb. treatment of creosote per cubic foot, beech ties give a life in track of from twenty-five to thirty years, the treatment costing from 45 to 80 cents.

The practice of the English roads in creosoting ties offers little that is new or instructive. With the exception of the London & Southwestern, which still uses the open-tank treatment, most of the roads treat under pressure and specify a full-cell treatment. The material used is mainly Baltic pine obtained from continental Europe. Very little experimental work is done, and, with the exception of 50,000 ties treated for the Great Northern by the Reuping process, little or no attempt has been made to economize in the use of oil by an empty-cell process. Most of the roads control one or more plants, but at the same time depend to a large extent on private concerns for creosoting their material. The general practice of renewing cer-

tain sections of track periodically instead of "spotting in" the ties, as is the custom on American roads, results in the fullest use of the creosoted ties. It is not uncommon for ties to remain in the track for ten years, when they are taken up and the majority used again in main-line track for another ten years, at the end of which time those which are in fairly good condition are taken up and put in side tracks. The result is that from twenty to thirty years' use is obtained from a considerable percentage of the creosoted ties.

The two main sources of supply of creosote are Germany and England, practically all of the other European countries deriving most of their supply from these producing countries, but mainly from Germany.

The German distillation plants which produce most of the creosote for the American export trade are in the coal and iron districts of Westphalia. The oil produced at the various works is shipped by barge to Amsterdam, Holland, or to Emden, Germany, where it is assembled in large shore tanks and thence pumped into tank steamers for export. The creosote produced in the plants of eastern Germany, Posen, and Silesia is disposed of locally or shipped to France and Italy. A German syndicate of tar producers and distillers practically controls the whole creosote industry on the continent. While the individual concerns making up the syndicate sell part of their output locally as they find a market, the greater part of the creosote produced is disposed of by a selling syndicate which represents the combination of producers and distillers. This selling syndicate entirely controls the export business, and the American consumer cannot hope to go into the German creosote market and bid for oil on a competitive basis. Fortunately, the standard set is high and the oil assembled for American trade is of uniformly good quality and is available at reasonable cost. It is obvious, however, that the German supply cannot long meet the rapidly increasing American demand, and it is not at all unlikely that there will shortly be a scarcity of creosote oil.

England is the only other European country producing creosote oil for export, and the situation as regards supply is somewhat similar to that in Germany. The London creosote is distilled almost entirely from tar produced at illuminating gas plants, whereas the "country oils" are derived largely from coke-oven tar, and, as a rule, are lighter and of poorer quality than the London oil. The tar distillation in England is not, as a rule, carried as far as in Germany, with the result that the percentage of solid naphthalene and anthracene is higher. The relative value of German and English oil for wood-preserving purposes is an unsettled question; the American consumers have rather decided opinions on the matter, so that the present demands for oil are somewhat equally divided between the two countries. Aside from the difference in general characteristics, there are undoubtedly more variations in the English oil than in the German, and the general market is in a more unstable condition. The British producers and exporters at the present time are working independently, with the result that there is keen competition and the prices fluctuate through rather wide limits in accordance with the amount of oil available at any particular time.

The importations of creosote oil into the United States, which in 1905 amounted to about 8,000,000 gallons, had by 1909 grown to nearly 10,000,000 gallons, or an increase of 100 per cent. Out of the total creosote consumption in this country of about 56,000,000 gallons in 1908, 69 per cent. was imported, while in 1903 the total amount used was only 7,700,000 gallons. This is an average increase of nearly 10,000,000 gallons per year, and it is certain that if this continues at anything like the present rate, there will be a serious shortage of creosote in a few years. The supply in both England and Germany is unquestionably limited, and although the output of the latter country can be increased by perhaps 50 per cent., part of this will have to go to local consumers and to other European countries. The ultimate solution of the creosote supply question should be home production. There is enough tar wasted in our beehive coke ovens

to furnish creosote for all consumers, and even now, if the tar output of American by-product plants was reduced, it would go a long way toward meeting present creosote requirements. The two principal factors responsible for the inadequate American creosote output to-day are the high initial cost of by-product plants and tar distillation works, and the lack of a market for some of the coal-tar products. The value of the creosote alone will not justify the distillation of tar, but American industry will not be maintaining its reputation if ways and means are not found by which the tar now produced or going to waste in this country can be made to yield the creosote and other coal tar products which are needed.

REINFORCED CONCRETE DEPOT AT GRAND PRAIRIE, TEX.

The question of economy in first cost is so often paramount when erecting stations and depots in small towns and cities that it is refreshing to note the character of buildings being erected by the Texas & Pacific, the station at Grand Prairie, Tex., standing as a good example. This structure is of reinforced concrete and is massive in appearance, as becomes a masonry building. The eaves are wide and the pitch of the roof low, the result being a building of pleasing architecture and suitable to a mild climate. While the first cost of this building is greater than that of one built of wood, it is practically indestructible, and, therefore the maintenance cost will be low. A concrete building rather improves in appearance with years, whereas a wooden building, such as would undoubtedly have been erected at this

point if precedents had been followed, deteriorates rapidly in appearance with age, and the maintenance cost continues to increase.

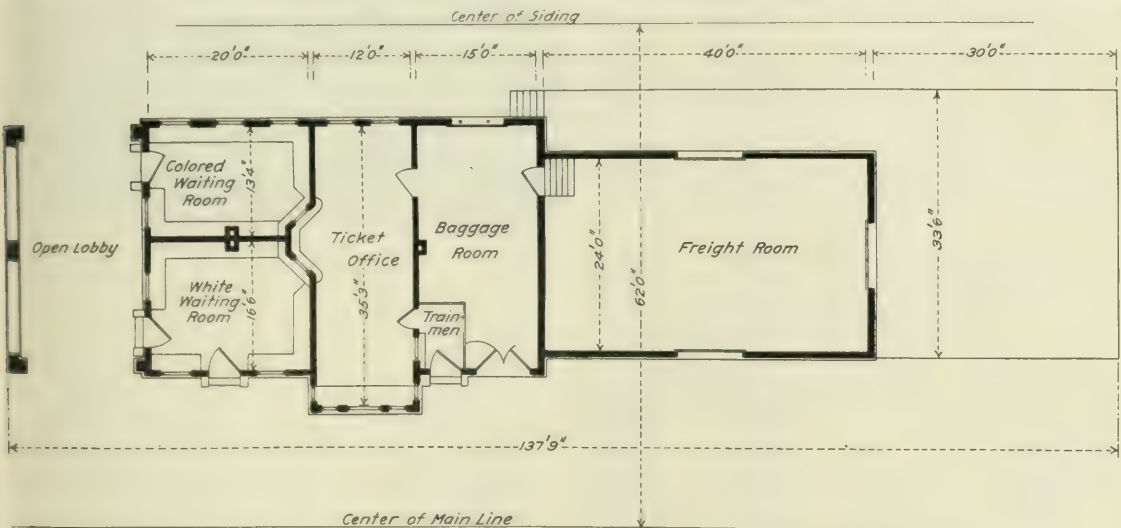
The total cost of the building at Grand Prairie was \$6,315. The concrete work in foundations, walls, columns and floor was



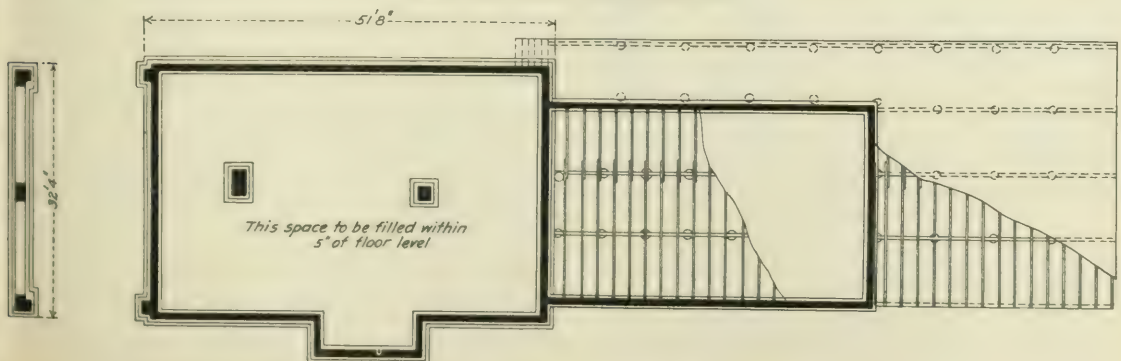
Station at Grand Prairie; Texas & Pacific.

done by contract for \$3,061. All other work, including painting, was done by company forces at a cost of \$3,254.

The walls are of reinforced concrete, cast in place, having 3/4-in. cold-twisted steel bars, placed horizontally and vertically on 18-in. centers, the concrete being composed of one part cement, two parts sand and four parts gravel. There is very little wood used in the building, the greater part being in the roof trusses and the freight platform; the wood used being long leaf pine.



Floor Plan; Grand Prairie Station.



Foundation Plan; Grand Prairie Station.

The roof covering is a metal shingle made by the company from selected metal roofing of dismantled cars.

We are indebted to B. S. Wathen, chief engineer of the Texas & Pacific, for the illustration and description of the building.

POOR'S MANUAL FOR 1910.

Poor's Manual of Railroads for 1910 (43d annual number) was issued this week. It contains 2,685 pages of text and is about 25 per cent. larger than the 1909 edition. The present number is devoted exclusively to statements of the railways and street railways, the statements of industrial corporations having been incorporated in a separate volume, "Poor's Manual of Industrials," a book of 2,300 pages, which was issued last May. The Manual this year appears in a new and very attractive type, larger and more legible than the type used in former editions.

A new feature of the 1910 edition is the large number of tables which will aid the reader in analyzing the financial strength and the operating efficiency of the important roads.

The editor finds the total length of steam roads on December 31, 1909, to be 238,356 miles, as against 232,046 miles on December 31, 1908, showing an increase of 6,310 miles.

The gross earnings for 1909 of the roads reporting, as shown below, were \$106,192,953, or 4.41 per cent. larger than in 1908, and the net earnings \$134,351,113, or 18.72 per cent. larger.

The following table shows the principal summary for all steam roads of the United States at the close of 1909, as compared with the close of 1908:

	1909.	1908.
Capital stock	\$8,030,680,963	\$7,641,913,086
Bonded debt	9,118,103,813	8,788,518,045
Other bonded obligations	393,497,799	804,455,084
Accrued liabilities	151,319,542	100,013,608
Miscellaneous liabilities	118,567,836	113,461,202
Bills payable and current accounts	933,646,991	940,361,739
Sinking funds, etc.	311,448,385	246,333,997
Profit and loss	919,823,188	831,298,538
Total liabilities	\$20,377,088,517	\$19,475,855,559
Cost of railroad and equipment	\$14,514,822,308	\$13,902,227,797
Stocks and bonds owned	3,084,387,008	3,012,575,029
Real estate and other investments	997,875,065	926,287,933
Cash, bills receivable and current acc'ts.	1,163,176,374	1,011,685,994
Material and supplies	213,124,839	224,781,368
Other assets	185,324,625	171,293,159
Sinking funds	177,859,392	122,313,373
Profit and loss	130,520,908	105,777,406
Total assets	\$20,377,088,517	\$19,475,855,559
Miles of road operated	1909.	1908.
Earnings—Passenger	237,867,79	228,285,73
Freight	\$378,243,601	\$375,246,516
Other	1,720,863,413	1,650,989,952
Total gross earnings	\$2,513,212,763	\$2,407,019,810
Net earnings	\$852,153,280	\$717,802,167
Other receipts	165,888,557	183,330,314
Total net income	\$1,018,041,837	\$901,182,481
Deductions: Taxes	\$90,790,949	\$82,357,619
Interest on bonds	318,755,456	304,475,354
Other interest	33,919,466	30,605,970
Dividends on stock	26,162,298	237,565,078
Miscellaneous	108,312,303	108,749,192
Rentals: Interest	34,406,772	36,308,746
Dividends	30,199,751	30,008,282
Miscellaneous	28,634,163	21,067,064
Total deductions	\$910,180,248	\$851,738,105
Surplus	107,861,589	49,444,376
Revenue per mile: Passenger	\$412,262,771	\$510,699,062
Freight	\$89,369,666	\$89,323,097
Miscellaneous	\$2,731,451	\$2,340,149
Total	\$1,141,364,168	\$1,132,362,308
Passengers carried	924,123,075	891,275,003
Freight mileage	29,896,152,301	28,988,676,148
Revenue per passenger mile	1.994 cts.	1.994 cts.
Revenue per freight mile	1.65 cts.	1.52 cts.
Revenue per mile	227,198,932,735	215,608,911,430
Revenue per ton mile	0.37 cts.	0.76 cts.

NEW YORK CENTRAL COMBINATION BUFFET, BAGGAGE AND MAIL CAR.

The accompanying photograph shows an interior view of the buffet portion of car 173, which was recently rebuilt as a combination buffet, baggage and mail car at the West Albany shops of the New York Central & Hudson River. This car is now in service on the Lake Shore Limited and on the Twentieth Century Limited trains.

The interior shown, finished in mahogany, is plain, and this, with the beam ceiling design, has the effect of increasing the large and roomy proportions of the compartment. The 19 large comfortable chairs, made at West Albany, are of mahogany to conform to the finish of the car. They are upholstered in green leather, which matches the carpet. The lighting is provided by concealed center and side electric lamps, power for which, with the lighting of other parts of the car, is generated by a 60-volt Gould axle-driven generator. The car is heated by the Ward vapor system and ventilated by eight Garland ventilators.

The car is 75 ft. 6 in. long, 10 ft. 1 1/4 in. wide and 14 ft. 8 in. high over all. It has a total weight of 136,700 lbs. The



Interior of Buffet Compartment.

passenger compartment is 27 ft. 9 in. long, and the baggage compartment 22 ft. 1 1/4 in.

The following additional special equipment is included:

Bath	Shower
Brakes	Westinghouse type I
Brake beams	Waxcott
Centering sleeve	Chatter
Couplers	Tucker
Door checks	Blount
Dust collector	Centrifugal
Draft gear	Miner spring
Oil boxes	Lavien
Platforms	Commonwealth steel
Slack adjuster	American
Step treads	Safety
Trap doors	Edwards steel
Window steel	Edwards
Wheels	Steel tired

EMPLOYER'S LIABILITY IN NEW YORK STATE.

The following is a synopsis prepared by the *Journal of Commerce* of the Employers' Liability acts which went into effect September 1 in the State of New York:

1. The "Fellow Servant" Rule is Greatly Modified.—The fellow servant rule of law, which relieved employers from liability for accidents caused by an act of a fellow workman of the injured workman, is amended so that hereafter the employer is liable for the act (causing an accident) of any person in his employ when such person is intrusted with any superintendence or intrusted with authority to "direct, control or command" any employee, thus greatly increasing the employers' liability, as it brings within the scope of the amended law a large percentage of all accidents.

2. "Assumption of Risk" Abrogated.—The amendment does

away with the rule of law of "assumption of risk," under which a workman by continuing at work with knowledge of dangerous or defective conditions was held to have assumed the risk and therefore was not entitled to recover damages resulting therefrom. This reversal of the old rules adds much to the employers' liability.

3. **"Contributory Negligence"—Burden of Proof Placed on the Employer.**—The rule of law (previous to this amendment) was that a workman who had been guilty of contributory negligence, however slight, in connection with an accident, could not recover damages for injuries, even though the accident was due in part to the negligence of the employer. Heretofore in all such cases the workman has been required to prove not only the negligence of the employer, but that he, on his part, was free from contributory negligence. The law as amended changes this rule and places upon the employer the burden of proving the contributory negligence of the workman. This amendment will be especially advantageous to the workman's family in death cases where the injured workman by reason of his death is unable to testify and may have been the only witness to the accident.

4. **Defects for Which the Employer Is Now Liable for Damages.**—The old law made the employer liable for damages arising from accidental bodily injuries caused by negligent defects in "the ways, works or machinery" used in his operations. The law is amended by the addition of the word "plant." This amendment makes the employer liable for many accidents to his workmen for which he has heretofore not been liable.

5. **Notice of Accident.**—The act amends the provision of the old law requiring specific service on the employer of a notice of the "time, place and cause" of the accident, by providing that unless such notice to the employer, if defective, is returned by the employer to the injured workman within eight days with a demand for a further notice, which demand must specify the particulars in which the first notice is claimed to be defective, the employer shall be considered as having waived all defects in the first notice. This new provision of the law practically makes any kind of "notice" legal notice.

6. **The Employer Is Made Liable for Injuries to the Workman of His Contractors and Sub-Contractors.**—The law as amended creates a new liability by making the employer liable to the workmen of his contractors and sub-contractors engaged in doing any part of the employer's work, for injuries caused by defects in the condition of the ways, works, or the machinery or the plant belonging to the employer.

New Doctrine of Workmen's Compensation.—The enactment of Chapter 674 entitled "An Act to amend the labor laws in relation to workmen's compensation in certain dangerous employments," which also goes into effect September 1, introduces in this country an entirely new doctrine as respects the liability of employers' to employees, the doctrine of "compensation" to injured employees irrespective of the question of negligence, as distinguished from the old doctrine of "damages" to the employee because of the negligence of the employer. This law specifies eight classes of employment:

1. The erection or demolition of any bridge or building in which there is, or in which the plans and specifications require, iron or steel frame work.

2. The operation of elevators, elevating machines or derricks or hoisting apparatus used within or on the outside of any bridge or building for the conveying of materials in connection with the erection or demolition of such bridge or building.

3. Work on scaffolds of any kind elevated twenty feet or more above the ground, water, or floor beneath in the erection, construction, painting, alteration or repair of buildings, bridges or structures.

4. Construction, operation, alteration or repair of wires, cables, switchboards or apparatus charged with electric currents.

5. All work necessitating dangerous proximity to gunpowder,

blasting powder, dynamite or any other explosive, where the same are used as instrumentalities of the industry.

6. The operation on steam railways of locomotives, engines, trains, motors or cars propelled by gravity or steam, electricity or other mechanical power, or the construction or repair of steam railway tracks and road beds over which such locomotives, engines, trains, motors or cars are operated.

7. The construction of tunnels and subways.

8. All work carried on under compressed air.

In these dangerous occupations, a workman injured from any cause due to a necessary or inherent risk, or to the failure of the employer, or boss, or a fellow employee to exercise due care, or to obey any law, shall receive half pay during his disability, beginning two weeks after the injury and extending not over eight years. If he is killed, his dependents shall receive a sum equal to 1,200 days' wages. If he has no dependents, the employer is to pay his necessary medical and funeral expenses, not exceeding \$100. The employer is excused from liability for deaths and injuries only in case of serious and wilful misconduct on the part of the employee. If an employee sues an employer under his previously existing rights, he loses the advantage of the new law; and if he sues for compensation under the new law, he cannot thereafter sue for damages under the old laws. The maximum disability benefit is \$10 a week and the maximum death benefit \$3,000. In computing the wages-rate of a man who is injured, regard shall be had, not only to what he was earning, but to what he will be able to earn after injury. An injured employee must submit to medical examination, at the expense of the employer, and to subsequent examinations, while disabled, not oftener than one in six weeks. An employer having compensated a contractor's employee may recover from the contractor if the contractor is liable, at law, for damages on account of the injury. The new law does not prevent an injured employee from suing a contractor or a sub-contractor.

STRENGTHENING OLD TRETTLES ON THE WABASH RAILROAD.

At the time of the construction of the Wabash Railroad the Phoenix column was the preferred type of column used in trestles intended to be permanent, and a number were erected by this company, the material being wrought iron. There has been a fear that in the intervening years some concealed deterioration might have taken place in them, and the trestles are now too light for the increasing loads of modern railway operation.

With a view to preventing rust on the interior of the columns, and also to stiffening them, a number of Phoenix columns in the approach of the bridge over the Missouri River at St. Charles, Mo., were filled with concrete a few years ago. Tests made in 1903 for the company showed that the filling of the columns with concrete had a tendency to give considerable increased strength and markedly increased the stiffness. The columns being 8 in. in diameter, the openings in the top through which the concrete could be poured were necessarily very small, and the concrete was poured in the form of a thin grout. It is believed that some of the grout was poorly mixed, causing sand pockets throughout the columns, and especially near the tops. The rain would get into the columns and fill the sand pockets. In the winter the water froze, and near the top the rivets broke as a result. While this was not general, there were enough instances of the kind to make it necessary to do something further really to strengthen the trestles.

To determine the effect of concrete on the exterior, thus converting the iron columns into reinforced concrete columns, two tests were made at the University of Illinois in April, 1909. An 8-in. Phoenix column 27 ft. long was taken and a length of 5 ft. cut from one end. The thickness of metal was 5-16 in. with an area in cross section of 12 in. The weight was 188.5 lbs. This short piece was tested as a plain column. The ends were

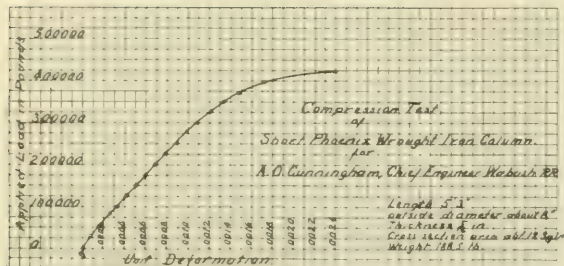


Fig. 1—Test of Phoenix Column.

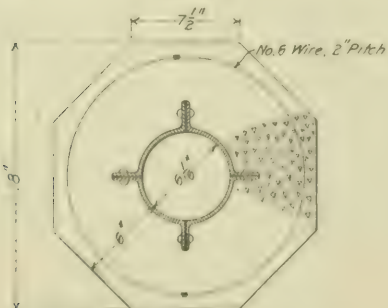
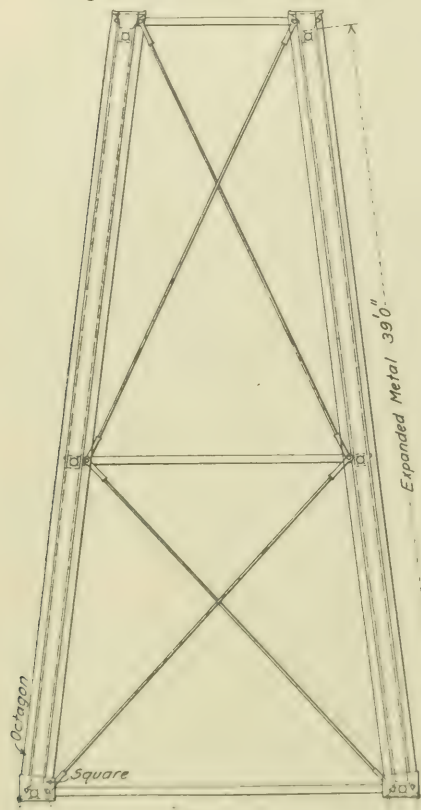


Fig. 6—Encasing Columns.

Area of section	Concrete mixture, 1 part cement, 3 parts sand	18.5 sq. in.
Area of steel column		0.083 sq. in.
		1.792 sq. in.
0.0000 cu. yds. concrete per lin. ft. concrete column		
0.0004 cu. yds. concrete per lin. ft. metal column		
0.0004 cu. yds. concrete per lin. ft.		

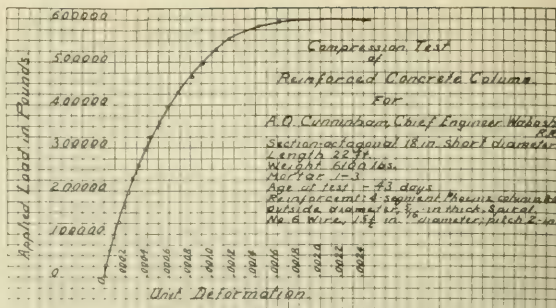


Fig. 3—Test of Reinforced Column.

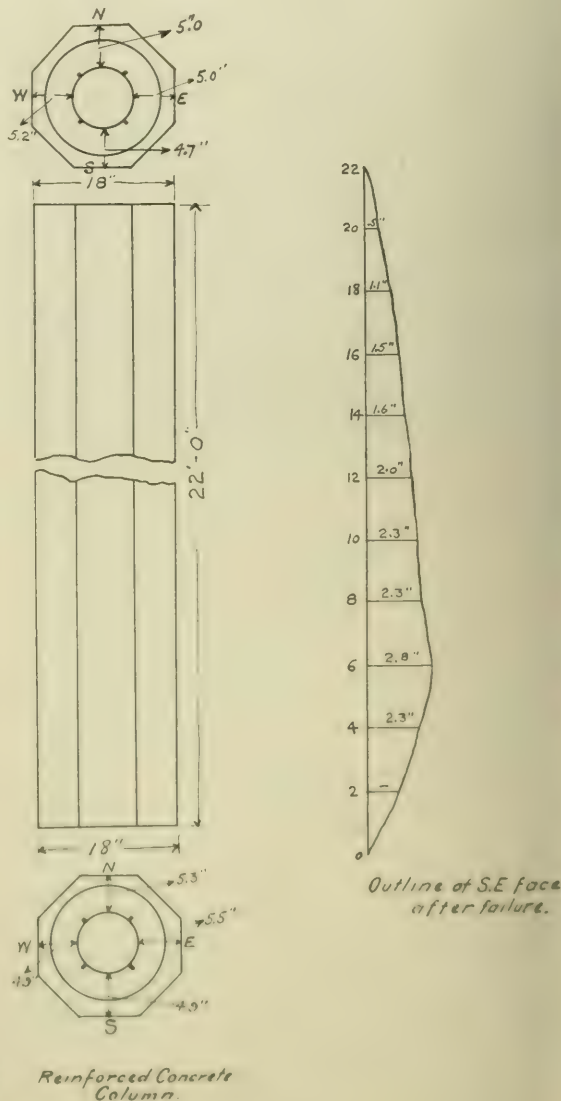


Fig. 2—Test Column.

carefully squared in a lathe before testing, and an adjustable bearing block was used. Two extensometers were attached to measure the shortening of the column over a gaged length of 50 in. The load deformation diagram for this column is shown in Fig. 3, with some notes on the test in Table 1. The column was shortened about one inch before the test was discontinued. Cracks opened between the rivets in the vertical

reference to its position in the testing machine. A spiral reinforcement was also used. The spiral was of No. 6 steel wire, about 15½ in. in diameter; pitch about 2 in. The pitch and diameter of this spiral were very irregular in places. The column was fairly true to dimensions and nearly straight. The ends were well squared, the longitudinal reinforcement being flush with the ends of the column, which was rounded at vertical

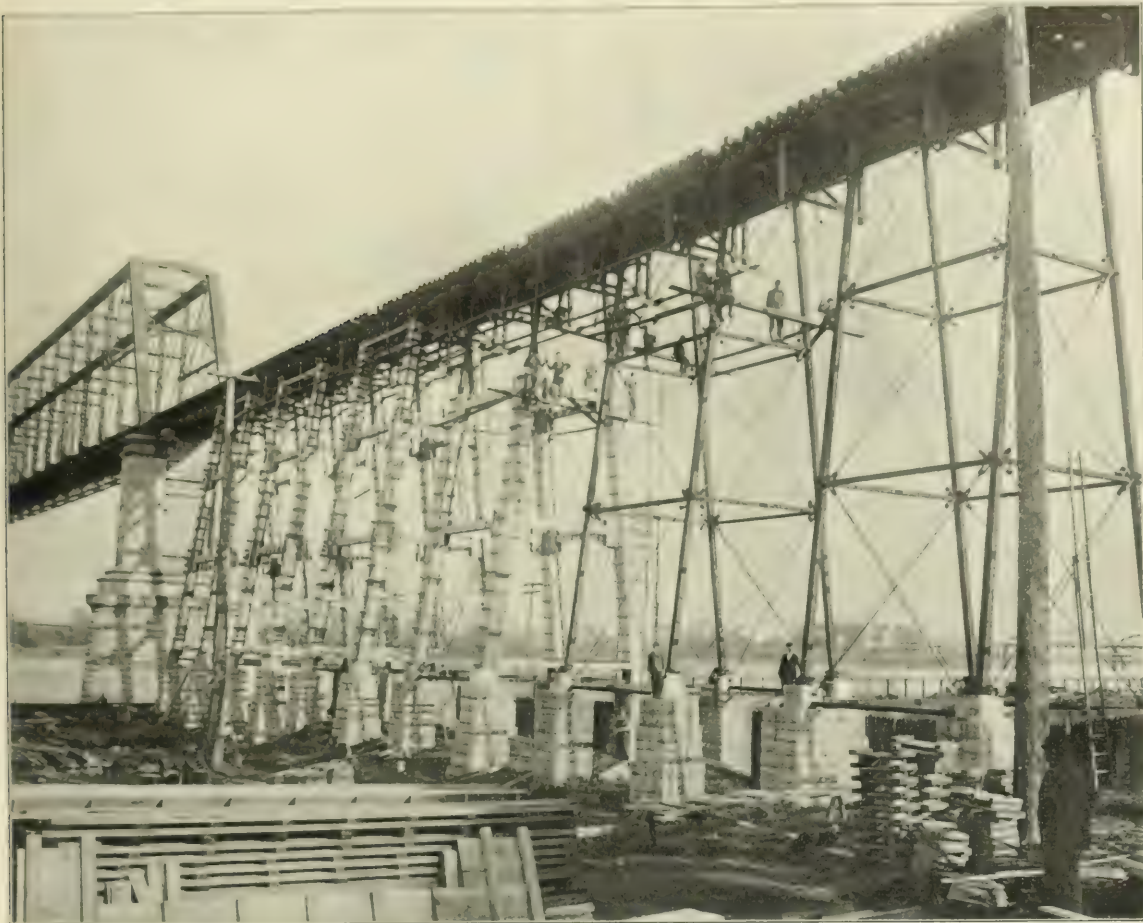


Fig. 4—Columns Being Encased in Concrete.

joints, and the flanges showed buckling in many places during the later stages of the test.

TABLE 1.

Total applied load, lbs.	Average unit stress, lb./sq. in.	Remarks.
0	0.0	Initial load.
28,000	0.000066	
54,000	0.000170	
80,000	0.001333	1 inch of scaling on outside surface.
400,000	0.001711	More pronounced scaling.
425,000	0.002380	1 inch of scaling removed.
430,000	0.002910	Maximum load.
490,000		Test discontinued; column had deflected about ¼-in. toward west.

The remainder of the column was used as reinforcement for a concrete column which was tested at the same time. It was octagonal in section, 18 in. short diameter; 22 ft. long, and weighed 6,100 lbs. The concrete consisted of 1 part Portland cement to 3 parts sand and was 43 days old when tested. The Phoenix column was continuous throughout the length of the reinforced column, but it was not centrally placed at one end. Fig. 2 gives the dimensions of the column before test with

position in a 600,000-lb. testing machine. The ends were bedded in a thin layer of plaster of paris in order to insure a uniform distribution of the load over the ends of the column. The plaster was allowed to harden in place for 28 hours before applying the load.

In order to obtain more definite information regarding the action of the column under load, measurements were taken to determine the longitudinal shortening of the column and the deviation from its original vertical position. The longitudinal shortening was measured by means of four extensometers, placed in sets of two on four faces of the column. These instruments were arranged in pairs, so that two independent sets of values were obtained. They could be read to 0.0001 in. The deviation of the column from its original vertical position was measured by means of fine threads stretched between points fixed near the ends of two faces of the column, 90 deg. apart. The movement of the threads over scales attached to the middle of the length of the column could be read to 0.01 in.

The load was applied through an adjustable bearing block. The pulling head of the testing machine moved at a rate of 0.05

in. per minute, and the load was applied in increments of about 25,000 lbs. At each increment of load the machine was stoppeu and a reading of the instruments taken. The load-deformation diagram for the column test is given in Fig. 3, and some of the notes are given in Table 2.

Total applied load, lbs.	Average unit shortening, cal. in.	Deflection from verti cal. in.	Remarks
5,000	0.0	0.0	Initial load.
31,500	0.000016		
357,000	0.000507	0.01	First appreciable deflection.
395,000	0.000593	0.01	
426,000	0.000693	0.01	
461,000	0.000817	0.02	Slight spalling near bottom on east face.
495,000	0.000918	0.02	Fine vertical crack at bottom on east face about 11 in. high.
527,000	0.001026	0.02	Vertical cracks on nearly every face at bottom. Cracks in middle of north face, about 15 in. high. No sign of cracking or spalling at top.
554,000	0.001149	0.04	Spalling increasing near bottom.
580,000	0.001431	0.07	
590,000		0.10	Spalling inside gage length on several corners.
594,000		0.1	Maximum load.
597,000		0.20	
599,000		0.30	
560,000			Test discontinued; column bent about 3 in. from vertical toward southeast face, at point 6 ft. from bottom. Sketch in Fig. 4 shows deviation of column from vertical after test. The photographs also show the condition after failure.

The failure of the column showed the effect of the eccentricity in the position of the reinforcing iron column. This gave the effect of a slight eccentricity to the load on the whole column. The first sign of distress was found at the bottom on the east face at a load of 461,000 lbs. The subsequent behavior of the

column also indicated that the eccentricity of the reinforcing column was responsible for the early appearance of deflection from the vertical and the final excessive deflection toward the S. E. face as shown in Fig. 2. Failure seems to have been primarily due to this bending.

The concrete in the column was of a very poor quality and seemed to contain lime. Large pieces could be broken in the hands. As soon as the vertical cracks began to appear, large blocks of concrete became detached from the column and dropped. These blocks comprised the material outside the light spiral, which seemed very effective in restraining the concrete inside of it.

After the foregoing laboratory tests were made 4 columns in one bent were made into reinforced concrete columns and observed for one year, to see whether any effect was produced by the jarring and vibration due to traffic. No effect was noticed.

The tests having shown that the effect of using concrete in connection with the columns to convert the old Phoenix column into a reinforced concrete column was practically to double the strength, it was decided to convert the old wrought iron trestle approaches to the Danville, Ill., bridge and the St. Charles bridge to reinforced concrete trestle approaches, thus making them strong enough to carry any loads that are likely to be used now or in the future on this line, and also preserving the metal for an indefinite period. A very important feature of reinforced concrete columns is that they always afford ocular evidence of their increasing weakness before they completely fail. The work on these two bridges is similar in appearance and detail, but the octagonal columns on the Danville bridge are 24 in. in



Fig. 5.—Concrete Encasement Completed.

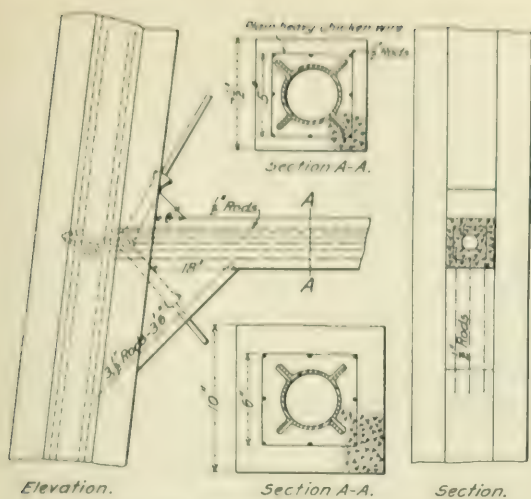


Fig. 7—Encasing Struts.

the short diameter, while on the 5th Charles bridge they are 18 m. The east approach of the 5th Charles bridge is 2,850 ft. long, and the west approach is 1,446 ft. long.

In Fig. 4 is shown the west approach of the St. Charles Bridge, where the columns are 10 ft. long, while the work was in progress. Fig. 5 shows the present appearance of the trestle. Concrete was poured from a car containing a concrete mixer and bins for sand and cement. One tower bent was completed at a time.

The concrete used is composed of 1 part of cement and 3 parts of coarse screened torpedo sand and fine gravel. The force of men engaged varied from 12 to 30, a fair average being about 20 men constantly employed. One tower (4 cols.) could be wrapped with the wire helix, have the forms put in place, concrete poured and the forms removed in about four days. Traffic over the trestle was not stopped during the progress of the work, and the concrete appeared to be excellent. It was stated in the report made by the testing laboratory that the concrete in the test specimen was rather poor, which was due to the fact that this particular column was made by laborers not accustomed to making concrete.

The concrete in the work itself is far superior, because it is made and placed by skilled workers in concrete. The work was done by the Carmichael Company, St. Louis, Mo. The plans were prepared and the work done under the supervision of A. O. Cunningham, chief engineer of the Wabash, to whom we are indebted for the information and illustrations from which this description was prepared.

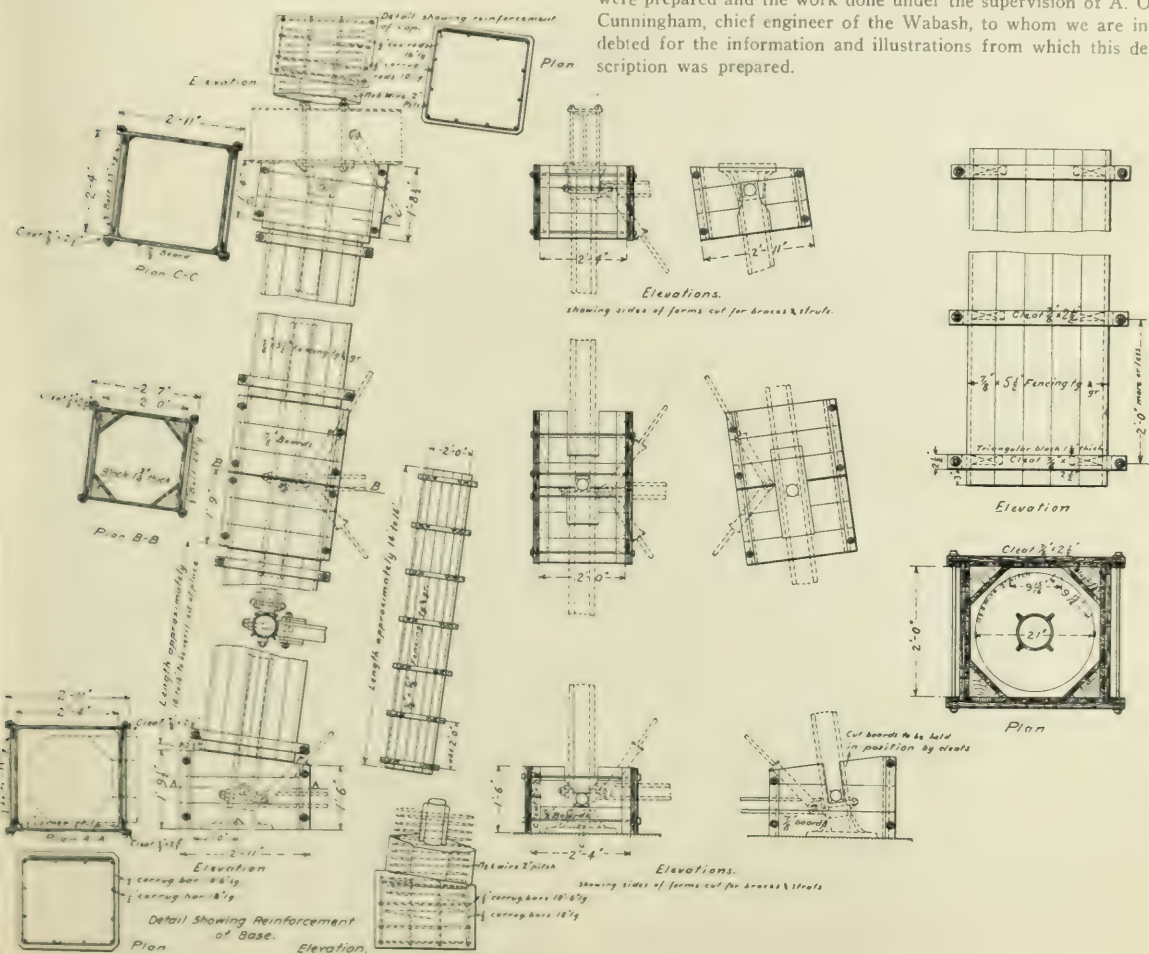


Fig. 8—Forms for Encasing Columns.

Area of section...	3.315 sq. in.	0.1123 cu. yds. concrete per lin. ft. outside of column.
Area of inner column.....	0.083 sq. in.	0.0074 cu. yds. concrete per lin. ft. inside of column.
	3.230 sq. in.	Total..... 0.1197 cu. yds. concrete per lin. ft.

WAGES, PRICES AND FREIGHT RATES.

Some very interesting data regarding relative wages, commodity prices and freight rates has been collected by Julius Kruttschnitt, director of maintenance and operation of the Harriman lines, which is presented in graphic form in the accompanying illustrations. One of the most interesting features of the chart, entitled "Retail Selling Prices of Commodities and Railway Freight Rates in 1910 Compared With 1900," is the column headed "Percentage Freight Rate to Selling Price." It shows

Commodity.	Shipped from	Year.	Retail selling price.	Freight rate, cts.	Per cent. freight rate, selling price.
Dressed beef, per lb.	Chicago to New York...	1900	16.0c.	.45	2.81
		1910	22.5c.	.45	2.00
Ham & bacon, per lb.	Chicago to New York...	1900	15.5c.	.30	1.94
		1910	26.5c.	.30	1.13
Lard, per lb.	Chicago to New York...	1900	8.0c.	.30	3.75
		1910	20.0c.	.30	1.50
Eggs, per dozen....	Iowa to New York.....	1900	43.0c.	1.50	3.49
		1910	50.0c.	1.50	3.00
Flour, per 50 lbs....	Minneapolis-New York..	1900	\$1.30	14.80	11.38
		1910	1.70	12.50	7.35
Men's suits, each....	Boston to New York....	1900	\$18.00	1.9	.106
		1910	23.50	1.9	.081
Men's suits, each....	Boston to Chicago.....	1900	\$18.00	4.2	.233
		1910	23.50	5.0	.213
Men's suits, each....	Boston to St. Louis.....	1900	\$18.00	5.0	.273
		1910	23.50	4.2	.179
Women's suits, each.	Boston to New York....	1900	\$17.50	2.5	.143
		1910	23.50	2.5	.111
Women's suits, each.	Boston to Chicago.....	1900	\$17.50	5.6	.320
		1910	23.50	5.6	.249
Women's suits, each.	Boston to St. Louis.....	1900	\$17.50	6.6	.377
		1910	23.50	6.6	.293
Gloves, per pair.....	Gloversville-New York..	1900	\$1.00	0.55	.550
		1910	1.37	0.55	.401
Underwear, per suit.	Boston to New York....	1900	\$1.50	0.15	.100
		1910	2.00	0.15	.075
Underwear, per suit.	Boston to Chicago.....	1900	\$1.50	0.7	.467
		1910	2.00	0.7	.350
Underwear, per suit.	Boston to St. Louis.....	1900	\$1.50	0.8	.533
		1910	2.00	0.8	.400
Shoes, per pair.....	Boston to New York....	1900	\$3.50	0.5	.143
		1910	4.00	0.5	.125
Shoes, per pair.....	Boston to Chicago.....	1900	\$3.50	1.4	.400
		1910	4.00	1.4	.350
Shoes, per pair.....	Boston to St. Louis....	1900	\$3.50	1.66	.474
		1910	4.00	1.66	.415

Retail Selling Prices of Commodities and Railway Freight Rates in 1910 Compared with 1900.

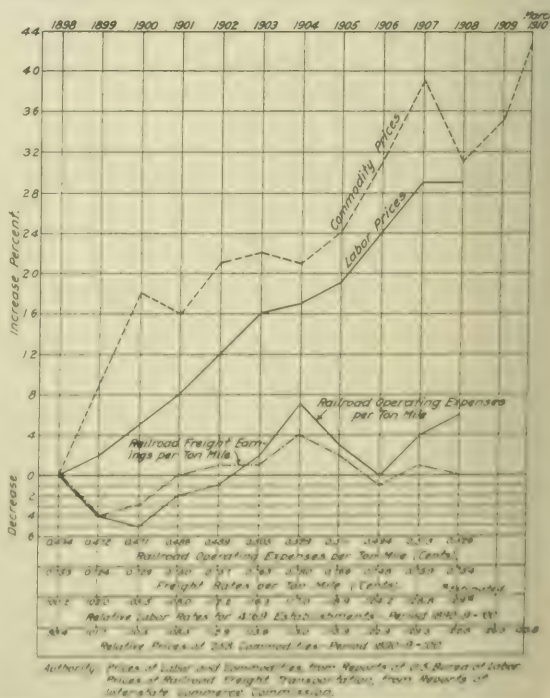
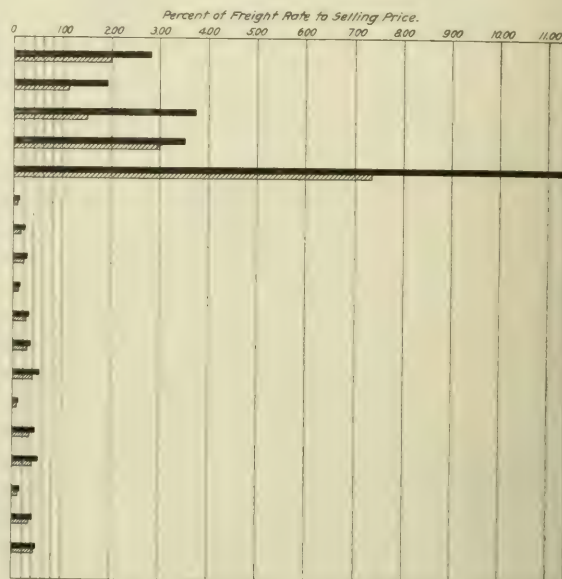
two things: first, that the percentage of the freight rate to the selling price of each commodity in 1900, as in 1910, was very small; and, second, that in every case it was smaller in 1910 than it was in 1900. The percentage of the freight rate to the selling price of each commodity is in each case smaller now than in 1900 because in every case the selling price of the commodity has increased, while in most cases the freight rate has remained stationary, and in some cases has declined.

For example, take the case of flour, the percentage of the freight rate to the selling price of which is larger than to any other commodity mentioned. In 1900 the freight rate was 11.38 per cent. of the selling price of the commodity. In 1910 it is 7.35 per cent. of the selling price of the commodity. This is due to the fact that the rate on flour per 50 pounds from Minneapolis to New York declined from 14.8 cents in 1900 to 12.5 cents in 1910, while the price of flour per 50 pounds increased from \$1.30 to \$1.70. The figures show how negligible the freight rate generally is as compared with the retail selling price of the commodity. For example, in 1900 the freight rate on dressed beef from Chicago to New York was 2.8 per cent. of the retail price at which it was sold in New York, and in 1910 it was but 2 per cent. In 1910 the average freight rate per suit on underwear from Boston to New York was but 0.1 per cent. of its retail selling price in New York, and in 1910 it is 0.075 per cent.

The freight rates given were verified by references to tariffs in effect in 1900 and to similar tariffs in effect in 1910. The prices were ascertained by inquiry from the leading retail dealers in the various commodities in New York, Chicago and St. Louis. In all cases the investigation was made to find for the two periods the prices for exactly the same quality of commodity. In the case of clothing, quotations were obtained for various grades in the two years mentioned, an average being

computed from all the quotations received where the prices quoted were for exactly the same quality of goods.

The second chart is, no doubt, self-explanatory. No figures showing freight rates per ton per mile and railway operating expenses per ton per mile are given for any date later than 1908, because, when the charts were made no statistics of the Interstate Commerce Commission for any later date were available. The statistics of the commission show that the average rate per ton per mile in the year ended June 30, 1909, was 7.63 per cent., which is the same as it was in 1903.



Labor and Commodity Prices, Freight Rates and Expenses per Ton Mile.

THE CAR DEMURRAGE BUREAUS.

BY WILLIAM BENJAMIN WILSON.

After twenty years of their existence, during which they proved their efficiency, it is not necessary to dwell at any length upon the advantages derived by the railways from the Car Demurrage Bureau. The reasons for their existence, most patent to-day than when they were first formed, are so manifest that no room is left for any sound argument for their discontinuance. They have insured accuracy to the individual road at a minimum of cost, assured to it uniform procedure, and, being disinterested parties have through judicious action prevented misunderstandings and friction between competing lines.

Prior to the formation of Car Service Associations and their successors, the Car Demurrage Bureaus, the detention to cars and the consequent loss of their earning power was enormous. At that time, by reason of the fact that there was no neutral force to prove, probe and unveil false statements, consignors and consignees placed one competitive road against another, causing constant friction between roads and serious delays to cars; and the collection of demurrage charges was farcical. When collections were made they were made erratically and generally to be refunded to the party paying them; if not by the operating departments they would be refunded by the traffic departments. The formation of the associations or bureaus worked a complete revolution in the practice of the public holding cars at will for loading and unloading purposes, reduced delays to cars, brought competing lines into harmony by the removal of suspicion, saved millions of dollars in the purchase of cars and of land for the laying of tracks necessary to hold cars, and added millions of dollars to the revenues of the roads above and beyond the cost of maintaining the bureaus.

In view of these facts, it is scarcely conceivable that the abandonment of such a valuable asset as these bureaus have proved themselves to be, should be considered by any responsible railway officer. However, there is an agitation going on, the objective being the accomplishing of such result. The reasons advanced are varied and may be summarized as follows:

First: The filing of demurrage rules with the Interstate Commerce and State Railroad Commissions by each railway separately renders the bureaus unnecessary. The assumption contained in this reason is that the supervision of these commissions will bring about through the majesty of the law a millenium in the commercial dealings of the public with the railways, which event would cause the elimination of frauds, either direct or indirect, or through collusion, on the revenues of the latter and produce a happy uniformity and strict accuracy in the interpretation, application and enforcement of car demurrage rules and act as a deterrent to sidestepping by competitors. The fallacy of this assumption is to be found in the well-established fact that reverence for the majesty of the law or fear of the law's penalties has not prevented evasions or violations of the law in the past, and does not in the present; and the time in the future when they will is very remote. It is, therefore, reasonable to assume that a disinterested bureau of supervision and arbitration, such as the car demurrage bureaus are, with its care and watchfulness in the direction of prevention will tend to lessen the probability of evasion or violation. In this connection it is educational to recall that falsification of weight and in classification, in violation of criminal statutes, has been practiced ever since there has been a railway. However, crimes of that character against the railway have been lessening year by year through the constant watchfulness and care of the inspection bureaus of the traffic departments: results not found feasible by independent action by individual roads. Classification rules, like demurrage rules, are filed with the Interstate Commerce Commission. Does that fact suggest that it would be a wise policy to abolish those bureaus and again open the door to a wide assault upon railway revenues? Also, as most of the subjects dealt with by the American Railway Association and the various traffic associations, are amenable to state and national laws, would that be considered a good reason

why those associations should be abolished and the interests relegated to the individual roads for independent consideration?

Second: Independent administration of our demurrage rules will permit combined reports.

The value of combined reports is yet to be demonstrated, but as the question is merely one of economic detail, it could be worked out just as well and as economically under a bureau as under any other sub-division of railway administration, with an advantage in favor of the bureau. The latter would give a common and equal attention to all roads in the preparation and forwarding of such reports and in dealing with them would be an influential factor in producing uniformity and accuracy in them.

Third: Sidestepping of the bureau in the matter of collecting our demurrage charges.

The car demurrage bureaus were never charged with a duty of collecting revenues, but they have been influential in aiding railway agents in collecting outstanding demurrage charges and the companies themselves in collecting such charges by legal process. It has always been the policy of railway corporations to make their revenue collections through their immediate bonded agents or by legal process, and the probability of changing that policy is very remote. Responsibility for the failure to collect revenues of any description must necessarily rest upon railway administration, as it cannot be placed upon bureaus whose exclusive field of activity is to hasten the loading and unloading of cars.

The foregoing reasons, together with the claims of greater economy in independent actions, are the principal arguments advanced for the substitution of road for joint bureaus. The arbitration feature of the joint bureaus is entirely ignored and yet that feature has proved itself to be a most valuable if not indispensable agency in dealing with disputes with the public and between roads, and it would be a decided step backward to dispense with it. As to economy, it is extremely doubtful if any could be effected or that any road could maintain a sufficient force of inspectors and clerks for the pro rata amount it now pays the joint bureaus for that service: on the contrary, there is a strong probability that the expense would increase, if not immediately, surely in a short time after the independent bureau was organized, for it is a well recognized fact that no matter how modest numerically the force may be on the inauguration of a new bureau on a railway, in an incredibly short time thereafter the cry for more assistance is raised and the force increases and continues to do so.

The tentative plan which has been suggested for the substitution of road for joint bureaus embraces in its main features the combination of "car record," "car orders," "car distribution," "car demurrage" and "per diem" into a bureau, and the formation of a joint committee of administration to be composed of representatives from each of the roads in the territory affected. As to the combination feature: The provisions for inspectors would overload such employees to such an extent that some of the subjects entrusted to their care would at times, perhaps very frequently, become subordinated to the other one or ones they considered more important. Car demurrage does not stand in a very close relation to the other subjects, for it deals directly with the commercial public, the closer to which the inspector can get the greater force is exercised in preventing the occurrence of demurrage. By this close relation to the public the inspectors of the joint bureaus have been very successful in preventing demurrage as well as reducing its accumulation and, because of their equal relationship to competing roads, without stirring up strife between the public and any one road. It is not probable that an inspector representing only one road could accomplish similar results, but there is a strong probability that if he were able to and did his full duty in the premises he would produce an opposite effect, to the detriment of the road employing him. Competing roads A, B and C, each employing their own inspectors in common territory, A's inspector looking only after the interests of his own road constantly prods the patron to release its cars, paying no

to-day apparently as hot as they ever were. The car uses four gallons of gasoline and one pint of lubricating oil per 100 miles; this makes 7½ miles per gallon of gasoline, or a cost of approximately one cent per mile. This is for the car loaded without the trailers; with the trailers it will make 18 miles per gallon of gasoline.

The car is operated by train order strictly; it is not allowed to go on the main line without first getting orders from the dispatcher's office.

The cost to convert this car into a motor car was as follows: Labor, \$36.20; material, \$29.60; Apple dynamo, spark coil and headlight, \$37.50; cost of automobile, \$250.

The brakes are operated by the exhaust from the engine; this is done by a cut-out which connects to the 8 in. brake cylinder. The exhaust is cut into this brake cylinder and the pressure is held in the cylinder by a 1-in. check valve. It is possible to put 50 lbs. pressure into the brake cylinder. The brake cylinder pressure is released by an independent lever. When the brakes are applied it also cuts the engine speed down on account of back pressure. This is an advantage on a motor car, as it keeps the engine from racing when the clutch is thrown out and brakes applied.

MALLET AND PACIFIC TYPE LOCOMOTIVES; CAROLINA, CLINCHFIELD & OHIO.

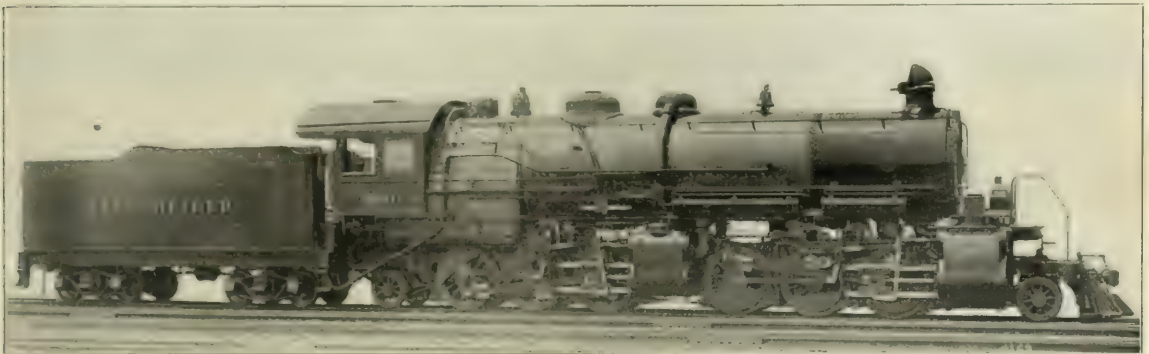
The Carolina, Clinchfield & Ohio runs almost directly south from Elkhorn City, Ky., to Spartanburg, S. C. and is used largely for transporting coal. It presents a maximum grade against

placed on the second ring immediately above the high-pressure cylinders. The arrangement of the steam piping is similar to that used on the Mallet locomotives built for the Southern Pacific Company (*Railway Age Gazette*, April 30, 1909, page 933). The steam distribution is controlled throughout by 15-in. piston valves, all of the same design. The high-pressure valves provide inside admission and the low-pressure outside admission, the ports and bushings being modified to suit. The valves are all set with a lead of ¼ in., a steam lap of 1½ in., and an exhaust clearance of ¼ in. The by-pass valves consist of flat plates, which normally cover the relief ports; this arrangement being in accordance with the usual practice of the builders for piston valve locomotives. Walschaert valve motion is used throughout, and the gears are controlled simultaneously by the Baldwin power reverse mechanism.

The frames are of cast steel, 5 in. in width, and the articulated connection is effected by a single radius bar. The boiler is supported on the front frames by a single bearer placed between the second and third pairs of driving wheels. The front bearer carries the controlling springs, and normally has a clearance of ½ in. between the upper and lower castings.

PACIFIC LOCOMOTIVES.

These locomotives have a tractive effort of 37,000 lbs. and, as indicated by the ratios, are well adapted for handling heavy trains on long grades. The boiler is of the extended wagon top type, 74 in. in diameter at the front ring and 83½ in. on the wagon top. The firebox staying is similar to that of the Mallet locomotives, the flexible stays numbering 386. The fire-doors are two in number, and are placed 28 in. between centers,



Mallet Locomotive for the Carolina, Clinchfield & Ohio.

loaded traffic of only .5 per cent. and the sharpest curves on the main line are 8 deg. In 1909 the road received an experimental Mallet locomotive, 2-6-6-2 type, from the Baldwin Locomotive Works. It weighed 342,000 lbs., of which 300,000 lbs. were on the driving wheels, and was rated at 4,000 tons. Its performance has proved so satisfactory that ten more locomotives of a similar type, but of greater capacity, have been ordered from the same builders; also three Pacific type locomotives for passenger service.

MALLET LOCOMOTIVES.

The new locomotives weigh 378,650 lbs., with 325,850 lbs. on the drivers, and have a tractive effort of 77,500 lbs. The boiler does not have a separable joint or feed water heater; the tubes are 21 ft. long. The shell, which is unusually large, is 86 in. in diameter. The exhaust from the high-pressure cylinders passes through a Baldwin reheater in the smokebox. The ratios indicate a free steaming engine with the good grade of coal which is used. Radial stays are used for the firebox and 404 flexible stays are grouped in the outside rows on the sides and back, in the upper corners of the sides and in two triangular areas on either side in the throat. Two oval fire-doors are placed 11 in. apart, center to center.

The boiler barrel is composed of three rings, the dome being

the width of the grate being 71¼ in. The tubes are set with 7/8-in. bridges.

The stack is of cast iron, with a wide-mouthed internal extension, and measures 21½ in. in diameter at the choke. The Master Mechanics' style of front end is used with an adjustable diaphragm plate in front of the nozzle. No cinder pocket is provided with this arrangement.

The main frames are of cast steel, 5 in. in width, and in one piece with the rear sections. The front rails are single and of wrought iron. Each rail is hooked and double keyed to its corresponding main frame, and is held in place by four vertical bolts, 1½ in. in diameter. At the point of its connection with the cylinder saddle the frame measures 4½ in. wide by 7 in. deep.

The front truck is of the swing bolster type and is fitted with a cast steel saddle and three-point suspension swing links of the same material. The wheels are steel tired with cast iron centers. The rear truck is of the radial type with outside journals. The side swing is taken by the spring links, which are seated at each end on flat keys, and so arranged that they have a limited amount of fore and aft, as well as transverse, swing.

The cylinders are lined with bushings 5/8 in. thick, and are placed 87 in. between centers, while the steam chest centers

are 49 in. apart. The valves are duplicates of those used on the Mallet locomotives and are arranged for inside admission, and set with a lead of $\frac{1}{4}$ in. The by-pass valves are also similar to those of the Mallet locomotives. The location of the steam chests on the Pacific type engines simplifies the arrangement of the steam and exhaust passages, but necessitates using rockers in connection with the Walschaert valve gear. The rocker boxes are bolted to the guide yoke, and the links are carried on longitudinal bearers outside the leading driving wheels.

The tenders of both classes of locomotives are similar in construction, although those for the freight engines have a greater fuel and water capacity. The frames are constructed of 12-in. channels, the center sills weighing 40 lbs. per foot and the side sills 25 lbs. The tanks are of the water-bottom type. Arch bar trucks are used, those under the passenger tenders being

Tubes, length	21 ft.	21 ft.
Heating surface, tubes	5,519 sq. ft.	3,903 sq. ft.
Heating surface, firebox	192 "	192 "
Heating surface, total	5,712 "	4,095 "
Grate area	78 "	54 "
Center of boiler above rail	122 in.	112 in.
<i>Tender.</i>		
Tank	Water bottom	Water bottom
Frame	12 in. chan.	12 in. chan.
Wheels, diameter	33 in.	36 in.
Journals, diameter and length	8 x 11 in.	3½ x 10 in.
Water capacity	10,000 gals.	8,000 gals.
Coal capacity	15 tons	14 tons.
* 1.2 P d ² s		

d = Diam. H.P. cylinder.

THE CHINCHOW-AIGUN RAILWAY.

The importance of Newchwang, China, as a commercial port should be further enhanced by the construction of the proposed railway from Chinchow to Aigun, writes the British Consul, for,



Pacific Type Passenger Locomotive for the Carolina, Clinchfield & Ohio.

fitted with steel-tired wheels, while the freight tenders are carried on solid rolled steel wheels.

The principal dimensions and ratios of both classes of locomotives are as follows:

<i>General Data.</i>		2-6-2	4-6-2
Type		2-6-2	4-6-2
Fuel	Bit. coal	Bit. coal	Bit. coal
Tractive effort	77,500 lbs.	37,000 lbs.	37,000 lbs.
Weight in working order	378,650 "	233,050 "	233,050 "
Weight on drivers	152,900 "	152,900 "	152,900 "
Weight on leading truck	21,600 "	12,750 "	12,750 "
Weight on trailing truck	28,200 "	37,400 "	37,400 "
Weight of engine and tender in working order	550,000 "	385,000 "	385,000 "
Wheel base, driving	31 ft.	13 ft.	13 ft.
Wheel base, total	46 ft. 6 in.	34 ft.	34 ft.
Wheel base, engine and tender	74 ft. 11 in.	65 ft. 10 in.	65 ft. 10 in.
<i>Ratios.</i>			
Total weight ÷ tractive effort	4.88	6.30	6.30
Weight on drivers ÷ tractive effort	4.22	4.13	4.13
Tractive effort x diam. drivers ÷ heating surface	7.67	625.00	625.00
Total heating surface ÷ grate area	73.80	75.80	75.80
Firebox heating surface ÷ total heating surface	4.00	4.70	4.70
Weight on drivers ÷ total heating surface	56.80	37.40	37.40
Total weight ÷ total heating surface	62.80	57.00	57.00
Volume equiv. simple cylinders, cu. ft.	23.70	11.40	11.40
Total heating surface on vol. cylinders	243.30	288.00	288.00
Grate area ÷ vol. cylinders	3.29	3.74	3.74
<i>Cylinders.</i>			
Kind	Compound	Simple	Simple
Diameter	24 and 37 in.	30 in.	30 in.
Stroke	32 in.	23 in.	23 in.
<i>Valves.</i>			
Kind	Piston	Piston	Piston
Diameter	15 in.	15 in.	15 in.
Outside lap	1½ "	1½ "	1½ "
Inside lap	1½ "	1½ "	1½ "
Lead	1½ "	1½ "	1½ "
<i>Wheels.</i>			
Diameter, driving	33 in.	33 in.	33 in.
Driving, thickness of tire	1½ "	1½ "	1½ "
Driving journals, main, diameter and length	11 x 13 "	10 x 13 "	10 x 13 "
Driving journals, side, diameter and length	10 x 13 "	9 x 13 "	9 x 13 "
Leading truck axle diameter	3½ "	3½ "	3½ "
Leading truck axle diameter	6½ x 13 "	6½ x 13 "	6½ x 13 "
Trailing truck axle diameter	6½ x 13 "	8 x 14 "	8 x 14 "
<i>Boiler.</i>			
Kind	Water bottom	Water bottom	Water bottom
Working pressure	200 lbs.	170 lbs.	170 lbs.
Grate area, heating of boiler	78 sq. ft.	54 sq. ft.	54 sq. ft.
Firebox length and width	117 x 36 "	108½ x 21 "	108½ x 21 "
Firebox plate, thickness	1½ "	1½ "	1½ "
Firebox water space	186 cu. ft.	186 cu. ft.	186 cu. ft.
Tube, number and outside diameter	148 x 3½ "	117 x 3½ "	117 x 3½ "

though the intention of the Chinese Government is to make Hulutao, a natural and ice-free harbor on the coast 35 miles southwest of Chinchow, the sea terminus of the line, Newchwang will obtain a considerable portion of the trade which the line should soon develop. The proposed line is intended to develop the Mongolian districts lying west of the Japanese and Russian railways, in Manchuria as far as Tsitsihar, where it meets the Trans-Siberian Railway. Thence the line is to be continued due north to Aigun, a small town on the Amur river, a few miles east of Blagoveschensk. There are indications of very excellent coal within 100 miles of the starting point of the line at Chinchow.

A 60 years' concession has been granted to Colonel José Guilherme, of Souza, Brazil, and Dr. Vicente de Toledo, of Ouro Preto, for the construction and operation of a railway from Porto do Souza, in the state of Espirito Santo, to Manhuassú, in the state of Minas Geraes. The concession includes a subsidy of about \$2,300 per mile. Any material to be imported for the building of the line will be exempt from customs duty. The estimate of about \$1,250,000 for the construction of a section, 34 miles long, of the Goyaz railway from Araguay to Catalao have been approved. A credit of \$78,500 has been opened at the Ministerio da Viação a Obras Publicas, to meet the expenses for the construction of the railway running from Cruz Alta to the mouth of the River Ijuhy.

The Belgian State Railways have had 26 different ministers since their beginning in 1836. Then they were under the Minister of the Interior, but shortly afterward the newly created Minister of Public Works took them over, and in 1884 the Ministry of Railways was established, since which time the occupant has been more stable, Vanderperckbohlm holding the place from 1884 to 1899, Libaert from 1899 to 1907, when he was succeeded by the present minister, Helleputte, who was graduated as an engineer in Ghent in 1872, served for three years on the railways, became a professor of architecture and engineering, a member of parliament in 1889, and Railway Minister in 1907.

General News Section.

The Baltimore & Ohio Southern term announced that it will withdraw October 1, from the Cincinnati Demurrage Bureau.

Governor Campbell, of Texas, has turned the ball to compel what he says the International & Great Northern at Fort Worth to pay unsecured claims against it.

The American Bar Association at its meeting in Chattanooga, Tenn., last week, adopted the report of a committee recommending the general adoption in all the states a Transfer of Stock law and a Bill of Lading law.

The time system of organization has been adopted in the general manager's office of the Southern Pacific lines in Oregon, as announced in another column. The arrangement is similar to that which was adopted on the Union Pacific last July. (July 8, p. 197.)

A press despatch from Houston, Tex., says that car repairers and other men, to the number of 1,000, including various classes which have to do with cars in the yards, employed on the Southern Pacific lines in Texas, have struck, demanding recognition of their union. According to one account, the strike has held up work in all of the shops between New Orleans and El Paso.

The office of the "Associated Railways" at Nashville, Tenn., which has been maintained by a number of the principal southern railways for several years past, with E. Baxter as counsel, to deal with interstate commerce matters, has been abandoned and after the first of October these matters will be looked after by a similar office to be maintained at Washington, with R. W. Moore as counsel.

Albany and Buffalo papers report a strike on the New York Central of the Brotherhood of Railway Signalmen, a union which seems to be made up of lampmen and battery men and some of the mechanics. The leader of the strikers is J. A. Martin, who says that the strike is doing serious damage to the road; but the officers of the company say that not enough men have left their work to seriously disturb traffic.

Italy owns its telegraphs, and the government has announced reduced rates for telegrams; these go into effect December 1, superseding rates which have been in effect over 25 years. Ordinary telegrams of 10 words will cost 11½ cents, as compared with 19.3 cents at present; each additional word will be one cent; urgent telegrams 34.7 cents and three cents for each additional word above 10. Telegrams addressed to newspapers go at half price between 9 p.m. and 6 a.m.

The Hudson & Manhattan has opened its line to Henderson street, Jersey City, west of the Pennsylvania station, and has made a change in the arrangement of its trains. The running of trains from Cortlandt street, Manhattan, to New Jersey and back across the river by the Christopher street tunnel and thence northward to 23rd street has been discontinued. The trains through the Christopher street tunnel now run to and from Henderson street, Jersey City. From Henderson street trains are run also to and from Cortlandt street, New York.

On the London, Brighton & South Coast, between Horley and Three Bridges, England, Henry Von Kramer has telephoned on and from a moving train, without a mechanical connection. The arrangement is similar to that which has been used in this country (on the New York, New Haven & Hartford and the Lehigh Valley) for telegraphing to and from moving trains. Two wires were laid along the tracks between the stations named and the electrical conductors on the train were arranged so as to move along at a distance of about 18 in. from the wires.

At Inman, near Atlanta, the Southern Railway has just finished and opened a large freight transfer station, to be known as "Inman Transfer," the operation of which will result in saving 24 hours in the time required for the delivery of L.C.L. freight from the east and west to all points south and west of Atlanta and vice versa. There are four sheds, each 700 ft. long, with tracks running the full length on both sides. This will give space for 125 cars at one time, and the station has a

daily capacity of several hundred cars. At present 125 men are employed on the platform, and it is intended to shift a night shift later.

On the night of September 1 at Divide, Colo., a robber who tried to get the valuables in the express car of train No. 3 of the Colorado Midland was instantly killed by the engineman of the train, Frank Stewart. The robber boarded the engine, while the train was at a lonely side track waiting for a train moving in the opposite direction, and he ordered the engineman and fireman to go back and aid him in getting into the express car. As they reached the car, the fireman dashed under it and crawled to the other side. The robber leaned down to shoot the fireman and the moment he turned his eyes away from the engineman. Stewart struck him on the head with a stone, which he had picked up as he got off the engine, and the robber was instantly killed.

Railway Exhibit at the Ohio Valley Exhibition.

The Ohio Valley Exhibition, which opened on August 24 and will continue until September 24, contains an exhibit which was provided by the combined railways of the South with the exception of some of the smaller roads and the Atlantic Coast Line. The various roads have contributed to the expenses in proportion to their mileage. T. C. Powell, vice-president of the Queen & Crescent Route, is chairman of the exposition's committee on the "South and Its Resources," and he has sent out a circular stating that the purpose of the railways in contributing this exhibition is to interest the people of the North in the South's resources in the expectation that this will promote the immigration of settlers from the North to the South and increase the number of industries in that section.

Criticism of Missouri Railroad Commission.

The charge that the Board of Railroad and Warehouse Commissioners of Missouri as now constituted is of little value to the state—useless, in fact—is borne out by the records of the office at Jefferson City. Dissension among the commissioners, who disagree on many of the complaints presented, adds to the inefficiency of the board. Reports of inspections of railway property on file in the office of the secretary of the board plainly show that at least one of the commissioners enjoys an almost perpetual vacation. This commissioner finds time to attend political meetings and conferences in the interest of a single Democratic candidate for a high office, but is frequently absent from board meetings and inspection trips. Two of the commissioners admit that they are handicapped by the discord engendered, they claimed, by the third member.

Neither Governor Hadley nor the attorney-general's office is pleased with the existing conditions, but the hands of officials who might correct matters are tied by the law, which appears to have invested the railway commissioners with a peculiar and almost royal sanctity. In justice to the commissioners, it should be stated that in some specific instances the powers of the board have been curtailed by injunction and court decisions, but there still remains to them sufficient power to keep them busy if the duties of their office were strictly attended to.

It would not be fair to leave the impression that all of the members of the board are negligent. Commissioner H. R. Oglesby invited *The Republic* to compare his record with that of his fellow board members, and it is only justice to state that the reports indicate that he has been the most active. For more than three years there has been a disagreement among the commissioners as to how inspections should be made, Mr. Knott refusing to accompany Messrs. Oglesby and Wightmann on special inspection trains provided by the railways for that purpose. In a few cases Commissioners Oglesby and Wightmann made inspections on special trains, with Commissioner Knott trailing them on a regular train.

Particular criticism has been made because employees of the grain department at Kansas City have been permitted to absent themselves from duty on political missions.

One of the first bills certain to be introduced in the next legislature will be a measure abolishing the board. Such a

bill failed of passage two years ago when introduced in the Senate, and if opposition to the measure develops next session another bill is sure to be offered separating the railway board from the grain inspection department.

Governor Hadley is known to favor the abolishment of the railway commission. He wants it supplanted by a State Public Utilities Commission. The public utilities bill died in the last legislature, not because it provided for abolishing the railway commission, but because the utilities law passed in the Folk administration had not received a fair test.

The grain inspection department as now constituted is anything but satisfactory to the boards of trade of the large cities. Charges frequently have been made that the inspectors employed by this department are not expert grain men and are utterly unfit to determine the different grades of grain. The complaint is made that the crudity of the work of one inspector is killing St. Louis as a grain market.

Only under the dignity of proceedings for impeachment can a railway and warehouse commissioner, who has been guilty of omission of duty or overtly culpable in the conduct of his office be removed.—*St. Louis Republic*.

Commissioner Henderson's Views.

Marked improvement is shown in the relations of the railways to the people in the last year, according to Charles Henderson, president of the Alabama Railroad Commission, who is just home after an inspection made in 30 counties. There is an increase in these excellent conditions over the year before, and thus it is indicated that all the time things are getting better. Captain Henderson finds that claims for overcharge and damages are paid with more promptness and to greater satisfaction. He also discovers the feeling between the local agent as to the people is more cordial and agreeable, and that the roads are reaping benefits from the bettered relations. Depots are better and there are more of them, and conditions are, as a whole, more conducive to good conditions. Captain Henderson is greatly pleased with the disposition of the railways to meet every demand made by the state.—*Montgomery Press Despatch*.

Radical Railway Legislation in Texas.

As stated in the *Railway Age Gazette* of September 2, page 443, the Texas legislature has passed a bill providing that the purchasers of any railway property under execution sale shall take title to its franchise privilege only upon condition that they shall file with the Secretary of State a written agreement to pay all of its unsecured debts and subject the property to a lien for that purpose. The specific purpose of the law is to insure the payment of unsecured claims against the International & Great Northern, amounting to \$2,000,000, but it is drawn in general terms, and was bitterly denounced by certain members of the legislature on the ground that it amounted to a repudiation of mortgage debts on railway properties. Senator Senter, who made the principal speech against the bill, said in part:

"This is a statutory prohibition upon the issuance of a mortgage by a railway company. It stipulates in terms that if a creditor of a railway company takes security for his debts he shall not have security, and, if he fails to take security for his debts, he shall have a preference lien. It provides that if his debt is secured it shall be unsecured, and if it is unsecured it shall be secured. It says, in terms, that a contract shall not be a contract and that a man who is without a contract shall have one by operation of law. Such provisions were never before embodied in a statutory proposal, and they are indeed amazing to any legal mind. * * * Yet I have just learned that the receiver of the road and the personal attorney of Mr. Gould applied to the railway commission for a revaluation of that railway in accordance with its present value in order that they might raise funds to pay all the debts of the company and take it out of the hands of a receiver; that they had arranged with bankers in the East for the sale of securities thus to be raised in order to pay off all of the debts of the company; that the railway commission refused to revalue the road and insisted upon holding it at the valuation made in 1894, which was based upon the conditions then existing and which placed its value at twenty-three millions of dollars.

"This valuation, it seems, was not made for the purpose of authorizing the issuance of bonds, but was rather an approximate and perfunctory valuation of the property.

"The State of Texas, through its taxing authorities, has valued the road for taxing purposes at thirty-five millions of dollars. This, then, is the attitude in which the State of Texas stands toward the railway company. For bonding purposes this property is worth but twenty-three millions of dollars, for taxing purposes it is valued at thirty-five millions.

"It may not sell securities to pay debts, which securities could be lawfully issued under the stock and bond law if we valued this property for bonding purposes just as we value it for taxing purposes. The state says to the railway company, although you shall not be permitted to mortgage your property to pay these unsecured debts, you must somehow contrive to pay them or we propose to put the ban of outlaw upon you. * * * If a creditor or stockholder shall choose to pay the debts he is not to be permitted to take any form of security for them; yet the very contention upon which this bill rests is that the property of the company is worth more than the amount of incumbrances upon it and that the lien holders are seeking to squeeze out the unsecured creditors. Was ever a more contradictory proposition submitted for the indorsement of the legislature. Will any sane mind assert that it is a honest measure?"

The only statement that we have seen to justify this law is that "there was a general feeling on the part of members of the legislature and others that the International & Great Northern should be made to pay its unsecured debts." A large part of the sum outstanding against the road consists of affirmed judgments in personal injury cases. A considerable amount of other damage claims and labor accounts is embraced in the total. This piece of legislation had its origin in the differences alluded to by Mr. Senter, that arose some time ago between the State railroad commission and the road as to a revaluation of the property as a basis for the proposed bond issue under the reorganization. The road claims that unless the commission grants it the necessary authority to issue bonds to cover its indebtedness it will be unable to meet its unsecured claims. It is considered doubtful whether this difference as to valuation would have led to legislation on the subject had not certain damage suit lawyers purchased large amounts of the outstanding unsecured claims against the road.

Bids Wanted for Building New York Subways.

The New York State Public Service Commission, First District, on September 1 advertised in the principal cities of the country for bids for the construction of the proposed "triborough" subway railways, the estimated cost of which will be \$125,000,000. The principal routes are from Battery Park at the south end of Manhattan Island northward through Church street, Vesey street, Broadway and Lexington avenue to the Harlem river; and thence on the west side of the city, through Mott avenue and Jerome avenue to Woodlawn road, Van Cortlandt park; and on the east side, through Southern boulevard and Westchester avenue to Pelham Bay park; a short line across the south end of Manhattan through Canal street; a line in Brooklyn from the Manhattan bridge through Lafayette avenue to Broadway and through Broadway to the Williamsburg bridge; lines in Brooklyn from Fulton street and Ashland place southward through Fourth avenue to the seashore, and a branch of the last named through New Utrecht avenue towards Coney Island. Three forms of contract are offered. No. 1 provides for the construction, equipment, maintenance and operation of the entire system by private capital, except some small portions that are already built or being built. No. 2 provides for building the Lexington avenue line to the Harlem river and short parts of the lines beyond that river, with money to be furnished by the city. No. 3 provides for the construction with the city's money of the Broadway-Lafayette line in Brooklyn and the Canal street line in Manhattan. The Fourth avenue line in Brooklyn is already under contract. The plans for the entire system cover 44.21 miles of line and 133 miles of track. The proposals for construction with the city's money apply to 25 miles of line and 81 miles of track and do not include equipment or operation. For those portions of the lines which are already under contract, the advertisements now ask bidders to present proposals for equipment, maintenance and operation.

The Public Service Commission, in deciding to issue these plans at this time, acted against the protest of one of its members, Commissioner Bassett, who holds that the cost will be

under nearly enhanced by having the tunnels two feet higher and seven feet broader than the present railways. This, for instance, means the cost without increasing the capacity. These plans for larger tunnels (to complete the way of full size standard cut or trunk line railways). The routes on which work is to be done are divided into 75 sections, and complete plans have been provided for each. For these bodies of plans and specifications bidders have to pay \$5 each, or \$100 for the entire set. For the contract terms \$1 each must be paid. The commission has used 75 tons of paper for these plans and specifications, and the work of making maps, has cost \$20,000.

Under the rapid transit law, as it now stands, these subways are to become the property of the city as soon as built, and competition is expected to take the shape of differences in the length of the term of the proposed lease. In bids for doing the work with the city's money, contractors are not to name lump sums, but must propose unit prices for the different kinds of work. The commission reserves the right to reject unbalanced bids. The city will acquire all real estate, rights and easements. Work must be begun within 60 days after the delivery of the contract. It is expected that the work can be done within four years, and there will be a clause empowering the city to retain 1 per cent. a month from the monthly payments if a contractor fails to complete the work in the time agreed upon.

The Trial of the Alleged Illinois Central Grafters.

The trial of E. B. Harriman, Charles L. Ewing and J. M. Taylor, formerly officers of the Illinois Central, charged with "grafting" in connection with the repair of cars for this road, continued last week in the municipal court of Chicago. F. C. Tarbot, formerly an employee of the Ostermann Manufacturing Company, testified as to how he and other employees of this company had removed parts from cars belonging to the Illinois Central, and put them on other cars, after which the Illinois Central had paid for these "repairs." Clarence H. Polley, formerly chief clerk of H. C. Ostermann, of the Ostermann Manufacturing Company, testified that in a space of four months, under orders from Mr. Ostermann, he had sent in bills for the repairing of 400 cars which had never been inside the Ostermann shops. He identified the original bills, which were produced in court, and which amounted to about \$75,000. He said that the numbers of the cars entered on the bills were taken as the cars were being drawn along the track of the road adjacent to the Ostermann Company's plant by a switching engine. The bills were stamped with the name of R. Roth, car inspector of the Illinois Central at the Ostermann plant, to indicate that they were correct. Polley said that this stamp was sometimes put on the bills by himself and sometimes by Roth. He said that the Ostermann Company had certain standard rates that were charged for the alleged repairs of the cars, these rates being varied somewhat in the bills so as to make it appear that they had been charged for repairs actually made under different circumstances. The evidence given tended to indicate that a very large number of former officers and employees of the Illinois Central were cognizant of what was being done, and were sharing in the Ostermann Company's alleged fraudulent profits.

Popular Prejudice.

On what is probably the loveliest sheet of fresh water in the eastern states, Moosehead lake, in northern Maine, there is a little steamship company which plies from landing to landing over its 40-mile length. It has a maximum rate of \$1.50 a ton for the freight it carries. There are three railways from which it can collect freight, there is no competition, and the rate itself does not seem unreasonable for the service performed.

The rate, in fact, when compared to that charged by private carriers, seems hopelessly inadequate. In the winter, a private individual, by means of sticking evergreens into the snow, marks out for himself a track over the ice, and teams the local freight on sledges. His charge is never less than \$12 a ton, and if the weather is stormy and the snow inclined to drift he will charge \$20, and get it.

Compared with the charge of the steamboat company, this looks like an extortionate monopoly. The Maine public, however, has developed a special conscience as regards corporations which would delight the heart of Mr. Roosevelt and others like

him. The agitation against the steamboat rates is continuous. None of the complainants seems willing to start competition, although it cannot be pretended that there is any exclusive right of way over the lake. The impression seems to be rather that an individual may make handsome profits, but that good faith cannot be assumed in a corporation unless it is manifestly on the narrow edge of bankruptcy all the time.

This is no exaggeration. A protesting Maine shipper said publicly that the rates charged by the railways serving his state, particularly the Maine Central and the Bangor & Aroostook, must be excessive, because those roads had not given evidence of their good faith by going through a receivership. It is a condition of mind with which it is useless to reason, because the agitator of this type does not want to know the facts. He wants something for nothing, and our complaisant politicians are willing to give him what he wants, so long as the gift is made at a corporation's expense.

Public opinion has become positively diseased on the question of corporation rights. It is hardly possible to name a prominent politician who is not so cowed by popular clamor that he is afraid to tell the public when it is wrong. This newspaper holds no brief for the corporations, and they probably fear its criticism far more than that of the noisiest politician of them all; but in this senseless agitation against corporate industry the American citizen is cutting off his nose to spite his face.—*Wall Street Journal*.

The Federal Stock and Bond Commission.

President Taft, on Saturday last, announced the names of the men whom he has appointed members of the commission authorized by the Interstate Commerce law of last June to investigate the question of federal regulation of railway stock and bond issues. The chairman is Dr. A. T. Hadley, president of Yale University, author of "Railroad Transportation," and well known as an expert in railway finance and in the relation of the railways to the public. The other members are F. N. Judson, of St. Louis; Frederick Straus, of New York; Walter L. Fisher, of Chicago, and Prof. B. H. Meyer, of Madison, Wis. Mr. Judson is a graduate of Yale and author of several books on Interstate Commerce and other legal questions. In 1890 he was counsel for the government in the case against the Santa Fe concerning rebates paid to the Colorado Fuel & Iron Company. Mr. Straus is a member of the firm of Seligman & Co., bankers, New York City. Mr. Fisher was attorney for the city of Chicago in the settlement of the complicated relations between that city and the railway companies four years ago. He is said to be the author of the plan whereby the city and the street railways now divide the profits from the operation of the lines. Prof. Meyer is chairman of the Wisconsin State Railway Commission and has written valuable books on railway subjects.

Railway Facilities in New York 55 Years Ago.

From a time-table of the old New York & Harlem Railroad dated Dec. 17, 1855, it appears that this line furnished the first real rapid transit that Harlem and the Borough of the Bronx enjoyed. There were 12 trains each way per day for passengers. Of these one was a milk train and another was a way freight, which carried way passengers. One train was an Albany express, running to Chatham Four Corners, where it connected with the Western (Boston & Albany) Railroad; one was a Dover Plains express, three White Plains trains, and five were Williamsbridge trains.

With the exception of the freighter, all these trains started from the Tryon Row Station, where the old Staats-Zeitung building stood (near the city hall, about three miles south of 42d street). They were drawn by teams of four horses [four to each car] as far as 32d street, where the locomotive was attached, stopping on the way at Canal street, Broome street, Houston street and Eighth, Sixteenth and Twenty-sixth streets for passengers. Travel was slow under these circumstances, and if a man missed his train at Tryon Row he boarded the first northbound horse car, and it was about an even chance whether he would arrive at 32d street before the train or too late.

At Broome street there was a ticket office, with a siding for two and sometimes three or more cars, which fell in behind the first car from City Hall. The conductor was always on the last car, so that if there was any delay, detention or other trouble the car would not be left behind. At Broome street a

ticket agent boarded the train and sold tickets to all who were without them. His coat was a curiosity in its way, being covered with little pockets, each being for tickets for a different destination. There were ticket stations at Yorkville, now 86th street; Harlem, now 125th street; Mott Haven, Melrose, Morrisania and Fordham. The first train in the morning left White Plains at 5 o'clock and arrived at City Hall at 6.45. Even in those days the people boasted of some luxuries. One was the theatre train, which started from City Hall at 1.20 p.m., but went no further than Williamsbridge (10 miles from 42d street; now in New York City). In those days 42d street, now the Grand Central Station, was but a signal station.

One of the rules read: "Trains coming into New York must not be detached from the engine until they have passed 42d street."

The engine house at this time stood on the west side of Fourth avenue, where the Park Avenue Hotel stands; after the engine was detached it ran ahead, while the cars ran by their own momentum to 27th street, where horses were hitched and drew them down to City Hall. The passenger cars, heated by wood fires, were lighted by small lamps at either end. These shed but little light, so it became a practice with many of the commuters to carry pocket or folding lamps which burned candles.

Some of the trains went as far as Mott Haven, turned around and went back again. The only house there was a little tavern on the east side that was patronized by target companies, as was also the River House, which was on the Manhattan side of the Harlem river, at Fourth avenue, near 132d street. Fordham also had an engine shed, and previous to 1855 a train started there over night and left in the early morning.—*New York Times*.

Estimates for Subways in Toronto.

The city of Toronto, Ont., has been considering the construction of subways to relieve the congestion of traffic on some of its principal streets in the center of the city, and has had the subject reported on by Forgie, Jacobs & Davies, of New York. Lines were considered which would cover a dozen miles of streets and cost \$24,000,000, but the engineers reported, in substance, that the congestion is not yet very severe and that probably it will be 10 years before such a system would be self-supporting. And it would be essential to have the underground line operated in connection with the surface lines now in existence. In 20 years, however, that is to say, in 1930, Toronto will feel acutely the need of additional transit facilities. The engineers recommended that, when the subways are built, they be made close to the surface; that the funds for construction be raised by pledging the credit of the city, and that equipment and operation be let to an outside company.

Association of Railway Electrical Engineers.

At the convention of this society to be held September 27-30 at the La Salle Hotel, Chicago, papers will be presented on the following subjects: "Electric Lighting of Railway Cars," "Axle Generating Systems," "Electric Traction on Trunk Lines," "Motor Driven Machine Tools," and "The Illumination of Railway Passenger Stations and Machine Shops."

The officers of the association are: E. M. Cutting, Southern Pacific, president; J. R. Sloan, Pennsylvania, vice-president; F. R. Frost, electrical engineer A. T. & S. F., second vice-president; George B. Colgrove, chief electrician, Illinois Central, secretary and treasurer.

Western Canada Railway Club.

The first regular meeting of the fall season will be held September 12 at the Royal Alexandra Hotel, Winnipeg, Can. A paper, "Should the Brake Power on Freight Cars be Increased?" which appeared in the May proceedings of the club, will be read by Thos. Clegg, air brake instructor, Canadian Pacific.

New York Railroad Club.

The first regular meeting of this club for the fall season will be held on Friday evening, September 16, at the United Engineering Societies building, 20 West Thirty-ninth street, New York. B. S. Truckley, engineer of tests, New York, New Haven & Hartford, will present a paper entitled "The Testing Department of a Railroad."

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings and places of meetings.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 33 State St., Boston, Mass.
 AMERICAN ASSOCIATION OF DETAILERS OFFICERS.—A. G. Thomason, Scranton, Pa.; next meeting June 22, 1911; Niagara Falls, N. Y.
 AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn.
 AMERICAN ASS'N OF LOCAL FREIGHT AGENTS ASS'N.—G. W. Denison, Penna. Co., Toledo, Ohio.
 AMERICAN ASS'N OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carey Bldg., Cincinnati, Ohio; Sept. 9-10; St. Louis.
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York; September 10, 16; St. Louis, Mo.
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 18-20; Denver, Colo.
 AMERICAN RAILWAY ENGINEERING AND MAINT. OF RYASS'N.—E. H. Fritch, Monadnock Bldg., Chicago; March 21-23, 1911; Chicago.
 AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; May 9, 1911; Detroit, Mich.
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago.
 AM. RAILWAY TOOL FOREMEN'S ASS'N.—O. T. Harroun, Bloomington, Ill.
 AM. SOC. FOR TESTING MATERIALS.—Prof. E. Marburg, Univ. of Penn., Phila.
 AM. SOC. OF CIVIL ENGS.—C. H. Hunt, 230 W. 57th St., N. Y.; 1st and 3d Wed., except July and Aug.; annual, Jan. 18-19, New York.
 AM. SOCIETY OF MECHANICAL ENGINEERS.—J. J. Haner, 13 Park Row, New York; annual, Sept. 27-29; St. Louis, Mo.
 AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., New York; annual, Dec. 6-9; New York.
 AMERICAN STREET AND INTERURBAN RAILWAY ASS'N.—H. C. Donecker, 29 W. 39th St., New York; Oct. 10-14; Atlantic City.
 ASSOCIATION OF AM. Ry. ACCIDENT INVESTIGATING OFFICERS.—C. G. Phillips, 143 Dearborth St., Chicago; April 26, 1911; New Orleans, La.
 ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; May, 1911; Montreal, Can.
 ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Colegrove, I. C. R.R., Chicago; annual, Sept. 27-30; Chicago.
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston.
 ASS. OF TRANS. AND CAR ACC. OFFICERS.—G. P. Conard, 24 Park Place, N. Y.; Dec. 13-14, Chicago; June 20-21, 1911, Cape May City, N. J.
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
 CANADIAN SOCIETY OF CIVIL ENGS.—Clement I. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal; annual, last week January.
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
 ENGINEERS' SOCIETY OF PENN.—E. R. Dasher, Box 200, Harrisburg, Pa.
 ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 503 Fulton Bldg., Pittsburgh; 1st and 3d Tues. in month, July, 17, 1911, Pittsburgh.
 FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich. Fred. & Pot. R.R., Richmond, Va.; 20th annual, June 21, 1911; St. Paul, Minn.
 GENERAL SUPERINTENDENTS' ASS'N OF CHICAGO.—H. D. Judson, 209 Adams St., Chicago; Wednesday preceding 3d Thursday, Chicago.
 INTERNATIONAL MASTER ROILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; next convention, Omaha, Neb.
 INTERNATIONAL RY. FUEL ASS'N.—J. B. Schuchman, La Salle St. Station, Chicago.
 INTERNATIONAL RAILWAY CLUB.—General Foremen's Association.—L. H. Bryan, 10 & 11 W. 2d Harbor, Mich.
 INT. RY. MASTER BLACKSMITHS ASS'N.—A. L. Woodworth, Lima, Ohio.
 INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels, 1915; Beloit.
 IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August, Des Moines.
 MASTER CAR BUILDERS ASS'N.—J. W. Taylor, Old Colony Bldg., Chicago.
 MASTER CAR PAINTERS ASS'N. OF U. S. AND CANADA.—A. P. Dyer, B. & M., Reading, Mass.; annual, Sept. 13-16; St. Louis.
 NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston.
 NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
 NORTH WEST RAILWAY CLUB.—T. W. Flanagan, Sop Line, Minn.; 1st Tues. in month, except June, July, August, St. Paul and Minn.
 NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, 4th Saturday; Duluth, Minn.
 OMAHA RAILWAY CLUB.—H. C. Christensen, Barker Bk., Second Ward, Railway Club of Kansas City, C. M. & St. P., 1008 Walnut St., Kansas City, 3d Friday in month, Kansas City.
 RAILWAY CLUB OF PITTSBURGH.—D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bath, Me.; 1st Tues. in month, Bath, Me.
 RAILWAY SMOOTHERS ASS'N.—J. P. Murphy, Box C, Collinswood, O.; annual, May, 1911.
 RICHMOND RAILROAD CLUB.—F. O. Robinson, 2d Monday, Richmond.
 RY. MAINTENANCE AND MATERIALS ASS'N.—Walter E. Emery, P. & P. Ry., Chicago, Ill.; annual, Sept. 13-16; Chicago.
 ST. LOUIS RAILWAY CLUB.—R. W. Laughton, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.
 SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Napson, La Salle St. Station, Chicago; Oct. 25 and 26; Hotel Chalmers, Old Point Comfort, Va.
 SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—F. W. Sandbach, A. & W. R. Ry., Montgomery, Ala.; annual, Oct. 20, Atlanta.
 SOUTHERN & N. W. RY. CLERKS R.R. CLUB.—A. J. Merrill, Piedmont Bldg., Atlanta, 3d Thurs. in month, Sept., July, Sept. and Nov.; Atlanta.
 TOLSON TRANSPORTATION CLUB.—J. G. McManister, Woodson Spruce Co., La. Bldg., 1st Sat. in month, May 6, 1911, La. Bldg., La.
 TRANSPORTATION CLUB OF BOSTON.—J. M. Sells, Buffalo, 1st Sat. after 1st Wed. in month, La. Bldg., La.
 TRINITY CLUB OF NEW YORK.—A. A. Swope, 20 Broadway, New York; 1st Friday in month, except June, July and August, New York.
 TRINITY ENGINEERS ASS'N OF AMERICA.—J. E. Mackie, 7042 Stewart Ave., Chicago; annual, June 29, 1911; Baltimore.
 TRAVELING ENGINEERS ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East, Buffalo.
 WESTERN CANADIAN RAILWAY CLUB.—W. H. Roscove, P. O. Box 1702, Winnipeg; 2d Monday, except June, July and August, Winnipeg.
 WESTERN SOCIETY OF ENGINEERS.—I. H. Warden, Monadnock Bldg., Chicago; Wednesdays, except July and August, Chicago.

Traffic News.

The Rock Island has extended temporarily the time during which it will accept passenger bills at 7 1/2 cents a mile to Atlanta.

The Illinois & Northshore carried in August 1,366,112 passengers, a daily average of 44,097. This, compared with 1,667,181 for August, 1909, shows an increase of 24 per cent.

It is estimated that about 75,000 American tourists are now on the other side of the Atlantic, and all of these are expected to arrive home between September 1 and October 1. Steamship agents expect that their passenger travel this year will be the highest ever known.

The steamship lines running between New York City and foreign ports have announced increases of from 7 to 12 cents per 100 lbs. in the freight rates on the principal commodities, to take effect September 1st. This is said to be the ending of a rate war which has been going on for some time.

The Bureau of Statistics of the Department of Agriculture estimates that the average condition of the cotton crop on August 25 was 72.1 per cent. of a normal, as compared with 75.0 on July 25, 1910, 63.7 on August 25, 1909, 76.1 on August 25, 1908, and 73.1 the average for the past ten years on August 25.

The Interstate Commerce Commission has changed from October 1 to December 1 the date on which the railways must comply with the recent order of the commission requiring a reduction of freight rates to interior western points (Salt Lake, Spokane, etc.), to make them more nearly equitable as related to the rates to Pacific coast cities.

The Interstate Commerce Commission has suspended a number of new freight tariffs that have been filed by the Kansas City Southern, and a number of other lines, which discontinue allowances heretofore granted to short "tap lines." The tap lines in question are lumber carriers, and it is charged that the proposed increases of from two cents per 100 lbs. to six cents will cause unreasonable discrimination.

The California State Railway Commission and officers of Wells Fargo & Co. have agreed on reductions in this company's rates amounting to about 16 per cent. The rates for short hauls are not to be changed, but there are to be substantial reductions in those for long hauls. Two months ago the commission issued an order reducing the rates about 19 per cent. The decision to reduce them only 16 per cent. was a compromise adjustment reached after conference with the officers of the company.

The railways of Texas have announced that on cotton sent to Galveston and destined to points out of the state, a reduction of four cents per 100 lbs. will be made at once, provided the Interstate Commerce Commission will waive the 30 days' notice. This decision means that to cotton destined to interstate and foreign ports the rates prescribed by the Texas Railroad Commission will be applied. It is a reduction from the 55-cent interstate to the 51-cent intrastate rate and terminates a rate controversy that has disturbed railway and cotton shipping circles.

The first telegraph tariff filed with the Interstate Commerce Commission, under the revised Interstate Commerce Commission Law, was sent in August 31 by the Telepost Company, 225 Fifth avenue, New York. The Telepost Company has a line from Portland, Me., to Boston, Mass.; one from Chicago to St. Louis and Kansas City, and also has connections to Omaha, Terre Haute, Indianapolis and Louisville. Patrick B. Delany, formerly well known in Western Union Telegraph circles, is consulting engineer of the company. The rates are very low.

The railways generally throughout the southern states have announced regulations for certification of bills of lading for cotton similar to those of the Southern Railway heretofore noticed. Agents are forbidden to give bills of lading until they actually get the cotton; a special agent pastes on the bill of lading a certificate of the genuineness of the signature of the local agent and for shipments to Europe copies of bills of lading will be sent to the agents at the seaboard; but only the original bill of lading will be negotiable. Shippers will be required to accept the conditions by signing the bill of lading.

The Louisville & Nashville has designated 10 agents who will be authorized to validate cotton bills of lading. Some of the railways west of the Mississippi, notably the Rock Island, have adopted these rules.

Chicago Hearings in Rate Advance Cases.

Examiners Brown and Hubert, of the Interstate Commerce Commission, took testimony throughout last week at Chicago in the proceedings involving the advance in rates for which the western railways are seeking the consent of the Interstate Commerce Commission. A feature of the hearings was a constant effort on the part of the attorneys for the shippers who are opposing the rate advances to make it appear on cross examination that the large increases in the operating expenses of some roads have been due to the fact that the managements have been padding the operating accounts. The result of this was that President Ripley, of the Santa Fe, after he had retired from the witness stand, sent to the examiners a statement, which was read into the record by T. J. Norton, general attorney of this road. Mr. Ripley said that in addition to following the requirements of the government regarding the keeping of the accounts, the company has its accounts examined every year by independent auditors, and he included a statement from Price, Waterhouse & Company, in which they certified that they had examined the books of the Santa Fe, and had found them correctly kept. Mr. Ripley's statement concluded as follows:

"If either the Interstate Commerce Commission or the shippers have any doubt respecting the accuracy of Santa Fe records, or of the honesty of the company's course, we hereby tender to them the opportunity of making personal inspection of our books, and we also offer to put at their disposal all the employees that they may need and render them every other assistance in our power to aid in making, for the record in this case, a thorough investigation."

On cross-examination, Attorney Atwood, representing the shippers, questioned Mr. Ripley at much length regarding the capitalization of the Santa Fe. Mr. Ripley testified that in the reorganization of the property in 1896 its securities were so reduced as to lower its annual fixed charges from \$9,000,000 a year to \$1,500,000. He believed that the securities issued on the reorganization represented approximately the cost and the value of the property. He further expressed the belief that the existing capitalization of approximately \$530,000,000 represents about the true physical value of the property. He was asked by Mr. Atwood how much importance should be attached to the factor of capitalization, or the value of the property, in determining the reasonableness or unreasonableness of rates, and replied, "I think that is one of the factors and a very important one. So long as the railways of this country are run by private capitalists, so long their return has got to be both safe and attractive. The maker of the rate, in the first instance, must so make the rate as to permit of the freest interchange of commodities, regardless of the capital of the railway and almost regardless of the cost of the service. That is what the maker of the rate has got to do if he is going to get the best out of his property. When it comes to limiting the rate by law, it is another proposition. Then you have got to consider the cost, interest on capital, and everything else. So long as the rate-maker makes a rate that does not bear heavily on any community and permits the very fullest interchange of commodities all over the country, thereby helping commerce, so long he ought not to be interfered with. As to the Interstate Commerce Commission, I think it should consider the value of the service to the shipper first and foremost, and give to the question of the cost and the valuation of the properties altogether secondary consideration. If there was one railway in this country reaching from east to west, with no competition, on which you were to fix the rates absolutely *de novo*, with the fixed idea of producing a return on the investment in it, that would be one question. Then you would have to take into account its capitalization. You would have to take into account the cost of the service. But no such condition exists in this country. The rates must be made on an entirely different basis. This idea that rates ought to be based on cost is a fallacy. The defenses on the basis of cost that have often been made by railways against proposed reductions in rates have had their foundation in fact as arguing against an arbitrary legal reduction in rates, but in forming the judgment of what a rate ought to be, the matter of cost should play a very small

part." Mr. Ripley was followed on the witness stand by W. E. Bailey, general auditor of the Santa Fe, who gave many statistical details to substantiate the more general statements which had been made by Mr. Ripley.

James Peabody, statistician of the road, estimated that if the advances in rates which were in question at the hearing went into effect the earnings of the Santa Fe would be increased about \$95,000 a year. He said that, whereas between 1903 and 1910 the mileage of line of the Santa Fe had increased 14.6 per cent., its additional trackage had increased 84 per cent. Between the same years freight earnings increased 42 per cent. and freight operating expenses increased 70 per cent. Meantime, taxes have increased 102 per cent. Mr. Peabody stated that the amount paid by the Santa Fe in wages in 1910 was \$7,000,000 more than the amount paid in 1909. An attempt having been made by counsel for the shippers to show that the cost of re-lining a tunnel, over \$700,000, had been charged improperly to operating expenses, Mr. Peabody said that "every year things of that kind occur. In 1903 a very large amount was charged against operation because of floods, the total being about \$1,000,000. These expenses cannot be spread over succeeding or preceding years." Mr. Peabody showed that whereas between 1903 and 1909 the increase in the tonnage of carload freight was 7.41 per cent., the increase in the tonnage of the cars in which it was carried meantime was 11.68 per cent., so that the road had to haul more dead weight in hauling a ton of freight in 1909 than in 1903. He contended that the growth of operating costs illustrates as clearly as anything can the necessity of advancing freight rates. "The money needed for the increased costs and increased facilities," he said, "must be supplied somehow. Either it must come from an advance in freight rates or the roads must borrow money. We cannot borrow money unless we have the increased freight rates, and if we could we would have to have the rate increased to pay interest on the borrowed money. I believe all the railways should provide a sinking fund of 1½ per cent. of the value of their property for meeting expenses which do not increase earnings and that this fund should be supplied out of earnings."

W. A. Potet, chairman of the Trans-Missouri Freight Bureau, placed in evidence the tariffs involved. Counsel for the shippers raised the question whether the rates had been agreed upon at meetings of railway traffic officers, and Mr. Potet stated that they had been. Counsel for the shippers then raised the point that agreements regarding rates were in violation of the anti-trust law, but Examiner Brown stated that the point raised was without merit; that the Commission was investigating the reasonableness of the rates and not the legality of the way in which they were made.

F. O. Melcher, vice-president of the Rock Island, testified regarding various increases in railway expenses. His testimony was briefly referred to in these columns last week. He showed that most of the increases in wages were in pursuance of decisions of federal boards of arbitration. He introduced a table showing that increases in wages made between February 1, 1906, and June 1, 1907, had increased the expenses of the Rock Island \$109,507 a month, and that increases made this year had increased its expenses \$108,280 a month. He gave the following figures showing the actual and estimated increases in expenses that have been or will be caused by wage advances: Fiscal year 1906-07, \$528,000; 1907-08, \$1,314,000; 1909-10, \$1,451,800; 1910-11, \$2,485,000; 1911-12, \$2,612,000. Referring to other changes that had caused increases in expenses he mentioned the fact that steel coaches weigh 139,000 lbs., as against the 113,000 lbs. which wooden cars of the same kind weigh. In consequence, the Rocky Mountain Limited on the Rock Island in 1909 weighed 775,000 lbs., and in 1910 it weighs 833,000 lbs. This increase in the weight of equipment increases the cost of hauling it. A wooden chair car costs \$11,000, while a steel chair car costs \$13,000. In the fiscal year just closed the earnings of the Rock Island increased by \$5,935,000, while its operating expenses increased \$5,555,000.

He stated that he could not foresee any economies which would tend to check the tendency of operating expenses to increase faster than earnings. He also referred to the increase in expenses caused by requirements imposed by federal and state laws, such as the safety appliances law, the hours of service laws, etc. He said he did not criticize such legislation, but said that it does cause increases in expenses. The reciprocal demurrage laws in

the different states had prevented economies in operation and did no one any real good. Referring to the demands of the public for safer and better transportation, he referred to the fact that since 1906 the Rock Island has installed 954 miles of automatic block signals. These signals are now adding to the expenses of maintaining the property at the rate of \$90,000 a year, and in a year or so the road probably will be spending \$150,000 a year in the maintenance of signals. Mr. Melcher read the following statement by the Iowa railway commission, which, he said, expressed his views: "Public attention has been in the past largely given to the subject of freight and passenger rates rather than toward compelling the railways to improve their tracks and roadbed in the interest of safety, and the latter is infinitely more important than the former." He estimated the physical value of the Rock Island at \$404,000,000, which exceeds its capitalization.

Frank Nay, comptroller of the Rock Island, estimated that the proposed increases in rates in question would increase the earnings of the road \$142,700. He said that the operating revenues in 1910 were \$63,080,428, as compared with \$58,053,704 in 1909. The net operating income was \$11,102,000 in 1910, or enough to pay 3.77 per cent. on the road's book value of \$294,314,051. Its net return had decreased since 1907, which was the best year in the thirteen for which he gave figures. The average rate per ton mile had declined from 9.53 mills in 1907 to 9.17 mills in 1910. If the average rate had been as high in 1910 as in 1909 the revenue would have been \$600,000 greater. During July, the first month of the present fiscal year, operating expenses increased \$281,454, and operating income decreased \$379,000, as compared with the same month of 1909. For three weeks of August the freight revenues had decreased \$245,000, and the total decrease for the seven weeks of the fiscal year was \$355,000.

Henry Miller, vice-president and general manager of the Wabash, gave testimony indicating that this road very much needs higher rates. He said that it emerged from a reorganization some years ago without any money in its treasury, and has been in that condition practically ever since. It has never paid a cent in dividends since and has never been able to sell its bonds at par. During the last fiscal year it earned about \$50,000 in excess of its fixed charges, but it has had deficits in many years which have been prevented from throwing it into insolvency only by the borrowing of money for short periods at high rates of interest to tide it over. The road is operated as economically as can be in the circumstances, but it could be operated much more economically if it had the money to spend on needed improvements. Since 1905 it has scrapped 100 locomotives and added 150, but it has not bought a freight car since 1907 nor a passenger car since 1904. In order to handle its business properly it needs new steel cars, more block signals, many new bridges, and second track between St. Louis and Detroit; between Chicago and St. Louis, and for over 100 miles between St. Louis and Kansas City, the traffic on all the parts of the line referred to having become too dense for economical operation on a single track. The wages which the road has to pay have increased \$1,867,154 between 1903 and 1910, and increases in wages aggregating \$300,000 have been made since January 1, and requests for increases from engineers, conductors, brakemen and shop men are under consideration. Payments for loss and damage to freight increased from \$36,328 in 1899 to \$512,892 in 1910. This increase was largely attributable to the rougher handling of trains since the introduction of the automatic coupler. Personal injury claims increased from \$90,832 in 1901 to \$392,454 in 1910. The hours of service law has added \$175,000 a year to the expenses of the road; full crew laws have increased its expenses \$50,000 since 1907, and the safety appliances laws, \$320,833 since 1904.

T. J. Tobin, general auditor of the Wabash, submitted statements showing the results of operation of the Wabash for six years. No dividend was paid during this period. The deficit in 1905 was \$1,459,372; in 1906 there was a surplus of \$509,332; in 1907 a surplus of \$304,165; in 1908 a surplus of \$261,866; in 1909 a deficit of \$19,259, and in 1910 a surplus of \$345,719. The Wabash's taxes increased from \$67,327 to \$97,190 in ten years and the cost of filing and publishing its tariffs was increased \$67,500 in five years by requirements of the Interstate Commerce Commission. The hearing at Chicago was adjourned to September 19.

The Illinois Manufacturers' Association on September 3 sent a telegram to President Taft asking that future hearings be conducted by the full commission instead of by examiners.

REVENUES AND EXPENSES OF RAILWAYS.

Y

Name of road	Mileage operated, per cent of period	Operating revenues			Maintenance of way and structure		Traffic		General		Total
		Freight	Passenger	Inc. misc.	Way and structure	Component	Traffic	Operation	General		
Alabama & Vicksburg	142	\$8,010	\$10,898	\$181,730	\$18,350	\$10,900	\$3,664	\$42,274	\$5,195	100.00	
Ann Arbor	391	78,981	51,590	140,965	22,710	14,369	22,710	47,764	4,204	100.00	
Atlantic Coast	7,419	1,222,461	1,927,414	6,670,380	1,031,160	970,406	186,439	1,990,155	16,437	100.00	
Atlantic Coast & Norfolk	2,003	1,363,753	2,118,094	2,031,804	234,864	240,263	43,192	1,990,155	16,437	100.00	
Boston & Maine	2,243	80,165	42,019	1,157,812	11,350	30,711	11,350	68,301	8,302	100.00	
California & Oregon	2,243	1,585,802	3,751,240	5,011,761	440,687	440,687	1,327,062	3,751,240	81,882	100.00	
Carrollton & Western	330	82,111	16,956	103,814	10,000	32,968	3,619	103,814	10,000	100.00	
Chicago & Eastern Illinois	965	685,928	1,822,009	909,904	111,762	32,000	3,619	103,814	10,000	100.00	
Chicago & North Western	369	7,118	1,169	382,949	101,339	140,369	20,641	166,761	8,889	100.00	
Chicago & St. Paul	7,829	9,968,271	16,917,136	6,014,222	1,088,369	668,375	17,712	2,402,673	18,594	100.00	
Chicago, Indianapolis & Southern	3,329	2,111,604	7,087,371	1,391,706	1,391,706	1,391,706	137,712	2,402,673	18,594	100.00	
Chicago, Rock Island & Pacific	7,396	2,584,190	1,740,498	1,088,586	865,825	65,825	15,467	1,011,114	19,141	100.00	
Chicago, St. Paul, Minneapolis & Omaha	1,739	7,934,939	4,438,039	1,298,934	247,611	147,089	25,710	449,005	3,829	100.00	
Cincinnati Northern	218	10,069	25,330	101,752	20,323	35,354	2,634	37,503	3,829	100.00	
Cleveland, Akron & Columbus	212	141,304	52,661	209,236	43,336	3,364	3,016	71,881	3,829	100.00	
Cleveland, Akron & St. L.	1,482	1,401,342	759,000	2,356,981	419,112	433,699	103,905	1,049,806	59,213	100.00	
Cumbyland Valley	490	350,360	37,206	536,355	29,714	33,289	4,378	77,062	5,701	100.00	
Delaware, Indiana & Western	490	749,484	3,007,936	306,362	400,924	100,924	68,121	867,967	24,684	100.00	
Detroit, Toledo & Atlantic	440	192,157	58,563	25,161	56,563	103,809	3,014	80,342	5,291	100.00	
Detroit, South Shore & Eastern	605	191,180	105,507	311,492	56,563	103,809	3,014	80,342	5,291	100.00	
El Paso & Northwestern	901	669,304	739,765	136,354	140,969	3,798	3,798	292,612	12,524	100.00	
Elgin, Joliet & Eastern	1,635	693,304	928,330	4,004,107	429,302	171,485	123,433	3,752,519	72,556	100.00	
Evansville & Terre Haute	1,550	2,850,211	99,292	2,954,014	42,307	47,769	5,040	131,945	18,872	100.00	
Florida Gulf Coast	454	114,906	213,859	42,307	47,769	5,040	131,945	18,872	18,872	100.00	
Fort Worth & Denver City	1,233	321,473	126,366	213,859	42,307	47,769	5,040	131,945	18,872	100.00	
Grand Rapids & Indiana	587	931,361	183,725	418,106	72,304	70,225	86,337	3,511,212	30,330	100.00	
Great Northern	7,274	4,066,180	1,887,475	5,792,161	134,233	629,114	86,337	3,511,212	30,330	100.00	
Gulf, Colorado & Santa Fe	1,318	4,066,180	1,887,475	5,792,161	134,233	629,114	86,337	3,511,212	30,330	100.00	
Houston & Texas Central	789	315,191	143,000	493,132	68,905	61,781	17,359	207,678	21,143	100.00	
Lafayette & Western	191	32,561	32,561	118,018	11,201	11,201	1,827	36,769	3,754	100.00	
Lake Erie & Western	80	32,561	32,561	118,018	11,201	11,201	1,827	36,769	3,754	100.00	
Lake Erie & Michigan	1,663	2,669,160	1,111,320	4,079,327	73,886	65,038	15,358	1,038,819	87,441	100.00	
Lake Shore & Michigan	1,433	2,676,894	493,757	3,499,661	484,668	439,661	123,583	1,038,819	87,441	100.00	
Ledgh Valley	3,900	2,274,122	806,120	1,014,885	102,544	109,100	22,672	391,892	33,392	100.00	
Long Island	4,590	2,970,991	985,918	4,201,569	731,336	807,669	92,063	1,419,928	91,053	100.00	
Louisville & Nashville	900	54,661	334,591	759,712	131,151	100,988	8,101	283,147	2,059	100.00	
Louisville, Henderson & St. Louis	922	372,120	334,591	759,712	131,151	100,988	8,101	283,147	2,059	100.00	
Maumee Central	1,746	1,469,360	805,337	2,511,882	399,855	340,378	71,072	951,143	47,014	100.00	
Memphis & Charleston	275	100,336	36,363	171,931	29,752	29,752	4,242	89,993	10,187	100.00	
New Orleans Great Northern	3,857	4,292,991	3,101,738	8,253,339	1,240,000	1,564,314	2,855	35,311	4,285	100.00	
New York Central & Hudson River	2,941	4,292,991	3,101,738	8,253,339	1,240,000	1,564,314	2,855	35,311	4,285	100.00	
New York, New Haven & Hartford	546	609,213	385,410	1,047,884	112,868	112,868	14,125	290,133	2,855	100.00	
New York, Ontario & Western	112	201,098	38,121	333,213	32,725	50,613	5,144	138,355	10,376	100.00	
New York, Philadelphia & Norfolk	603	132,127	231,209	28,232	28,232	28,232	4,824	70,974	14,216	100.00	
New York, Philadelphia & Western	1,951	4,480,550	38,240	2,914,252	28,232	28,232	4,824	70,974	14,216	100.00	
Norfolk & Southern	471	698,576	207,108	965,933	110,014	729,680	96,366	1,848,484	36,336	100.00	
Northern Central	5,814	3,926,134	1,907,908	6,247,336	1,002,909	1,002,909	96,366	1,848,484	36,336	100.00	
Pennsylvania	1,416	3,661,974	769,258	42,773,533	644,211	769,258	76,708	1,038,423	86,336	100.00	
Pennsylvania Co.	3,970	9,090,377	2,988,027	12,938,395	1,831,317	2,344,533	206,125	3,511,170	351,170	100.00	
Pittsburgh & Eastern	351	188,903	58,441	44,692	44,692	44,692	8,023	110,347	10,376	100.00	
Pittsburgh & Lake Erie	2,828	307,323	449,496	1,372,509	166,934	166,934	48,015	577,610	35,020	100.00	
Pittsburgh, Cincinnati & Western	1,191	1,225,086	610,960	1,711,178	258,395	261,610	27,823	675,151	32,701	100.00	
Pittsburgh, Cincinnati & Lake Erie	1,468	2,078,086	718,564	3,341,315	163,463	163,463	13,858	335,585	24,813	100.00	
Railroad	498	11,476	114,011	499,333	44,297	35,340	7,705	100,146	5,471	100.00	
St. Louis Southwestern	773	117,447	112,334	553,492	44,297	35,340	7,705	100,146	5,471	100.00	
Southern Ry.	7,030	3,037,298	1,349,651	4,779,651	505,635	879,911	1,322	1,531,133	21,429	100.00	
Texas & Pacific	1,885	719,362	348,237	1,133,015	173,941	209,416	18,076	362,214	137,869	100.00	
Texas & Western	111	371,933	60,062	462,975	50,813	92,325	7,030	158,268	10,885	100.00	
Tennessee Central	825	37,008	33,390	147,752	14,752	10,580	5,638	35,569	7,408	100.00	
Vandalia	188	75,274	12,933	89,247	135,795	161,715	29,299	314,680	19,821	100.00	
Vicksburg, Shreveport & Pacific	171	3,391	201,216	820,358	135,795	161,715	29,299	314,680	19,821	100.00	
Virginia & Southwestern	188	75,274	12,933	89,247	135,795	161,715	29,299	314,680	19,821	100.00	
Virginian Ry.	470	90,906	22,913	332,247	28,752	34,831	1,408	25,252	3,031	100.00	
West Jersey & Shore	353	162,321	612,990	811,933	28,752	34,831	1,408	25,252	3,031	100.00	

Mileage operated on July 31, 1909:

• 7,459 miles; • 515 miles; • 211 miles; • 867 miles; • 6,976 miles; • 5,311 miles; • 5,669 miles; • 4,498 miles; • 3,441 miles

Mileage operated on July 31, 1909: * 7,459 miles; † 515 miles; ‡ 211 miles; § 567 miles; || 6,976 miles;

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 77-A giving a summary of shortages and

decrease is in group 3 (Central), where the surplus was reduced from 25,256 to 16,602. In this group the surplus box decreased from 15,278 to 7,764. There is a quite general development of slight shortages of all classes, the total having in-

CAR SURPLUSES AND SHORTAGES.

Date.	No. of roads.	Surpluses				Shortages			
		Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.
August 17, 1910	8	180	360	841	155	89	76	0	0
" 2— " 17, 1910.	22	2,966	126	7,093	7,465	19	11	136	47
" 4— " 17, 1910.	21	7,764	352	5,611	2,875	469	180	113	25
" 6— " 17, 1910.	10	1,438	116	367	521	113	252	1,000	0
" 7— " 17, 1910.	20	977	129	1,041	1,157	409	44	148	0
" 8— " 17, 1910.	22	5,507	627	2,907	4,227	178	7	6	100
" 9— " 17, 1910.	3	689	85	0	67	0	0	37	0
" 10— " 17, 1910.	12	3,017	82	3,017	2,202	0	1	9	5
" 11— " 17, 1910.	11	1,168	321	1,000	3,034	50	0	0	30
" 12— " 17, 1910.	19	2,533	710	1,547	5,245	701	92	15	143
" 13— " 17, 1910.	6	695	28	11	856	141	270	30	145
Grand total	164	27,284	2,936	22,770	25,770	2,169	933	1,514	465

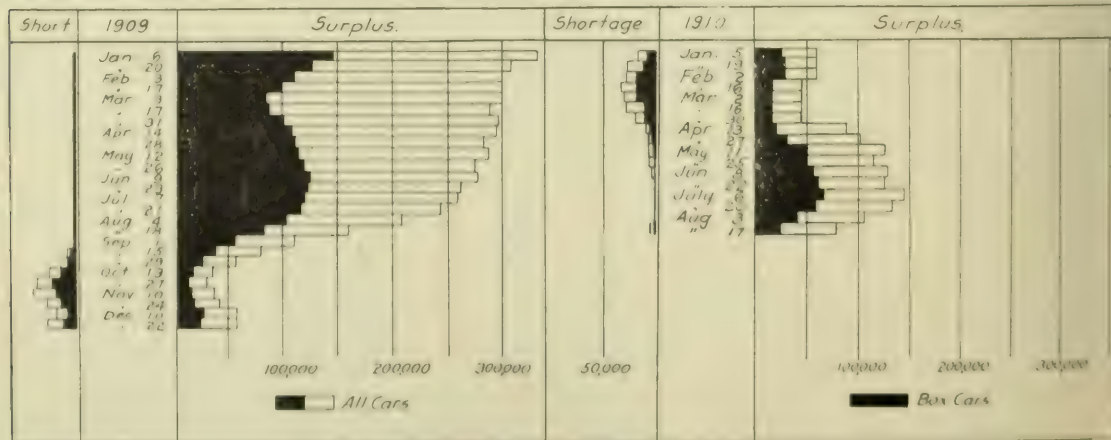
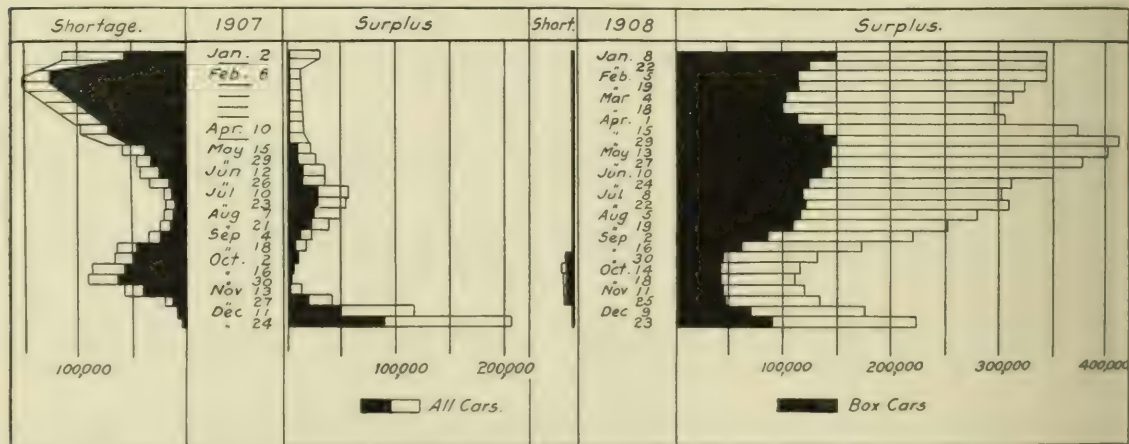
*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan, and Western Pennsylvania lines; Group 4—West Virginia, Virginia, and North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota, and North and South Dakota lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.

surpluses by groups from April 28, 1909, to August 17, 1910, says:

"There has been a further decrease in the surplus of 26,804 cars, being 25.4 per cent. of the total surplus reported in our last bulletin. Of this decrease, 13,756 cars are box, the decrease amounting to 33.5 per cent. of the last surplus reported for this class. Coal cars decreased 6,323, or 21.7 per cent. The largest

creased from 2,783 to 5,081. In group 4 (North Atlantic) there is a scarcity of coal cars, the shortage of this class in that territory totaling 1,000 cars."

The accompanying table gives car surpluses and shortages by groups for the last period covered by the report, and the charts show surpluses and shortages in 1907, 1908, 1909 and 1910.



Car Surpluses and Shortages in 1907, 1908, 1909 and 1910.

Railway Earnings and Expenses in Texas.

The Texas Railway Commission has made public statistics of the earnings and expenses of the railways in that state for the year ending June 30, 1910. They show that while gross earnings increased 4.5 per cent., operating expenses increased 6.67 per cent., so that there was a decrease in income from operation as compared with last year. The following are the figures: Freight earnings, \$165,485, increase \$7,339,181, or 4.50 per cent.; Passenger train earnings, \$35,115,89, increase \$1,763,418, or 5.04 per cent.; Other earnings, \$1,436,777, increase \$113,777, or 7.92 per cent.; Gross earnings, \$212,310,657, increase \$20,465,747, or 9.64 per cent.; Operating expenses, \$222,602,47, increase \$14,191,899, or 6.67 per cent.; Income from operation, \$22,121,138; decrease \$115,022, or .52 per cent.

The Small Burden of Freight Rates

People seem to be doing a little figuring of late on their own hook concerning freight rates. A party of Topekans who were discussing this subject the other day told some personal experi-

ences. A barrel containing two sets of dishes, worth \$2.00 at retail, arrived at a Topeka freight house from a factory in Pennsylvania. It weighed about 175 lbs. It seemed that it was necessary for three different railroads to haul this barrel of dishes on its journey of about 1,100 miles. The freight charges amounted to \$1.15.

"And," continued the man who paid the freight bill, "it cost me 35 cents to have the same barrel hauled from the freight depot a short three-quarters of a mile to my home." *—Topeka State Journal.*

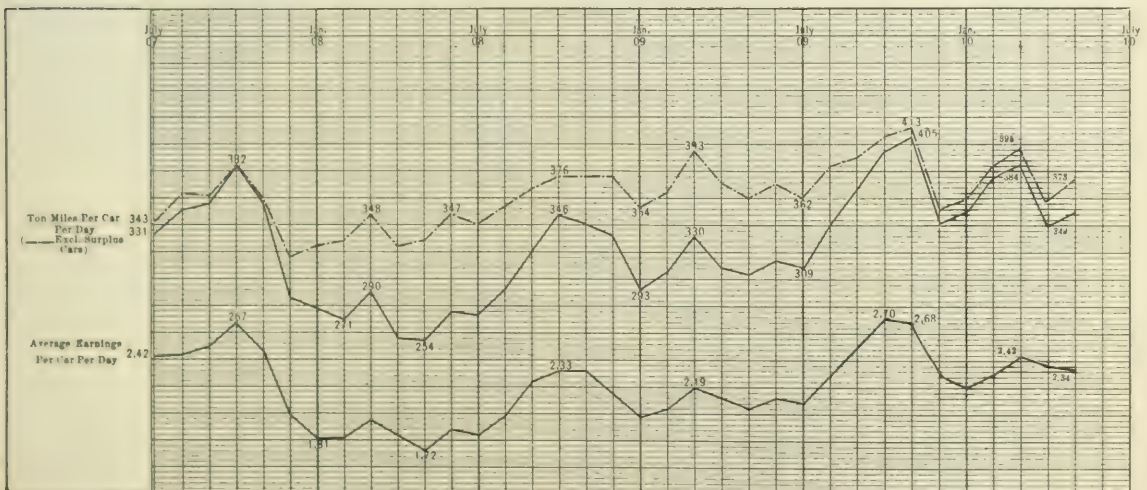
Freight Car Balance and Performance

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 80, covering car balance and performance for May, 1910, says:

"The performance during May was very similar to that recorded for April. There was a further reduction in the use of foreign cars, and the per cent. of cars on their home lines increased from 56 per cent. to 58 per cent., with a reduction in



Car Performance in 1907, 1908,, 1909 and 1910.



Car Earnings and Loading in 1907, 1908, 1909 and 1910.

CAR BALANCE AND PERFORMANCE IN MAY, 1910.

	N. Y., N. J., Del., Md., Eastern Pa.	N. Y., N. J., Va., W. Va., No. and So. Carolina, Pa.	Ky., Tenn., Miss., Ala., Ga., Fla.	Ill. Wb., Minn., Iowa, Mo., Okla., Kan., Colo., Neb., Dakotas.	Mont., Wyo., Idaho, Nev., Cal., Ariz., Texas, New Mex.	Canadian Lines.	Grand Total.
Revenue freight cars owned	77,455	688,012	200,104	174,006	385,742	17,334	1,235,344
Average number of system cars on line	87,440	378,432	125,338	91,780	245,469	62,410	1,235,344
Revenue freight cars owned	39,925	271,918	103,025	62,291	145,001	12,973	516,098
Revenue freight cars owned	77,408	658,450	228,263	157,913	423,070	19,213	2,083,802
Excess	3	16	109	85	140,771	9,310	2,083,802
Per cent of cars on line to total owned	48	56	60	53	71	36	58
Home	92	40	40	37	39	74	10
Foreign	100	96	109	85	110	133	98
All railways	3,018	30,001	10,708	6,516	16,087	1,117	99,116
Private cars on line	80,480	690,031	238,971	154,371	433,097	20,300	2,183,398
Total, all cars on line	149	1,378	619	792	5,04	1,91	5,04
Per cent of cars on line to total owned	112	10,137	2,790	2,588	6,467	408	33,099
No. of freight engines owned	69	68	86	54	68	11	62
Average cars on line per freight engine owned	14,001.613	322,540.297	102,116.118	127,488.938	305,310.946	24,438.462	1,661,907.065
Total freight-car mileage	17.9	24.4	21.9	24.7	22.6	38.7	24.1
Average miles per car per day	73.2	66.1	67.3	68.6	69.5	73.1	68.2
Per cent of freight including Company's freight	307,836.649	8,106,756.210	2,803,067.107	1,922,307.496	1,094,944.925	27,487,076.1	22,318,189.8
Average ton-miles, including Company's freight	11.3	15.5	15.2	13.4	12.0	15.9	14.3
Per ton-mile	15.0	23.5	23.0	18.7	18.1	21.0	21.1
Per loaded car mile	202	339	335	358	361	644	349
Gross freight earnings	\$5,814,103	\$18,110,809	\$13,812,409	\$11,051,052	\$29,073,575	\$3,092,296	\$1,07,080,572
Average freight earnings: Per car owned	\$2.43	\$2.27	\$2.11	\$2.43	\$2.43	\$2.69	\$2.43
Per railroad-owned car on line	2.45	2.38	1.96	2.41	2.22	3.19	2.45
All cars on line	2.34	2.25	1.87	2.31	2.13	4.90	2.34

the loaded mileage to 68.2 per cent. in May as against 68.7 per cent. in April. Compared with May, 1909, however, the cars on home lines were materially less, the difference amounting to 16 points in the percentage, or over 300,000 cars.

"Shop cars show an increase from 5.55 per cent. to 5.99 per cent., a natural result for this period of the year. The miles per car per day show an improvement from 24.0 to 24.4. This average, excluding idle equipment, was 26.1.

"There was an increase in the tons per loaded car from 20.9 in April to 21.1, and in the ton miles per car per day from 340 to 349. Earnings per car per day decreased from \$2.35 to \$2.34. These results reflect the improvement in coal traffic during the month."

The table shows car balance and performance for the period covered by the report, and the charts show earning and performance figures in the last three years.

Freight Rate Hearing in New York.

Messrs. George N. Brown and Frank Lyon, representing the Interstate Commerce Commission, resumed in New York on Wednesday of this week the hearing on the reasonableness of the extensive advances in freight rates which were announced last June by the Trunk lines and which were suspended until November 1 at the request of the commission. The hearings are held in the Waldorf-Astoria hotel. The Trunk Line Association was represented at the hearing by C. C. McCain, chairman. Among the railway men present were: Daniel Willard, Hugh L. Bond and George F. Randolph, of the B. & O.; D. W. Cooke, of the Erie; John B. Thayer and F. I. Gowen, of the Pennsylvania; G. W. Kretzing, of the Grand Trunk; Edgar J. Rich, of the Boston & Maine; W. C. Kallman, of the New York Central; A. Patriarche, of the Pere Marquette, and R. T. Haskins, of the New Haven.

Among the representatives of shippers are: F. B. Montgomery, chairman of the Shippers' Traffic Committee, of Chicago; E. E. Williamson, commissioner of Receivers and Shippers' Association, Cincinnati; H. C. Barlow, traffic director of the Chicago Association of Commerce; Clifford Thorne, of Washington, Iowa, counsel for the Corn Belt Meat Producers' Association and Farmers' Crop and Grain Dealers' Association, and John H. Atwood, of Kansas City, Mo., general counsel; Francis B. James, attorney for the Shippers' Association and National Industrial Traffic Leagues, and Louis R. Brandeis, of Boston, counsel for the Seaboard shippers' organization. In this capacity he represents the Chamber of Commerce of the state of New York, the Merchants' Association of New York, Boston Fruit and Produce Exchange, Richmond Chamber of Commerce, Baltimore Board of Trade, Philadelphia Chamber of Commerce, Boston Chamber of Commerce and others.

Mr. Prouty Discountenances Reports That Railway Accounts Are Padded.

Commissioner Charles A. Prouty, of the Interstate Commerce Commission, at Chicago, September 2, repudiated stories alleged to have emanated from the office of the Commission in Washington to the effect that the accounts of the railways have been padded in order to strengthen their claim for an increase in rates. Mr. Prouty is fully convinced that the railways are keeping their accounts in the manner prescribed by the Commission.

STATE COMMISSIONS.

The State Railroad Commission of Louisiana proposes to make a general reduction in the rates to be charged by the express companies of the State and has issued a distance tariff showing the proposed rates. A hearing will be held at Baton Rouge, September 29.

The State Railroad Commission of Louisiana is considering the adoption of changes in its car demurrage rules and proposes to let down the bars for the farmers in very liberal fashion. Where freight is to be hauled in wagons three miles, the commission proposes to require the railways to allow 120 hours additional free time (or seven days in all); and where it is to be hauled 10 miles, 168 hours additional free time. A hearing is to be held at Baton Rouge, September 27.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

John Blackett has been appointed auditor of the Coahuila & Zacatecas, with office at Saltillo, Coahuila, Mex., succeeding Longfellow Matthews.

Donald T. Morris, executive assistant to Charles O. Kanger, president of the Philadelphia Rapid Transit Co. at Philadelphia, Pa., has resigned, effective September 15.

W. B. Jansen, vice president and assistant to the president of the Atchison, Topeka & Santa Fe at Chicago, has resigned on account of ill health. E. J. Engel has been appointed assistant to the president and will succeed to the duties of Mr. Jansen.

The officers of the Brockville, Westport & Northwestern are now as follows: D. B. Hanna, president; J. D. Morton, vice president; L. W. Mitchell, treasurer, and R. P. Ormsby, secretary, all with offices at Toronto, Ont. D. B. Hanna is president, J. D. Morton general auditor, L. W. Mitchell treasurer and purchasing agent of the Canadian Northern Quebec.

The officers of the Central Arkansas & Eastern, which is building a new line in Arkansas, are as follows: R. M. Foster, president; E. P. Melson, secretary; G. K. Warner, treasurer; S. H. West, general attorney; S. C. Johnson, general auditor, all with offices at St. Louis, Mo., and S. G. Seabrook is claim agent, with office at Pine Bluff, Ark. All these officials are officers also of the St. Louis Southwestern with the exception of R. M. Foster and E. P. Melson.

Operating Officers.

Charles W. Kouns, general manager of the western lines of the Atchison, Topeka & Santa Fe, has been appointed general manager of the eastern lines, with office at Topeka, Kan., succeeding James E. Hurley, deceased. Mr. Kouns was born on



C. W. Kouns.

October 22, 1854, at New Holland, Ohio, and began railway work in 1871 as a telegraph operator on the Kansas Pacific, now a part of the Union Pacific. Two years later he was made train despatcher on the same road, and in 1876 was appointed train despatcher of the International & Great Northern. The following year he was appointed chief clerk to the master of transportation of the Galveston, Harrisburg & San Antonio, and from 1877 to 1880 he was consecutively freight conductor, chief train despatcher and trainmaster of the International & Great Northern. He went to the Missouri Pacific in 1880 as train despatcher of the Eastern division, and the following year returned to the International & Great Northern as trainmaster. In 1883 he was appointed master of transportation of the Galveston, Harrisburg & San Antonio, and two years later was made division superintendent on the Union Pacific. In 1888 he went to the Atchison, Topeka & Santa Fe as superintendent of transportation. He held this position till 1907, when he was made assistant to the second vice-president. In March, 1909, he was appointed general manager of the western lines of the same company, which position he has held until now.

A. H. Otis has been appointed general manager of the Ocean Shore Railway, with office at San Francisco, Cal.

G. S. Flournoy, assistant general manager of the Fitzgerald, Ocilla & Broxton at Fitzgerald, Ga., has resigned.

M. E. Eager, superintendent of transportation of the Oregon & Washington at Tacoma, Wash., has been appointed superintendent, with office at Tacoma.

E. F. Hinchell has been appointed an accountant in the Comstock, Bluffton & Chicago, with office at Huntington, Ind., succeeding D. R. Taylor.

F. C. Fox, general superintendent of the Eastern district of the eastern lines of the Atchison, Topeka & Santa Fe, has been appointed general manager of the western lines, with office at Amarillo, Tex., succeeding C. W. Kouns, promoted.

The following officers of the St. Louis Southwestern have had their authority extended over the Central Arkansas & Eastern, a new line building in Arkansas: J. W. Maxwell, general superintendent, Tyler, Tex.; E. A. Peck, superintendent, Pine Bluff, Ark., and F. J. Hawn, superintendent of transportation, Tyler.

J. O. Kelly, trainmaster of the Missouri Pacific at Jefferson City, Mo., has been appointed a trainmaster of the International & Great Northern, with office at Palestine, Tex., in charge of the Longview, Palestine, Galveston and Mincola sub-divisions. W. E. Miller has been appointed trainmaster of the Taylor sub-division, including Palestine yard, with office at Palestine.

In accordance with the Hine system of organization which has been established on the Southern Pacific Lines in Oregon and the Oregon Railroad & Navigation Company, the titles of general superintendent, superintendent of motive power and chief engineer have been abolished, and the following officers will hereafter be designated as assistant general manager: M. J. Buckley, general superintendent at Portland, Ore.; George W. Boschke, chief engineer at Portland; J. F. Graham, superintendent of motive power at Albina, Ore.; C. G. Sutherland, chief clerk to the general manager at Portland, and J. D. Stack, an assistant division superintendent on the Sacramento division of the Southern Pacific.

Traffic Officers.

M. E. Snyder has been appointed a traveling freight agent of the Northern Pacific, with office at Spokane, Wash., succeeding E. L. Hanke.

W. F. Gleeson has been appointed general freight and passenger agent of the Ocean Shore Railway, with office at San Francisco, Cal.

W. T. Dunne has been appointed a traveling freight agent of the Chicago, Peoria & St. Louis, with office at Chicago, succeeding L. Williams.

A. D. Aiken has been appointed a commercial agent of the Rock Island Lines west of the Mississippi river, with office at McAlester, Okla.

Herbert Wiley has been appointed a general agent in the passenger department of the Chicago, Indianapolis & Louisville, with office at Chicago.

F. D. Hunter has been appointed a general agent of the Chicago, Burlington & Quincy, with office at Billings, Mont., succeeding H. H. Swearingen.

Einar Olsen, auditor of the Coahuila & Zacatecas, has been appointed traffic manager, with office at Saltillo, Coahuila, Mex., succeeding E. C. Farrell, resigned.

H. R. Grier, general agent of the Tonopah & Goldfield at Goldfield, Nev., has been appointed district freight and passenger agent, with office at Goldfield, and his former position has been abolished.

H. St. John Waggaman has been appointed a commercial agent of the Houston East & West Texas and the Houston & Shreveport, with office at Houston, Tex., instead of traveling freight agent, as was previously announced in these columns.

H. O. Young, traveling freight agent of the Minneapolis, St. Paul & Sault Ste. Marie, at Boston, Mass., has been appointed New England agent, with office at Boston, succeeding H. A. Kennedy, deceased. H. J. Jernegan succeeds Mr. Young.

Percy R. Flanagan has been appointed general agent of the Chicago Great Western, with office at Spokane, Wash., succeeding W. E. Pinckney, resigned to go into other business. J. H.

Dengel, commercial agent at Kansas City, Mo., has resigned to go into other business.

W. J. Brown has been appointed a traveling agent of the Kansas City, Mexico & Orient, with office at New York, succeeding G. M. Guthridge, and J. F. Waggoner has been appointed traveling agent, with office at Los Angeles, Cal., succeeding H. K. Campbell.

E. M. Winstead, traveling freight agent of the St. Louis Southwestern at Houston, Tex., has been appointed commercial agent, with office at Houston, succeeding G. M. Winstead, resigned to engage in other business. Martin Henninger, soliciting freight agent, succeeds E. M. Winstead, and J. Bodenheimer succeeds Mr. Henninger.

H. E. Farrell, freight traffic manager; J. P. Park, general freight agent, and E. W. LaBeaume, general passenger and ticket agent of the St. Louis Southwestern, all with offices at St. Louis, Mo.; and F. H. Jones, general baggage agent of the St. Louis Southwestern of Texas, Texarkana, Tex., have had their authority extended over the Central Arkansas & Eastern.

G. M. Kridler, general agent of the Lake Shore & Michigan Southern, the Lake Erie & Western, the Toledo & Ohio Central and the Zanesville & Western, at Pittsburgh, Pa., has been appointed division freight agent of the Lake Shore and the Pittsburgh & Lake Erie, with office at Youngstown, Ohio, succeeding H. F. Ledlie, resigned. B. J. Torbron, commercial agent at Toledo, succeeds Mr. Kridler.

H. C. Miller has been appointed a soliciting freight agent of the Chicago Great Western, with office at Kansas City, Mo. H. E. McElroy has been appointed a traveling freight agent, with office at Pittsburgh, Pa., succeeding G. A. Smith, promoted. R. W. Myles has been appointed a contracting freight agent at Pittsburgh, and E. E. Harold, a soliciting freight agent at Seattle, Wash., succeeding C. L. Lundquist.

C. M. Booth, first assistant general freight agent of the Pere Marquette at Detroit, Mich., has been appointed general freight agent, with office at Detroit, succeeding Percy F. Gaines, deceased. J. E. Williams, chief of the tariff bureau at Detroit, and R. P. Paterson, have been appointed assistant general freight agents, both with offices at Detroit. Mr. Williams will have general supervision of the tariff department and such other duties as may be assigned, and his former office has been abolished.

Engineering and Rolling Stock Officers.

C. M. Stansbury has been appointed master mechanic of the Ocean Shore Railway, with office at San Francisco, Cal.

The office of C. S. Thompson, superintendent of bridges and buildings, Colorado lines of the Denver & Rio Grande, has been transferred from Pueblo, Col., to Denver.

William Gill has been appointed master mechanic of the Iowa Central, with office at Marshalltown, Iowa, succeeding C. E. Gossett, transferred, instead of William Hill, as was previously announced in these columns.

C. Harder has been appointed mechanical engineer of the Kansas City Southern, with office at Pittsburgh, Kan., succeeding R. L. Langston. J. I. McLean has been appointed master mechanic, with office at Pittsburgh, succeeding G. S. Hunter.

The following officers of the St. Louis Southwestern have had their authority extended over the Central Arkansas & Eastern, a new line building in Arkansas: C. D. Purdon, chief engineer; J. S. Berry, superintendent of bridges and buildings, both with offices at St. Louis, Mo.; T. E. Adams, superintendent motive power, Pine Bluff, Ark., and W. J. Williams, superintendent of telegraph, Tyler, Tex.

Purchasing Officers.

H. P. Alden has been appointed purchasing agent of the Missouri, Oklahoma & Gulf, with office at Muskogee, Okla.

C. C. Anthony has been appointed purchasing agent of the Denver, Northwestern & Pacific, with office at Denver, Colo.

N. A. Waldron, storekeeper of the St. Louis Southwestern at Pine Bluff, Ark., has had his authority extended over the Central Arkansas & Eastern.

Railway Construction.

New Incorporations, Surveys, Etc.

ATCHISON, TOPEKA & SANTA FE.—The Santa Fe is seeking an entrance into Waco, Tex., and may use the tracks of either the St. Louis & San Francisco from McGregor northeast for about 20 miles, or the Texas Central from Morgan City southeast about 58 miles. If satisfactory arrangements cannot be made for trackage rights, the company may build its own line into Waco.

The Concho, San Saba & Llano Valley has opened for business the Sterling City district branch from San Angelo, Tex., northwest to Sterling City, 41.4 miles.

BUFFALO CREEK & GAULEY.—This company, which was organized to build from Clay, W. Va., east to Huttonsville, about 75 miles, has laid track on about 13 miles. Work is now under way by C. P. Keeley & Co., Cressmont, W. Va., and Duffield & Reed, Clay. J. G. Bradley, superintendent, Clay.

CHICAGO & NORTH WESTERN.—The James River Valley line, built under the name of the James River Valley & Northwestern, has been opened for business from Gettysburg, S. Dak., south to Blunt, 40 miles.

CHICAGO, MILWAUKEE & PUGET SOUND.—The Tacoma Eastern has finished work on an extension from Glenavon, Wash., southwest to Morton, nine miles. The line is now in operation from Tacoma to Morton, 67.3 miles.

CONCHO, SAN SABA & LLANO VALLEY.—See Atchison, Topeka & Santa Fe.

COVINGTON, BIG BONE & CARROLLTON.—Work has been started, it is said, on an electric line from Covington, Ky., south to Crescent Springs. It is estimated that the line will cost about \$2,000,000.

CUBAN ROADS.—An act has been passed by the Cuban Congress, and approved by the president, authorizing the construction of a railway from Cifuentes, in the province of Santa Clara, west via San Diego del Valle, to La Esperanza. The new line is to connect with the lines of the United Railways of Havana or the Cuban Central.

CUMBERLAND RAILROAD.—An officer writes that a contract has been given to S. P. Condon, Knoxville, Tenn., for building an extension of the main line from the present southern terminus, to Bush Mountain tunnel, in Kentucky, 2.7 miles; also for building the Tye Fork spur, from the extension of the main line, 2.7 miles long.

DULUTH & IRON RANGE.—An officer writes that grading contracts have been given to Carl Hall & Co. and to John Runquist, both of Duluth, Minn., for building a logging spur from Spring Mine, Minn., to Dunka river, easterly about 12 miles, with a branch easterly about eight miles, and work is now under way. The track laying will be carried out by the company's men. Maximum grades will be two per cent. and maximum curvature 10 degrees.

ELIZABETH CITY & ALBEMARLE.—Plans have been made for building a line from Elizabeth City, N. C., south via Weeksville, 13 miles. The work will include a 40-ft. bridge. R. Johnson, Norfolk, Va., is the contractor. C. E. Kramer, president, Edenton, N. C.; Patrick Mathew, chief engineer.

FORT SMITH, SERRANO & EASTERN.—This company, operating a line from Paris, Ark., to Subiaco, six miles, has been extended from Subiaco to Scranton, eight miles.

GARDEN CITY GULF & NORTHERN.—This road is now open for traffic from Garden City, Kan., north to Scott City, 12 miles. (July 15, p. 142.)

GULF & MAGNOLIA NORTHERN.—An officer writes that surveys have started locating the route from Junction City, Ark., northwest towards Magnolia and Hope. It is expected that contracts will be let and work started early in October. The company has under consideration the question of building an extension from Atlanta, Columbia county, or from Threeforks,

Union county, north to Camden, about 40 miles. (Sept. 9, p. 149.)

HENDERSON & MANHATTAN.—The new Henderson street station, Jersey City, N. J., of the Hudson & Manhattan was opened for business, September 6, also a new extension which adds over one mile to the system and prepares the way for the final extension to Newark. Only one-half mile of tunneling will now have to be done in order to connect with the Pennsylvania tracks, over which the entrance will be made into Newark. Construction work is now going on and it is expected that the extension will be finished and in operation by the summer of 1921.

JAMES RIVER VALLEY & NORTHWESTERN.—See Chicago & North Western.

KENTWOOD & EASTERN.—The Bolivar line has been extended from Scanlon, La., to Foley, seven miles.

LEXINGTON & EASTERN.—According to press reports, this company has secured funds for building an extension from Jackson, Ky., southeast into the coal fields of Perry, Knott and Letcher counties, thence to a point in Virginia.

MOBILE RAILWAY & TERMINAL CO.—See Mobile, Ala., under Railway Structures.

MONTROSE & STATE LINE.—Incorporated in Pennsylvania with \$150,000 capital, to build from Montrose, Pa., north to the Pennsylvania-New York state line, 15 miles. The incorporators include: H. E. Paine, president; W. J. Douglas, E. C. Randolph and R. E. Koehler.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, has asked for bids for the construction, equipment and operation of the tri-borough subway and elevated system of New York City, comprising about 44 miles of lines, bids to be opened about October 20. Bids are also asked for the construction of these subways with money to be provided by the city, these to be opened October 27. The bids may be made for one or more of the sections into which the construction work has been divided.

NORTH & SOUTH CAROLINA.—This road has been extended from Dillon, S. C., south to Mullins, 16.9 miles.

OREGON RAILROAD & NAVIGATION CO.—A contract is said to have been given to Twohy Bros. for building the cut-off from a point near Coyote, Ore., on the Columbia river, 25 miles west of Umatilla, southeast to Stanfield, 26 miles. The cost of the work will be about \$800,000. The new line will be about 15 miles shorter than the present line. (July 29, p. 206.)

SAN PEDRO, LOS ANGELES & SALT LAKE.—According to press reports, contracts have been given to the Utah Construction Co. and to Shattuck & Edinger for work on 60 miles of line, which is to be located on higher ground than the existing line between Guelph, Nev., and Crestline.

SOUTH GEORGIA-WEST COAST.—This line has been extended from Perry, Fla., southwest to Hampton Springs, five miles.

STERLING-MOLINE TRACTION CO.—An officer writes that grading contracts are to be let soon to build from Sterling, Ill., southwest via Prophetstown, Morrison, Lyndon, Erie and Hillsdale to Moline. The general contract has been let to the Northwestern Engineering & Construction Co., 1318 Majestic buildings, Milwaukee, Wis. The maximum grades will be about 1 per cent. and maximum curvature 12 degs. There will be four or five steel bridges. W. E. Tuller, president, Morrison, and C. G. Schneider, chief engineer. (July 29, p. 206.)

TACOMA EASTERN.—See Chicago, Milwaukee & Puget Sound.

UTAH ROADS (ELECTRIC).—Application has been made in Logan, Utah, for a franchise. Plans made to build from Wellsville, Utah, north to Lewiston, about 20 miles. L. Nielsen, representing Ogden and Salt Lake capitalists and officials of the Logan Rapid Transit Co., are interested.

WILLIAMSVILLE, GREENVILLE & ST. LOUIS.—Train service has been extended on this road from Hiram, Mo., north to Cascade, 11 miles.

Railway Financial News.

ARIZONA, TEXAS & SALT LAKE.—The stockholders will meet on October 27 on ratifying the lease of the Arizona & California, which runs from the Colorado river to Cadiz, Cal., and of the Fullerton & Richfield; purchasing the capital stock of the Fullerton & Richfield, the Concho, San Sala & El Paso Valley and the Kings River Railway; also on purchasing the capital stock and bonds of the Gulf & Interstate of Texas and the lands of the Texas & Gulf.

BALTIMORE & OHIO.—President Willard is quoted as denying the rumor that the dividend rate will be reduced. After mentioning the improvements planned, particularly in train service, he said: "If conditions become such that there is any likelihood of our earnings not being sufficient to maintain the present 6 per cent. rate on the common stock, we will simply suspend all but the most necessary improvements. There are many thousand owners of the common stock of the Baltimore & Ohio, and these people bought it because they thought it would pay them 6 per cent. on its par value, and we are going to do our best to see that they are not disappointed."

BEAUMONT, SOUR RIVER & WESTERN.—The Texas Railway Commission has authorized the registration of \$1,855,528 temporary new first mortgage bonds, based on the valuation of the road made by the commission. The issue of \$266,566 was canceled and the new bonds substituted.

CENTRAL NEW ENGLAND.—A payment of 5 per cent. on the \$7,250,000 general mortgage, 5 per cent., income bonds has been authorized, payable September 30. Last year 4 per cent. was paid.

CUBA RAILROAD.—An improvement and equipment mortgage, covering all railway lines and other property, now or hereafter owned, has been made to the New York Trust Company as trustee, securing an issue of 50-year, 5 per cent. bonds, issuable on account of improvements, additions and extensions at not exceeding \$12,000 per road mile. These bonds will be subject to the first mortgage 5 per cent., 50-year bonds of 1902.

FLORIDA EAST COAST.—The directors have authorized the payment of 3½ per cent. on November 1 on the outstanding \$20,000,000 general mortgage income 5 per cent., 50-year bonds of 1909.

NATIONAL RAILWAYS OF MEXICO.—This company has bought most of the \$10,000,000 stock of the Pan American Railroad, running from Geronimo, on the Tehauntepec Railway, to the Guatemala border, 286 miles, and the entire \$1,000,000 capital stock of the Vera Cruz & Isthmus, running from Vera Cruz and Cordova to Santa Lucracia, 265 miles.

PAN AMERICAN RAILROAD.—See National of Mexico.

VERA CRUZ & ISTHMUS.—See National of Mexico.

WESTERN PACIFIC.—The company has paid out of its own treasury the September coupons on its \$50,000,000 first mortgage, 5 per cent. bonds. Heretofore the Denver & Rio Grande has advanced money for the payment of this interest, taking Western Pacific second mortgage bonds as security.

The work on the new line from Arica, near the north end of Chile (formerly belonging to Peru), over the west range of the Andes to La Paz, in Bolivia, encounters serious obstacles. On a large part of the line there has been no rain for 40 years, and 75 miles of pipe line have been laid to secure water while building. From a point 26 miles from the sea, 1,955 ft. above it, the ruling grade is 165 ft. per mile for 17 miles, and there is then a section of cog-wheel track for 25 miles, with a grade of 317 ft. per mile. The summit, 119 miles from Arica, is reached at Laguna Blanca, at an elevation of 15,120 ft. The Bolivia end of the line is over a high plateau and not particularly difficult. The firm of John Jackson, Limited, of London, has contracted to build the road by the spring of 1912. The earth work on some 70 miles on the Bolivia end and 60 on the coast end had been completed last May.

Supply Trade Section.

The plant of the Ottumwa Box Car Loader Co., Ottuma, Iowa, was burned August 30, at a loss of about \$100,000.

The Crawford Locomotive & Car Company, Streator, Ill., is entering the field of car building, including freight equipment of all types and steel underframes for passenger or freight cars. The company is also well equipped to handle general repairs, reinforcing and rebuilding of cars.

The Ehret Magnesia Mfg. Company, Philadelphia, Pa., announces that it will on January 1, 1911, commence shipments of Ehret's 85 per cent. magnesia products from its new reinforced concrete plant. This new plant is built upon the site of the buildings which were recently destroyed by fire.

The Davenport Locomotive Works, Davenport, Iowa, had a fire in its plant August 26, which totally destroyed the blacksmith shop and part of the power house. The loss is estimated at \$20,000, which is practically covered by insurance. The fire crippled the company for a time, but all shops with the exception of the blacksmith shop are again working full force.

In order to guard against a shut down due to a shortage of natural gas, the Union Switch & Signal Co., Swissvale, Pa., has placed an order with Tate, Jones & Co., Inc., Pittsburgh, Pa., for equipping all its furnaces, forges, etc., with the Kirkwood auxiliary oil-burning system. When this equipment is installed the change from natural gas to oil can be made very quickly.

Charles F. Kenworthy, until recently with the engineering department of the American Brass Co., and formerly of the Kenworthy Engineering Co., has been engaged by the Rockwell Furnace Co., New York, to represent it in the New England states and Canada. Mr. Kenworthy has devoted his entire time, for the past 18 years, to the design and construction of furnaces and fuel apparatus.

Edward H. Barnes, of Atlanta, Ga., has been made a representative, in the Southern district, of S. F. Bowser & Co., Inc., Fort Wayne, Ind., effective September 1. Mr. Barnes has been in the railway supply business for a number of years and was recently associated with the Bass Foundry & Machine Co., of Fort Wayne. While with this company he attended to its railway interests. Previous to his service with the Bass company he was in the operating department of the Southern Railway for a number of years.

L. T. Canfield, who was recently elected vice-president and manager of sales of the Union Draft Gear Company at Chicago,

has had considerable experience in railway work and in the railway supply business. From January, 1903, to August of the same year he was with the Standard Railway Equipment Company, St. Louis, Mo., and in 1904 he went with the American Car & Foundry Company, New York, with which concern he was connected until December, 1909, first as assistant superintendent in the steel car department at Berwick, Pa., then as shop director at Manchester, England, and later as shop director at Castellarre, Italy. He returned to the United States in February, 1907,

and since December, 1909, has been in the sales department of the Union Draft Gear Company, at New York.



L. T. Canfield.

TRADE PUBLICATIONS.

Conveying Machinery.—The Link-Belt Company, Philadelphia, Pa., has just issued book No. 81, describing the Peck carrier, its most recent development in conveying machinery for coal, coke, cement and similar products. A large number of illustrations show both details and complete installations.

Bird Neponset Products.—F. W. Bird & Son, East Walpole, Mass., have just issued a large circular, 28 in. x 37½ in., telling of the history, growth and various products of the company. The circular is printed in poster style, in two colors. A smaller circular bears a photographic reproduction of this company's first patent, granted in 1825.

RAILWAY STRUCTURES.

DALLAS, TEX.—The Houston & Texas Central has received bids for the new freight house to be built adjoining the old building on Wood street, between Jefferson and Market streets. The new building will be 200 ft. long, 70 ft. wide, and will cost approximately \$10,000. The company expects to have the building ready for service by winter and work will be pushed to that end.

FULTON, ILL.—The Chicago & North Western is building a freight yard and engine terminal point, which is now about half completed. In connection with the yard there will be a 58-stall roundhouse, 80-ft. turntable, modern coaling plant, serving four tracks and having an upper pocket capacity of 800 tons, water station with steel tank of 150,000 gals. capacity, clinker pits with 250 ft. of track, power house, storehouse and hotel and lunch room for employees. All power required to operate the various parts of this plant, such as the turntable, coal hoist, water service pumps, lighting, heating and ventilating fans and shop machinery is to be furnished by two large electric generators located in the power house. The entire steam plant will be in one battery of five 150 h.p. boilers. The approximate cost of the plant is estimated at about \$600,000. (Sept. 2, p. 442.)

JERSEY CITY, N. J.—See Hudson & Manhattan under Railway Construction.

MOBILE, ALA.—The Mobile Railway & Terminal Co. has been incorporated in Alabama with \$500,000 capital. Terminals are to be established about a mile from Mobile on a large tract of land secured for that purpose, and it is understood that tracks will be built into Mobile. J. T. Cochrane, president of the Alabama, Tennessee & Northern and the Tombigbee Valley railways, Mobile, is president; W. G. Cochrane, vice-president; K. R. Guthrie, secretary and treasurer.

MOUNT VERNON, N. Y.—See New York.

NEWBURG, W. VA.—The Baltimore & Ohio has given a contract to Charles A. Simms & Co., it is said, for constructing a reservoir to have a capacity of several million gallons. The reservoir is to cover more than 15 acres, and will be constructed of steel and concrete. On account of the difficulties experienced by the Baltimore & Ohio at Newburg, W. Va., with its water supply it has been decided to construct the large reservoir at that place.

NEW CASTLE, IND.—The Lake Erie & Western will build a passenger station.

NEW YORK.—A contract has been given by the New York, Westchester & Boston, to William Dickinson & Son, Syracuse, N. Y., for building a reinforced concrete passenger station at Pelham Parkway, in the borough of the Bronx, also for similar structures at Dyre avenue, Mount Vernon, and at East Sixth street, Mount Vernon. The value of the contract is \$90,000. (July 15, p. 145.)

WHEATON, ILL.—The Chicago & North Western is asking for bids for a brick passenger station, to cost \$10,000.

Late News.

The items in this column were received after the printed documents were closed.

The Pacific & Idaho has ordered one ten-wheel locomotive from the Baldwin Locomotive Works.

The Louisville & Wadley has ordered one ten-wheel locomotive from the Baldwin Locomotive Works.

The American Express now does business over the San Pedro, Los Angeles & Salt Lake, having superseded the Wells Fargo Express. The American now operates over the Union Pacific, The Oregon Short Line, The Oregon Railroad & Navigation Co. and the San Pedro.

According to a press despatch from Scranton, Pa., Joseph J. Jernyn, president of the Gulf, Texas & Western, has acquired exclusive ownership in the property, including the town sites, coal lines and other subsidiary property. R. C. Megargel, chairman of the board of directors and one of the vice-presidents of the company, has resigned his position, having sold out his interest in the property. This road is now in operation from Jacksboro, Tex., west to Seymour, 75 miles, and it is proposed to extend it northwest to Roswell and southeast toward Dallas.

The Long Island Railroad began running trains into Manhattan, New York City, on Thursday of this week. Previous to the opening, the railway company had run a large number of excursion trains from Long Island towns to Manhattan, each carrying a full load of invited guests; and on the day of the opening, there were celebrations in Jamaica and many other places. On the day before the opening, the Kinsman Block System Co. secured from United States Commissioner Shields a temporary restraining order forbidding the use of automatic stops in the subways and tunnels, on the ground that the apparatus infringes the Kinsman patents. The question of making the injunction permanent will be argued on September 21.

At the freight-rate hearing before the examiner of the Interstate Commerce Commission in New York City on Wednesday, the first testimony presented was from Mr. Brown, general solicitor of the New York Central, in the shape of estimates of the probable increase in receipts if the proposed new rates are adopted. For 50,554 miles of railway in Official Classification territory, the annual increase would be \$27,000,000, while the annual increases in wages already granted aggregate \$34,700,000. The gross freight receipts of all these roads for the calendar year, 1909, was \$725,000,000. These roads serve more than two-thirds of the population of the entire country. After some cross examination, the examiner called upon the Baltimore & Ohio, which had furnished part of the figures, to produce a statement showing what increases in wages had been made by that road in the past ten years.

The Interstate Commerce Commission has found the Pennsylvania Railroad guilty of discrimination in the matter of furnishing coal cars to the Berwind-White Coal Co., to the great injury of Jacoby & Co., of Indiana county, Pa. There were two complaints, and the damages sought to be recovered amount in the first to \$51,950, and in the second to \$36,901. The commission leaves for future determination the question of damages sustained. On the general question of discrimination it says: "During the years 1902, 1903 and 1904 the employees of the defendant that were in charge of the distribution of coal cars had special orders for giving to the Berwind-White Coal Mining Co. a special allotment of 500 cars daily. That company had contracts for supplying coal for certain steamships sailing from New York harbor. Complaint had been made that these steamers were frequently delayed because of lack of coal, and the defendant felt that it was warranted in making that special arrangement with the coal mines that had undertaken to supply them with fuel. Few, if any, of these specially assigned cars reached the Berwind-White mines in this particular mining district, and therefore, it is difficult to determine to just what extent these complainants were prejudiced by that preference of a competing company's operations in another district. Nevertheless it was inequitable in principle, and undoubtedly so to some extent at least in its results, and we see no grounds upon which it can be justified by the commission."

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Birmingham Southern has ordered five locomotives from the American Locomotive Company.

Mitsui & Company, Tokio, Japan, have ordered one Mogul locomotive from the American Locomotive Company. It will weigh 92,000 lbs., and have 17-in. x 24-in. cylinders and 54-in. driving wheels.

The Castel Valley Railroad has ordered one freight, 2-8-0, locomotive from the American Locomotive Company. This locomotive will weigh 156,000 lbs., will have 20-in. x 26-in. cylinders and 50-in. driving wheels.

The Tremont Lumber Company, Winfield, La., has ordered one logging, 2-6-2, locomotives from the American Locomotive Company. This locomotive will weigh 101,000 lbs., will have 16-in. x 24-in. cylinders, and 46-in. driving wheels.

CAR BUILDING.

The Baltimore & Ohio is asking for equipment specifications for 75 steel passenger coaches.

The Chicago, Milwaukee & Puget Sound has confirmed the report of the *Railway Age Gazette* of September 2 to the effect that it will build 250 logging cars at the Tacoma shops.

The El Paso & South Western, reported in the *Railway Age Gazette* of September 2, in an unconfirmed item, as being in the market for passenger cars, advises that it is asking prices on three baggage, two postal, two chair and four steel coaches.

The Lehigh Valley is asking for equipment specifications for 1,000 hopper cars. These cars are understood to be the remaining 1,000 of the inquiry for 3,000 cars reported in the *Railway Age Gazette* of September 17. The 1,000 gondolas were reported placed on October 8 and the 1,000 box cars on October 22.

The New Orleans, Mobile & Chicago, as reported in the *Railway Age Gazette* of August 19, has ordered 200 forty-ton flat cars and 100 forty-ton box cars from the American Car & Foundry Co. The flat cars will be 41 ft. 6 in. long, 9 ft. wide and 4 ft. 1 1/4 in. high. The underframes will be of steel. The inside measurements, and 41 ft. 11 in. long, 9 ft. 5/8 in. wide, 14 ft. 10 1/2 in. high. The bodies will be of wood and the under-box cars will be 40 ft. long, 8 ft. 6 in. wide, 7 ft. 10 in. high, frames of steel. The following special equipment will be used:

Bolsters, body	Built-up
Bolsters, truck	Arch bar
Brakes	Westinghouse
Brake-beams	Buffalo Brake-Beam Co.
Brake-shoes	Cast iron
Couplers	Sharon
Draft gear	Farlow Draft Gear Co.
Dust guards	Wood
Wheels	33-in. cast iron

The box cars will have inside metal roofs.

MACHINERY AND TOOLS.

The Chicago & North-Western will purchase some electrical machinery for its new engine terminal at Fulton, Ill. (See under Railway Structures.)

IRON AND STEEL.

The Northern Pacific has ordered 385 tons of structural steel from the American Bridge Co.

The Korean Railway has ordered 7,000 tons of rails from the United States Steel Products Co.

The Chicago, Milwaukee & St. Paul has ordered 9,000 tons of rails from the Lackawanna Steel Co.

The Oregon Short Line has ordered 5,500 tons of structural steel from the Pennsylvania Steel Co.

The Copper Range Railway has ordered 160 tons of structural steel from Worden-Allen Co., Milwaukee, Wis.

The Louisville & Nashville has ordered 500 tons of structural steel from the Louisville Bridge & Iron Co., Louisville, Ky.

The Missouri Pacific has ordered 800 tons of structural steel from the Virginia Bridge Co., Memphis, Tenn., for a bridge at Judsonia, Ark.

General Conditions in Steel.—The month of September, so far, has not shown any heavy buying movement as has been generally anticipated, although manufacturers look for considerable improvement later on. Reports indicate that the increase in new buying, as compared with the first week of August, does not exceed 5 per cent. Small orders for immediate use predominate with very few, if any, large and long time orders.

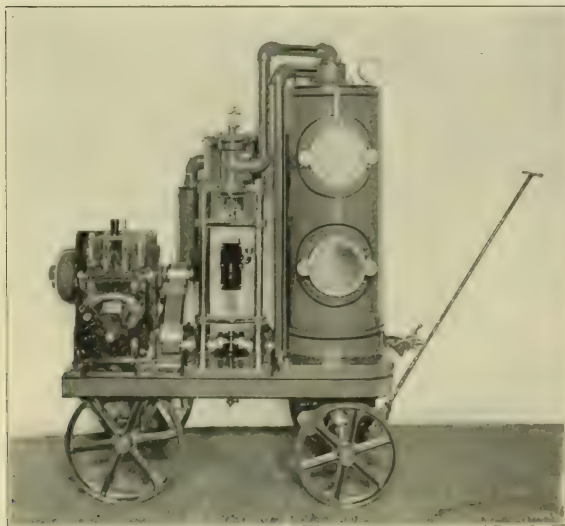
Keller A. O. Portable Vacuum Cleaner.

The portable vacuum cleaner illustrated herewith is made by the Keller Manufacturing Co., Philadelphia, Pa. It is for use in hotels, auditoriums, office buildings, railway yards, etc. This size has sufficient capacity to operate one 10-in. sweeper; two 4-in. upholstery renovators; one 4-in. round brush, or two 10-in. rectangular wall brushes.

Its small size and light weight provide for its being easily portable. The over-all dimensions are 22 in. wide, 46 in. long and 56 in. high.

The motor, pump and separating tanks for collecting the dust are mounted on a substantial truck, having wide faced iron wheels and forged steel axles. The wheels may be rubber tired for indoor use. The main frame work of the truck is built of heavy angle iron, securely riveted at the corners and reinforced with gusset plates. The fifth wheel is large, all parts being made of forgings or steel castings.

The motor shown, 1½-h.p., is of a semi-enclosed type, but it may be fully enclosed for use out of doors. This motor is



Keller Portable Vacuum Cleaner.

furnished for any standard current and voltage and is of ample power, so that at no time is it worked over load. Ring oilers give automatic lubrication to the armature shaft. For direct current, a suitable starting box and main line switch are mounted near the motor in a metal box.

The Keller vertical, double-acting, piston-type, vacuum pump used with this equipment has a cylinder 7 in. in diameter by 4-in. stroke. The cylinders and valve chambers are cast in one piece and of such thickness as to permit one re-boring. The piston, of the hollow type, has metallic packing rings, and the crosshead guide is of the marine type. The piston rod, connecting rod and crank shaft are of forged steel. The periphery of the heavy counterbalanced fly wheel is provided with cut teeth, which mesh into a cut ratchet pinion on the motor shaft.

The two superimposed tanks (shown in the photograph as one tank) collect and separate the dust which is pumped into them,

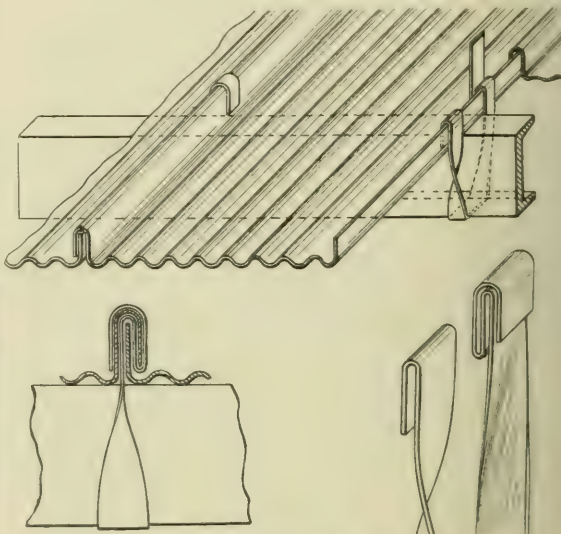
and afford sufficient storage capacity to avoid frequent emptying. The incoming dust-laden air enters at the side of the lower tank, is projected upward against the inside of a conical baffle device, and the heavy dirt and large particles of dust are drawn down by the force of gravity. These tanks are made of sheet metal, securely welded, without rivets and thoroughly galvanized. They are tested to a pressure above that to which they are subjected in use.

The displacement of this machine is 45 cu. ft. of free air per minute. The working vacuum is 10 to 15 in. of mercury, but the pump will produce a maximum vacuum of 20 to 22 in.

New Corrugated Iron Roof.

The Edwards Manufacturing Co., Cincinnati, Ohio, makers of a complete line of sheet metal building material, such as cornices, skylights, metal ceilings, etc., has just perfected a new corrugated sheet steel roofing which is said to be different from anything previously offered in this line.

There is perhaps no more popular roofing than corrugated steel. However, regular corrugated roofing, as manufactured



Details of Edwards Roof.

to-day, is said to have a number of disadvantages. The Edwards patent pressed standing seam corrugated roofing is understood to do away with many of these objectionable features. It is especially adapted for use in structural steel buildings, to which the corrugated steel is applied afterwards, either as a siding or roofing. The accompanying drawings illustrate this feature and the method of its application. The roof has tight seams and is applied directly to the purlins without the use of rivets, which are largely responsible for the corrosion when they are used.

In order to get good results with corrugated iron it is necessary to lap the sheets over two corrugations. By using this new roofing, with the standing seam, a great saving can be effected on the side seams alone, and in addition, a much tighter side lock is assured. By means of the cleats used with this roofing, it is possible to make tight joints, and at the same time to provide for vibration. This roofing can be placed and worked entirely from above, no scaffolding being necessary, which is a very important consideration when it is difficult to arrange scaffolding on the under side of the roof.

Sweden is preparing to operate a railway in Lapland by electricity to connect with its line from Gellivard to the Norwegian port of Narvik, which now carries great quantities of iron ore. The Lapland line is expected to carry some 4,000,000 tons of ore yearly. The water supply is said to be abundant. It will be conducted to the turbines and flow from them through tunnels, and the engine room is to be blasted out of the solid rock, where the Arctic weather will have comparatively little effect.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY TUESDAY AND FRIDAY FROM 7:30 A. M. TO 1:30 P. M.
THE RAILROAD GAZETTE (1847), 80 FLEET ST., NEW YORK

CHICAGO: PUBLISHED BY W. H. BROADMAN, 100 N. Dearborn St.
LONDON: ALLEN LANE & CO. LTD., 10, Bedford Square, W.C.1

W. H. BROADMAN, *Proprietor*

F. A. SIMMONS, *Vice President*

HENRY LEE, *Secretary*

The address of the company is the address of the officers.

EDITORS

W. H. BROADMAN, *Editor*

RAY V. WELCH

B. B. ADAMS

SAMUEL O. DICKS

ERNEST McCLELLAND

W. E. HOOPER

HENRY LEE, *Editor*

G. E. FOWLER

F. J. LESTER

BROADMAN, *Editor*

WILLIAM F. BRYANT

F. W. KESTLER

HENRY LEE, *Editor*

S. W. DUNN

H. H. SIMMONS

CLARENCE DEMPING

Subscriptions, including regular weekly issues and special daily editions published in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico	\$5.00 a year.
Canada	\$6.00 a year.
Foreign Edition (London)	£1 12s. (\$8.00) a year.
Single Copies	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 42 FRIDAY, SEPTEMBER 16, 1910. NUMBER 12.

CONTENTS

EDITORIAL

Editorial Notes	487
The Illinois Central Car Repair Scandal	488
The Illinois Manufacturers' Association	489
Denver & Rio Grande	490
New Books	492

LETTERS TO THE EDITOR

.....	492
-------	-----

ILLUSTRATED

Double Truck Railways in Kentucky	498
Composite Gon-Iola Car; Gilman & Pittsburgh	499
Clark's Tablet Exchanger	501
Progress of the Grand Central Terminal	503
Fifth Avenue Retaining Wall; O. & W., Seattle, Wash.	508
Locating the Point of a Frog	511

MISCELLANEOUS

The Story of An Arbitration	495
Late of Lockboxes and Fines	497
American Association of Railway Superintendents	500
Protection of Wood by Crystalline Pigments	507
The Industrial Development of the South	510
A German Report on American Methods of Railway Correspondence ..	511

GENERAL NEWS SECTION

.....	512
-------	-----

SUPPLY TRADE NEWS

.....	522
-------	-----

AN interesting speculation of the future arises in connection with both the retrospect and the present view of the railway bond market. A very few years have gone by since the time when the interest return on the "gilt-edged" long time railway bond was as low as 3.75 per cent. and, in a few cases, as low as 2.50. Those were the days when there was lively guessing in financial quarters whether the general interest return on the high grade security would not go lower still, perhaps settling down to a 3 per cent. basis at last; and the majority opinion among the financiers probably veered in that direction. One logical result was the popularity of the long time railway bond.

It commanded a higher price not merely because it would offer the chance of reinvestment but also because of the belief that its interest rate and return in a few years would rise above the market standard. Finally the reverse has come to pass. The solid long time bond of a strong railway is now probably an average of eight or ten points in price; its interest return is probably a half or one per cent. greater in the new literature than to the old holder; and the holder of the short time bond at an approaching maturity finds himself better off than the holder of the "long" bond, even though the latter may be better secured. One may even go further and say that the short junior bond of a sound railway is just now better than its senior "long" security. Undoubtedly this change, so unlooked for half a dozen years ago, is due to abnormal and unnatural events that have affected the price of all securities. But the unexpected change is there, is not likely to react for years and tends to shift the whole prospectus of railway bond financing. It is by no means unlikely that ere long and in rather high degree the new issued "long" railway bond may be discredited, relatively speaking, the "short" bond accredited and the short note more accredited still—in order that the investor may avail himself of shifting market conditions. This strange, almost paradoxical, reversal has more comfort for the railway financier who a few years ago marketed his long time low rate bonds than for him who must market short high rate ones in the future. Incidentally it sheds its light on the fatuity of long time computation and forecast of conditions in the railway security market.

THE Massachusetts highway commission reports that since January 1 of this year there have been 710 automobile collisions, 479 injuries and 42 deaths. This bespeaks recklessness, intoxication or stupidity. The percentage of deaths and injuries to the total number of automobile users is very large. The *Boston Post*, commenting on this, says: "If that ratio were to be kept up steadily on the railways of Massachusetts the community would rise against them in a storm of indignation. Yet there need be no more accidents, proportionately, with motor cars than with steam cars. Common sense, caution, sobriety, respect for the force of a high-powered engine will do much. Nine-tenths of the automobile accidents are preventable." To say that drivers of motor cars in the streets and roads can be made as careful as locomotive enginemen on railways is to ignore some patent and important facts. Possibly we have no particular call to preach on the subject of safety on the highways—unless on the low ground that the railway man is naturally interested in the doings of everybody that is committing the same sins that he himself commits—but we will venture to remind our friends in Massachusetts that if they should conclude to rise in a storm of indignation at automobile recklessness they would find that the inculcation of common sense, caution and sobriety is a difficult task. With locomotive runners this task is satisfactorily accomplished only by the establishment of signal towers, manned by men clothed with absolute authority to stop any and every runner on the road, no matter how high-strung he may be; by constant and severe discipline of runners and by care in selecting men for the engines. We wish that we could think of some way to apply these regulative forces in the streets; for without them we are doomed to many years' experience of the present disgraceful conditions.

ANOTHER class of automobile items in which railway men take an interest is illustrated in the following:

Nahant, Mass., Sept. 11.—Albert E. Hanna and Mrs. Fannie Reed were killed when an automobile, in which they were riding, crashed into an electric light pole on the Nahant road early to-day. The tires on both rear wheels burst, and Hanna lost control of the machine while it was traveling at high speed.

If a prominent citizen was killed by the derailment of a passenger train the public's demand for information would cover

all questions that the reporters and editors could possibly think of. Imagine these questions applied to this case (or to the case of the president of the United States if he had been killed on that 75-mile fast motor trip from the New Hampshire mountains to Beverly): What was the quality of those tires? Did they come from the shop of the best maker? Had the proprietor of the car been so penurious as to let them become too much worn? Were they carefully inspected at every stop? Was the steering gear in good order? Was the chauffeur's brain in good order? Had he a first class record for sobriety, experience, cautiousness and all the other virtues? Was he strictly complying with the by-laws of the town through which he was passing? Was he sleepy from having worked long hours? Was the proprietor of the car an oppressor of "labor"? And so on. It will, indeed, be a considerable time before automobile traveling will be as safe as railway travel.

AN organization to be known as the American Society of Engineer Draftsmen has been formed in New York City. Its aim is to improve the work done by draftsmen and to raise them as a class to a higher professional standard. Draftsmen employed in every branch of engineering work are eligible to membership. There is a place for such a society and it should be able to serve a useful purpose. There are plenty of draftsmen. The schools are turning out men fitted to enter this line of work in great abundance. But there are not enough good draftsmen, either in railway service or elsewhere. Probably the main reason is that those who are employed in drafting work almost always regard it as a mere stepping-stone to something better. As they hope and expect that they will not be engaged in it long, they usually do not try perseveringly to learn to do it as well as it ought to be done and can be done. Now, all draftsmen cannot become chief engineers. A good many are bound to have to spend their lives in subordinate positions. Those who are going to have to remain draftsmen will get along a great deal better as such if they perfect themselves in this line of work. The number who can now be found who are worth more than \$20 a week is too small. Whatever tends to improve the work of draftsmen as a class is going to increase the number who will be paid more than this amount, and we can see no reason why exceptionally good men should not be able, in course of time, to command a good deal more than this. While improvement of the work and elevation of the professional standard of draftsmen will enable them to command more pay as such, and also to get a great deal more personal satisfaction out of their duties, the acquirement of proficiency in this line can hardly, it would seem, tend to unfit a man for promotion. On the contrary, it is apt to attract attention from his superiors that will cause him to be put in line for promotion to the highest positions. Whatever this society does to increase the proficiency of draftsmen as a class, and better to fit the more talented of them for promotion, will be a valuable contribution to the progress of the engineering profession.

THE way that some of our up-to-the-minute state railway commissions get down to the last and finest details of railway operation is to the railway officer, in many cases, nothing less than astonishing, not to say annoying and absurd; but the action of the Corporation Commission of Oklahoma in ordering the railways of that state to loosen up a bit in their exclusiveness in the matter of vestibules will strike a sympathetic chord in the breasts of many travelers, including railway men. In Oklahoma towns of 3,000 population all of the entrances to a passenger train on the side next to the station must always be open when the train stops at the station, and in smaller towns, there must be one opening to each coach. It should always be made easy for passengers to enter the rear end of the hindmost car in which they are likely to find seats.

THE Interstate Commerce Commission has issued a classification for the operating revenues and operating expenses of carriers by water, making this classification effective January 1, 1911. The form prescribed follows in general the theory of accounting exemplified in the classification prescribed for railways. Operating revenues are divided into three general accounts; revenue from transportation, revenue from operations other than transportation and charter revenues. These general accounts are in turn divided into 13 primary accounts. Operating expenses are divided into five general accounts—maintenance, traffic expenses, transportation expenses, general expenses and charter expenses. The general accounts are in turn sub-divided so that there are 58 primary accounts in all. One of the interesting points raised by this order of the Interstate Commerce Commission is the question of how far the jurisdiction of the commission extends over water carriers. The Mann-Elkins amendment to the act to regulate commerce did not in any way change the power of the commission over water carriers. Section 1 of the Hepburn law provides that the act shall apply to any corporation or person engaged in Interstate Commerce partly by rail and partly by water. In the *Cosmopolitan Shipping Co. v. the Hamburg American Packet Co., et al.* (13 I. C. C., 266), the commission went at some length into a discussion of its jurisdiction over the carriage of freight by ocean steamship lines. In this case, the commission was asked to make an order retraining the defendants from pooling freight. The defendants entered demurer, claiming that they were not subject to the commission's jurisdiction. The commission held that only the water carriers that were subject to its powers were those on which it could enforce its judgment, and it found that in the case of overseas carriers it would be quite impossible to enforce judgments or orders of the commission and that Congress plainly did not intend to give it power over such carriers. Moreover, water carriers which form a service independent of any movement of freight by rail, are not under the jurisdiction of the commission. The returns, therefore, prescribed by the commission will be required only from those water carriers that operate between different ports in the United States; that is, either coastwise steamship companies, or lake companies, and which publish through joint tariffs in connection with some railway company. For instance, the Southern Pacific Company's steamship lines, which quote joint rates from New York, via New Orleans, to San Francisco will, it may be assumed, be required to keep their revenue and expense accounts in accordance with the classification now prescribed. Taken only in this restricted sense, the new orders of the commission are not of very widespread importance, although the publication of such statistics as will be required by the new classification will be of considerable interest, because, to our knowledge, no steamship company has ever made public such detailed accounts of its business as will now be required.

THE ILLINOIS CENTRAL CAR REPAIR SCANDAL.

WHEN the reports regarding the frauds in connection with the repair of cars belonging to the Illinois Central were first published, railway men received them skeptically. They were hard to believe, both because of the amounts of money said to be involved and of the prominence and previous good reputations of some of those against whom charges were made. But evidence has been piled upon evidence until whatever may be the results of the civil and criminal proceedings pending in the courts, there will be no doubt in the mind of the public as to what has taken place. Whoever may be the persons responsible for the conditions disclosed, no one can say anything of the conditions themselves but that they were equally disgusting and disgraceful. That a brazen conspiracy existed for a considerable time between certain officers and employees of the Illinois Central and certain car repair concerns to rob the stockholders of the Illinois Central has been established beyond a reasonable doubt. President Harahan deserves commendation for pushing the investigation of the frauds relentlessly and for instituting

civil and criminal proceedings against the alleged guilty concerns and persons.

While the details of the conspiracy and of its carrying out are being recounted in the courts, to the education of a cynical and venal-looking public, is a good time for railway managers to consider the opportunities which gave rise to these frauds. They grew out of improper relations which had been formed by officers of the road, looking to the ownership by them of substantial amounts of stock in companies which were paid to do certain work for the road. The road paid its officers to serve it to the best of their ability. It was their duty to get good work done for it at the minimum reasonable price. On the other hand, it was to their interest, as stockholders in the concerns which repaired the Illinois Central's cars, for these concerns to make the largest practicable profits. That they should get the work done for the road at the minimum reasonable cost and at the same time receive the maximum practicable dividends on the stock they owned in the car repair companies was impossible. Therefore, as men are apt to do in cases of that sort, they "made one hand wash the other." They used the offices of trust and responsibility, for the conscientious performance of the duties of which the stockholders of the Illinois Central were paying them, as means to filling their pockets with dishonest profits at the expense of the stockholders of the Illinois Central.

In one sense the conditions which have been disclosed were probably unique. We do not think that there is another railway in America in which grafting has prevailed recently on so magnificent a scale. But, in another sense, the conditions were not unique. The Illinois Central is not the only road with officers who have acquired interests adverse to those of its stockholders. The scandal in connection with the purchase of real estate for the Chicago & Western Indiana is still fresh in the public mind. When a railway officer owns a substantial amount of stock in a concern from which his road buys fuel or supplies, he is under a constant temptation, if he has anything to do with purchases, unfairly to favor that concern. Men of strict integrity and strong will firmly resist this temptation. But no man knows how strict is his integrity or how strong is his will until he has put them to the test. For his own protection the railway officer who has anything to do with buying, directly or indirectly, should keep out of concerns from which his road makes purchases. There are plenty of other places where he can invest his savings and get as large honest profits. If a railway officer wants to go into the supply business he ought to get out of the railway business. The chances are that he cannot honestly serve both the railway for which he is buying supplies and the company from which he buys them; and if he does almost nobody who knows of his dual connection will give him credit for honesty.

The matter, however, is not one for settlement by the individual consciences of railway men. The railways of the United States are conducting their business in the white glare of publicity. They will have to continue to do so. To get a square deal from the public, their managements must be, as Caesar demanded that his wife should be, above suspicion. If the officers of a railway are allowed to become interested in concerns from which the railway buys supplies, a relation is formed which is extremely apt, as past experience has shown, to lead to frauds against the railway. Even if this does not result, such relationships are adapted to excite public suspicion; and public suspicion regarding such matters quickly develops into conviction. When the public is convinced that there is dishonesty in the management of one railway it promptly jumps to the conclusion that there is dishonesty in the management of all of them; when you talk now to the "man in the street" you find that he is taking the case of the Illinois Central as typical. If the public believes there is an evil in the management of railways, it does not strike merely at that evil, but it strikes at the entire railway system of the country. The fact that in the past the railways used passes, and in some cases less veiled methods of bribery, to influence legislation, did not merely arouse a public sentiment that de-

manded abolition of and punishment for these abuses, but it created a public sentiment which demanded wholesale reductions of railway earnings.

The termination and prevention of all improper or suspicion-exciting relations between railway officers and employees on the one hand and railway supply concerns on the other is a matter which, it would seem, should receive the attention of all those who exercise final authority over railway management. Such relationships, so far as they exist, afford a most inviting field for the exercise of the art of the "muckraker;" and we may be sure, the Illinois Central scandal having now directed his attention to that field, he will soon be down upon it with great energy and verbosity. The wise railway officer and the wise railway management will arrange matters so that he will find as little material and as few characters for the "muckraker's" new "School for Scandal" as practicable.

THE ILLINOIS MANUFACTURERS' ASSOCIATION

THE statement filed by William Duff Haynie, counsel for the Illinois Manufacturers' Association, at the rate hearing in New York on September 12, had all the characteristics of the public effusions for which this organization has become famous. If the Illinois Manufacturers' Association should ever, anywhere, issue or file a statement which was fair and devoid of hypocrisy it would indicate unmistakably to those who have followed its past career that it was falling into senile decay. It is perfectly well known that a large part of the members of the organization do not approve of the course in regard to railway matters which it has taken. In spite of all their efforts, however, it continues to be dominated by professional agitators who, incapable of discussing railway questions and trying railway cases on their merits, habitually resort in such discussions and in the trial of such cases to Pecksniffian protests against evil-doing, and to deliberate misrepresentations worthy of the cheapest political charlatan.

The statement filed at the New York hearing is worthy of the Association's most ignoble traditions. It bitterly berates the railways for having impaired their earnings by unfair discriminations in rates. Now, there is no question that the railways have been in the past and are now guilty of unfair discriminations in rates. The statement of the Illinois Manufacturers' Association on this subject is entitled to special respect. It is expert testimony. Many of the worst discriminations of which the railways were guilty in the past, and are guilty now, have been brought about by the unscrupulous pressure and for the behoof of concerns belonging to that Association. For example, the International Harvester Company is one of the leading members of the Illinois Manufacturers' Association. One of the unfair discriminations of which the railways are now guilty is that of giving this organization a stoppage-in-transit privilege on machinery, for which there can be offered no respectable justification. Frank B. Montgomery, traffic manager of the International Harvester Company, is chairman of the committee which is handling these rate advance cases for the shippers. Mr. Montgomery is a very amiable and a very able man. But we think, in view of the favors his concern is getting from the railways, he showed less than his usual discretion in allowing counsel for the Illinois Manufacturers' Association to read into the record charges against the railways of unfair discrimination.

The International Harvester Company is by no means the only member of the Illinois Manufacturers' Association which has received and is receiving unjust favors from the railways. A number of the large concerns belonging to it own tap line railways. Since the Illinois Manufacturers' Association invites investigation of the subject of unfair discrimination, we respectfully suggest that the Commission might make inquiry as to the reasonableness of the divisions of the through rates that some of these tap lines are receiving. And since the Association complains that the railways have depleted their revenues by the payment of fines for rebating, we suggest that it show its good faith

by filing a statement with the Commission of all the fines that the railways have paid and of all that they ought to have paid for giving rebates to its members. This would not only be instructive as showing what the railways have been doing, but it would also be very instructive as indicating how big a hypocrite the Illinois Manufacturers' Association is.

Among the other charges made by the attorney for the Illinois Manufacturers' Association is that the railways have been guilty of the prevention of beneficial legislation. The railways, however, are not the only concerns that have opposed legislation which they thought might be inimical to their interests. For example, bills were introduced at the last session of the legislature of Illinois to limit the number of hours per day that employees should be allowed to work in certain kinds of manufacturing. A great many people thought that such legislation would be beneficial. The Illinois Manufacturers' Association differed from them, and, in consequence, maintained a lobby at Springfield during a good part of the session. The legislation was not passed—which shows that the Illinois Manufacturers' Association employs more effective methods for preventing legislation which it thinks will be adverse to its members than the railways do. There have been in circulation since many rumors about "jackpots" being made up at the Illinois capital, to prevent certain kinds of legislation. And we regret to say that the names of some very prominent members of the Illinois Manufacturers' Association have been mixed up in these unkind reports. The Illinois Manufacturers' Association, condemning others for opposing "beneficial legislation," is a fine imitation of Satan rebuking sin.

The statement read into the record at the New York hearing by the attorney of the Illinois Manufacturers' Association harmonizes well with the general course which has been pursued by the big shippers of the country, and particularly those belonging to this Association, both before and since the legislation was passed which gives the Interstate Commerce Commission power to reduce and to prevent advances in rates. Up to five or six years ago they resorted to every device that they could contrive and put pressure on the roads in every way they could think of to get secret rebates. The fact that large amounts of rebates were given shows how fruitful their industry was—for it should never be overlooked that no rebate was ever given by a railway which was not received by some shipper. Since secret rebating was abolished the large concerns have been engaged in depleting railway revenues in two ways. One of these has been to get unfair discrimination for their own benefit provided for by the published tariffs. The other has been to carry on constant agitation against alleged excessive freight rates. The railways, while seeking to readjust their freight rates on a higher level, are trying to eliminate some of the unfair discriminations by which the big shippers and big centers of industry are now profiting. Of course, the big shippers and big industrial centers cannot come out in the open and complain that they are being deprived of favors to which they are not entitled. Consequently they weep copiously in public places because, as they allege, the advances in rates the railways are trying to effect will place an undue burden on the public. Why, it may well be asked, do they always try to exemplify their solicitude for the public at the expense of the railways? Why did they not wait until the rates were advanced before greatly raising their prices? We think it is tolerably well known that every large concern in the United States is charging very much higher prices than it was ten years ago, although freight rates are no higher now than they were then. Since they already have raised them without any advance in rates, why should they raise them again, after an advance in rates? The obvious purpose of the buncombe which the counsel for the Illinois Manufacturers' Association has injected into the rate advance case is to prejudice public sentiment and cloud the true issue in these proceedings. It is to be hoped that the public will not be misled by it as it sometimes has been in the past by similar utterances.

DENVER & RIO GRANDE.

THE discouraging features of the annual report of the Denver & Rio Grande Railroad Co. for the year ended June 30, 1910, does not lie in the much-discussed cost of the Western Pacific, but is to be found in the heavy increase in transportation expenses of the D. & R. G. itself. This increase apparently indicates that the D. & R. G. is incapable in its present condition of fully taking advantage of the increased traffic which it is expected the Western Pacific will bring to it. The company earned gross in 1910 \$23,600,000, as against \$20,900,000 in 1909. Operating expenses last year amounted to \$15,800,000 and the year before to \$14,500,000, so that in 1910, after the payment of taxes, there remained operating income of \$6,960,000, as against operating income in 1909 of \$5,700,000. This in itself is not a bad showing compared with what other western roads may be expected to show, but the trouble is that the increase in operating expenses was disproportionately heavy in the cost of conducting transportation, while maintenance expenses, which on a road like the Rio Grande ought properly to be comparatively large, show only slight increases over the previous year of lighter traffic.

In 1910 transportation cost \$8,200,000, an increase over 1909 of \$900,000, or about 13 per cent. The total number of revenue tons carried one mile in 1910 was 1,352,600,000 tons, and in 1909 1,161,200,000 tons. This is an increase of about 16 per cent., and we find that it cost the D. & R. G. about as much in transportation expenses per ton to handle this increased business as it did to handle the business of 1909. For instance, the expenses for yard conductors and brakemen increased 15 per cent., the expenses for yard enginemen increased 15 per cent., the expenses for fuel for yard locomotives increased 11 per cent., the expenses for road enginemen increased 11 per cent., the expenses for fuel for road locomotives increased 11 per cent., and the expenses for road trainmen increased 12 per cent.

If the hope of the D. & R. G. to ever pay dividends on its common stock lay only in the increased traffic that the Western Pacific is to bring it, the company would first have to find some way of reducing its own operating costs so that this increased traffic may be handled at a correspondingly increased profit. The D. & R. G. runs through some of the most difficult rail-roading country in the United States. It was located at a time when engineers attempted to make the first cost of building their line low, even at the expense of future high operating costs. Moreover, almost the entire mileage of the D. & R. G. lies through mountainous country. Most of the other roads that cross the Rocky mountains have a considerable mileage either east or west of the mountains on which the materially lower operating costs tend to average down the expenses per mile of road and per unit of equipment. The following table gives the unit costs of maintenance. Since about a quarter of the total mileage of the line is narrow gage and there is a corresponding amount of narrow gage equipment, the accompanying figures show how expensive it is to maintain a road situated and built like the D. & R. G.

	1910.	1909.
*Maintenance of way, per mile	\$907	\$844
†Repairs and locomotive	3,106	3,317
“ “ passenger car	500	476
“ “ freight car	72	68

*Per mile of first and second track, the mileage of sidings and branch tracks not being given in the report, on account of the cost of track equipment is taken so that the figures here given, when compared with the unit figures of maintenance of way costs as given in these columns, to reflect, if other data is reported, is unduly high.

†This includes renewal only and does not take into account renewals, depreciation or superintendence.

To offset these high operating costs the D. & R. G. has a highly profitable local business such as is enjoyed by few other roads in the west. Moreover, from the nature of its tonnage, and from its almost impregnable position as regards competition, on a great part of its mileage it is enabled to charge high ton mileage rates, the revenue per ton per mile last year being 1.28 cents. This, however, is a decrease of .3 mills from the revenue per ton per mile in 1909.

Freight traffic statistics show that total car mileage was 162,561,757 in 1910 and 92,456,871 in 1909. Of the total in 1910,

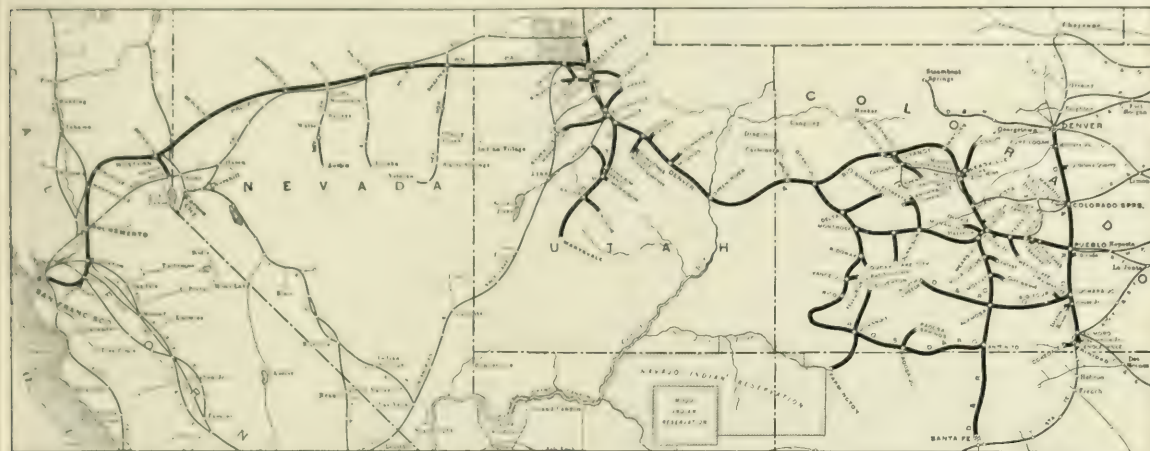
66,103,876 was loaded car mileage and 36,178,881 was empty car mileage, in 1909, 29,606,248 was loaded car mileage and 31,859,645 was empty car mileage. The revenue freight load was 265 tons in 1910 and 242 tons in 1909. The average haul of each ton being 105 miles in 1910 and 108 miles in 1909.

Passenger revenue amounted to \$1,300,000 last year and to \$1,800,000 the year before; the revenue passengers carried one mile being 787,561.29 last year and 729,666,418 the year before. The revenue per passenger per mile was 1.86 cents in 1910 and 2 cents in 1909.

The reported tonnage of freight was quite evenly distributed among the various classes of commodities. The total tonnage in 1910 was distributed as follows among the various classes of commodities: Products of agriculture, 3.60 per cent.; products of

Western Pacific. In studying the statement of President Jeffery that over \$70,000,000 has been spent on the Western Pacific, it must be borne in mind that the interest charges on the \$50,000,000 first mortgage bonds have been charged, as is proper, to construction account. This interest from September 1, 1905, to March 1, 1910, amounts to over \$11,500,000, leaving less than \$59,000,000 paid for actual construction. The interest charge, of course, is actually as truly a part of construction cost as are the wages of steam shovel men.

After the payment of 5 per cent. on its own preferred stock the D. & R. G. last year had an actual surplus of about \$400,000 to the credit of profit and loss. The monthly statements given out by the company include in "other income" interest accrued on the second mortgage bonds of the Western Pacific. Presi-



Denver & Rio Grande and the Western Pacific.

animals, 1.14 per cent.; products of mines, 84.29 per cent.; products of forests, 2.33 per cent.; manufactures, 5.54 per cent.; miscellaneous, 1.68 per cent.; merchandise L.C.L., 1.42 per cent. It is interesting to note that of the total tonnage carried by the D. & R. G. in 1910, 44.70 per cent. was precious ore, the amount carried being 5,785,245 tons, comparing with 4,321,861 tons in 1909. Although furnishing nearly 45 per cent. of the total tonnage, the revenue from this tonnage amounted to only about 16 per cent. of the total freight revenue. On the other hand, bituminous coal, which furnished 27 per cent. of the total tonnage, or 3,523,334 tons in 1910, gave a revenue of \$4,000,000, or 23 per cent. of the total freight revenue.

Besides the hope that the D. & R. G. stockholders may benefit directly through increased traffic on their own line due to the full operation of the Western Pacific, they may hope to benefit indirectly through the earnings of the Western Pacific paid to the parent company in the shape of interest. The D. & R. G. owns all of the \$50,000,000 Western Pacific stock, which it carries at a book value of \$4,284,953, and \$25,000,000 Western Pacific second mortgage 5 per cent. sinking fund bonds, carried at a book value of \$18,750,000. At present the D. & R. G. is not receiving any income from this investment. The Western Pacific has spent, exclusive of accrued interest on second mortgage bonds, \$70,483,302 to June 30, 1910. This money was raised as follows: \$48,008,145 was the proceeds of the sale of \$50,000,000 first mortgage 5 per cent. 30-year bonds of the Western Pacific; \$18,784,333 was the proceeds of the sale to the D. & R. G. of \$25,000,000 second mortgage 5 per cent. bonds of the Western Pacific, and \$4,606,412 was advanced by the D. & R. G. under contract of June, 1905. The amount advanced by the D. & R. G. to the Western Pacific was raised by the sale by the D. & R. G. of \$22,944,000 first and refunding mortgage 5 per cent. bonds, from the proceeds of which the D. & R. G. used for its own capital purposes \$7,000,000 and advanced the remainder to the

dent Jeffery states in the annual report that this interest was neither earned nor paid by the Western Pacific, and that it is properly a deferred asset. Considerable criticism, especially in Wall Street, was directed against the company because it included in its monthly statements this accrued interest on Western Pacific second mortgage bonds, and President Jeffery is quoted in a newspaper article as defending the company's action on the ground that the Interstate Commerce Commission rules for monthly returns required the inclusion of this accrued interest in other income, whether it was paid by the Western Pacific or not. This defense is probably technically sound, but if any real desire on the part of the management had been manifest to be frank with its stockholders and the public, it would have been the easiest thing in the world to have put a note against the words "other income" in the monthly statement of earnings, explaining that it included a bookkeeping account of interest accrued which the Western Pacific is not at present either earning or paying. Certainly the annual report is frank enough, and no attempt is made to disguise the actual financial position of the company. As was pointed out at the beginning of this review, the financial showing of the company is good rather than disappointing. Last year the Western Pacific was in operation so short a time and to such a limited extent that its effect on the D. & R. G.'s earnings must have been comparatively slight, so that while the Rio Grande has been paying the highest charges that it is likely to have to pay, it received last year the minimum benefit from its new venture.

The Western Pacific, as a piece of construction, has been described in the *Railway Age Gazette* of March 19, 1909, page 563. Its traffic possibilities are hard to forecast, but since it parallels the Southern Pacific for a considerable distance, it may be assumed that if it is able to get its share of business, this business should be highly profitable. Since the close of the fiscal year the Western Pacific has paid out of its own treasury September

coupons on its \$50,000,000 first mortgage 5 per cent. bonds. If this is an indication that the Western Pacific is now able to take care of its own first mortgage bonds from earnings, the security holders of the D. & R. G. may well feel that they can afford to wait even a considerable time for the payment of interest on the second mortgage bonds; in other words, apparently if the Western Pacific is now able to stand on its own feet in so far as paying its current obligations to outside parties is concerned, and no longer act as a drain on the resources of the Rio Grande, the Rio Grande ought to be well able to take care of itself until such time as the Western Pacific can begin to repay its family obligations.

The following table shows the operations of the Denver & Rio Grande in 1910 and 1909:

	1910.	1909.
Average mileage operated	3,541	3,534
Freight revenue	\$17,300,613	\$15,160,234
Passenger revenue	5,275,895	4,744,418
Total operating revenue	23,563,437	20,876,571
Maintenance of way	2,890,602	2,530,107
Maintenance of equipment	3,804,120	3,572,327
Traffic	511,108	467,269
Transportation	8,234,207	7,294,331
Total operating expenses	15,801,954	14,852,574
Taxes	893,515	762,824
Operating income	6,955,952	5,704,712
*Gross corporate income	9,646,667	7,034,129
Net corporate income	4,161,012	3,056,948
Interest on Western Pacific second mortgage bonds not paid and therefore deducted	1,152,845	.....
Dividends	2,488,990	2,288,990
Betterments and new equipment .....	.....	361,714
Surplus	399,177	286,714

* Includes the amount due on Western Pacific second mortgage bonds but not earned or paid.

NEW BOOKS.

The Mann-Elkins Act. Notes and Comments by Prof. Frank Haigh Dixon. The amendment to the Interstate Commerce Act, which was passed June 18 and which has just gone into effect, is the subject of a thorough and careful analysis by Professor Dixon, of Dartmouth College, in the *Quarterly Journal of Economics* (Cambridge, Mass.), for August. Professor Dixon is a most thorough and careful student and a lucid writer; and his review of this law shows that he is perfectly familiar with the federal laws relating to transportation as they existed before, as well as with every word of the discussions in Congress and the newspapers which attended the passage of the Mann-Elkins bill. Professor Dixon is also a fair and judicial-minded critic; but he seems to think that the commission will have little trouble in carrying out the herculean task of examining all new freight tariffs and passing on their reasonableness before they go into effect. He looks upon this provision of the law as fair, because it only gives to the shipper the same right that the carriers have long possessed. Theoretically, everybody must agree with this apparent establishing of justice and equity; but as a practical matter the question whether or not the "shippers" who object to rate increases are going to be any less numerous than the flies of Egypt is what oppresses the railway manager.

American Street Railway Investments. Issued annually in connection with the *Electric Railway Journal*. 1910 edition. Published by the McGraw Publishing Co., New York. 190 pages, 9 x 13 inches. Cloth. Price, \$5.

The 1910 edition of this standard manual of information on street and interurban railways shows the gradual development in number and importance of electric street and interurban railways and contains detailed information in relation to the earnings of the various companies which have supplied statements for publication. This information has been supplemented in many cases by traffic statistics of passengers carried and results per car mile. Car hour statistics have also been included where obtainable. With the general broadening of powers of state commissions to require more detailed returns from the street railways, the information that is available has very considerably increased within the past few years, and the Street Railway Red Book shows a correspondingly greater volume of statistics. The book is a recognized necessity for any one making investigations as to street and interurban railway properties.

Letters to the Editor.

STATIONS KEPT CLEAN BY WIDE-A-WAKE SUPER-INTENDENTS.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The able president of the Baltimore & Ohio, you inform us, has started a campaign for clean stations. In repeating this, you set the seal of your approval on the proposal to accomplish the desired purpose in part by means of traveling inspectors, who will presumably instruct, warn, check and report. Are you quite sure that the appointment of the inspectors will not endanger the success of the foray against uncleanness? After all is the division superintendent, who is charged with much more responsible and delicate duties, not quite capable of banishing the flies, the dust, the cinders and the vile smells? If the dapper young man with the ruthless unwinking eyes and the highly sensitized olfactory nerves is to be a permanent feature of the organization, will the superintendent not leave to him the unexhilarating task of satisfying commuters and railway commissions? After all the superintendent is paid to look after such details, and our organization gives him the facilities for so doing. Then why not make him do it? The supervision of roadbed, equipment, and traffic requires that he should spend a large portion of his time on the line; he has trainmasters, roadmasters, bridge and building inspectors and engineers to act as eyes for him over his district when he is at headquarters; and there is really no reason why he should not be kept informed of the condition of every station and every other building.

There is one railway in Western Canada which is famed for the neatness of its stations and the generally well-kept appearance of the property. There are no special inspectors traveling around, poking in the ash-heaps and the water closets. The superintendents are required to keep their districts presentable, and they do. The secret of it all is personality. The general manager of that line might be called a crank on certain things, and he is a thirty-third degree crank on neatness. He goes over the line frequently, and no detail about the appearance of the property is permitted to escape him. A superintendent knows that his chances of promotion will be seriously affected by the appearance of the equipment, the roadway, the bridges and the buildings on his district. Nor is he required to make bricks without straw. At the larger stations, janitors are authorized and the most modern sanitary appliances are installed. At the way stations, a monthly allowance is made to the station agents for the cleaning of the building; the buildings are regularly overhauled and repainted and scavenging work is arranged for frequently and regularly; prizes are authorized for station agents who cultivate flower gardens and reach the high water mark of attractiveness. The superintendent examines the stations and freight sheds closely as he passes over the line, and when he is at headquarters the trainmaster or some other district officer is on hand to check any tendency to sluttishness. The result of it all is six thousand miles of well-groomed track, and an unending succession of tastefully kept stations.

Is this not possible on any system? Undoubtedly, yes. All that is needed is general enthusiasm; and on the part of the general manager, wise discrimination in apportioning praise and blame, combined with a willingness to supply ungrudgingly the wherewithal to do the work. Is it not better to handle it through and by the superintendents, than to weaken their sense of responsibility and their control of the local agents, by delegating the work to itinerant "white-wings" who will weary everybody with unpractical suggestions and inane comment?

STAFF OFFICER

[This is very refreshing, but, alas! all this good news comes from Western Canada, which is 2,000 miles from those Eastern cities where we have observed station "toilet" rooms full of flies to offend the eye and other things to offend the nostrils. The reader will, no doubt, readily guess what road is here referred

to. If he cannot, we would suggest that he exercise his mind on one of those puzzles which appear in the yellow journals, such as "Ch—go, What prominent city?" There is no disagreement between our correspondent and ourselves. He contemplates an inspector who will *inspect, learn, check and report*. He should cut out the first two of those four words. On a road where the superintendents keep their stations in first-class condition, the inspectors' reports would tell, not how bad, but how good. We have not been in Western Canada lately; but, considering railway stations generally we cannot drive away the thought that many superintendents who are classed 98 per cent. perfect, fail to cure this last and worst evil which started this discussion. Mr. Paine's comparison with the Augean stables was not unduly hyperbolic. —EDITOR.]

THE RULES OF INTERCHANGE.

September 11, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE.

Executives of American railways are taking note of the effect which rules of interchange produce on the terminals. Much discussion is taking place on the subject of "Run, Repair or Transfer." The term is sometimes used interchangeably with "Twentieth Century Inspection." It is startling how many notions are extant as to what either term implies; by some the principle involved is given an extremely broad meaning; by others an equally narrow one. Although the understanding of what is meant differs so greatly, almost everyone seems to assume that no difference of opinion exists as to what the terms cover. As a result those who think they agree may disagree very seriously, and those who think they disagree may after all view the matter in precisely the same light as their supposed opponents.

The term "Run, Repair or Transfer" is specific. It can mean nothing more and nothing less than that when one railway offers another a carload of freight the freight shall be received and forwarded toward its destination; and that unless the freight can be forwarded in the car containing it without first making repairs to the car, repairs shall be made; and if that course will not permit the load to go forward in the original car, then the load shall be transferred to a car that is suitable. The underlying principle of the "Run, Repair or Transfer" idea is that railways, being in the transportation business, should transport freight when freight is tendered by one railway to another for transportation; that the railway to which freight is offered is in a far better position to determine whether the vehicle containing it is safe to run than is the railway whose handling of the freight is at an end.

It is frequently pointed out that previous to the installation of through car service, the railway receiving freight from another, after deciding what car to use, stowed the freight in the car, yet the receiving railway now undertakes to say that the delivering railway shall put the equipment in shape to suit the receiving railway's real or fancied needs.

Another feature that is being pressed not a little is that when a railway joins in the issuance of a joint tariff it is obligated to take freight that is offered by any railway party to the tariff, and that the car which contains the freight is not a point at issue. Others take a different view. It is a point for the lawyers to decide, perhaps, yet just common, ordinary horse sense should be sufficient. One thing is certain: Since rules have been formulated defining responsibility as between the delivering railway and the receiving railway for cost of repairing the vehicle or transferring the load, whichever is necessary, the matter is very much simplified.

The term "Twentieth Century Inspection" is less definite, more inclusive; and if "Run, Repair or Transfer" is suited to twentieth century needs and if the practice of delaying business, while quarrelling over the condition of the vehicle which contains it, is a relic of by-gone years, then it is fitting at this time to use the two terms interchangeably as is being done.

Some prominent officers hold that the rejections so deeply

deplored by "Run, Repair or Transfer" advocates are greatly exaggerated; that they are in fact very few in number. If that is so then let it be hoped that even the few delays will be stopped. But it is not so. The rejections go merrily on and little is being done to avoid them. The rules permit it.

To whom shall we look for improvement? Clearly no individual can bring it about; neither can an individual railway; whatever is done must be done by the railways through associating themselves together.

Shall we look to the American Railway Association? No. The only binding rules it ever made relate to car per diem. True, the American Railway Association, in November, 1908, suggested that as an underlying principle the status of the lading in or on a car shall be considered the guide and not the vehicle in which the lading is transported, but a principle is one thing and a practice is quite another. There is thus far nothing binding about this principle that the American Railway Association has laid down.

Shall we look to the Association of Transportation and Car Accounting Officers? That association makes no rules at all. True, it recommends, but it has not reached the point where it has had the courage to even recommend rules relating to the interchange of freight and cars.

Shall we look to the American Association of Railroad Superintendents? Doubtless that association would like to do its part in remedying the trouble, but its rules, too, are recommendatory and it cannot even recommend in a matter so clearly and definitely affecting all superintendents without offending somebody.

Shall we look to the American Association of Freight Agents? That association also only recommends. Its influence has been thrown on the side of improved service in a way that should have made a deep impression. And it has made an impression, but it was about as deep and passed away about as quickly as to insert one's finger into the sea and then remove it.

What a situation when serious men engaged in a serious work cannot make any more headway in a phase of transportation, which clearly concerns them in their effort to please the patrons!

Shall we look to the Master Car Builders' Association? This is the association that is empowered to do things. Nothing recommendatory about M. C. B. rules of interchange. They are binding. Those of us who are members of it can tell the agent, the superintendent, the manager and even the president where to "head in," and they quickly do so when we speak through our rules of interchange.

But the M. C. B. Association at present is opposed to the principle of "Run, Repair or Transfer." And why? Is it because the others favor it? Rather, is it because each road fears it is the only one that can be counted on to "play fair?" Each opponent of "Run, Repair or Transfer" holds sacred his right to reject traffic. No traffic manager, individually or through his association, can move a pound of freight for a patron without requiring payment for the service. But the car inspector, acting under the rules of interchange, can require his company to move a whole carload or trainload for that matter, without a cent of charge. And move it, too, in a direction which damages the patron.

James J. Hill is quoted as saying that "it is no more disastrous to have the banks close their doors than to have the railways choked." He is also quoted as saying that "the problem of terminals is the greatest problem of the country, the problem of transportation agencies, of financiers, of the communities directly affected and of all the industries that depend directly or indirectly upon cheap and speedy carriage for the commodities which they buy and sell. It is a problem for everybody, since probably not one business man in the whole country would fail to feel the disastrous effects if it were to be neglected for the next five years as it has for the last ten, and to blight every form of activity by paralyzing the whole trade." If Mr. Hill should some day undertake the study of the rules of interchange, it may be safely stated that when he has completed it there will be "something doing."

When a member of a political faith thinks the party of his choice does not promote his ideals, he is at liberty to transfer his affiliations or start a new party; not so with a member of the association that frames the rules of interchange. The only recourse that any member of the M. C. B. Association has lies in pointing out that new conditions have arisen and that ideals are changing in the conduct of transportation. I am, then, well within my rights in calling attention to the fact that for years a very few have so controlled the association as to prevent the "Run, Repair or Transfer" question even coming before the convention, and I protest against having it further throttled in committee room. I am the association's friend when I urge its members and its committee to live up to its great opportunity. Individuals die, no matter how progressive they may be. Associations escape this experience so long as their ideals and their work keep pace with the needs of the times.

AN INSURGENT MASTER CAR BUILDER.

WEAK POINTS IN THE LATEST STANDARD CODE.

Nashville, Tenn., September 6, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I beg leave to call attention to one defect and one serious omission in the latest revision of the standard code of train rules. The rules will never be sound until the question of clearance as between inferior and superior trains is settled, and settled right. The code seems to admit of a variation of thirty seconds a week in watches; and I know from experience that watches do vary more than that. No watch, however fine, can be depended upon to keep exact time in service, because subjected to such unusual usage. In jumping on freight trains men often permit their watches to strike the sides of cars, and some times train and enginemen come in contact with strong magnetic currents, or fail to wind watches regularly because they have no regular hours of duty. While cases cited above may not be common, it is a fact that conductors and enginemen have carried and used watches which were more than a minute slow or fast.

In view of this fact, it must be evident to any officer that code rule 88 is unsafe. One trouble in getting it revised has been that operating officers look upon anything less than five minutes as too insignificant. I would recognize the necessity for making a sharp distinction between passenger and freight trains, providing less clearance for the former than the latter, as between each other. I would change rule 88 to read, "At meeting points between first class trains, the inferior train must clear the main track at least two minutes before the leaving time of the superior train." And I would change rule 89 to read, "At meeting points between all trains, except first class trains, the inferior train must clear the main track at least five minutes before the leaving time of the superior train." The rules provide for the inferior train pulling into the siding. This is not as clear as it should be made in order to make the rule invulnerable in the eyes of some jurymen. I would provide a separate rule, preferably rule 87, to say how inferior trains should take siding, thus avoiding repetition, and would word it as follows, "Inferior trains must keep out of the way of superior trains in the opposite direction, clearing their time as required by rule, and in meeting them must, when practicable and not otherwise directed, pull into the siding at the nearest end. If necessary to pass this point to pull, or to back in, the movement must first be protected, as prescribed by rule 99."

"At meeting points between extra trains the extra in the inferior time-table direction must take siding in the same manner, unless otherwise directed."

It may be contended by some that to impose a clearance of two minutes upon an inferior passenger train would be burdensome; that it would require too many helping orders to be given. My experience has been that when time is at all fast passenger trains, even when on time, must be helped to their meeting point with superior trains. However that may be, the rule should be sound from every viewpoint.

Another defect in the code may be found on page 48, example 9, Form F. The code reads, "To pass one section by another, the following will be used:

"(9) Engs. 99 and 25 reverse positions as 2d and 3d No. 1 H to Z.

"Under (9) Engine 99 will run ahead of Engine 25 'H' to 'Z,' and, if necessary, both engines will arrange signals accordingly. Following sections, if any, need not be addressed."

I would change that form to read as follows:

"To pass a section by one or more, a form similar to the following will be used:

"(9) C & E 2d and 3d No. 1, H.

"Engs. 99 and 25 display signals and run as Second and Third No. 1, H to Z. Eng. 99 pass. Eng. 25. Exchange orders.

"This order supersedes only the former instructions creating the two sections. Following sections, if any, need not be addressed. If third section be the last, the words 'display signals and' will be omitted. If the sections addressed hold no unfulfilled orders, or parts of orders, the words 'Exchange orders' will be omitted.

"Conductors and enginemen addressed must make a careful and complete exchange of orders, comparing with each other after having done so and, under their new section numbers, must use only such orders as are addressed to their sections after having made the exchange."

Notice that the code example may be used only to pass a section next ahead while in practice it often is desired to run a third section by the first and second. The form I offer will meet every requirement. Also note that the code rule fails to say what disposition shall be made of existing train orders. Must the trainmen be depended upon to properly arrange green signals and exchange orders, or is it the duty of the dispatcher to re-issue orders? Some roads in adopting the latest code have, upon my calling attention to this oversight, provided for an exchange of orders by the crews, but they have given the dispatchers no form for passing a third section by the first and second.

Give us another revision of the rules and probably they will stand the test for all time. There are other errors to which I might call attention.

H. W. FORMAN.

WHO ARE THE STRONG MEN?

August 26, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I want to discuss some thoughts which occur to me since reading the editorial headed "Managers, Superintendents and Dispatchers," in your issue of August 26.

Having occupied the three positions named in the heading of your article, I can appreciate, better than probably might otherwise be the case, some of the points to be considered. The article is quite right wherein it says, "One of the greatest needs of the American railway world to-day is that kind of general manager who will take as much care in selecting strong men to fill the position of superintendent as he does in cutting down his percentage of expenses to receipts," etc.

Here is the crux of the situation; and the difficulty, as I see it to-day, is that of mistaking who are the "strong men." Not so many years ago, the "strong men" in charge of railway operation were those men who, by natural ability, energy and force of character, pushed themselves ahead of their fellow employees, and, attracting to themselves that attention which naturally came to them by reason of such qualifications, they were placed in charge of properties, and, as a rule, made a success, and it was and is such men as these who made the Pennsylvania Railroad, the Chicago, Burlington & Quincy, the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the Lake Shore & Michigan Southern, the Norfolk & Western and many others which I might name, famous and prosperous, and great properties. But these men are rapidly going to the rear, either being on the retired list and pensioned or perhaps dropped out altogether, and in their places we are finding too often a "made-to-order" variety of superintendent whom nature never intended to fill the position

which can a man) be a holding. By a "system," and because possessed of a diploma, he can, by divine right or otherwise, fitted to hold the job formerly held by men who earned their spurs.

I believe it was Napoleon who said, "Let him wear the spurs who earn them," and whose unquestioned answer was because of his recognition of ability, which found among the common men. Remove incentive from the great mass of employees, and you remove the greatest impelling force for upbuilding of the property. If, as I notice, the Pennsylvania Railroad proposes hereafter, in addition to its "made-to-order" superintendents, to have "made-to-order" signalmen by a course of schooling which will make rulers of the fortunate young men who, in three years, will become masters of the hands of operatives who are today doing the trick satisfactorily and faithfully, what hope is there for this mass of toilers? They see at once that "once a towerman always a towerman," and that any effort on their part, or attempt to advance themselves, will bring nothing more than perhaps change to another and more difficult tower, while every year there will be a new crop of rulers brought on to supervise those who have only had the advantage of learning practically what the other has to learn theoretically.

A recent illustration comes to mind. A roadmaster on a Western road—I might say the best trackman I have ever known, and who can do any and every job of maintenance and construction that can be suggested—wanted to quit because a young engineer had been promoted and placed over him as engineer of maintenance of way. The young engineer had a smattering of maintenance knowledge picked up by some process of special schooling, and he attempted to give this veteran trackman instructions, some of which were so absurd as to disgust and drive all of the spirit out of this faithful and efficient trackman.

The article referred to might be supplemented by one dealing with the question of "Just *who* are the strong men, and what makes them strong men?" My impression of some promotions I have seen is that "imitation men," instead of "strong men," are the rule.

Now, why is it that some of these "strong men" whom "system" has made superintendents are not passed through the degree of train despatcher? I can answer. For the very good and sufficient reason that they would know as much about train despatching as a hog knows about Sunday, and would get about as far in moving traffic as I might get in attempting an amputation, or an operation for appendicitis. Yet, if you will look about you, you will find that many of the "strong men" in charge of operating railways to-day came up as train despatchers and trainmasters, and became superintendents and managers. Under a "system" these men have notice served on them that that avenue of promotion is closed hereafter.

Under a "system" of special schools for signalmen, or superintendents, or master mechanics, such men as Mudge of the Rock Island, Brown of the New York Central, Harahan of the Illinois Central would still be kept laborers; Johnson of the Norfolk & Western might still be a locomotive engineer; Nick Maher, a train despatcher; Wickersham, a station agent; Willard, a locomotive engineer; Underwood a brakeman; Thomas, a laborer; Moon, a telegrapher; my poor friend Hurley, a station helper; Gardner, a train despatcher; Gruber, a telegrapher; Sullivan, a machinist; and thus I might go on.

The trouble is that men who themselves have not climbed the ladder, except from the bottom to the top rung in one jump through a special "system," cannot put themselves in a position to see, in any other light than the same avenue which they used, a chance for other men.

Again I say, let him wear the spurs who earns them. Let every private carry a marshal's baton in his knapsack. Remove the barrier of a "preferred class" from the possibility of promotion by the mass, and we may get back to the condition where "strong men may be found for places as superintendents," and the last paragraph of the editorial, which says, "The feeling that they have a hard fate in not having a better body of men to select from," will have its answer.

VICE-PRESIDENT.

THE STORY OF AN ARBITRATION.

BY CLARENCE DUMING,
Attorney at Law, New Haven, Conn.

There have of late been not a few arbitrations of the transportation companies with their employees. While the outcomes have been published duly and aroused comment and criticism, there has rarely been an exact public report of the arbitration proceedings and almost never any statement as to what may be called the functional doings of the arbitration boards. Seen from this wide viewpoint, the arbitration in Connecticut just ended between the dominant street railway corporation of the state and its conductors and motormen may have some fresh suggestions of value at a time when arbitration, as a solvent of labor disputes, is an expanding force. In the Connecticut case there have also been certain elements the more informative because they have been somewhat unique.

The New York, New Haven & Hartford is the parent corporation which, through its holding company, the Connecticut Company, owns or controls nearly all of the street railway properties of the state. It has somewhat more than 81 per cent. of the total primary mileage of the state; about the same proportion of the primary and secondary mileage (second track and sidings) reckoned together; and its gross earnings are about 90 per cent. of the total. The steam corporation actually, though not technically, controls several hundred miles of street railways in Massachusetts and also owns or controls practically all the Rhode Island trolleys. In connection with the Connecticut arbitration, this outside ownership of trolley properties by the New Haven company is of importance, as the arbitration finding on wages, bear on the rate in Rhode Island and to a somewhat less degree in Massachusetts. Moreover, the policy of the Connecticut corporation involves the same wage rate for its motormen and conductors, whether they are union men or not. These two groups in the employment of the Connecticut Company number about 1,600 men, which would probably rise to nearly or quite 3,000 were those in Massachusetts and Rhode Island to be included. The Connecticut arbitration thus had pretty large financial scope and its import was not diminished by the fact that it was the first of its kind in the state.

THE ARBITRATION CONDITIONS.

The antecedent conditions and certain important negotiations which led to the arbitration may be better reviewed later as part of the sworn testimony at the hearings. It will suffice at this point to say that the articles of agreement for arbitration signed by the representatives of the men and of the Connecticut Company provided that each party should choose an arbitrator and the two arbitrators a third, the three to constitute the board and the finding of the majority to be binding for a period, of not more than two years, to be fixed by the board; that the arbitrator for the men should be paid by them, the arbitrator for the corporation paid by it, and the general expenses and charges of the third arbitrator should be shared jointly. There were minor provisions for death or disability and for the sessions of the board. As to the wage scale, the contention of the company in the arbitration articles was for the former scale, which, while varying locally, may be described as the 21-25 scale—that is, from 21 cents an hour for the first year of service up to 25 cents on the sixth year and thereafter. The demand of the men was for a "flat" rate of 30 cents an hour and time and one-half for overtime in place of the old additional five cents an hour. It may also be stated here that a few weeks previous to the arbitration, and beginning April 9, the company had posted and put in operation an increased wage scale varying by years from 21½ to 26 cents an hour. This new wage scale, posted after negotiations with a committee of the men, had not been revoked.

The men chose as their arbitrating representative David E. Fitzgerald, of New Haven, who as attorney had represented on previous occasions the labor unions in the courts. The Connecticut Company chose the writer as its representative, but with

the express proviso on his part that he should act as arbitrator pure and simple, and not as agent or attorney of the company. In the important, if not vital, matter of choice of the third arbitrator the two initial arbitrators were in full accord and their system may be worth its description, as a suggestion at least for other proceedings of the kind.

HOW THE THIRD ARBITRATOR WAS CHOSEN.

A somewhat unique plan was adopted. It was agreed that it was desirable that the third arbitrator should be chosen from Connecticut, and that he be a man familiar with local conditions. Next the state community was divided into groups and a process of exclusion adopted in order that, as soon as possible—if the mining phrase may be pardoned—"pay dirt" might more quickly be reached. First, to be excluded, necessarily, were all persons having official relations with labor organizations on the one hand and public service corporations on the other hand. Next on the excluded list were persons in politics and public life as not being disinterested parties. The clergymen were excepted for two reasons—sympathy with the character of their congregations and as even more likely to be swayed by sentiment than the facts. The medical profession went out as unrelated to business, large employers of labor in the factories and cognate occupations on account of prejudiced relations with the open or closed shop, and the mercantile class as liable to undue feeling in the matter of freight rates. Finally, a review of the list of Connecticut attorneys-at-law showed practically none of eminence in the state not doing more or less corporation business. With the lawyers out, the available groups were reduced to two—judges of the higher courts of the state and the group of "executive educators," including college presidents, deans of departments and headmasters of large preparatory schools, to whom were added professors of political economy.

The list of seventeen Connecticut judges was used first and resulted in the choice for third arbitrator, from a residual group alphabetically arranged, of Judge W. S. Case, of Hartford, a judge of the Superior Court, who accepted the place, one judge having previously declined it. At a later meeting of the organized arbitration board it was decided that the hearings would be open to the public and that the case for the men should be presented first. The representatives for the Connecticut Company at the hearing were Calvert Townley, vice-president, and J. K. Punderford, general manager of that corporation, and Vice-President E. G. Buckland, of the New York, New Haven & Hartford, the parent corporation, who conducted the case. The representatives of the trolley men were Razin Orr, international treasurer of the Street Railway Association of Trolley men; Charles Minnix, president of the State Conference Board; Roger Lehey, treasurer of the State Conference Board, and W. D. Mahone and W. B. Fitzgerald, of the Amalgamated Association of Street and Electric Railway Employees, the latter in primary charge of the case for the men.

THE EVIDENCE.

Mr. Fitzgerald, for the men, first put in signed schedules from business houses showing the increased prices of provisions since 1907, the date of the last increase of wages previous to the increase posted April 9, 1910, followed by letters from other business houses to prove that during the three years the prices of furniture, boots, shoes and rubber goods increased, as well as provisions. He also introduced several magazine articles and later offered some hundreds of cards signed by the trolley men to prove the increase of rents, and letters from officers of other labor organizations to show the high wages of their men as compared with the trolley men pay of locomotive engineers, firemen, trainmen, bricklayers, carpenters and others. Vice-President Buckland, for the company, while admitting a certain rise of commodities, countered as to the amount by comparative lists from the newspapers in 1907 and 1910, government and trade reports, advertisements of dealers, testimony of real estate men to show slight or no rise in rents in New Haven, and evidence from contractors to prove the long apprenticeship and precarious work of the men in the higher paid voca-

tions. Other testimony or exhibits made by Mr. Buckland showed 598 men on the company's waiting list of trolley men and the wage scales of 104 street railways east of Buffalo and north of Pittsburgh, nearly all of which were below the scale of the Connecticut company, and some of them far below. Much evidence on both sides was offered on the subject of the trolley runs—on the side of the men to show undue disparity and reduction in average wages; on the part of the company to prove the necessity of difference in the runs and their substantial fairness.

Mr. Fitzgerald claimed high earnings and prosperity of the company. Mr. Buckland answered with exhibits and testimony of auditors during 1909 to prove net earnings of but 2½ per cent. on the "investment" of the parent corporation. Unfortunately for his plea, underlying securities assumed by the parent company were counted in this investment after interest on them, earned and paid, had been subtracted from earnings over cost of operation, and the net earnings over all were then ratioed to both the debt and advances for improvements—some \$9,000,000 of the latter, and the whole, amounting to some \$36,000,000. Contingent and remote liability was treated as direct investment and as if it were capital stock. This error, due to a bookkeeping technicality, vitiated the figures and left the actual condition of the Connecticut Company quite nebulous—particularly as in its own return and in that made to the Connecticut Railway Commission, earnings over and above operation are transferred to the steam (parent) corporation's account and there lose their identity. In consequence, the arbitration board, at its conference following the hearing, was forced to expunge this evidence.

A VIOLATED COMPACT.

But a matter which, in the opinion of the arbitrator representing the company, left all economic and fiscal issues in the shade was the evidence of a violated compact. Stated as briefly as possible and ignoring minor details, this vital testimony was as follows: In March, 1910, the trolley men asked an increase of pay and placed their demand in the hands of a committee of 13, representing the 11 divisions of the system. The committee met Vice-President Townley and General Manager Punderford in conference and presented a high wage scale, which was rejected by those officers. Next came a wage scale offered by Mr. Townley. It was reshaped by the chairman of the committee, and, after some discussion, accepted by that body—Mr. Townley polling the committee and receiving not only its collective and individual assent, but a promise to support it actively when referred back to the men in their local divisions. Of the 11 local divisions 9 voted in favor of the scale, several of them unanimously, only the New Haven and Norwich unions dissenting. The company, after some postponement asked for by the committee's chairman, posted the advance scale, that of April 9, heretofore referred to. Suddenly, for causes not fully brought out at the hearing, but evidently outside influence, the compact was violated; the committee went back to the officers of the company and asked a yet higher wage scale; on its refusal they appealed to President Melten, who charged them with bad faith and suggested arbitration as the only alternative. That alternative the committee accepted. At this point and as evidence on the charge of bad faith of the committee may be cited the form of ballot sent out by it for a referendum vote on the question of sustaining the latest demand formulated after the scale of April 9 had been approved by the 9 out of the 11 divisions. On the ballot the committee asked the men whether or not they would sustain their demands. No reference was made to the previous action, attitude or pledge of the committee and the ballot was, in effect, a campaign circular, rather than an official ballot. In the referendum the men, by a large majority, naturally sustained that demand.

THE DECISION OF THE ARBITRATORS.

In dealing with the great mass of evidence filling 526 large pages of typewriting and a huge bulk of exhibits the arbitrators divided it into three classes: economic, fiscal and moral, the last two, respectively, relating to the fiscal condition of the company

and its ability to pay, and the question of had faith and broken agreement and pledges.

As to the cost of living there were found in both the testimony and the exhibits, most inconsistent disparities, and many obvious flaws. As ex-parte, all of that line of evidence opened itself to suspicion. The magazine articles were semi-sensational; government reports covered long periods of time, and were not localized to Connecticut; newspaper advertisements of prices were abnormal, their quotations of prices too infrequently changed and not up to date. Through nearly all the prices cited ran the two errors of being fixed at points of time instead of covering periods of time and also not allowing—in the case of foods—for amounts entering into consumption. One table, however, prepared by one of the arbitrators and introduced by consent, was an exception to the rule. It was taken directly from the household account of a family of seven, unvarying in size, and covered six corresponding months of 1907 and 1910, and 63 articles of food, including ice. It showed a gain for the second and later period of a little more than 8 per cent. Contrasted with figures from the same household for 1904 the table indicated a gain of about 17 per cent. The strong suggestion of the return was that the major part of the rise in cost of living came in the three years preceding 1907 and, coming slowly, was less felt and recognized; while the 8 per cent. rise since 1907, coming suddenly, has been felt more acutely and challenged attention.

In making their findings the three arbitrators, appealing more to their own experience than to the erratic references in the evidence, agreed that there was a rise in the cost of living which, considered by itself, entitled the men to more pay than was given them under the wage scale in force. But they disagreed on the "market price" principle and economic law of supply and demand connoted by the oversupply of men on the waiting list and the lower wage scales of other Eastern trolley lines. The arbitrator for the company urged the general principle as reinforced by other facts, notably the increased wages already granted by the company and the tendency of the dread of the potent weapon of a street railway strike to raise wages of the trolley men above the normal market level. His two colleagues urged that the oversupply of men on the waiting list implied their inefficiency, despite his counter claims that efficiency was reasonably guaranteed by the company's dread of damage suits and injury to rolling stock. The three arbitrators substantially agreed that wages in other vocations were practically no criterion for this case, and also agreed in ignoring the evidence on both sides—the "fiscal" question—relating to the financial condition of the Connecticut Company.

But the great contest came in the consultation over the question of the agreement with the company violated by the men; and in his final finding Judge Case took the view that it was excluded from consideration by the articles of arbitration, which, in his opinion, referred to wages alone. The arbitrator for the company, per contra, held that permission given by those articles to each side to present any evidence it desired were the dominating words that widened the scope of the investigation so as to include the whole moral question of the violated compact; and, in his minority opinion filed, expressed his belief that by refusing to face this moral issue the arbitration had worse than failed. It ought, perhaps, to be added that at the hearing counsel for the men had refused to put in evidence on the violated agreement, while a large amount of the company's testimony bore explicitly on the point. In the end the arbitrator for the men concurred with Judge Case in giving them a small increase—about 2 per cent.—of pay—Judge Case writing the opinion.

In looking back over the long arbitration protracted through some two months—though the actual hearings lasted through only four days—some brief reflections of a general nature on arbitrations of the kind may be indulged. In the first place the articles of arbitration should be scrutinized by each side with the utmost care. A single sentence in them, even a word, may be the turning point of the whole case—especially should the

third arbitrator be a strict constructionist or the reverse. The articles should be free from collateral issues and reduced to the direct question involved. Secondly, the "cost of living" factor is almost sure to figure in wage arbitrations, and may also be reduced to low terms. One side tries to push the cost of living up, the other to pull it down. The process is well nigh endless, the returns almost sure to be unprecise, the statistics a great jungle of figures from which the weary arbitrators must at last turn to the not much more definite tests of personal experience. Thirdly, the management of the arbitration on each side should be left to trained attorneys to marshal and align the evidence and prevent diffusion; and, for the same reason, the third arbitrator, who practically sits as umpire, should have a clear head in cutting short irrelevancies. Finally, the side that adopts the policy of contracting its volume of exhibits to essentials will, in that too often dreary branch of an arbitration, have vantage over its opponent who, with his multitude of documents, correspondingly dilutes his cause.

LIFE OF FIREBOXES AND TUBES.

In his report on improvements in locomotive boilers before the International Railway Congress, H. H. Vaughan, assistant to the vice-president of the Canadian Pacific, had the following to say concerning the life of fireboxes and tubes on American locomotives:

Life of Fireboxes.—The life obtained from steel fireboxes varies considerably with the quality of the water used and with the type of firebox. No reliable information is obtainable with reference to the influence of the quality of steel on the life of the firebox with the exception that one administration reports steel having from 0.10 to 0.18 per cent. carbon has been found to give better results than steel having from 0.18 to 0.25 per cent., while several report that a special brand of acid steel having exceptionally low phosphorus and sulphur has been found preferable. Some administrations with locomotives of an older type in which the firebox is deep and placed between the frames and where water is of good quality report the life of fireboxes as high as 20 years and over, but the general experience with modern engines using 180 to 200 lbs. boiler pressure is that the life varies from two to four years in bad water districts, and up to ten years and over where water is good. The exact life of fireboxes is difficult to determine from the fact that the various sheets composing it do not last the same length of time. Where the nature of the scale is such that the sheets become easily overheated and the service is severe, side sheets in engines of the wide firebox type are occasionally replaced in from one to one and a half years, while crown sheets which do not deteriorate so quickly give considerably longer service. Thus one administration reports that side sheets are being renewed in from one to three years while crown and flue sheets average five years life.

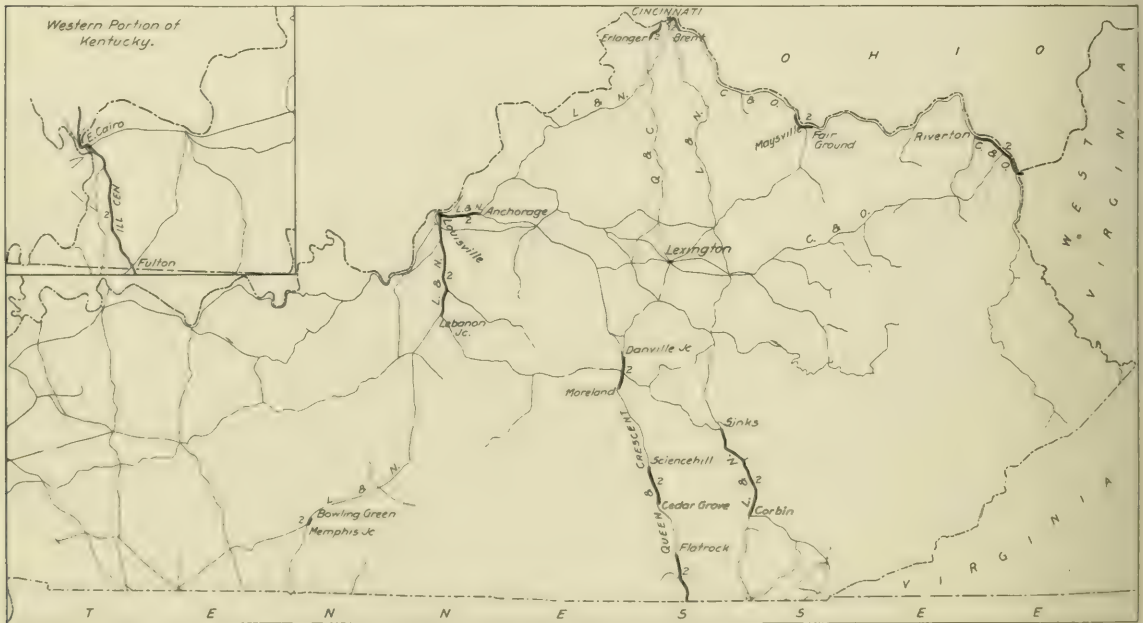
It is difficult to present any correct figures on account of the great variation in the conditions. The figures given above are fairly representative of the replies received from a number of administrations. The Buenos Ayres & Rosario Railway, which uses both copper and steel fireboxes, states that with copper the life of the firebox has been from 10 to 12 years and with steel about four years. This would indicate a considerably longer life for copper fireboxes than for those made of steel, but the copper firebox has been found impracticable in American service on account of the rapid erosion caused by the sparks, due to the high rates of combustion at which engines are frequently worked. It should be borne in mind in connection with the life of fireboxes, that in American practice the miles run per locomotive per annum are exceedingly high, 30,000 to 35,000 miles frequently being obtained, while individual engines in passenger service have been run from 6,000 to 7,500 miles per month. Measuring the life of fireboxes therefore in terms of years does not represent entirely the service obtained, unless the miles run per month or per annum are

taken into account, and when this is done the service obtained from steel fireboxes becomes satisfactory. The reason for the rapid deterioration of the side sheets in wide firebox engines in service where the water is of a bad quality is not entirely clear. It has, however, recently been ascribed to the inclination of the firebox sheets towards each other at the top so that the bubbles of steam formed next the sheet are not wiped off by the ascending streams of steam bubbles from other portions of the sheet, as is the case with fireboxes of a narrow type placed between or on top of the frames. Some boilers have recently been constructed in which the width of the firebox sheet is reduced in order to allow of the inclination of the firebox sheet outwards towards the top so as to obtain this action. Whether from this cause or not there is little doubt that overheating of side sheets occurs and that the reason is on account of insufficient circulation. Some recent experiments

occurs and the water is of an average quality, the life of the body of the tube will average from 8 to 12 years before it is scrapped on account of insufficient strength. The Buenos Ayres & Rosario Railway, which uses both brass and iron tubes, reports brass tubes as lasting from 10 to 12 years, while iron tubes are scrapped after four years on account of pitting. This evidently is caused by the quality of the water, and there would not appear to be a very great difference between the life of the brass and iron tubes where the water is not of such a quality that the body of the tube is attacked.

DOUBLE-TRACK RAILWAYS IN KENTUCKY.

The railway map of Kentucky, given herewith, is printed for the purpose of showing all sections of railway in the state on



Double-Track Railways in Kentucky.

have indicated that an improvement may be obtained by arranging for a greater depth of water in the sides of the firebox below the surface of the grates, and this would also confirm the theory that defective circulation is a reason for the short life frequently obtained from side sheets on boilers of the wide firebox type.

Life of Tubes.—The life of tubes varies largely with the quality of the water. It is common practice to safe-end or weld additional portions on to the body of the tube from four to ten times where the water is such that no pitting of the body of the tube occurs. The length of time required before the tube is removed on account of the end being so damaged by rolling and heading that it cannot be maintained in a sufficiently tight condition for proper service, varies, according to the water conditions, and type of engine, from five to six months up to three years and over. On one railway tubes are removed for safe-ending after 40 to 60 thousand miles in freight service and 75,000 to 110,000 miles in passenger service. On another they are removed in bad water districts after five to six months, and in relatively good water districts after 10 to 12 months. The shortest life of the body of the tube reported is from two to three years, while some administrations report tubes lasting as long as 15 years and over. Where no pitting

which there are two or more main tracks. The termini of the sections, as shown in the map, are as follows:

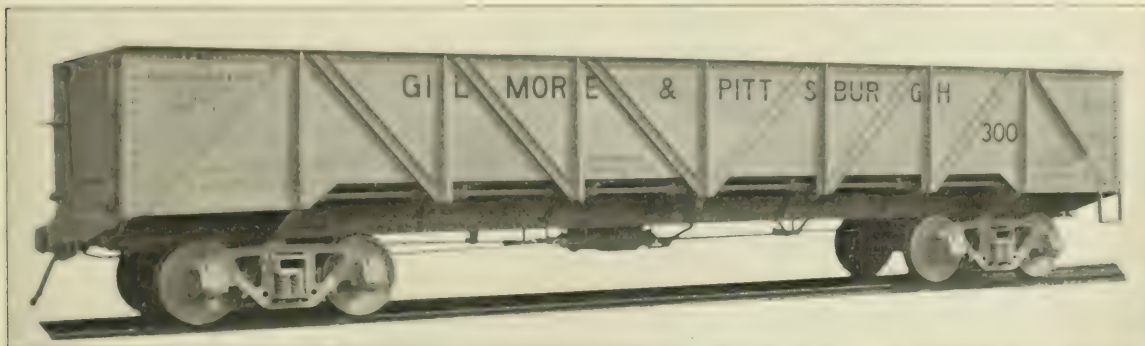
KENTUCKY.		
	No. tracks.	Approx. miles.
<i>Queen & Crescent.</i>		
Ludlow to Erlanger	2	7
Danville Junction to Moreland	2	9
Science Hill to Cedar Grove	2	12
Flat Rock to Helenwood, Tenn.	2	30
<i>Cincinnati & Ohio.</i>		
Barkonsville, W. Va. to Riverport	2	37
Fair Ground to Lawrence Creek	2	8
Breed to Cincinnati, Ohio	2	10
Sinks to Corbin	2	34
At Lexington	9	1
<i>Memphis Central.</i>		
Wickliffe near Cairo to Fulton	2	41
At Louisville	2	1
<i>Louisville & Nashville.</i>		
Louisville to Anchorage	2	16
East Louisville to South Louisville	2	—
Louisville to Lebanon Junction	2	29
Bowling Green to Memphis Junction	2	5
Covington to Milldale Tunnel	2	1

COMPOSITE GONDOLA CAR FOR THE GILMORE & PITTSBURGH.

The Gilmore & Pittsburgh recently had built by the Western Steel Car & Foundry Co., Chicago, 100 fifty-ton composite gondola cars of the design shown. These cars are of the general service type, intended for use as an ordinary solid floor gondola or a side dump car, making it suitable for any loading usually carried in gondola or hopper cars.

intended to facilitate repairs in a section of the country where wood is plentiful and steel has to be transported considerable distances. The design, however, permits of all-steel construction, and a number of such cars are in service on different railroads.

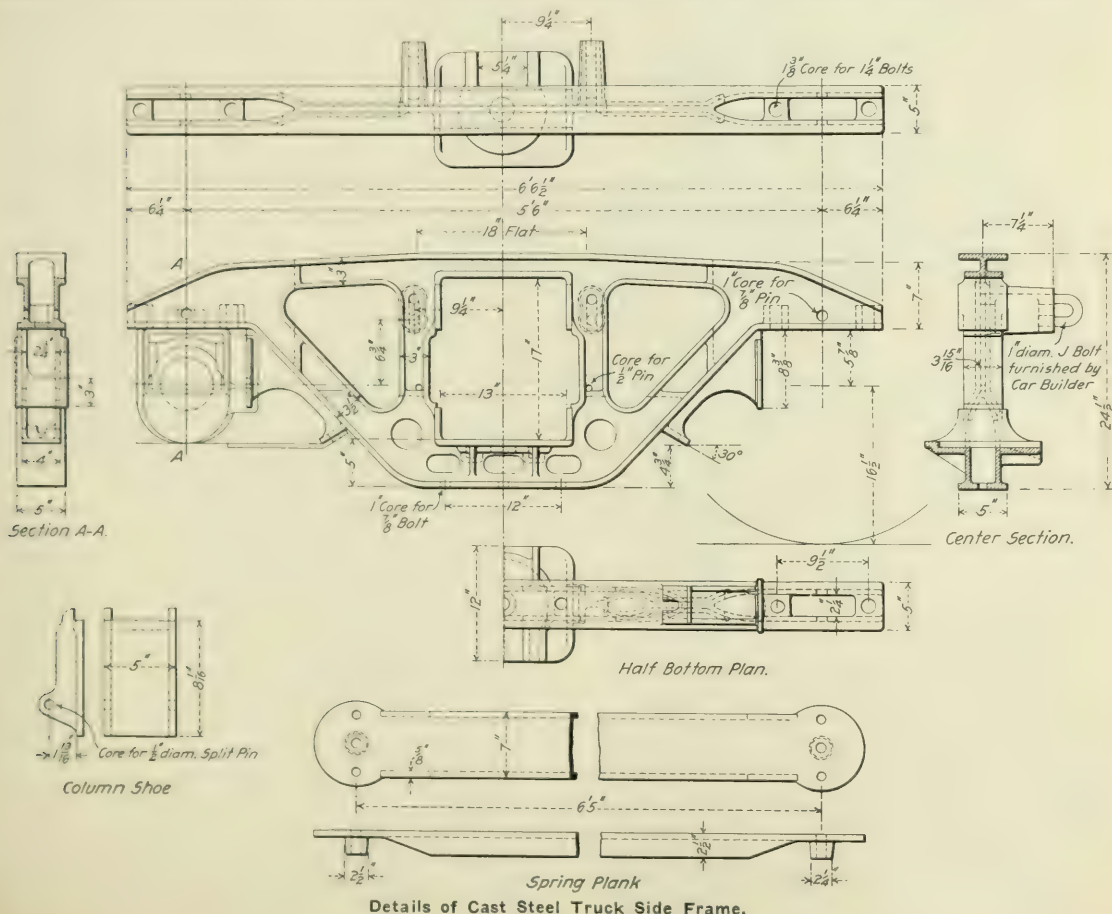
The 16 drop doors, extending the full length of the car, are arranged to discharge the load at the sides. The doors on either side may be operated independently, or those of both sides together. It requires from three to four minutes to discharge the



Composite Gondola Car; Gilmore & Pittsburgh.

The photograph shows the general design, which utilizes a single center sill with trussed side framing, made up of standard sections for the tension and special sections for the compression members. The flooring, side and end planks are of yellow pine,

load and return the doors to their closed position. They are operated by chains and a creeping shaft device. This arrangement has proved very efficient for this purpose, as accidental opening of the doors is effectually prevented. The ends are ar-



ranged for dropping to facilitate the loading of long material.

Probably the most interesting detail of this car is in the all-cast steel truck, made by the Pittsburgh Equipment Co., Pittsburgh, Pa. It is said to be the first such application to American cars. The drawing shows the design of the I-beam section truck side frames and the journal boxes. The assembled truck has but four bolts, one on each journal box; these are $\frac{1}{8}$ -in. in diameter and pass through the two vertical members of the frame and the lug on the top of the box. Cotter pins may be used instead of bolts as they are not subjected to any stress, the provision being made merely to prevent the side frame from lifting off the box in case of derailment or collision.

The journal box conforms to M. C. B. standards, except that it has a top and a side lug cast integral for receiving the interlocking truck side frame, and also that the boxes must be cast in rights and lefts. Reference to the illustrations shows lugs cast on the under side of the oblique members of the side frame for bolting a temporary strap around the box in case it is necessary to replace a broken one by a standard M. C. B. box. The side frame is cored for column bolts for the same emergency.

The truck side frames have filler block or cheek plates on the columns, an invention of W. P. Richardson, mechanical engineer, Pittsburgh & Lake Erie. These cheek plates are removable and serve the double purpose of allowing the bolsters to be

AMERICAN ASSOCIATION OF RAILWAY SUPERINTENDENTS.

The second meeting, for the current year, of the American Association of Railway Superintendents was held at the Planters Hotel in St. Louis, on September 9. Fifty-three delegates were present. Two local associations were admitted to membership, those of Oklahoma and Indianapolis, Ind.

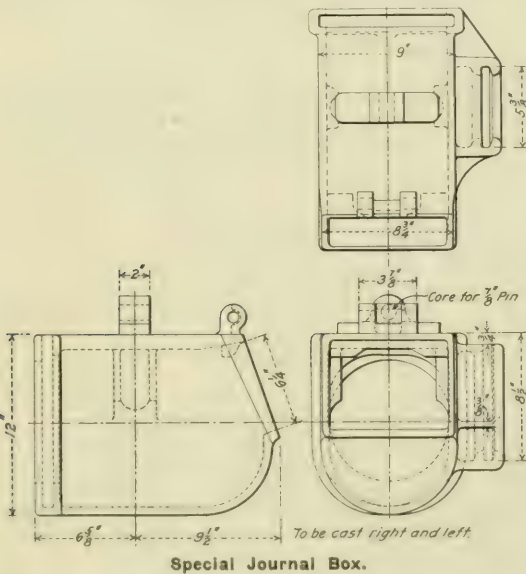
The Committee on Interchange Car Inspection reported the action taken by the various divisions of the association on the rules promulgated at previous conventions and considerable discussion ensued regarding the cost of inspection. T. B. Fogg, general manager of the Toledo Terminal, believed it was not right to require as many inspections as are now made in transferring cars. He said that frequently more damage is done in the yards after the inspection by the delivering line than was done on the road. If a transferring line such as his made no inspection then the inspection made by the receiving road placed all responsibility for damage between the two inspections upon the transferring company. He believed inspection terminating the road trip should be abolished and that an examination should be made at the point of delivery to the transferring company. Few of the delegates believed this matter was one that the association should take up, as it was purely local. The inspection at the termination of the road trip is primarily an examination required by law to see that all safety appliances work properly and the road trip properly ends on the arrival of the car in the yards. The discussion and reading of reports from local associations showed that all were working practically under Rule 2 of the Master Car Builders' Association as to inspections. J. E. Taussig, terminal superintendent of the Wabash, St. Louis, Mo., suggested that all car interchange rules should be practically uniform, and this was the sense of the convention. The uniform list of non-transferable commodities recommended by the Association of Railway Claim Agents was adopted.

The Transportation Committee favored dropping the matter of recommending grain door rules because conditions in the grain business are such that uniform rules for the collection of grain doors are not practicable. President Somerville requested the committee to include the subject in its list of subjects for the coming year as he did not agree with the recommendation. He believed the subject was of growing importance and that if properly studied the situation now existing could be materially improved. The committee agreed to investigate further and report at the next meeting. The association acted favorably on the committee's recommendation that the following resolution be referred to the American Railway Association:

"RESOLVED, That all broken, defective and imperfect seals be reported by the agent of the receiving road to the superintendent or agent of the delivering road, by letter, within 48 hours after seals are examined by a representative of the receiving road; reports to include all cases of absence of seal, seal improperly applied, broken seal, indistinct impression on seal, blank seal, seal on insecure door fastening, and where the seal and door fastening together do not fully protect the contents of car."

On the subject of uniform lettering of cars recommendation was made that the marks "A" and "B" be used on sides and "D" and "C" on ends. In addition, the recommendation was made that all cars belonging to a certain railway system have only the name of the system stenciled on them, it being the opinion of the committee that the ownership of a series of cars belonging to a subsidiary company, or division, can be easily recorded in the offices of the auditor and superintendent of transportation, thereby materially simplifying the operating department's work. The committee also believed that as all cars are at present equipped with air brakes it is unnecessary to stencil on them the words "Air-Brakes." While this is a small matter on one car, when all the cars bearing the words "Air-Brakes" are taken into consideration, it means considerable wasted labor and expense. It was decided to refer this subject to the American Railway Association for its consideration.

The committee recommended that the matter of "set-backs" be submitted to the American Railway Association, favoring



Special Journal Box.

placed or removed without jacking up the car or taking out the spring plank, and of taking a considerable portion of the service wear of the bolsters off of the truck side frame column faces. The spring planks have projections at each end so that they drop into sockets in the spring seat portion of the truck side frame.

Following are the general dimensions of the cars:

Height from rail to top of body	8 ft 11 in
Height from rail to top of floor	4 ft 7 in
Depth of car body	4 ft 1 in
Length inside of body	11 ft 9 in
Length over end sills	13 ft 9 in
Width inside of body	9 ft 2 in
Width over end sills	10 ft 2 in
Length of drop door openings, 1 door	4 ft 0 in
Length of drop door openings, 2 doors	4 ft 10 in
Width of drop door openings	1 ft 0 1/2 in
Distance from center to center of trucks	21 ft
Truck wheel base	9 ft 6 in
Capacity	50 tons
Weight	41,808 lbs.
Ratio of paying freight to total wgt. loaded car	79.6 per cent.

Other special equipment used on these cars is as follows:

Brakes	Westinghouse
Brake beams	Damascus, Weycott
Couplers	Climax
Coupler operating device	Carmer
Center plates	Cast steel
Draft rigging	Westinghouse friction
Draw gear	Brownwood
Journal wedges	Drop forged steel
Nut locks	Bartley

the adoption, as recommended practice, of a blank to be used for the reporting of setbacks, similar to the following

NORTH AND SOUTH RAILROAD

St. Louis, 1910

Persons to Mr.

Superintendent

Dear Sir:

Cases designated below were sent back to your road for causes shown, during the 24 hours ending last midnight.

Time		Car Number	Initial	Cause
a. m.	p. m.			

The use of this blank by one superintendent for three months had reduced the number of set-backs 35 per cent. The report of the committee on this matter was adopted unanimously.

The subject of hoof weights used in determining charges for the carrying of live-stock caused a long discussion. The committee pointed out that track scale weights are not always correct, which was objected to by some delegates who believed it was not good policy to cast reflections on track scale weights, and that this was a thing which should not be taken up by superintendents because it is almost wholly a local traffic matter. The general opinion seemed to be that the matter was an operating matter, as the superintendents in charge of operation must weigh cars loaded with live-stock on arrival, and after they are unloaded. This means considerable delay and the tying up of cars which should be promptly released. The committee argued that if track scales did not give the correct weight, the railway might be guilty of a violation of the Interstate Commerce Law. Owing to the present practice of charging by scale weights there are arbitrary allowances of "shrinkage" and "fill" provided for in tariffs. If shippers of live-stock were compelled to install alley scales and give the actual hoof weights to the railways, as a basis for freight charges, "shrinkage" and "fill" can be eliminated from tariffs. It was decided to refer the question and a verbatim report of the discussion of it to the American Railway Association.

The Executive Committee docketed the following subjects for discussion: "Charge for Disinfecting Cars Loaded with Cattle from Quarantine Districts," and "Broader Scope of Activities of the Association."

The government provides regulations for the shipment of cattle from infected districts and for the cleaning and disinfecting of cars used for that purpose. It was believed that no railway can refuse to receive such cattle for shipment. Therefore, the cost of cleaning and disinfecting the cars cannot be avoided. The opinion prevailed that the shipper should pay for the cleaning and disinfecting of the cars and that the traffic department should provide for this in its published tariffs, for it was pointed out that government officers are daily becoming more strict in their requirements. It was decided to refer the matter to the American Railway Association and to the American Association of Freight Traffic Officers.

The matter of broadening the scope of the association was discussed in a paper presented by E. H. DeGroot, Jr., superintendent C. & E. I., St. Louis, Mo., and one by T. B. Fogg, general manager, Toledo Terminal. Both believed that the American Association of Railway Superintendents, as at present organized, cannot present the views of the local superintendents in a proper manner to the American Railway Asso-

Education. Attention was called to the fact that the American Railway Association had passed a resolution regarding the advisability and necessity of calling on the many voluntary railway officers' organizations in the United States for assistance and information. The discussion indicated a general desire to have the American Association of Railway Superintendents composed of individual superintendents, rather than, as at present, of divisional or local sections. J. E. Taussig, Terminal Supt. Wabash, St. Louis, Mo., presented a resolution asking the president to appoint a committee of five to redraft the entire constitution and by-laws of the association so as to make eligible to membership trainmasters, general yardmasters and train dispatchers, and to follow as closely as possible the organization of the American Railway Engineering and Maintenance of Way Association. The resolution was adopted unanimously and the president stated that he would later announce the names of the committee for this purpose.

The following officers were elected:

President, J. A. Somerville, superintendent terminals, Kansas City, Mo.

First vice-president, Brent Arnold, superintendent L. & N., Cincinnati, Ohio.

Second vice-president, S. M. Russel, superintendent T. P. & W., Peoria, Ill.

Members executive committee, E. H. DeGroot, Jr., division superintendent C. & E. I., St. Louis, Mo., and E. R. Scoville, superintendent B. & O., Chillicothe, Ill.

Secretary and treasurer, O. G. Fetter, Cincinnati, Ohio.

The St. Louis division acted as the host of the members and their families, who were given a street-car ride around the city in private cars by courtesy of the St. Louis Traction Co. A lunch was given in the Planters Hotel roof garden at noon, and at 5 p.m. special street-cars took the delegates and their families to Delmar Garden, where dinner was served. This was followed by a vaudeville entertainment in the Delmar Garden Theatre.

CLARK'S TABLET EXCHANGER.

The photographic illustrations show a tablet exchanger lately adopted as standard on the New South Wales Government Railways, where tablets have been in use on fast trains requiring an automatic exchanger, for over 15 years. The principal characteristic of Clark's design is the "helical arm" on the engine

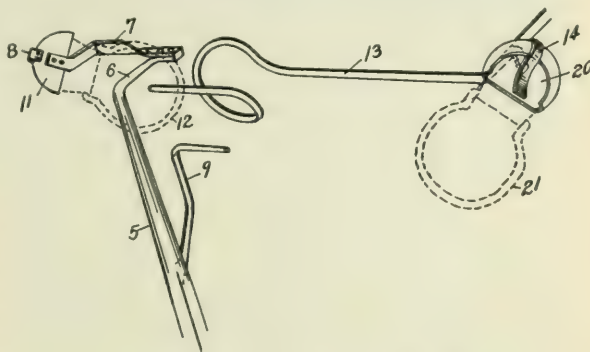


Fig. 1—Operation of Tablet Exchanger.

for picking up the tablet. The way the apparatus works may be seen from Fig. 1, and its appearance just after an exchange has been made is shown in Fig. 2. In Fig. 3 the fireman is taking off a tablet which the engine has just picked up, and the station man is putting the ground apparatus down out of the way. As the engine passes the ground exchanger, the point of the corkscrew arm 13, Fig. 1, enters the bail 12 and pulls the tablet (in pouch 11) out of the holder 8. When this is free,

the bail 12 swings round the corkscrew arm 13 and is gradually braked or stopped by the resistance of the atmosphere and comes to rest on the arm without clatter or impact. Then the arm 9 enters the ring 21 of the tablet on the engine and pulls it from the spring holder 14.

The arm on the locomotive is fastened to the left trailing splash. The apparatus is fitted to a plate which bolts to the back of the splash with slotted holes to permit it being adjusted bodily as the wheel tires get thin. This can also be done by a regulating bolt through the projecting arm as it passes out over the foot-plate.

When an engine passes the distant signal the fireman places the incoming tablet (which is inside a strong leather pouch) in the brass pocket on the arm, the ring being held in position by a spring clip. After passing the home signal the fireman lowers it into position by a lever and connecting rod, and as soon as the exchange is made he then heaves it up and removes the

the exchange is made he removes the tablet, and he also lowers the apparatus unless it is required for the next train.

This apparatus is in use over 339 miles of road and at 48 meeting stations, by six regular trains, daily, besides specials. The tablet apparatus is Tyer's. On the system where Mr. Clark works there are 40 locomotives fitted with tablet exchangers, eight of which have his patent. All new ones are made to his pattern and the old ones are being converted as they pass through the shops.

The only parts of the apparatus that are patented are the twisted arm on the engine and the pocket on the ground exchanger. This pocket is an essential part, as the ring must be presented downwards or otherwise it will not be taken by the engine.

The apparatus can pick up at any speed, the faster the better. Ordinarily, trains change at from 25 miles to 55 miles an hour; and the ring is not damaged or pulled oblong. Mr. Clark says

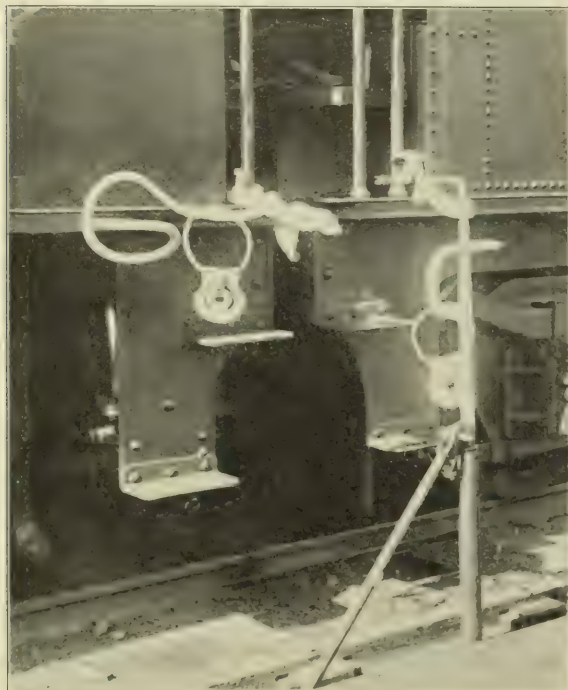


Fig. 2.

Clark's Tablet Exchanger; New South Wales Government Railways.



Fig. 3.

tablet and pouch and ascertains if he has received the correct one. It is then hung up in the cab until they approach the next station. On the New South Wales Railways the apparatus is only used on express and mail trains and only at stations where the train is not required to stop. The ground apparatus is placed on the down side of the line for down trains and on the up side of the line for up trains, and at some places at the foot of the station platform ramp. Sometimes it is placed in the center of the 6-ft. space between the main line and the loop, as shown in the photograph, Fig. 3.

When a through train is due the person in charge of a station obtains a tablet for the section in advance and raises the ground apparatus from its box underground, to which it is attached by a pin, on which it works. Having raised it he inserts the tablet pouch in the brass pocket and sets the ring in a spring clip to hold it in position (at night he lights a lamp at the foot which is a signal to the engineer that the tablet is in position). After

that the helical arm should also be put on the ground exchanger to insure fast exchange without pulling the rings oblong. The rings are 6 in. in diameter and are made of $\frac{1}{4}$ in. steel wire rope.

Engine driver James, who has been running on the government railways 13 years, says: "I have been stationed at Albury for the past eight years, and have been working express trains with tablet exchanging apparatus in use for 13 years, running 200 miles a night and exchanging tablets 22 times. The speeds at which the exchanges are made are from 25 to 50 miles an hour. I have had this exchanger in use on the Great Southern express for the last 12 months, and during that time it has never missed a tablet. I have tried it at 60 miles an hour and it works without a hitch."

The inventor's address is William Clark, Steam Shed Inspector, Government Railways, Goulburn, New South Wales, Australia.

PROGRESS AT THE GRAND CENTRAL TERMINAL.

The excavations for the new tracks at the Grand Central Terminal, New York City, have now reached a point where they have demonstrated all of the tracks in the old train shed, as shown in Fig. 3 of the accompanying illustrations, and readers who are familiar with this station and who, we assume are quite numerous, will be interested in a few views showing the progress made on the new station up to the present time. The front of the old station building, facing Forty-second street, is now nearly demolished, and that part which faces on Vanderbilt avenue (seen at the left in Fig. 3) will soon follow. All of the passenger trains are now running to or from the eastern part of the new yards, upper and lower; some of the tracks here being on their permanent locations and some in temporary loca-

will be observed that, in the Grand Central Terminal, the course for the express trains is one story above the track level and the connection for suburban tracks by one story above the suburban track level. The Interborough subway, shown in this illustration, is on a level with the express train loop. This is the only one of the city subways now in operation. The subway next below this will afford direct connection to the Lackawanna, the Erie and the Pennsylvania stations in Jersey City.

In Fig. 2, the building on the left is the Belmont Hotel, less than half the height of which is shown in the picture. On the right is the Grand Union Hotel, an old landmark. The carriage-way in the foreground is substantially level and one traveling on this grade southward soon reaches the existing level of Park avenue. Beneath this carriage-way are the tracks of the surface street railway which extend under Park avenue south to

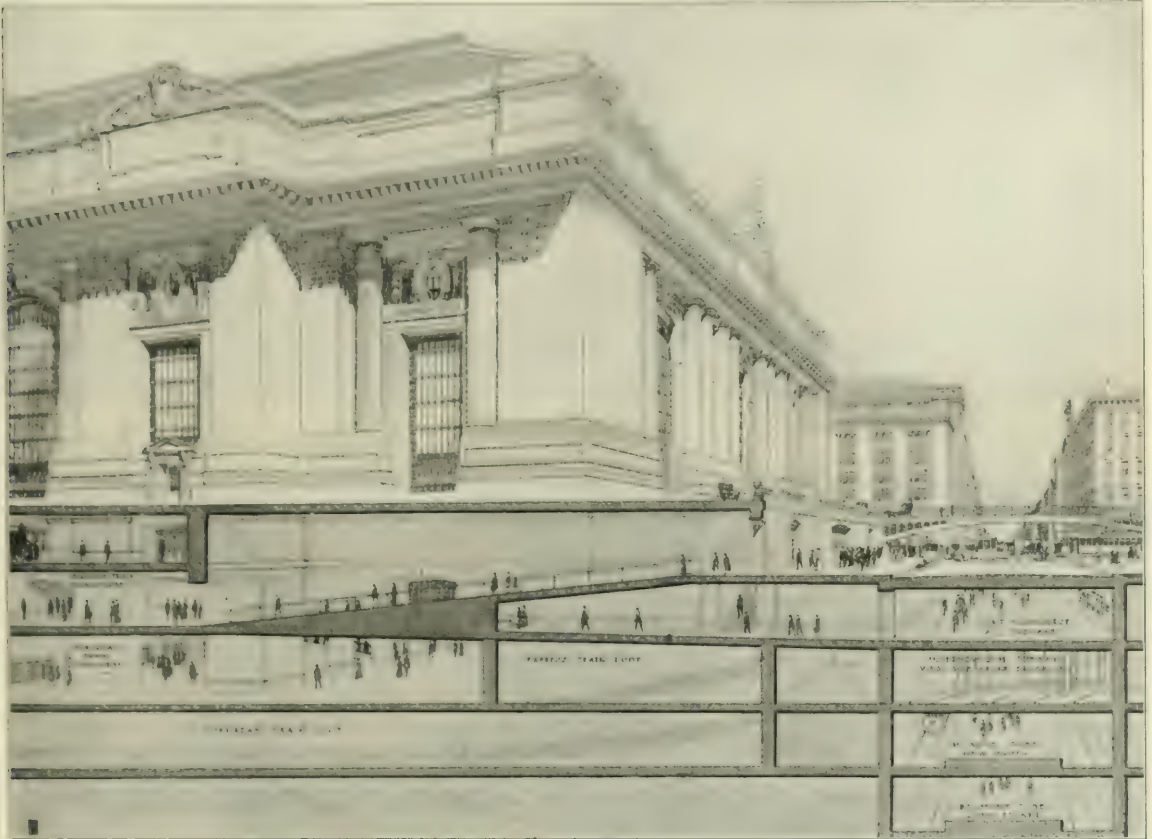


Fig. 1—Grand Central Terminal, New York City. Proposed Elevated, Surface and Underground Approaches.

tions. After the completion of the whole of the station, these temporary tracks will be re-arranged for use as storage tracks. At present, the storage yards at Mott Haven, 5 miles out, are still used for switching and cleaning most or all of the through trains. At the left of Fig. 3, in the extreme background, may be seen baggage cars standing in what is left of the old yard. This is the part of the yard that is devoted principally to the express companies. It is still connected with the outlet to the main line by a single track.

Fig. 1 shows the architect's latest sketch of the southwest aspect of the proposed new station. The principal feature of this drawing is the bridge spanning Forty-second street. The floor of this bridge shows in the central foreground of Fig. 2. The arrangement of the passages in Fig. 1 to connect with the subways in Forty-second street, is in some respects tentative. It

Thirty-fourth street. It will be observed that this drive-way extends across the front and around both sides of the terminal station, at a grade some 12 or 15 ft. above the level of the streets which surround the station.

In Fig. 3, the columns for the new structure, which appear at the right of the engraving, are about on the center line of Park avenue, which is the center line of the original right-of-way of the New York & Harlem Railroad. Those parts of the new building which are finished and which are partly shown at the right are now occupied by offices of the New York Central and of the New Haven road. The engineering department of the New York Central, as well as several clerical departments, are still quartered in other buildings. The chief engineer is still in the temporary building at Madison avenue and Forty-third street.

Fig. 4 shows these office buildings and the platform tracks on

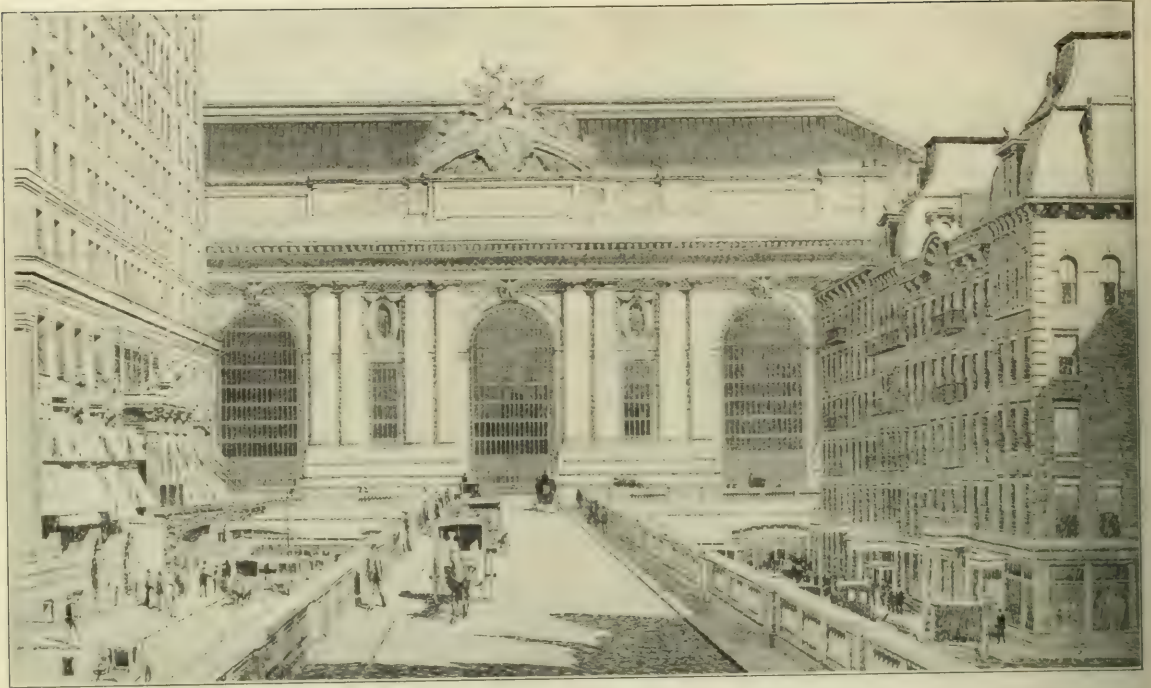


Fig. 2—Grand Central Terminal, New York City. Proposed Main (South) Approach to New Station.



Fig. 3—Excavation for New Station; Looking North from a Point on the Line of 43d Street.



Fig. 4—Grand Central Terminal, New York City. Looking South from 48th Street.



Fig. 5—Last of the Grand Central Station.

Note: Portions of the old roof truss are visible at the extreme left of the building. Below these, the panel giving the date of erection as 1899 (the C. V. is not put on until the last house was enlarged in the year named). The seven panels which appear in the background above the window sills are those which were put in place when the building was built in 1871. "C. Vanderbilt, President," which is on the center panel is the name that is readable in the photograph.

the upper level. The Forty-fifth street footbridge across the yard, which appears at the right in this picture, is that which appears in the center of Fig. 3. The ground floor of the completed office building at the left is occupied by a branch of the city post office.

The wagon entrance to the new baggage room, which is now in use, is beneath the arch of the three-story bridge which connects the two office buildings. The transverse street which faces these buildings is Forty-fifth street. The bridge, partly completed, at



Fig. 6—Panoramic View of the Grand Central Terminal Yard; Looking Southwest, August 5, 1910.



Fig. 7—Fifty-fourth Street Bridge; Looking North. Entrance to Park Avenue Tunnel.



Fig. 8—Forty-sixth Street Bridge; Looking West. Arrangement of Water and Gas Piping.

Forty-sixth street, indicated by B, is that which is shown in Fig. 8. The platform which shows white at the left in Fig. 4 is one of the permanent concrete passenger platforms. The roof or shed for this platform has not yet been put up. On the lower level tracks, seen in this view, a number of gondola cars are visible. Ten tracks at the extreme left of the lower level are now to use for passenger trains. On the upper level twenty-six tracks are in use. The rail building at the extreme right at Fig. 4 is the last one shown.

Fig. 5 shows the headhouse of the old station as it appeared on August 5. Beyond it, in the center, is the Belmont Hotel. At the left may be seen the "tunnel" through which street cars run beneath Park avenue. In the distance appears the framework of a new hotel being built at Park Avenue and Thirty-fourth street, and, a half mile farther, the tower of the Metropolitan Life Insurance building, 700 ft. high.

Fig. 6 is a view looking south, showing at the right the passenger tracks on the old level and at the left the new tracks on the upper new level. Parts of four transverse bridges for streets are shown.

Fig. 7 shows the entrance to the Park avenue tunnel looking south. At the right in this picture, the tracks are on the new level. The girders in the foreground will constitute the first transverse bridge to be completed over the new yard, and the temporary truss footbridge above it will then be taken down.

Fig. 8 shows the arrangement of water and gas pipes on the transverse bridge at Forty-sixth street.

PROTECTION OF WOOD BY CRYSTALLINE PIGMENTS.*

BY HENRY A. GARDNER

It makes little difference what paint is tested when faulty wood is used, for the result in every case will be failure. A notable instance of such failure is recorded in the tests conducted at Fargo, N. Dak., by the Agricultural Experiment Station and the Paint Manufacturers' Association, where most of the wood used on the western side of the test fences (northern hard pitch pine) was extremely sappy and of a hard grain. After a few months' wear, the resinous sap, through the action of the sun, pushed itself through the paint and completely deteriorated the latter in many spots. Again, at Atlantic City and at Pittsburgh, in the paint tests made under the inspection of the American Society for Testing Materials and the direction of the Carnegie Technical Schools, it developed that cypress and yellow pine gave unsatisfactory results in many cases. The inspectors, therefore, were forced to draw their conclusions from these tests almost universally from the white pine panels. Paint tests, therefore, if their object is to determine the value of pigments, should be made upon high grade wood, such as white pine or poplar, carefully inspected and seasoned.

Seasoning and Drying.—The importance of the proper seasoning and drying of wood cannot be overestimated, as the effect of an excess of moisture in lumber is bad from every standpoint. Every one is familiar with the appearance of a building painted immediately upon erection in the early spring, when the excess moisture in the wood, or the moisture that comes from the plaster, works itself to the surface. The badly stained appearance of the paint, which first indicates that moisture is working through, is followed by scaling and blistering, and the effect to beautify and protect has been defeated.

The strength of wood is also vitally affected by the moisture content. It is fairly well known that the strength begins to be greatest when the excess moisture in the cells or honeycomb part of the wood is removed, and when that point is reached where the fibers or cell walls are satisfied. Kiln drying may remove even more of this moisture, but if the moisture does not extend beyond the fiber saturation point, a fair degree of safety and strength is to be depended upon.

Action of Crystalline Pigments.—The effect of certain crys-

talline pigments in aiding the opaque white pigment in their battle to properly protect wood has been demonstrated in practice, and by test, and to-day the paint manufacturer is using these crystalline pigments in small percentage for this purpose. The filling of wood, such as floors for instance, has almost always been done by the use of pigments such as quartz silica, or very fine barium sulphate. The action of these pigments in penetrating the pores of the wood and becoming attached by their rough surfaces to the tentacles of the wood is extremely important. Pigments such as zinc oxide or white lead are made up of particles more spherical and with smoother surfaces, and will not secure the same hold upon the woody fiber, obtainable through the use of the rougher or more crystalline pigments. The painter often uses materials such as yellow ochre for the priming coat for wood, understanding that the ochre has a high content of crystalline pigments, such as silica or silicates. It has been found, however, that a much better practice is to have the priming coat of a paint made up with a small percentage of the pure crystalline pigments.

Treatment of Refractory Woods.—Yellow pine, cypress and other hard woods used in the construction of frame buildings, generally contain a large quantity of pitch and sap which tend to harden the grain and make penetration of the paint almost impossible. To meet such conditions, the painter generally reduces the paste or liquid paint with turpentine or other volatile solvents that will act as accelerators in carrying the paint into the fiber of the wood, and even assist in amalgamating the paint with the resins contained in the wood. The use of new solvents, such as benzol, xylol and toluol, to replace turpentine, is being experimented with, and so far very good results have been obtained. The penetrative values of the above-mentioned coal-tar distillates are high, and their price, as compared with the price of turpentine, will probably make them commercially acceptable.

The Photomicroscope as an Adjunct in Field Inspections.—

The paint chemist is often called upon to report upon the value of a paint that has suffered exposure. The conditions generally looked for as being indicative of the value of a paint are hiding power, gloss, color maintenance, degree of chalking, general condition and checking. Most of these conditions are easily determined, except the latter, which cannot always be seen by the naked eye. A great many paints soon after exposure become very hard and brittle, and fine checking starts in. In order to determine the amount of checking present, and permanently record the condition, the writer has developed an apparatus which has given most satisfactory results. Its value in the field, to the paint inspector, cannot be overestimated. The apparatus is made in the following manner:

The arm and body of a microscope containing a draw tube fitted with objective and eyepiece is mounted in a horizontal position on a solid iron base, the bottom of which is punched and threaded to the standard size to receive the screw from the top of a heavy tripod. This latter piece of apparatus is placed close to the painted surface, and, by raising or lowering the tripod, the microscope can be placed in front of any spot it is desired to inspect. By regulating the coarse adjustment, the microscope is focused on the painted surface in such a way that any checking, cracking, paint coat abrasions, or other disturbing influences, even of the slightest degree, are promptly brought to the eye of the observer. The tube-camera apparatus is then placed directly over the eyepiece of the microscope and exposure is made by lifting the shutter-cap for 20 or 30 seconds, according to light conditions, giving an excellent detail photograph.

The tube camera is made of a metal tube $1\frac{1}{2}$ in. in diameter, into which is placed a lens and shutter fixed to the ordinary bulb apparatus for making an exposure. On the rear end of this tube is placed a disk of metal into which is fitted a block of wood having a central annular opening the size of the tube. On the back of the block is firmly set and screwed into position a film pack, such as is used for the ordinary photographic camera.

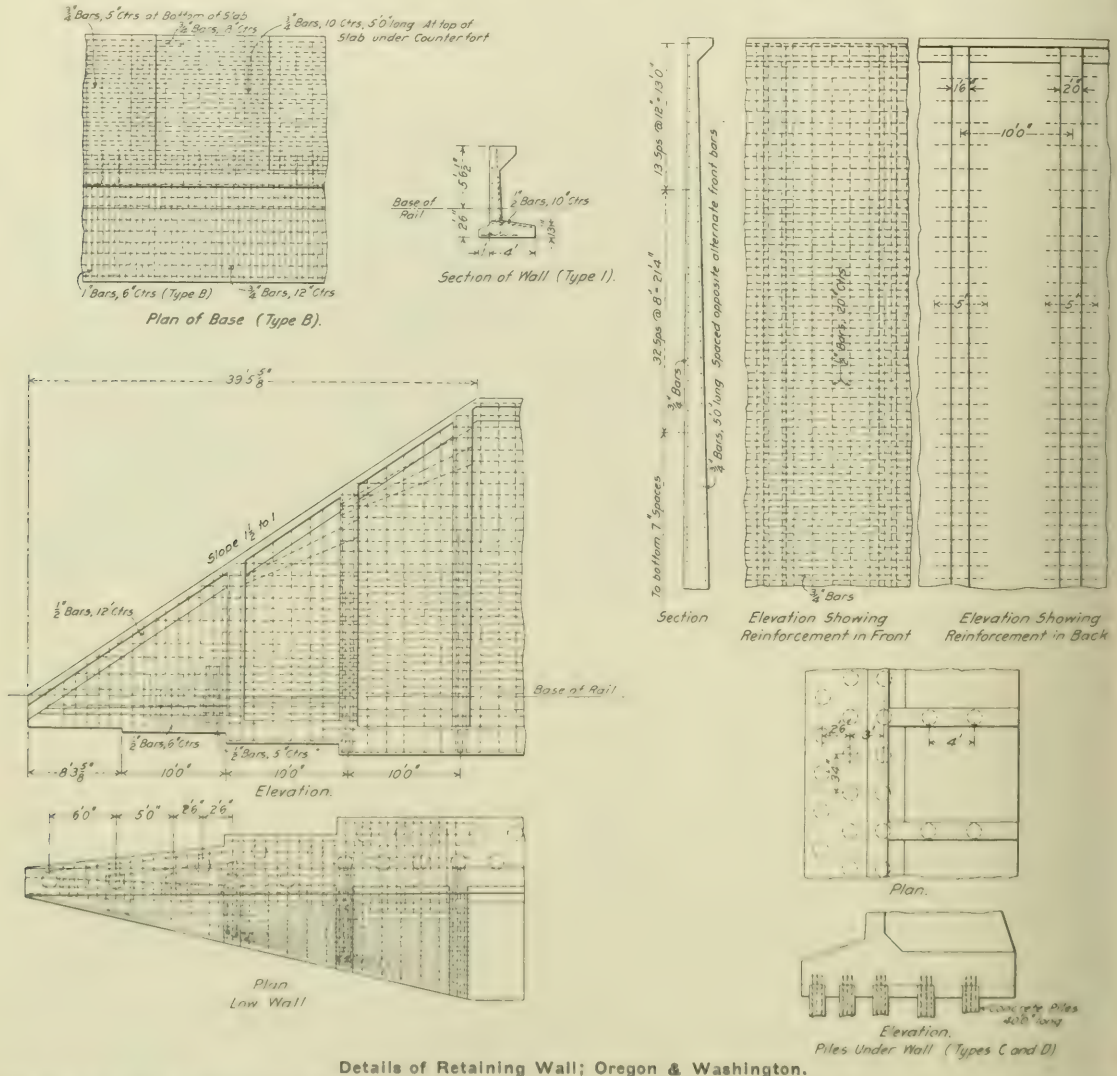
*From the *Journal of the Franklin Institute*, August, 1910.

FIFTH AVENUE RETAINING WALL; OREGON & WASHINGTON, SEATTLE, WASH.

In connection with the new passenger station in Seattle, Wash., the Oregon & Washington is widening Fifth avenue and yet retaining yard space in a manner which shows the value placed on such space in that city. A retaining wall is to be built varying in height from 0 to 45 ft. with a total length of 1,680 ft. It is estimated that the structure will contain 7,500 cu. yds. of concrete and 350 tons of steel. Owing to the inadvisability of excavating below the foot of a temporary bulkhead now in place, concrete

sq. in.; in shear, 50 lbs. per sq. in.; bond between concrete and steel, 75 lbs. per sq. in.; steel in tension, 17,000 lbs. per sq. in.; ratio of deformation, 12. Details of the wall are shown in the accompanying illustrations.

The widening of Fifth avenue is accomplished without the loss of yard room by means of a bridge. One end of the bridge rests on the retaining wall and the other end on reinforced concrete girders supported on reinforced concrete posts 20 ft., center to center. The bridge adds to the roadway a width of 16 ft. with a sidewalk 8 ft. 9 in. wide carried on brackets, thus gaining for Fifth avenue a total width of practically 25 ft. The bridge



Details of Retaining Wall; Oregon & Washington.

piles will be used to support the wall. Wooden piles would have to be cut off below the permanent water level to prevent decay, and this would call for deep excavation. The use of concrete piles lessens the excavation and virtually reduces the height of the wall, thus saving concrete. Comparative estimates showed the work with concrete piles to be somewhat cheaper than with wood piles.

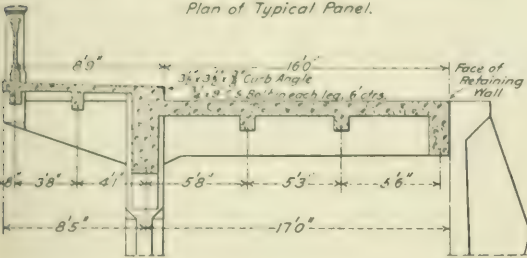
The structure will require 1,969 piles, approximately 40 ft. long and of the pedestal type, as designed and driven by McArthur Brothers, these are to be reinforced for a depth of 15 ft. below the bottom of the wall. In designing the wall the following stresses were allowed: Concrete, in compression, 500 lbs. per

is about 1,000 ft. long, and it is estimated will contain about 1,800 cu. yds. of concrete and 150 tons of steel. The concrete in the wall and bridge is to be a 1 2 4 mixture, gravel being used.

While the fiber stress method was used in designing the wall, the factor of safety method was used for the bridge. Factors of safety of 5 for live load and 4 for dead load were used, with ultimate values of 50,000 lbs. per sq. in. for steel and 2,000 lbs. per sq. in. for concrete. The bridge was designed for a 24-ton wagon in accordance with the Harriman Lines common standard specifications for highway bridges. The sidewalk was designed for a live load of 150 lbs. per sq. ft. All girders and beams in these structures were designed as simple beams with steel added

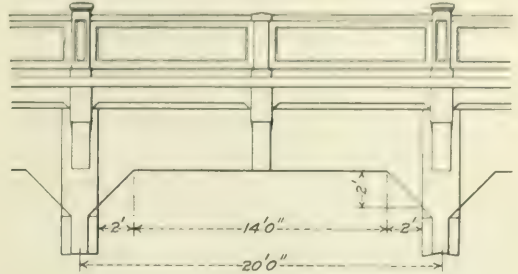


Plan of Typical Panel.

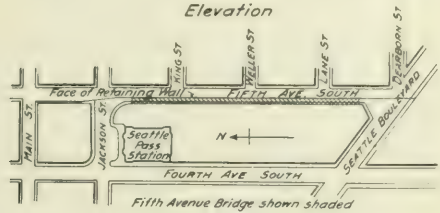


Section.

Overhanging Side Walk, Fifth Avenue Retaining Wall at Seattle.



Elevation



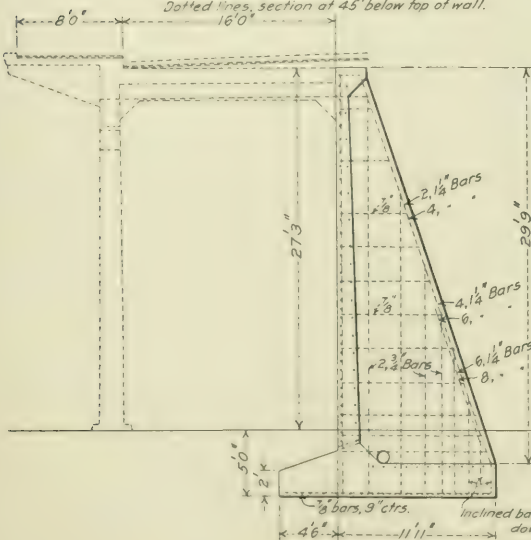
Vicinity Map.

Joint to be filled with alkali resistant proofing compound in event of contraction.

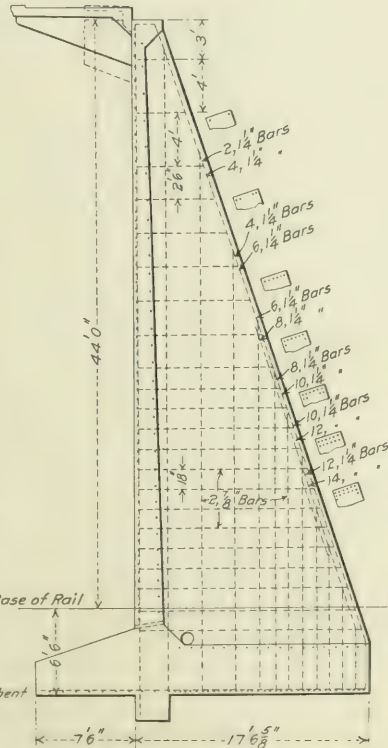


Detail of Joint.

Full lines, section at top of wall.
Dotted lines, section at 45' below top of wall.



Section of Wall. (Type D)



Section of Wall. (Type A).

Sections of Retaining Wall at Seattle; Oregon & Washington.

THE INDUSTRIAL DEVELOPMENT OF THE SOUTH.

Nowhere in the country probably is there a more fertile field for the profitable expenditure of time and money on the development of an industrial department than in the organization of the railways that spread over the southeastern portion of the United States. Nowhere, certainly, are the difficulties of making such a department a success more numerous or more vexatious than in that same territory. On a road that has land to sell it is comparatively easy to convince a board of directors that there will be a direct profit in spending money on colonizing their territory; but the results to be obtained by colonization on the lines of a road such as the Southern Railway, without lands of its own, are more indefinable and more general, so that it is harder for the industrial department to support its appeals for appropriations by a direct showing of dollars and cents profit.

Some 15 years ago the industrial department of the Southern Railway began to take definite steps to make its work a profit-yielding undertaking as much as is the work of the traffic department or the operating department. The South needed capital first of all. It needed exploitation as to its natural resources, and it needed settlers who would be capable of developing these resources. With the slow and often probably disheartening struggle of the industrial department to interest northern capital and northern and foreign settlers in the opportunities that were standing ready for them in the territory reached by the Southern Railway, we are not so much concerned, because this is largely history. With the results and with the methods of obtaining these results we are concerned, because what has been going on on the Southern Railway for years is applicable to a number of roads just now being exploited. Almost every week one hears of farmers' specials, of lectures given by experts on farm development and kindred subjects in some part of the United States. On the Southern Railway the work is not just beginning; neither is it completed, but the initial difficulties have been overcome. The snowball has been started, and, while still requiring pushing, it is showing the results of previous labor by a growth that is out of proportion to the present effort expended.

The difficulties in the way of interesting either capital or labor in the southern field are due largely to the history of that part of the country. It is not a new country; its traditions were well defined and accepted before the civil war; its prejudices are equally well defined, as are the shortcomings of some of its population. While the West was largely settled by westerners, the South, if it is to expand, must be settled to a considerable extent by northerners and by foreigners. The prejudice against both of these "aliens" used to be particularly strong, and the prejudice against new methods of agricultural manufactures was also strong. The method employed by the industrial department of the Southern Railway in interesting capital in the South was much the same as that employed by any modern selling agency. The natural advantages of locating various industries on the lines were studied, and these advantages were placed before manufacturers who were interested in that line, both in the West and in the North. The arguments in favor of locating industries in the South were presented through lectures, through pamphlets and through personal letters to business men.

The department began publishing about 15 years ago a periodical called *The Southern Field*. At present about 10,000 copies of each issue are printed and distributed free. No advertising is taken and the cost of the publication is debited against the industrial department. In fact, the industrial department apparently keeps only one side of a set of books; it is all debit. The returns on its labors and expenditures are credited to the traffic department. *The Southern Field* has as its principal object the arousing of interest in the South. In itself, without other aid, it is doubtful whether it persuades manufacturers or farmers to settle in the South, but its aim is to publish articles of enough general interest so that a man will read them whether he is looking for a place where he may better his lot or whether he is per-

fectly satisfied where he is. The direct salesmanship of the department comes in the writing of personal letters and in the talks which those connected with the department have with prospective settlers. A careful follow-up system is maintained, and there have been numerous cases where it has taken years to work a manufacturer up to that pitch of enthusiasm in which he is willing to actually invest his money in a plant along the lines of the Southern Railway. Naturally, there is a heavy responsibility on the department, for just as the success of one manufacturer, brought, say, from Connecticut to North Carolina, interests and attracts numerous other Connecticut manufacturers, so the failure of one plant located by the advice of the industrial department carries with it widespread influence.

To cite a few concrete instances of the development that is taking place in the South: In the little town of High Point there have been established 28 furniture factories, with an approximate weekly output of 80 carloads of furniture. The great majority of these factories have been established within the last few years. They are apparently prosperous, and on both sides of High Point, along the lines of the railway, the industry is being extended and new factories are being built. There are on the Southern Railway 121 knitting mills and 42 woolen mills. In 1909 there were 570 cotton mills located on the lines of the Southern Railway, with a total of 7,606,424 spindles, this in a country that used to send all of its cotton to Fall River, Mass., or Manchester, Eng., for manufacture. The manufacture of cotton seed products and cotton seed oil has in itself become an important industry in the South. The growing of peaches in South Carolina and northern Georgia especially has become tremendously profitable and the fruit has become widely known.

The South still needs capital, but it is not in such vital need as it was even a comparatively few years ago. Fully as necessary as capital is the need of settlers and of labor. One reads of the wonderful work that is being carried on by Canadian roads in inducing foreigners or people from the United States and from England to settle along their lines. The Southern Railway, while not having, we have said, any land of its own that it can sell to settlers, also has to work against the disadvantage not experienced by Canadian roads of having to persuade the present inhabitants of its territory that they will be benefited and not injured by the immigration of foreigners to their country. Of the benefits of foreign immigration to the South, no one who has studied the question at all can have doubts. It is true that there is a class of foreign immigrants who are a menace to the country rather than a benefit to it, but this class, even in New York City, is not very large and is confined quite closely to the immigrants who settle in the cities. Those who take up farming and get out in the country are, nine times out of ten, desirable citizens.

The industrial department of the Southern has its offices in London and its agents on the Continent. It is not enabled, however, to put as attractive a proposition before the prospective immigrant as is a Canadian road, because in most cases they cannot offer the immediate advantages, without the expenditure of any great amount of money, that a land grant railway can offer. For that very reason skill is needed in presenting the real advantages that the South has to offer in such a way that they will appeal to the class of immigrant that makes a desirable settler.

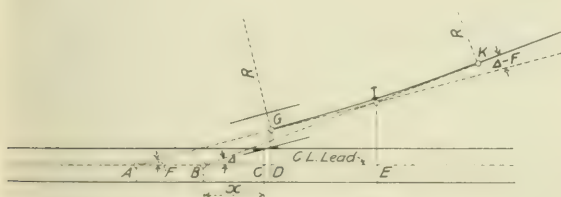
Beside this work of colonizing the South, the industrial department undertakes to educate the people who are already settled there, so that while becoming more prosperous themselves, they may be more valuable assets of the railway. There is a distinction between the planter and the farmer. The natural instinct of southerners in general leads them to be planters. They have been in the habit of planting cotton, expending a minimum amount of labor and knowledge on the operation. They have found that it is possible to raise some crops on the surface soil enriched by fertilizer with the minimum expenditure of elbow grease and brain tag, and it is difficult indeed to persuade them that such a course is short-sighted. The example

of the thrifty German farmer who moves to the Southland who is in the habit of getting the maximum yield from a given acreage of ground is invaluable as an argument in favor of more modern methods of agriculture. The industrial department of the Southern has agents, out continually in its territory instructing farmers in the fundamental principles of their art, studying territorial conditions, with the hope that they may discover new uses to which the soil of that particular place may be put to advantage, and making the results of their efforts known to those who may want to benefit by it. The Southern Railway has had plenty of experimental farms, but the trouble seems to have been that seeing isn't always believing, and the southern planter not only has to be shown and convinced but also persuaded to adopt methods that are foreign to his established traditions. The results, however, obtained in this work of education, as well as the work of interesting capital and settlers in the South, has at last got past the preliminary stage on the Southern. The successful operation of the great number of manufacturing plants that have been established, in good part through the efforts of the industrial department, along the lines of the railway are such strong arguments in themselves that the work of the industrial department in persuading a man that it is at least worth while thoroughly to investigate the opportunities offered has become materially less. In work of this kind after a fair start has been made the results become cumulative; the snowball grows at a constantly increasing rate without the expenditure of a proportionately greater amount of labor.

LOCATING THE POINT OF FROG.

We are indebted to T. H. Brown, assistant engineer of the Baltimore & Ohio, for the following description of a method for locating the point of frog. The accompanying diagram illustrates a condition often encountered in yard and turnout work which has been neglected in text books and field books for railway engineers. A fault with nearly all books is that turnout problems are treated in a manner which precludes the possibility of using formulae presented therein for any work involving standard lengths of frogs, lead, etc.

Having the point of intersection of the center line of the lead track with any other track the problem is to determine the dis-



Locating the Point of Frog.

tance to move forward or backward to locate the point of the frog of a given number, with a given degree of curve back of the heel of the frog. The formula here given requires the frog angle and length of the frog from point to heel to be known, and the angle between the body track and the ladder must be found by measurement. Ordinarily if the point of the frog is located the track can be thrown to position without additional stakes, but if necessary the point K can be located by a single measurement from G. Tables giving distances from point of intersection to point of frog, prepared for different frog angles and for varying values of Δ and R are of great value, not only in field work but in planning yards where space is limited and a minimum degree of curve is desirable.

Let

F = frog angle

R = radius of curve back of frog

H = point to heel

W = width of frog at heel

Δ = intersection angle

$$DI = R \tan \frac{1}{2} (\Delta - F) \cos F$$

$$CI = H - (2.54 \sin F + W \sin \frac{1}{2} F)$$

$$AC = AB \cos \Delta \cos F$$

Then

$$AF = DI + (DI + AC)$$

$$EI = AF \tan F$$

$$BI = EI \cos \Delta$$

$$AB = (AE - BI)$$

If

$$AB \text{ is less than } AC$$

$$BC = x - (AC - AB)$$

If

$$AB \text{ is greater than } AC$$

$$BC = x - (AB - AC)$$

A GERMAN REPORT ON AMERICAN METHODS OF RAILWAY CORRESPONDENCE.

Government Engineer Bruno Schwarze, of Halle, who has made a study of American railways, reports on the methods of correspondence and of filing and indexing letters and documents. He notes that communications are directed to persons, and not to offices; to "Mr. N., Superintendent Pittsburgh Division, B. & O. R. R.," and not to "Pittsburgh Division, B. & O. R. R.;" that they go in the first instance to the man addressed, and not to a central office thence to be distributed to the proper persons. Every official in a somewhat independent position—even the foreman of a shop—has his private secretary, who often works in the same room with his chief. At a touch of the button this clerk appears, takes a seat, without being asked, on the opposite side of the double desk, and takes down in shorthand what his chief dictates; then goes to the typewriter, and in a few minutes has the letter, and if required one or two copies, ready for signature. These clerks, even those of high officers, are often very young men. Technical knowledge is not required of them, and is scarcely necessary. As a rule, they appear very intelligent. The private secretary is almost constantly with his chief, even when he travels. The high officers who have private cars provide a berth in them for their clerks, and the two are often on very confidential and familiar terms. The secretary must, as Mr. Schwarze was told, hear everything, see everything, report to his chief everything that may be of use to him, and be as silent as the grave to everybody else.

What according to German ideas is an unpermissible or even a punishable custom is that in the absence of his chief the secretary signs his full name to letters, indicating only by a flourish attached to the last letter of the name that it is not the chief's own signature, such flourish being an initial of the secretary; and letters with such forged signatures, as we may call them, have full validity in the service. A certain head of an important department was so represented by his 22-year-old clerk while absent on a trip to Europe.

In offices where there is a very large correspondence, the opening of letters is supervised by the chief clerk, who sends them to the desks of the persons who have the several matters in charge, except those which he judges that he can answer himself. Copies of his answers to these he submits to his chief, and a copy is filed. The copies have no signatures.

The different branches of the service being largely independent of each other, there are fewer written orders and reports than in the German service. If the man at the head of a given service thinks a man culpable, he may discharge him on the spot; but he is likely to be very cautious about this, as the trade union to which the man belongs is likely to make trouble if the dismissal was unjustifiable. But this independence of chiefs may result in favoritism in dealing with subordinates.

General News Section.

The Michigan Central tunnel, under the Detroit River, was opened for regular freight trains September 10.

Philadelphia papers say that the strike of conductors and motormen on the street railways of that city in the early part of this year cost the Philadelphia Rapid Transit Company \$2,300,000.

Eleven men were killed and seven injured, on Sunday last, by a cave-in at the western end of the tunnel of the Erie Railroad in Jersey City, where grading is going on for the connection of the old and new lines of the road.

The Atchison, Topeka & Santa Fe has installed a gasoline motor car on the Arkansas Valley line from Holly, Colo., to La Junta. The car is a 200-h.p., 70-ft. McKen motor car which makes the round trip of 212 miles each day on a schedule of about 25 miles an hour, including stops.

The Pittsburgh, Cincinnati, Chicago & St. Louis has been found guilty on ten counts of violating the Indianapolis smoke ordinance and fined \$1,000 and \$100 costs in the city court. A number of affidavits have been filed against other alleged offending companies, but these will be held over until the supreme court passes on the validity of the ordinance.

The Pennsylvania has installed a telephone system at its east side roundhouse in Indianapolis with 28 stations, one in the home of each member of the wrecking crew. When there is a call for the crew the operator at the roundhouse can instantly connect all the 28 instruments and can ring all 28 of the telephones at one time; and then he can give the message to all the men at once.

The Illinois Central has canceled its contract with the Cusack Sign Co., which controlled the signboard advertising along the road's right-of-way, and it is stated that the large signs which now obstruct the view of Lake Michigan from trains and residences facing the lake will be removed at once. W. L. Park, vice-president, ordered this change, which is in pursuance of a policy of beautifying the right-of-way.

Two months longer are allowed the railways of Alabama in which to comply with the citation of the Railroad Commission to show cause why sanitary closets are not installed in every station in the state. This is the result of a conference last week with 35 railway representatives. The commission proposes also to require cuspidors and window screens in passenger cars and portable steps for all coaches.

The Chicago, Milwaukee & Puget Sound on September 7 resumed traffic over its lines in Montana and Idaho which had been badly damaged by the forest fires. For about 30 miles in the Bitter Root Valley all the bridges were burned. During the interruption due to the fires freight was sent over the Northern Pacific from Missoula, Mont., to Lind, Wash. The C. M. P. S. expects to begin running through passenger trains from Chicago to the Pacific coast by November 1.

The Railway Commission of Canada occupies a pretty large territory. Last week it was sitting at Vancouver to hear complaints of the boards of trade of Dawson and White Horse concerning freight rates on the White Pass & Yukon Railroad. Most of the freight which is the subject of discussion passes through United States territory, being carried over the railway from Skagway to the head of navigation on the Yukon river. The Interstate Commerce Commission has recently decided that it has no authority in that part of Uncle Sam's domain.

Long Island Railroad in Manhattan.

The Long Island Railroad began running passenger trains to and from Seventh avenue, Manhattan, New York City, on September 8, according to the announcements which had been made. The number of trains is about 100 each way daily. On the first day the estimated number of passengers carried was 7,000. A considerable portion of the passengers must have been persons making the trip out of curiosity, as the trains

to and from Long Island City, delivering passengers to and taking them from the East river ferry boats, continued to carry about 75 per cent. of their usual number. Vice-President Rea, of the Pennsylvania, speaking of the virtual completion of this tunnel extension of his road, gives a striking measure of the magnitude of the enterprise in the phrase that nine years have been taken to complete the construction of a railway over which a passenger is carried in nine minutes. The main, or eastern entrance to the station at Seventh avenue is some 900 ft. from the nearest elevated railway line and about half a mile from the Interborough subway, so that to a large portion of the people going to the station, the approach involves some considerable travel on foot. Mr. Rea, in his statement, deplors the fact that the city has not taken action looking to the provision of a new subway through Seventh avenue, and he expresses the hope that the Mayor and the Public Service Commission will promptly see that some progress is made. At present, the Sixth and Ninth avenue elevated lines are having considerably increased traffic; and the surface lines north and south through Broadway, Sixth avenue, Seventh avenue, Eighth avenue and Ninth avenue, and east and west through 34th street are running additional cars to accommodate the Long Island passengers.

The new time-tables of the Long Island Railroad show how the tunnel will save time. All trains from the Pennsylvania station at Seventh avenue leave from six to seven minutes earlier than the boats for the same trains formerly left the Manhattan side of the 34th street ferry. This means a saving of about 15 minutes. For example, the time-table shows that Kensington, Great Neck, can be reached from the Seventh avenue terminal by one train in 26 minutes. Before the tunnels it required 45 minutes from Kensington to the 34th street side of the Long Island ferry and 10 minutes more before a passenger reached Seventh avenue, if that were his destination.

F. H. Niles Tells of Illinois Central Grafting.

F. H. Niles, formerly president of the Blue Island Car & Equipment Company, testifying on September 8 at the trial of F. B. Harriman, C. L. Ewing and J. M. Taylor, formerly officers of the Illinois Central, and charged with grafting in connection with the repair of cars for this road, told in detail of the organization of the Blue Island Company and of the relations of various officers of the Illinois Central with it. Mr. Niles said that the matter of organizing the Blue Island Company was first suggested to him by Mr. Taylor, then general storekeeper of the Illinois Central, at Taylor's residence in Chicago in June, 1907. Taylor told him that he was interested in the Ostermann Manufacturing Company and was making a "good thing" out of it, and that he and some of his friends were thinking of starting a car repair company. Out of this conversation grew the organization of the Blue Island Car & Equipment Company under the laws of South Dakota, with a capital of \$150,000. At the start Taylor, Harriman and Ewing each took 100 shares of stock, and Joseph E. Buker took 10. William Renshaw did not take any. The capital stock was subsequently increased to \$300,000 and then to \$450,000, and in the fall of 1909 to \$500,000. The stock had a par value of \$100, but was recorded as having been fully paid for at the start on payment of \$25 a share in cash. When the stock was increased the new shares were issued pro rata to the original stockholders for \$1 each. Niles testified that in January, 1910, the following were among the stockholders in the company: C. G. Raw, 714 shares; F. B. Harriman, 699 shares; C. L. Ewing, 639 shares; J. M. Taylor, 487 shares; Elmer E. Wilson, assistant storekeeper of the Illinois Central, 45 shares; Joseph E. Buker, superintendent of the car department, 10 shares; T. M. Borrowdale, assistant superintendent of car department, 10 shares; F. B. Barton, master mechanic Burnside shops of the Illinois Central, 15 shares.

The stock owned by Raw, Harriman, Taylor and Ewing, Niles said, was issued in his name, and the dividends were paid to him and transferred to the real owners by his personal check, by payments in cash and, in some instances, in the form of bonds of the Illinois Central and of Nelson Morris & Company.

which Niles purchased for Rawn and Harriman and delivered to them. Dividends for Rawn and Harriman usually were paid by check to Taylor and later to Ewing, while Taylor and Ewing were paid directly by Niles. Becoming suspicious that the books were being watched, Harriman, according to the witness, directed that his and Rawn's profit should be paid to A. C. Goodrich, formerly a clerk in Harriman's office. The books of the Blue Island Car & Equipment Company were destroyed in January, 1909, but before its reorganization under the name of the Blue Island Rolling Mill & Car Company. Owing to this, the witness was unable to give the exact figures regarding all the dividends that had been paid on the stock. The first dividend, which was paid in December, 1907, was 10 per cent. Other dividends of 10 per cent. were paid from time to time, and finally, in December, 1909, a 30 per cent. dividend was paid. The total business done by the company during the period of its existence amounted to about \$1,500,000, and it paid dividends aggregating, the witness estimated, \$400,000. Niles identified canceled checks on three different banks in Chicago, which had been signed by him and on which money was received which, he said, finally reached different officers of the Illinois Central. On the backs of some of these checks were written the words "Part to F. B. H.," meaning Harriman, and on others the words "Part to I. G. R.," meaning Rawn. Niles said that he wrote these memoranda on the backs of the checks after they had been cashed and returned to him, so that he might have information that would indicate to him for whose benefit the checks had been issued. He stated that on one occasion he drew about \$11,000 in currency from the banks and paid it to Harriman personally at the Railway Exchange in Chicago. He said he was directed by Harriman to get the Illinois Central bonds for Rawn and to get the Nelson Morris & Company bonds for Harriman himself, and that he delivered the Nelson Morris & Company bonds to Harriman personally and left the Illinois Central bonds for Rawn at the latter's house.

The evidence showed that the actual amount of capital invested in the Blue Island Car & Equipment Company, on which \$100,000 in dividends was paid in about two years, was about \$37,000. The evidence indicated that out of the \$100,000 in dividends over \$300,000 was received by the officers and employees of the Illinois Central. The witness said that the bills against the Illinois Central were padded under his direction. He also said that in the early history of their business Buker directed that no charge for repairing a freight car should exceed \$225, and that this was later increased to \$250 and finally to \$275. Taylor was on the board of directors of the Blue Island Company for a year and then resigned because it was feared that his connection with the company might give rise to suspicion. Niles said that at different times about 1,000 cars were repaired by the Blue Island Company for other roads than the Illinois Central, including the Rock Island, the Chicago & Eastern Illinois, the Chicago Great Western, the Santa Fe and the Missouri Pacific, but that the bills for this work were made out on the regular contract basis of 15 per cent. profit over cost. He stated that no officers of these roads were interested in the Blue Island Company and that, in consequence, the handling of their business was not very profitable to it.

Fred C. Peck, former bookkeeper for the Ostermann Manufacturing Company, testified to having called on various officers of the Illinois Central and telling them that he knew of a way by which they could save \$30,000 a month on the repair of their cars, but he said that they refused to pay any attention to his statements.

Car Ferry Disaster on Lake Michigan.

On Friday morning last car ferry No. 18 of the Pere Marquette Railroad, bound from Ludington, Mich., to Milwaukee, fully loaded with freight cars, sank in the middle of Lake Michigan, and 27 persons were drowned. Fourteen of these appear to have been members of the crew, including the captain and most (or all) of the officers; two were stowaways, and the rest passengers. Car ferry No. 17 was near by and the men of its crew succeeded in saving 15 of the crew of No. 18. Boat No. 17 had been brought to the scene by a wireless telegraph message. The cause of the disaster is a mystery. Besides the 27 persons mentioned, two of the crew of No. 17 lost their lives in trying to rescue the men of No. 18.

Railway Signal Association.

Secretary, C. C. Rosenberg has issued an advance notice of the annual meeting at Richmond, Va., in October containing a considerable number of proposed amendments to the constitution and the reports of the committee on mechanical interlocking, on power interlocking, on electrical signaling for electric railways and on automatic stops and cab signals. A separate supplement, filling 183 pages, contains an elaborate index to signal literature, which has been prepared by a special committee for the promotion of signaling education, of which W. J. Eck, of the Southern, is chairman, and A. D. Cloud, of the Signal Engineer, is vice-chairman. This is a thorough and exhaustive work. The principal items in the order of business for the annual meeting are as follows:

Tuesday, October 11.

10:00 a. m. Opening.
11:15 a. m. Proposed Amendments to the Constitution.
12:00 noon. Mechanical Interlocking.
2:30 p. m. Power Interlocking.
4:30 p. m. Signal Practice.

Wednesday, October 12.

9:00 a. m. Report of Sub-committee on Standard.
10:30 " Automatic Block Signaling.
11:30 " Electric Signaling for Electric Railroad.
12:15 p. m. Automatic Stops and Cab Signals.
1:30 p. m. Adjourn for the day. Year Exhibit.
Thursday, October 13.

9:00 a. m. Wires and Cables.

10:45 " Storage Battery.

11:45 " Signal Failure.

H. M. Buck, secretary of the Signal Appliance Association, 30 Church street, New York City, has issued the announcement of the arrangements for exhibits at Richmond, together with a program of the social functions proposed in connection with the annual meeting. A space 65 ft. x 80 ft. has been reserved at the Jefferson Hotel for exhibits, and parties desiring space should send in their applications to Mr. Buck at once, together with a check for the annual dues, \$50.

With the index above referred to, Mr. Rosenberg sends out a circular in which the executive committee suggests that the work be printed as an independent bound volume, in cloth binding, separate from the Proceedings, to be sold at, probably, \$1.

The first change proposed in the constitution is one to divide the eastern from the western part of the country by a line through the middle of Lake Michigan and thence south along the eastern boundary of Illinois, instead of by a line through Buffalo and Pittsburgh. This is proposed by T. S. Stevens, W. W. Slater and other western members. Following these are eight proposed amendments, all submitted by W. J. Eck, A. H. Yocum and other eastern men. First, they propose to do away with the necessity for dividing the country by enlarging the executive committee (to be called the Board of Direction). The board would consist of president, first vice-president, second vice-president, secretary-treasurer, eight directors and the three latest living past presidents. Four of the directors would be elected each year. As the first vice-president retired, after a two years' term, the second vice-president would take his place. It is proposed to have the nominating committee each year name members for the following year, and to have always on this committee three past presidents; the senior past president to be its chairman. The next amendment improves the provisions for nominating officers by letter ballot preceding the annual meeting. A paragraph is introduced allowing a voter to change his vote at any time before noon on the first day of the annual meeting. Another proposition is to give the Board of Direction the power to decide whether or not an active member may retain his membership when he goes out of the railway service. Another requires the president to have the approval of the Board of Direction in selecting members of the standing committees.

The secretary presents an informal statement of the reasons for and against holding the annual meeting each year in Chicago in March.

Master Car and Locomotive Painters' Association.

The 41st annual convention was opened Tuesday morning, September 13, at the Southern hotel, St. Louis, Mo., with John D. Wright, Baltimore & Ohio, presiding. The membership attendance was 161, with 170 guests. The convention opened with an invocation and an address of welcome by the mayor of St. Louis, to which R. E. Miller, Delaware, Lackawanna & Western, responded. The secretary's report showed a total membership of 268 and a balance of \$200.50 on the books. The election of officers resulted in the following: J.

H. Pitard, Mobile & Ohio, president; John T. McCracken, Interborough Rapid Transit Co., first vice-president; John Hartley, Atchison, Topeka & Santa Fe, second vice-president; A. P. Dane, Boston & Maine, secretary and treasurer. The regular program was then taken up.

Forty-seven supply firms were represented, and temporary officers were elected as follows: W. E. Orr, C. A. Willey Co., New York, president; H. G. Kittredge, Kay & Ess Co., Dayton, Ohio, secretary; William Marshall, Anglo-American Varnish Co., Newark, N. J., treasurer. The entertainments, arranged by T. J. Lawlor, American Roll Gold Leaf Co., Providence, R. I., consist of an automobile and theatre party on Tuesday, card party and river trip on Wednesday, and an inspection of the Anheuser-Busch plant and the annual ball on Thursday. The supply companies made no exhibits, with the exception of a small display in the sample rooms of the hotel.

Chicago Signal Club.

The Chicago Signal Club held its second meeting on Tuesday, September 6, at the office of *The Signal Engineer*, Plymouth building, Chicago. The attendance, being representative of practically all of the signal departments in Chicago, showed that great interest is being taken in the club and its work. A resolution was adopted "that the purpose of the Chicago Signal Club is only to bring the members of the various signal departments together at intervals so that the members may receive the benefit of each other's experiences and opinions and may profit by discussion and study of the problems constantly arising in their work." The subjects scheduled for discussion included mechanical towers, lead-outs, wire numbering and the maintenance of potash batteries. By special request of the club, F. J. Lepreau gave a talk on the care of primary cells, and many interesting points were brought out. The discussion following his talk occupied the greater part of the evening, so that time for only one subject, wire numbering, remained, and the other subjects were postponed to the next meeting, which will be held on September 26 at 7 p.m. at the same place. W. H. Arkenburgh, of the signal department of the Chicago, Rock Island & Pacific, at Chicago, is chairman of the club, and A. D. Cloud is secretary.

Salt Lake City Transportation Club.

The Salt Lake City Transportation Club, Salt Lake City, Utah, was organized at a meeting on September 9. The following officers were elected: President, W. F. Yeo, traveling passenger agent, Pennsylvania Lines; vice-presidents: D. R. Gray, district freight agent, Oregon Short Line; J. A. Foley, commercial agent, Illinois Central; C. J. McNitt, auditor Oregon Short Line; H. E. Van Housen, superintendent, San Pedro, Los Angeles & Salt Lake; J. C. Dailey, general superintendent, Denver & Rio Grande; treasurer, Ira H. Lewis, assistant cashier, Denver & Rio Grande; secretary, J. W. Ellingson, contracting freight agent, San Pedro, Los Angeles & Salt Lake. Any employee of a transportation company living in Salt Lake City is eligible to resident membership; outside railway men are eligible to non-resident membership, and newspaper men are eligible to honorary membership.

Joint Car Inspectors' Association.

The Chief Joint Car Inspectors and Foremen's Association of America held its annual meeting at Washington, D. C., last week. The election of officers for the ensuing year resulted as follows: Henry Boutet, Cincinnati, president (re-elected); F. W. Trapnell, Kansas City, vice-president (re-elected); Stephen Skidmore, Cincinnati, secretary and treasurer (re-elected); T. J. O'Donnell, of Buffalo, N. C. Shultz, of Chicago, William McHugh, of New York, J. L. Stark, of Columbus, and A. Berg, of Erie, executive committee.

Cleveland Passenger Club.

This is an organization of traffic men in the city of Cleveland which has lately been established. J. K. Dillon, assistant general passenger agent of the Pennsylvania lines, is president.

Roadmaster's and Maintenance of Way Association.

See Late News columns for report of opening sessions of the convention in Chicago.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
 AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; next meeting June 22, 1911; Niagara Falls, N. Y.
 AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn.
 AMERICAN ASS'N OF LOCAL FREIGHT AGENTS' ASS'NS.—G. W. Dennison, Penna. Co., Toledo, Ohio.
 AMERICAN ASS'N OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew Bldg., Cincinnati, Ohio.
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York; semi-annual, Nov. 16; St. Louis, Mo.
 AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 18-20; Denver, Colo.
 AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASS'N.—E. H. Fritch, Monroeville, Pa.; New York; March 21-23, 1911; Chicago.
 AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; May 9, 1911; Detroit, Mich.
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago.
 AM. RAILWAY TOOL FOREMEN'S ASS'N.—O. T. Hartoun, Bloomington, Ill.
 AM. SOC. FOR TESTING MATERIALS.—Prof. E. Marburg, Univ. of Penn., Phila. AM. SOC. OF CIVIL ENGINEERS.—C. W. Hunt, 280 W. 57th St., N. Y.; 1st and 3d Wed., except July and Aug.; annual, Jan. 18-19, New York.
 AM. SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Haner, 13 Park Row, New York; annual, Sept. 27-29; St. Louis, Mo.
 AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., New York; annual, Dec. 6-9; New York.
 AMERICAN STREET AND INTERURBAN RAILWAY ASS'N.—H. C. Donecker, 29 W. 39th St., New York; Oct. 10-14; Atlantic City.
 ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; April 26, 1911; New Orleans, La.
 ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; May, 1911; Montreal, Can.
 ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Colegrove, C. & I. R., Chicago; annual, Sept. 27-30; Chicago.
 ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston.
 ASS. OF TRANS. AND CAR ACC. OFFICERS.—G. P. Conard, 24 Park Place, N. Y.; Dec. 13-14, Chicago; June 20-21, 1911, Cape May City, N. J.
 CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
 CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. Laidlaw, 413 Dorchester St., Montreal, Que.; Thursdays; Montreal; annual, last week January.
 CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month; Chicago.
 CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
 ENGINEERS' SOCIETY OF PENN.—E. K. Dasher, Box 704, Harrisburg, Pa.
 ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Dasher, 208 Fulton bldg., Pittsburgh; 1st and 3d Tues. annual, Jan. 17, 1911; Pittsburgh.
 FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich, Fred & Pot. R.R., Richmond, Va.; 20th annual, June 21, 1911; St. Paul, Minn.
 GENERAL SUPERINTENDENTS' ASS'N OF CHICAGO.—H. D. Judson, 209 Adams St., Chicago; Wednesday preceding 3d Thursday; Chicago.
 INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; next convention, Liberty St., New York.
 INTERNATIONAL RY. FUEL ASS'N.—D. B. Sebastian, La Salle St. Station, Chicago.
 INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.
 INT. RY. MASTER BLACKSMITHS' ASS'N.—A. L. Woodworth, Lima, Ohio.
 INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels, 1911; Berlin.
 IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
 MASTER CAR BUILDERS' ASS'N.—J. W. Taylor, Old Colony Bldg., Chicago.
 MASTER CAR AND LOCO. PAINTERS' ASS'N. OF U. S. AND CANADA.—A. P. Dane, B. & M. Reading, Mass.; annual, Sept. 13-16; St. Louis.
 NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, ex. June, July, Aug. and Sept.; Boston.
 NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in month, except June, July and August; New York.
 NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d. Mon., ex. June, July, August; St. Paul and Minn.
 NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. M. & St. P., Duluth; 4th Saturday; Duluth, Minn.
 OMAHA RAILWAY CLUB.—A. H. Christensen, Barker Bldg., Second Wed. Railway Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City; 3d Friday in month; Kansas City.
 RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
 RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 19 North Linden St., Bethlehem, Pa.; annual, Oct. 11-13; Richmond, Va.
 RAILWAY S'KEEPERS' ASS'N.—J. P. Murphy, Box C, Collinwood, O.; annual, Dec. 1911; Erie, Pa.
 RICHMOND RAILROAD CLUB.—F. O. Robinson; 2d Monday; Richmond.
 ROADMASTERS' AND MAINTENANCE OF WAY ASS'N.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; annual, Sept. 13-16; Chicago.
 ST. LOUIS RAILWAY CLUB.—B. W. Frazer, Union Station, St. Louis, Mo.; 3d Friday in month, except June, July and Aug.; St. Louis.
 SOCIETY OF RAILWAY PASSENGER OFFICERS.—C. Nyquist, La Salle St. Station, Chicago; Oct. 25 and 26; Hotel Chamberlin, Old Point Comfort, Va.
 SOUTHERN ASSOCIATION OF CAR SKIDDER OUTLINES.—E. W. Sandbach, A. & W. R. Ry., Montgomery, Ala.; annual, Oct. 20; Atlanta.
 SOUTHERN & SOUTHWESTERN R.R. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., Mar., July, Sept. and Nov.; Atlanta.
 TOLEDO PASSENGER CLUB.—L. G. McComber, Woodmen Spree Co., Toledo; 1st Sat. annual, May 6, 1911; Toledo.
 TRAVELERS' CLUB OF BUFFALO.—J. M. Sells, Buffalo; 1st Sat. after 1st W. C. annual, Jan. 13; Buffalo.
 TRAVEL CLUB OF NEW YORK.—C. A. Skogge, 200 Broadway, New York; last Tuesday in month, except June, July and August; New York.
 TRAIN DISPATCHERS' ASS'N. OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 20, 1911; Baltimore.
 TRAVELERS' ASSOCIATION.—A. O. Thompson, N. Y. C. & H. R. R., New York.
 WESTERN CANADIAN RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg; 2d Monday, except June, July and August; Winnipeg.
 WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monmouth Bldg., Chicago; Wednesdays, except July and August; Chicago.

Traffic News.

About 40 railway traffic men of Salt Lake City, Utah, are taking measures to establish a railway club similar to that in St. Louis.

The Way Bill is a new paper which made its first appearance recently. It is published monthly by the Traffic Club of Chicago and edited by the publicity committee of that organization. It is devoted entirely to the affairs of the club.

The Atchison, Topeka & Santa Fe and 87 other roads have secured from the United States Circuit Court, at St. Paul, a hearing, which will be begun October 12, on their application for an injunction against the enforcement of the reduced rates on oranges and lemons from the Pacific to the Atlantic coast recently ordered by the Interstate Commerce Commission.

The Wells-Fargo Express has made a general reduction, averaging 10 per cent., in its rates on lines in the state of Oregon, except between places where the present rate is 60 cents per 100 lbs. or less. The highest rate between any two points in Oregon is \$3.75, and this will be reduced to \$2.75. These reductions follow extended negotiations with the State Railway Commission.

Washington reports say that the Interstate Commerce Commission will within a few weeks make a general ruling on the long and short haul clause of the Interstate Commerce Law as revised last June. As the law now stands, rates for a long distance, which are less than those for a short, cannot be made except after the approval of the commission. Many applications have already been received from railways for approval of existing rates which do not comply with the rule.

The Interstate Commerce Commission is issuing this week a supplemental order in the rate hearings. A large number of tariffs filed by the roads west of Chicago since the beginning of the hearings quote advanced rates on commodities not named in the former tariffs, and are worded to take effect November 1, to which date all the other tariffs were postponed. The present order formally calls the reconvened hearing in Chicago on September 19. It is expected that Commissioner Prouty will be in Chicago on the 19th.

Commissioner Prouty, of the Interstate Commerce Commission, took testimony at Los Angeles, Cal., on September 9, regarding the complaint of the citrus fruit shippers in California that the trans-continental railways make excessive charges for the refrigeration of fruit. The shippers say that the railways charge from \$60 to \$75 per car for icing and that this is exorbitant. They ask the commission to require the railways to let them pre-cool their own fruit and ice their own cars for shipment. They claim that the railways do not pre-cool the fruit properly before putting it into the cars, and that a second icing is necessary, thus adding to the expense of shipment. The railways entered a general denial of all these charges.

When the state railway commission of Texas had before it a few months ago the proposition to reduce the freight rate on cotton shipments one of the arguments advanced by the railways against the proposed action was that should a reduction be made the cotton grower would not be benefited; that the amount of the reduction would be absorbed by other interests. The commission saw fit to overrule the objections of the roads and the rate was ordered reduced 4 cents per 100 lbs. from the principal Texas points to Galveston. That the argument of the railways was at least partly correct is shown by the recent announcement that the steamer lines out of Galveston have raised the ocean rate on cotton 2 cents, thus nullifying to the extent of 50 per cent. the benefit that the state commission expected to give to the cotton grower. This increase of 2 cents by the steamer lines will go into effect September 10, and, according to reliable reports a second raise of another 2 cents is in contemplation. If this is done all of the profits or revenues, amounting to about \$1,000,000 in a year, based on a normal Texas crop of cotton, that the commission's reduction takes from the railways, will go to the steamship lines, and the cotton grower is in the same position that he was before the rate was reduced.

Traffic Agreement Between Frisco and Harriman Lines.

The traffic arrangement between the St. Louis & San Francisco and the Sunset Central lines of the Southern Pacific, which has already been referred to in the columns of the *Railway Age Gazette*, will go into effect on October 1. Schedules for the through trains to be operated by these roads jointly are now being worked out.

The Frisco System operates lines from St. Louis, Mo., and Kansas City to North Texas gateways, including Dallas, Sherman and Ft. Worth. It also operates lines from New Orleans, La., to Brownsville, Tex., and has close affiliations with the National Railways of Mexico. These two parts of the system are not connected by any line owned or controlled by Frisco interests.

The Sunset Central lines of the Southern Pacific operate the Houston & Texas Central and the Texas & New Orleans, which has lines from New Orleans, La., El Paso, Tex., and from all south Texas points to the north Texas gateways, but these lines have no physical connection or definite arrangements for reaching the allied Harriman lines at Kansas City.

The Harriman lines have contemplated the construction of a line between Dallas, Tex., and Kansas City. The Frisco lines have also given consideration to the matter of building a line through the north Texas gateways to Houston or some other point in south Texas. As all other large railway systems serving Texas have lines both north and south of the Red river, they are all, of course, competitors of either the Frisco lines, the Southern Pacific lines, or both.

There were two ways by which the Harriman and the Frisco interests could meet this competition—by individually building lines to connect their now disconnected lines, or by entering into a traffic agreement under which they would act together in handling business between Kansas City and New Orleans and south Texas points. The latter arrangement, under which the construction of additional lines on the part of both is avoided, has been the outcome of the situation.

The close traffic contract which has been made extends over a period of ten years, and it is intended to give freight and passenger service by the through route thus formed which will be run over the new route between Galveston, Tex., and Houston on the one hand and Kansas City and St. Louis on the other. The "Texan," leaving Galveston at 6:30 a.m., will run through to St. Louis, and returning will leave St. Louis at 9 a.m. The "Hustler," leaving Galveston at 9 a.m., will run through to Kansas City, and returning will leave Kansas City at 5 p.m. The "Meteor," leaving Galveston at 7:25 p.m., will run through to St. Louis, and returning will leave St. Louis at 8:25 a.m. This is the present plan, which, however, may be slightly changed.

Condition of Corn and Wheat.

The Bureau of Statistics of the Department of Agriculture reports the average condition of corn on September 1 as 78.2, as compared with 79.3 last month, 74.6 on September 1, 1909, 79.4 on September 1, 1908, and 79.5 the ten-year average on September 1. In the principal corn states the averages were: Illinois, 86; Iowa, 82; Texas, 75; Kansas, 59; Missouri, 83; Nebraska, 68. The average condition of spring wheat when harvested this year was 63.1, as compared with 61.0 last month, 88.6 when harvested in 1909, 77.6 in 1908 and a ten-year average when harvested of 78.0. The averages in the principal states were: North Dakota, 33; Minnesota, 83; South Dakota, 73; Washington, 60. The average condition of apples on September 1 was 46.8, against 47.8 last month, 44.5 on September 1, 1909, 52.1 in 1908, and a ten-year average on September 1 of 54.7.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 77-B, giving a summary of car shortages and surpluses by groups from April 28, 1909, to August 31, 1910, says:

"There is a reduction in the surplus of 18,738 cars, or 23.8 per cent. Of this 6,969 are box cars, a decrease of 25.5 per cent. in this class, while the decrease in coal and gondola cars is 8,662, or 38.0 per cent. There is quite an increase in the short-

age, the total for this report being 9,293 cars, of which 4,594 are box cars and 2,964 coal and gondolas.

"The decrease in surplus is quite general, excepting in group 6 (Northwestern), where the reductions in coal and miscellaneous (the latter principally stock cars), were offset by an increase in the box surplus, and in group 11 (Canadian), which

on our last bulletin, reports a decrease of over 40 per cent., with shortages in all classes totaling 777 cars. The reduction in coal car surplus is quite heavy in groups 2 (Eastern), 3 (Middle) and 5 (Southern), while group 4 (North Atlantic) reports a shortage in this class of 2,120 cars, an increase of 1,120 cars since our last bulletin."

CAR SURPLUSES AND SHORTAGES.

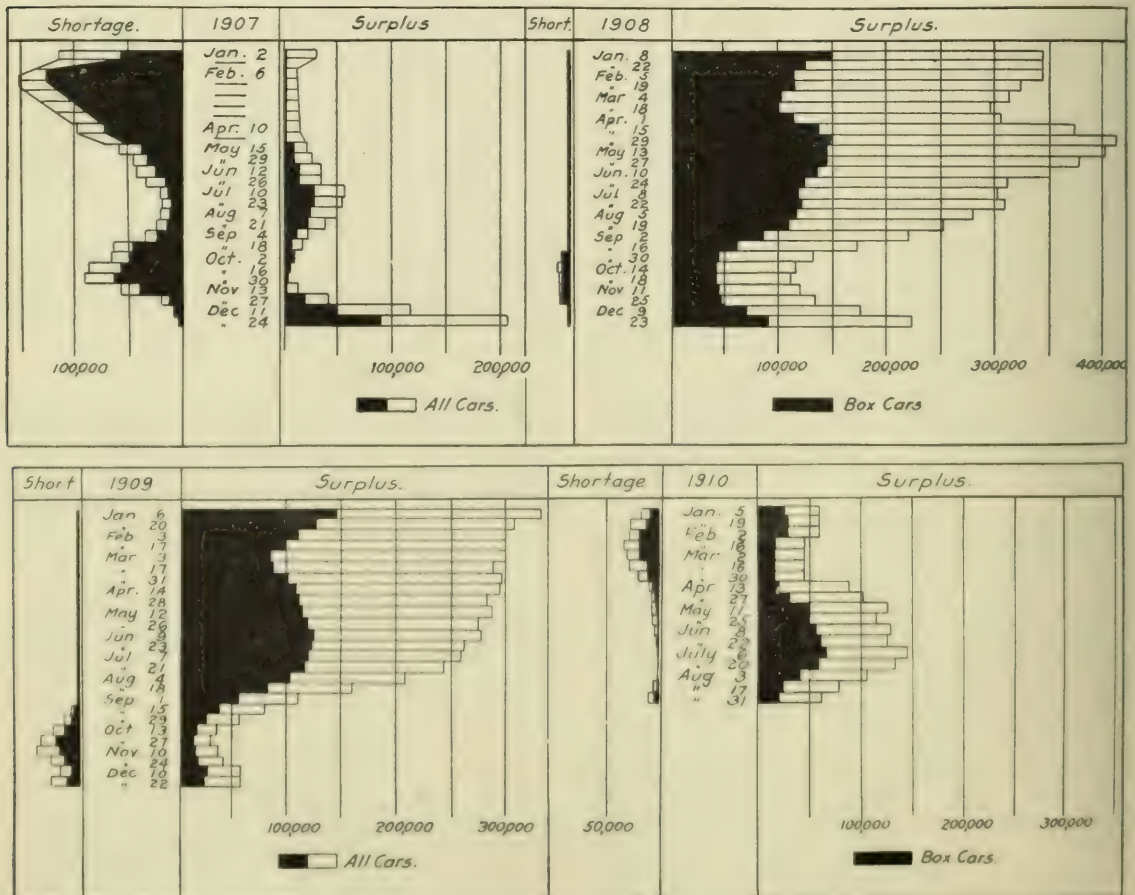
Date.	No. of roads.	Surpluses					Shortages				
		Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group 1—August 31, 1910	8	20	493	333	216	1,062	205	211	341	20	777
" 2—" 31, 1910	22	1,781	37	4,899	6,618	13,335	245	1	8	85	339
" 3—" 31, 1910	22	4,590	283	2,176	2,827	9,876	330	115	12	8	465
" 4—" 31, 1910	10	655	24	327	644	1,370	1,094	274	2,120	200	3,688
" 5—" 31, 1910	20	667	118	117	1,256	2,158	617	150	312	0	1,079
" 6—" 31, 1910	20	7,460	969	2,176	2,802	13,427	301	2	50	108	461
" 7—" 31, 1910	3	226	8	0	444	678	0	0	45	0	45
" 8—" 31, 1910	13	1,093	110	2,030	2,260	5,493	662	15	11	7	695
" 9—" 31, 1910	11	794	273	212	735	2,014	64	0	0	0	64
" 10—" 31, 1910	20	1,495	927	1,911	3,710	8,043	707	145	15	300	1,168
" 11—" 31, 1910	6	1,514	206	27	899	2,646	369	0	50	92	511
Total	155	20,315	3,488	14,108	22,111	60,022	4,594	914	2,964	821	9,293

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan, and Western Pennsylvania lines; Group 4—West Virginia, Virginia, and North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota, and North and South Dakota lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.

also reports an increase in box car surplus. This situation seems to indicate the accumulation of box cars for the movement of grain from the Northwest.

"Group 1 (New England), which shows an increased surplus

The accompanying table gives surpluses and shortages by groups from the last period covered by the report, and the charts show total surpluses and shortages bi-weekly in 1907, 1908, 1909 and 1910.



Car Surpluses and Shortages in 1907, 1908, 1909, and 1910.

Condition of Railways of Texas.

H. G. Askew, superintendent of the railways of Texas, has given out a statement regarding the earnings and expenses in the fiscal year 1909 and 1910 of 32 roads in that state having about 92 per cent of the mileage in the state and doing about 96 per cent of the business. The figures given by Mr. Askew differ somewhat from those given out by the Texas railway commission, which were published in the *Railway Age Gazette* of September 9, page 179. Mr. Askew's figures are as follows (rounded off):

Total operating revenue	
1910.....	\$48,115,214
1909.....	\$41,000,100
Increase for 1910.....	\$7,115,114
Total operating expenses	
1910.....	\$7,541,954
1909.....	\$9,000,000
Decrease for 1910.....	\$1,458,046
Net operating income	
1910.....	\$40,573,260
1909.....	\$32,000,100
Increase for 1910.....	\$8,573,160

After giving the foregoing figures, Mr. Askew continues in part: "A thing for the general reader to bear in mind is that neither 'net operating revenue' nor 'income from operation' means that the sums set opposite them are the clear profits to the companies after all necessary and unavoidable expenditures have been paid out of the receipts, earnings or revenues. Far from it. In the 1910 period, more than \$29,000,000 of expenditures, and in the 1909 more than \$26,000,000 of expenditures, not included in the operating expenses, remain to be shown in the statements before they are complete.

"To give a clearer idea of the final results of the 32 roads for the two 12-month periods, I will now continue the statement:

1910 Period

Net operating revenue, shows in the foregoing.....	\$23,068,028
Income from miscellaneous sources.....	1,262,719
Gross corporate income.....	\$24,330,743
Deductions from gross corporate income:	
Interest on funded debt.....	\$12,195,668
Other interest.....	2,397,207
Rentals of tracks, yards and terminals.....	1,502,275
Rentals of equipment.....	2,064,110
Taxes.....	2,051,513
Additions and betterments.....	6,614,891
Other deductions.....	255,010
Total deductions.....	\$29,180,978
Balance, deficit.....	\$4,860,229
Net operating revenue, as before stated.....	\$23,486,818
Income from miscellaneous sources.....	486,510
Gross corporate income.....	\$24,335,358
Deductions from gross corporate income:	
Interest on funded debt.....	\$12,117,770
Other interest.....	2,464,233
Rentals of tracks, yards and terminals.....	1,206,895
Rentals of equipment.....	2,394,773
Taxes.....	2,700,258
Additions and betterments.....	5,041,400
Other deductions.....	581,933
Total deductions.....	\$26,507,507
Balance, deficit.....	\$3,170,506

"Thus it will be seen that statements ending with net operating revenue (or as some still say, 'income from operation'), amounting in each year to more than \$23,000,000, would, if not continued to the end, present what some folks call half-truths, causing even many careful readers to form the idea that the railways in Texas were making large net profits, whereas when continued to the point which develops whether or not there was profit or deficit, shows for neither year a profit, but on the contrary a deficit for 1909 of \$2,170,506.70, and for 1910 a deficit of \$4,860,229.80, or for the two years a deficit of more than \$7,000,000.

"It will be observed that the situation is growing worse for the railways, and it may well be asked how, if the foregoing figures are correct (and they are to the best of my knowledge and belief), the railways can still continue in business. In answer, I will say that I have treated the 32 companies as a whole in my statements herein given. Some few of the companies are, while not to say prosperous, making a living. Others are keeping afloat for a while on (so-called) temporary loans, and hoping for better times. This results, however, as to such roads, in a gradual annual increase in the amount of 'other

interest, the second item in my statements of deductions from gross corporate income.' Still, others are in a more disastrous situation.

"The charging by me of additions and betterments against the income derived from the operation of the properties is not sanctioned by the system of railway bookkeeping prescribed by the interstate commerce commission.

"I have not failed to reflect upon whether or not additions and betterments might properly be considered to be amassable in the nature of a return to the stockholder, in lieu of a cash dividend, by reason of the enhancement of the value of the property, but so far as my observations have gone, the instances are few, if any, where the stockholders have reaped any of the benefits of this enhanced value. The public and the employees have probably received the benefit of most of the improvements, in the directions of speed, safety and comfort, but the cases seem to be few in Texas where a railway company is appreciably nearer a regular dividend paying basis after the expenditures for improvements were made than it was before. Increases in scales of wages, the 'increased cost of living,' which affects the prices of all the materials which a railway company has to purchase, as well as those articles which a private family uses, and the constant nipping, here and there, of transportation rates, practically the only source from which a railway company derives the means with which to meet its necessary and unavoidable expenditures, seem to absorb all of the 'economics in operation,' and other tangible benefits which, under other conditions, might have resulted in some benefit to the owners of the properties as well as the users of them."

Freight Rate Hearing in New York City.

The hearing begun in New York city last week by Examiner Brown, of the Interstate Commerce Commission, on the proposed trunk line freight tariff, was devoted during the first three days largely to the settlement of questions of procedure concerning which lawyers representing merchants' associations asked many questions and offered innumerable criticisms; and the testimony which was given was made up almost entirely of estimates, on the one hand, of the probable increase in income if the proposed new rates were adopted, and, on the other, of the increased expenses due to the advances which have been made in wages. Statements of this kind were presented by an officer of the New York Central, covering 50,000 miles of railway, as reported last week; and by officers of the Baltimore & Ohio, the Pennsylvania, the Delaware & Hudson and other roads, each for itself. On the Baltimore & Ohio the increase in wages, if it had been in force last year, would have amounted to \$2,070,233; proposed rate increases, \$2,308,107. The estimate of freight income is based on the assumption that the volume of traffic would be the same this year as last. To prepare the estimate had taken the services of 275 clerks, working six weeks.

On the Pennsylvania a total pay roll of 87 millions will be increased by about seven millions, or 8.15 per cent. The estimate of increase in freight receipts on the Pennsylvania was made on actual figures of one day in each of six representative weeks of the year 1909. If the proposed increases had been in effect in that year, the increase in revenue would have been \$3,061,579.

The Delaware & Hudson has increased wages \$397,686 a year; probable freight increases by proposed rates, \$172,601 a year. About half the tonnage of this road is coal, on which no increase is proposed, and of the other half five-eighths is not affected.

The Lehigh Valley calculates its increase in wages at \$820,502; proposed increase of receipts, \$756,341. The Lackawanna, the Bessmer & Lake Erie and a number of other roads presented estimates in which the ratio of income to outgo did not vary greatly from those given above.

On cross-examination some of the railway representatives were asked about increases in passenger fares, but the examiner decided that that subject must be left for another hearing; the present deals only with through freight rates. Mr. James, counsel for one of the shippers' organizations, called attention to the fact that commodities on which rates had not been raised, such as sugar, iron, paper, cement and lead, were made by the "trusts."

On Monday of this week J. B. Thayer, third vice-president of the Pennsylvania, gave a general statement of the attitude and

policy of that road. The proposed advance in rates would increase the gross receipts of the company only about 2.3 per cent. Following the year 1900 receipts increased and wages had to be advanced; and again in 1906 the same thing occurred. Each time increases in rates were considered and some advances were made, but in 1902 the company advanced wages several million dollars and also increased the freight rates on many commodities (not class rates). In 1906 this procedure was repeated and rates were advanced on coal, coke, steel and other commodities, but class rates were not touched. Passenger rates are not compensatory, but public sentiment forbids their increase. All of the increases proposed in the tariffs now under investigation have to do with long distance business. No advances are proposed to points within 150 miles of New York. The long distance rates have been too low as compared with those for short distances. From New York to Harrisburg, 200 miles, the first class rate is 33 cents, while to Chicago, over 900 miles, it is only 75 cents. It is right to advance class rates while not advancing those on the heavier commodities because the class rates apply to costly goods, carried in small lots. This is the most costly service dealt with by the freight department. The high speed demanded between New York and Chicago is costly, and the average loading per car is very low. Iron and other commodities were sufficiently advanced in 1906 and before. Asked why iron and steel are carried from Pittsburgh to New York at very low rates Mr. Thayer said that Mr. Carnegie had threatened to build another railway. The Pennsylvania has no further increases in contemplation at this time. Asked if the advance in wages, which has been 33½ per cent. in 10 years, was not compensated for by the increased efficiency of operation, the witness replied that for this greater efficiency millions of dollars had to be invested and the interest on these millions must be paid.

The New York, New Haven & Hartford presented an estimate of increased revenue of \$648,862 yearly, while the increase in wages will be \$1,772,566.

Following Mr. Thayer, C. F. Daly, vice-president of the New York Central, in charge of traffic, gave testimony and opinions in which he agreed with Mr. Thayer on all important points. Increases in rates were considered in 1908, but out of respect to the views of a large number of shippers, action was postponed. In 1909, the question came up again when labor leaders began to air their demands. Had it not been for the increase in wages, rates would have been let alone, in the hope that the increase in business would be sufficient to maintain a reasonable net revenue. Questioned as to the reasons for varying rates on the different classes or commodities, Mr. Daly said that the three upper classes were too low in comparison with the service performed. The advance is infinitesimal as compared with the value of the goods. Asked how the rates had got into such an inequitable condition, Mr. Daly said that rates have never been properly adjusted. The present rate fabric is the result of crazy-quilt work, which had been done to meet conditions as they existed from time to time. The present commodity rates are the result of the action of a great variety of elements. These still constitute the most delicate fabric that exists in the business world.

Most of the day, Tuesday, was spent in the cross examination of Mr. Daly by the lawyers for the shippers' organizations, but little of importance was brought out. The lawyers devoted themselves to the futile task of discovering the bases on which railway traffic men make their rates, but got nothing from Mr. Daly, except that in each case he used his own best judgment. Mr. Daly has spent all his life in the passenger department, and has had charge of freight only about two years, and, therefore, declined to answer many questions about the details of the freight department. He said that other rates not yet touched were too low and ought to be raised. The company hoped to make other advances besides those which have been announced. Many questions were asked both of Mr. Daly and other witnesses as to the capitalizations of railways and as to whether exorbitant profits had not been made in recent years, but this line of talk served mainly to amuse the spectators, and brought out nothing new.

D. W. Cooke, of the Erie, gave testimony similar to that of Messrs. Thayer and Daly. He said that the rates from New York to the west were in many cases ridiculously low as compared with the value of the service, and he could not understand why the shippers were protesting at rates which were dirt cheap.

Railway Officers,

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Frank W. Matthews has been appointed receiver of the San Antonio & Rio Grande at San Antonio, Tex.

Lucius Tuttle, president of the Boston & Maine, has resigned, and Charles S. Mellen, president of the New York, New Haven & Hartford, has been elected acting president of the Boston & Maine.

E. P. Shannon, treasurer of the Oregon Electric at Portland, Ore., has been appointed assistant to President John F. Stevens, of the Oregon Trunk, the Oregon Electric and the United Railways Co.

The National Railways of Mexico having assumed the operation of the Vera Cruz & Isthmus, E. N. Brown, president of the National Railways, has been elected also vice-president of the latter road. Thomas Milan will continue as president of the Vera Cruz & Isthmus, with office at Mexico City, Mexico.

Allen McCarty has been appointed to the new position of general auditor of the Delaware & Hudson, with office at Albany, N. Y., and the following change has been made in the organization of the accounting department: The comptroller will have charge of the general corporate and fiscal accounts and the general auditor will have charge of the operating, revenue and expense accounts.

Henry C. Hudgins, whose appointment as assistant to the president of the Norfolk Southern, with headquarters at Norfolk, Va., has been announced in these columns, was born

September 19, 1841, in Matthews county, Va. Mr. Hudgins attended the Virginia Collegiate Institute at Portsmouth, Va., from 1855 to 1860, and six years later entered the service of the Baltimore Steam Packet Co. as receiving clerk, and was then successively delivery clerk, manifest clerk and chief clerk. In 1870 he went to the Old Dominion Steamship Co. as sub-agent of subsidiary lines, and was also manifest and rate clerk in the office of the main line at Norfolk, until June, 1881, when he was appointed agent of the Norfolk & Southern (now the Norfolk



Henry C. Hudgins.

Southern). The following year he was appointed general freight and passenger agent of the same company, and remained in that position until his recent appointment as assistant to the president.

Edward J. Engel, whose appointment as assistant to the president of the Atchafalaya, Topeka & Santa Fe, with office at Chicago, has been announced in these columns, was born July 28, 1874, at Havana, Ohio. He attended the common schools until 1891 and then spent six months in a high school and later six months in a business college at Sandusky, Ohio. He began railway work in March, 1899, with the Santa Fe, and has been consecutively stenographer in the purchasing department, stenographer to the president and chief clerk in the president's office, from which position he has just been promoted to assistant to the president.

Operating Officers.

C. A. Coolidge, superintendent of the Oregon Electric at Portland, Ore., has been appointed general manager of the United Railways Co., in charge of transportation and main-

tenance, succeeding to the duties of L. B. Wickersham, transferred.

H. H. Hoover, chief train dispatcher on the Salt Lake division of the Denver & Rio Grande at Salt Lake City, Utah, has been appointed assistant superintendent, with office at Salt Lake City. S. L. Knece succeeds Mr. Hoover.

W. A. Purkett has been appointed trainmaster of the Illinois Southern, with office at St. Genevieve, Mo., in charge of the Missouri and Illinois divisions, and R. W. Cumming has been appointed chief dispatcher, with office at Sparta, Ill.

Wm. Lloyd has been appointed assistant superintendent on the Idaho division of the Oregon Short Line and the Southern Pacific Lines east of Sparks, Nev., with office at Pocatello, Idaho, succeeding J. H. Woffington, retired. H. W. Joslyn has been appointed an assistant superintendent, with office at Pocatello.

Traffic Officers.

C. L. Davis has been appointed traveling freight agent of the St. Louis & San Francisco, with office at Dallas, Tex.

H. E. Haefler has been appointed general freight and passenger agent of the Gulf, Texas & Western, with offices at Dallas, Tex., and at Jermyn.

C. L. Rutt has been appointed general freight and passenger agent of the Trinity Valley & Northern, with office at Dayton, Tex., succeeding R. B. Edgar, assigned to other duties.

C. J. Peterson has been appointed a commercial agent of the Chicago, Milwaukee & St. Paul, with office at Cincinnati, Ohio, succeeding G. L. Williams, resigned to engage in other business.

A. J. Puhl, city passenger agent of the Chicago, Burlington & Quincy at Chicago, has been appointed general agent in the passenger department, with office at Chicago, succeeding H. A. Cherrier, resigned to engage in other business. W. B. Byrne succeeds Mr. Puhl.

E. L. Adams, commercial agent of the New York Central Fast Freight Lines at Toledo, Ohio, has been appointed commercial agent of the Lake Shore & Michigan Southern, with office at Toledo, succeeding B. J. Torbrun, promoted; there will be no appointment made to fill Mr. Adams' present position.

Harry D. Fry, freight solicitor for the St. Louis & San Francisco at Dallas, Tex., has been appointed traveling freight and passenger agent of the Texas Midland, with office at Houston, Tex., and J. M. Symmonds, traveling freight and passenger agent of the Texas Midland, at Tyrell, has been transferred to Dallas.

Walter R. Morris has been appointed assistant traffic manager of the American-Hawaiian Steamship Co., in charge of Mexican and Central American business, with office at New York. Mr. Morris has been identified with the traffic departments of the Southern Pacific and Pacific Mail at San Francisco and New York since 1888, and resigned to accept this new position.

George E. Farrington, general agent of the Vandalia, with office at Terre Haute, Ind., has retired. Mr. Farrington was born September 24, 1841, at Terre Haute, and began railway work in 1868 as a clerk in the general office of the Terre Haute & Indianapolis. In 1873 he was made general agent, which position he has held with that road and its successor, the Vandalia, continuously to date. He was also for a number of years from 1879 secretary of the Terre Haute & Indianapolis.

Warner W. Croxton, whose appointment as general passenger agent of the Norfolk Southern, with office at Norfolk, Va., has been announced in these columns, was born on August 25, 1880, at Richmond, Va. Mr. Croxton received a high school education, and began railway work on June 1, 1900, as a stenographer in the freight department of the Southern Railway. He was later transferred to the passenger department. He was appointed a traveling passenger agent in March, 1904, at Norfolk, Va., and in October of the following year he was transferred to New York City. In April, 1907, he returned to Norfolk, and in September, 1908, he was transferred to Baltimore, Md. Mr. Croxton went to the Norfolk Southern in September, 1909, as assistant general passenger agent at Norfolk, which position he held at the time of his recent appointment as general passenger agent.

Engineering and Rolling Stock Officers.

C. A. Braut has been appointed a mechanical engineer of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Indianapolis, Ind.

Henry Cornell has been appointed a roadmaster of the Oregon Railroad & Navigation Co., with office at La Grande, Ore., succeeding C. McCann, resigned.

Walter Frank has been appointed superintendent of motive power of the Indiana Union Traction Co., with office at Anderson, Ind., succeeding R. C. Taylor.

L. B. Wickersham, vice-president and general manager of the United Railways Co. at Portland, Ore., has been appointed chief engineer of the Oregon Electric, reporting to the president.

C. E. Priest, district car inspector on the Northern district of the Rock Island Lines at Cedar Rapids, Iowa, has been appointed a car foreman, with office at Inver Grove, Iowa, succeeding A. M. Crain, assigned to other duties. B. W. Venamon succeeds Mr. Priest.

OBITUARY.

Charles A. Marsh, passenger agent of the Atchison, Topeka & Santa Fe at Buffalo, N. Y., died in Syracuse on September 6.

G. P. McAdam, formerly superintendent dining and parlor car service of the Wisconsin Central at Chicago, died in Chicago on September 11.

W. A. Tuley, formerly general passenger agent of the Fort Worth & Rio Grande and the St. Louis & San Francisco at Dallas, Tex., died September 10 at Stephenville, Tex.

L. C. Engler, road foreman of engines of the Hocking Valley, at Columbus, Ohio, was killed in the derailment of a northbound passenger train on that road September 12, near Lemoyne, Ohio.

Lloyd Wheaton Bowers, formerly general counsel of the Chicago & North Western and recently solicitor general of the United States, died on September 9 at Boston, Mass.

Mr. Bowers was born March 9, 1859, at Springfield, Mass. He graduated from Yale University in 1879, and in 1882 received the LL.B. degree from Columbia College. After practicing law for two years in New York he went to Winona, Minn., where he was engaged in the general practice of law, and later moved to Chicago. In 1893 he was appointed general counsel of the Chicago & North Western, and held that position until March, 1909, when he was appointed solicitor general of the United States. He was generally regarded as one of the ablest railway attorneys



Lloyd W. Bowers.

in the country. Mr. Bowers was a student at Yale with President Taft, and they had always been close personal friends. The President made the statement since Mr. Bowers' death that had he lived he would have been appointed a justice of the Supreme Court of the United States.

G. J. De Vilbiss, superintendent of motive power of the Hocking Valley at Columbus, Ohio, was killed in the derailment of a northbound passenger train on that road September 12, near Lemoyne, about 11 miles south of Toledo. In 1904 Mr. De Vilbiss was a master mechanic on the Baltimore & Ohio at Newark, Ohio, and in 1907 he was appointed superintendent of motive power on the Hocking Valley. In addition he had also been at various times since 1907 superintendent of motive power of the Toledo & Ohio Central, the Zanesville & Western and the Kanawha & Michigan.

Railway Construction.

New Incorporations, Surveys, Etc.

ARKANSAS ROADS (ELECTRIC).—Residents of Little Rock, Ark., are back of a project to build a line from Little Rock southwest to Hot Springs, 50 miles.

BANGOR & AROOSTOOK.—This company is making preliminary surveys for a line from West Seboois, Maine, north via Chesuncook lake, Chamberlain lake and the Allegash river valley, to Allegash Falls and St. Francis, about 160 miles. Part of the work will be done in the late fall and early winter.

D. Currie & Co. has begun construction work on ten miles of new line, to extend the Van Buren and Grand Isle branch to Upper Madawaska. The line is expected to be in use before the end of the present year.

Work is under way consolidating the Oakfield and Ashland Junction yards into one large freight yard with a new station about 30 rods from the present Oakfield station. The new yard will be more than one mile in length.

CALIFORNIA ROADS.—According to press reports from Oroville, Cal., M. J. Lorraine is making surveys for a line from the eastern border of California, west through the Beckwith valley to Oroville, thence southwest to San Francisco, without passing through Sacramento. The line is to parallel the Western Pacific part of the way. It is said that the new line will be shorter than the Western Pacific.

CANADIAN NORTHERN.—This company is reconnoitering for a route from Edmonton, Alb., northwest to Stewart, B. C., at the head of Portland channel, the most northerly Pacific port in Canada. This route will open up the Peace River valley. During the summer a feasible pass was found from Bear River valley, in which Stewart is located, on the Alaska boundary, eastward to the Nass River valley. Reports previously made by railway engineers indicate that a low maximum gradient is available to and through the Rockies and the Bistine mountains, thence eastward through the valleys of the Parsnip and Peace rivers to the Pouse Coupe prairie, and from Peace river, via Lesser Slave lake, Slave Lake river and Athabasca river to Edmonton.

CINCINNATI, LOUISVILLE, LEXINGTON & MAYSVILLE TRACTION.—An officer writes that work will be started about the first of next year on the section of this projected line, from Covington, Ky., southwest to Owenton, about 45 miles. The company was organized to build from Cincinnati, Ohio, south to Lexington, Ky., with an east and west line from Maysville to Louisville and a connecting line at Dry Ridge, in Grant county, Ky., in all about 250 miles. W. T. S. Blackburn, president, Dry Ridge. The Reliance Engineering Co., Cincinnati, are the engineers.

COPPER RIVER & NORTHWESTERN.—This line is now finished from Cordova, Alaska, north, and part of the material for the steel bridge over the river at mile 155 has been shipped from Seattle, Wash. This is the last steel bridge on the line, and it is expected that track laying will be finished to the river about the time the bridge is in place. The company expects to have the line ready for operation to Kennicott, mile 160, by January, 1911. (Aug. 5, p. 262.)

GALVESTON-HOUSTON (ELECTRIC).—See Texas Roads.

GEORGIA & CAROLINA.—Incorporated in South Carolina, with \$100,000 capital, to build from Hamburg, S. C., opposite Augusta, Ga., on the Savannah river, north to Spartanburg, S. C., 120 miles. The office of the new company will be at Edgefield, S. C. A. W. Jones, C. C. Howard and C. R. Coffin, all of Augusta; A. E. Padgett, Edgefield, and D. Crosland, Aiken, are interested.

GRAND RAILROAD. Organized in Wisconsin to build from Woodman, Wis., south via Patch Grove and Mount Hope to Bloomington, 26 miles. W. T. Leighton, president, Little Grant; W. E. Lewis, secretary and treasurer, Patch Grove.

GRAND TRUNK PACIFIC. An officer of the Transcontinental Railway writes that up to July 31, 1910, about 717.5 miles of

main line track had been laid, of which 96.5 miles were laid during 1910. About 95 per cent. of the work has been finished by the Toronto Construction Co., who have subcontracts from the Grand Trunk Pacific for work on sections west of Moncton, N. B. From Moncton west to the Quebec boundary track had been laid on 203 miles up to July 31. The section from Lake Superior junction, where connection is made with the Fort William branch west to Winnipeg, is now in operation. No plans have been made for extending the line east of Moncton.

HUDSON BAY RAILWAY.—According to press reports, construction work has been started on the Hudson Bay line from a point near the approach to the bridge under construction over the Saskatchewan river at The Pass, Keewatin. The northern terminus of the line will probably be at Fort Nelson. (Aug. 19, p. 332.)

KANAWHA, GLEN JEAN & EASTERN.—This company, operating an eight-mile line in Fayette and Raleigh counties, W. Va., will soon have an extension completed to connect with the Virginian Railway. The K. G. J. & E. is owned by coal operators, and mines about 1,000,000 tons of coal each year, it is said, most of which will be carried to tidewater over the Virginian Railway.

LOUISIANA ROADS.—A company is being organized by residents of Orange, La., to build from that place northeasterly to the Red river, about 50 miles. The line will traverse timber lands. Arrangements have already been made for traffic connections at the Red river. It is proposed to put engineers and right-of-way men in the field as quickly as possible so that contracts can be let. S. R. Shepherd, secretary of the Orange Commercial Club, is the principal promoter.

MILWAUKEE WESTERN ELECTRIC.—A certificate of public convenience and necessity has been granted by the Wisconsin Railway Commission to build an extension from the proposed terminus at Beaver Dam, Wis., to Fox Lake, about 10 miles. Work is now under way building from Milwaukee northwesterly to Beaver Dam, 56 miles, with a branch to Waukesha, nine miles. C. A. Chapman, Inc., are the engineers, 1537 Marquette building, Chicago. (Dec. 17, p. 1213.)

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—An officer writes that a contract has been given to Foley, Welch & Stewart, St. Paul, Minn., for building the connecting line to the ore docks in Superior, Wis., also for the ore dock and approaches (Sept. 2, p. 440.)

MISSOURI, OKLAHOMA & GULF.—Surveys are said to be under way north from Wagoner, Okla., for the proposed extension north, thence east to Joplin, Mo., 120 miles. An extension is also to be built from this line north to Pittsburg, Kan.

MISSOURI, KANSAS & TEXAS.—Plans, it is said, are being made to build a branch from Smithville, Tex., south to Bloomington, 90 miles. Connection is to be made at Bloomington with the new line of the St. Louis, Brownsville & Mexico to Port O'Connor, in Calhoun county. It is understood that the Missouri, Kansas & Texas will secure trackage rights over this line to tidewater at Port O'Connor.

NUCES RIVER VALLEY.—An officer writes that contracts will be let about January 1, to build from Beeville, Tex., west via Lapara, Oakville, Simmons, Tilden, Cotulla, Carrizo Springs and Bermuda to Eagle Pass, about 180 miles. There will be three steel bridges. William A. Frisby, president; George G. Ehrenborg, chief engineer, Beeville.

NORFOLK & WESTERN.—An officer writes that the work to be carried out early next year in Columbus, Ohio, includes the laying of additional tracks in the Joyce avenue yard and the rearrangement of tracks for the purpose of securing more prompt interchange of traffic between the N. & W. and the Pennsylvania lines. The grading work will not be heavy and will be started next spring by the company's men. The track work will also be carried out by the company's men.

OKLAHOMA PUBLIC SERVICE & INTERURBAN.—An officer writes that contracts have been let to Dan Sweetney & Co. and to the M. Ryan Bros. Co. for work on this line. The plans call for a line from Stillwater, Okla., south to Perkins, thence west via Coyle and Langston to Guthrie, also from Stillwater, north to Morrison, and then southeast via Jennings to Sapulpa. There will be one 200 ft. steel bridge, a power house, terminal and car

boats, also a freight house. L. J. Lampla, president, and P. A. Sturgeon, chief engineer, Stillwater. (June 5, p. 129.)

PINCHER CREEK, CANADIAN & MONTANA.—The company, which proposes to build a 700-mile line from the United States boundary across Alberta, will apply for an extension of the charter permitting the main line to be built from Pincher creek, Alb., to the Canadian Pacific, north via Calgary and Edmonton into the Peace river country. The project is backed by New York capitalists. It is understood that connection will eventually be made with the Hill system in Montana.

SEABOARD AIR LINE.—This company on September 1 opened an extension of the Dunnellon branch in Florida, from section 29 C. Mine to section 34 Mine, 2.71 miles. (June 10, p. 143.)

SOUTHERN PACIFIC OF MEXICO.—This company has notified the Mexican government that construction work on the line down the Pacific slope has been finished to a point about 10 miles south of the Santiago river in the territory of Tepic. Under the terms of the concession the company has two years more to complete the gap that now exists between Yago and Tequila. This work may be finished within the next 18 months. The southern division cannot be opened for traffic until the bridge over the Santiago river is finished some time early next year. It is said that no application has been made for an amended concession to extend the line further down the coast to the port of Manzanillo, and that such an extension is not contemplated. The force of laborers is being increased and the construction work pushed as rapidly as possible. (April 1, p. 919.)

SPRINGFIELD & CENTRAL ILLINOIS TRACTION.—An officer writes that this company is planning to build from Springfield, Ill., south via Pawnee, Morrisonville, Hillsboro, Greenville and Carlisle to Centralia, with an east and west line through East St. Louis, Granite City, Edwardsville, Vandala, Louisville and Oincy to Mount Carmel. The work will include three steel bridges, each to be 200 ft. long and about 5,000 ft. of trestles. There will also be some stations, power houses and substations. The principal revenue is to be derived from carrying passengers and coal. The prospects of building the line are good, but it is undecided when bids will be asked for the work. Isaac A. Smith, president and chief engineer, 309 Security building, St. Louis, Mo.

SPRINGFIELD & WESTERN (ELECTRIC).—An officer writes that a charter has just been secured and surveys are to be made at once from Springfield, Mo., west to Carthage and Joplin, with a branch from Paris Springs, south via Mount Vernon to Pierce City, a total of about 100 miles. H. D. Mackay, president; J. E. Woodrill, secretary, and M. M. Hollanback, chief engineer, Springfield. (Aug. 19, p. 333.)

STOCKTON TERMINAL & EASTERN.—This company has begun operating trains on the first section of about 12 miles from Stockton, Cal., northeast to Linden. The plans call for an extension northeast via Bellota to Jenny Lind, in all, 38 miles. M. J. Gardner, president, and J. E. Adams, manager, Stockton. (Jan. 28, p. 210.)

TAMPA & JACKSONVILLE.—Contracts are said to have been given to J. R. Emerson and to Oliver & Kite, Gainesville, Fla., to build an extension from Fairfield, Fla., south for seven miles towards Dunnellon, to which point the line is eventually to be extended. Additional contracts will probably be let soon.

TEXAS ROADS (ELECTRIC).—According to press reports, the Stone & Webster Corporation, of Boston, Mass., is planning to build an electric line between Houston, Tex., and Dallas, to connect on the north with the North Texas Traction Co. and on the south with the Galveston-Houston line. Surveys are said to have been made and work is to be started as soon as the Galveston-Houston line is finished. Work on the Galveston terminal station for the Galveston-Houston line is to be started at once and will be ready for use as soon as the line is finished into Galveston.

TEXAS SOUTHERN.—Incorporated in Texas, with office at San Antonio, Tex., to build from Potect southeast to Pleasanton, in Atascosa county, eight miles. The incorporators include: E. P. Parks, G. W. Nock, F. R. Remington, J. W. Hunt and F. H. Vurmeister.

Railway Financial News.

ATLANTIC, LOUIS & BAY F. R.—Walter D. Hogg, former chairman of the executive committee, has been elected chairman. Mr. Hogg has been acting chairman of the executive committee since the retirement two years ago of Victor Morawetz.

CENTRAL NEW ENGLAND.—The directors have declared the full 5 per cent. on the \$7,250,000 general mortgage income bonds for the year ended July 1, 1910. Of these bonds the New York, New Haven & Hartford owns \$6,900,000. The first payment on these bonds was made last year and was at the rate of 4 per cent.

CHESAPEAKE & OHIO OF INDIANA.—The company has filed a mortgage to secure \$40,000,000 bonds. Of these bonds \$8,200,000 are to be issued to the Chesapeake & Ohio. They are to be 5 per cent. bonds of 1910-1960.

CHICAGO, ROCK ISLAND & PACIFIC.—The block of preferred stock of the Rock Island Company which was taken over by Kuhn, Loeb & Co. last July at a time when it was understood that Pearson-Farquhar syndicate, which had acquired it, were not in a position to carry this stock any longer has been sold by Kuhn, Loeb & Co. to Phelps, Dodge & Co. The stock is said to amount to about 20 per cent., and since the preferred stock of the Rock Island Company carries with it the election of a majority of the directors of the Rock Island Company, which controls the Chicago, Rock Island & Pacific, Phelps, Dodge & Co. have apparently acquired a substantial interest in Rock Island affairs. Phelps, Dodge & Co. control the El Paso & Southwestern, but their principal business interests are connected with the mining and production of copper.

EL PASO & SOUTHWESTERN.—See Chicago, Rock Island & Pacific.

EVANSVILLE & TERRE HAUTE.—The directors have declared a dividend of 5 per cent. on the common stock, payable November 1, and have declared the regular annual dividend of 5 per cent. on the preferred stock, payable in two instalments. The common dividend of 5 per cent. compares with 4 per cent. paid annually from 1906 to 1909 inclusive.

FITCHBURG RAILROAD.—Stockholders are to vote on September 22 on the question of authorizing an issue of \$400,000 preferred stock, the proceeds to be used to reimburse the Boston & Maine for permanent additions and betterments paid for by the B. & M.

FONDA, JOHNSTOWN & GLOVERSVILLE.—This company has applied to the New York Public Service Commission, Second district, for permission to issue the balance of its authorized first consolidated general refunding mortgage bonds of 1903-1953, amounting to \$163,000. The proceeds of these bonds are to pay floating debt and to furnish funds for improvements and betterments.

INTERNATIONAL & GREAT NORTHERN.—Judge McCormick, in the United States circuit court at Dallas, Tex., has, on the application of the second mortgage bondholders' committee, adjourned the foreclosure sale from September 15 to October 6 or some later day to which the sale may be adjourned.

NATIONAL RAILWAYS OF MEXICO.—At a meeting of the stockholders to be held October 5 the question of issuing bonds for making general improvements is to be voted on.

WABASH-PITTSBURGH TERMINAL.—The receivers have filed suit in the United States circuit court at Toledo, Ohio, against the Wabash and the Wheeling & Lake Erie for an accounting under the traffic and trackage agreement by which the Wabash and the Lake Erie agreed to appropriate 25 per cent. of their gross earnings from traffic interchanged with the Terminal to meet any deficiency in interest on the Terminal company's first and second mortgage bonds.

The different industrial centers of Bolivia are at the present time connected with each other by about 2,000 miles of wagon road. The present extent of railways in operation in the Republic is about 500 of so-called trunk lines.

Supply Trade Section.

The Rail Joint Company, New York, has moved its general office to the Cameron building, 185 Madison avenue.

Victor H. Cochrane and Ira G. Hedrick have formed a partnership to practice consulting engineering under the firm name of Hedrick & Cochrane, with office at 1118 McGee street, Kansas City, Mo.

The McKeen Motor Car Company, Omaha, Neb., advises that 85 of its cars are now in service, that 37 railways are operating or have ordered them, and that 10 of these lines have placed additional orders for cars.

The Chicago Bridge & Iron Works, Chicago, has bought land in Greenville, Pa., and will build a fabricating shop to have an ultimate capacity of about 4,000 tons. It is expected that the new shop will be ready by the first of the year.

The Frick Company, Waynesboro, Pa., have placed an order with Tate, Jones & Co., Inc., Pittsburgh, Pa., for a large plate heating furnace, 8 ft. x 10 ft., inside. It will be equipped with the Kirkwood fuel oil burning appliances manufactured by this firm.

James A. Sherwood has been appointed Canadian agent for Thos. Firth & Sons, Ltd., Sheffield, England, effective October 1, with headquarters in Montreal. For the past five years Mr. Sherwood has filled a responsible position in the sales organization of E. S. Jackman & Co., Chicago, agents for the Firth-Sterling Steel Co. Prior to that time he was the railway representative in Canada for the Ewald Iron Co. He is thoroughly posted on the fine steel business in all its branches, having been closely associated in the development of the Firth-Sterling business in Chicago, and also having had valuable experience as assistant manager and salesman in the old Chicago staff of Howe-Brown & Co., and Park, Bro. & Co., when these firms were under Mr. Jackman's management in Chicago, during the period 1889-1893.

The Isthmian Canal Commission will receive bids until September 20 for lumber, dredging sleeves, hose, suction pipe, brake-shoes, road machines, lanterns, etc. (Cir. No. 602), and for suction dredge ladder, steel castings, steel discharge pipe, electric motors, punches and dies, electric cable, lumber, etc. (Cir. No. 603), and until September 30 for castings, cold-rolled steel, wire rope, copper ladder rungs, steel and brass tubing, pipe fittings, valves, cocks, oil cups, bolts, nuts, nails, tacks, hinges, twist drills, rail benders, jacks, grindstones, crucibles, shovels, hoes, brooms, plumber's furnaces, anchors, oilers, oil cans, tallow pots, sprinkling cans, camp lamps, steel tapes, hose, packing, gaskets, buffing leather, emery cloth, tablecloths, twine, chairs, soft soap, friction clutch pulley, wool waste, rubber belting fire brick, etc. (Cir. No. 604).

The Marion Shovel & Dredge Company, Marion, Ohio, has recently been organized, with John D. Owens as president, A. E. Cheney, secretary and general manager; George D. Copeland, treasurer, and H. J. Barnhart, chief engineer. It is the intention of the company to build steam shovels, dredges, ballast unloaders and other similar machinery. The company has secured 125 acres of land near Marion, located between the Hocking Valley and the Pennsylvania railways, with the C. D. & M. electric railway running the full length of the site. Bids are now being taken for the plant of structural steel, reinforced concrete and brick. It will be equipped in a modern way, and arranged to meet future extensions without changing the general plan. At the outset the plant will have a capacity of about 10 machines per month. It is the expectation of the company to have it ready for operation in February.

The annual report of the American Locomotive Company shows that at the beginning of the fiscal year, 1909-1910, the company had unfilled orders on its books amounting to \$6,150,000, and on July 1, 1910, unfilled orders amounting to \$17,550,000. President Marshall says that during the first half of the fiscal year there was only a slight increase in the monthly output as compared with that of the preceding year of depression, the revival in plant activities being confined to the six months ended June 30, 1910. In 1909-10 the company earned gross \$22,203,392, an increase over 1908-9 of \$13,194,738. Manufac-

turing, maintenance and administrative expenses and depreciation cost \$29,605,443 last year, an increase over the previous year of \$11,939,481. In expenses for last year there is included \$803,484 for depreciation. The report for 1909 does not state how much of the total operating expenses was allowed for depreciation. After the payment of interest on bonds of constituent companies, coupon notes, etc., the American Locomotive Company had a profit in 1910 of \$2,084,758 as against \$987,139 in 1909. Dividends of 7 per cent. (\$1,750,000) were paid on the preferred stock in both 1909 and 1910. There was a surplus, therefore, in 1910 to the credit of profit and loss of \$334,758, as compared with a deficit to the debit of profit and loss of \$762,861 in 1909. During the year \$5,000,000 5 per cent. notes were issued, of which \$1,000,000 mature October 1, 1912; \$2,000,000 October 1, 1913, and \$2,000,000 October 1, 1914. Of the proceeds of these notes, between \$3,500,000 and \$4,000,000 has been spent on increasing the capacity of the company's plants, principally at Dunkirk, Richmond and Schenectady. During the year the company also bought such of the notes maturing in 1910 as were offered at favorable terms, and on October 1 will pay the balance of the fourth instalment of short term notes amounting to \$911,000, leaving a balance of \$1,000,000 of these notes outstanding, so that with the \$5,000,000 notes issued last year there will be a total of \$6,000,000 notes outstanding. The general balance sheet of June 30, 1910, shows cost of property at \$51,741,792, comparing with a book value of cost of property June 30, 1909, of \$49,757,746. Cash on hand June 30, 1910, amounted to \$1,702,269, as against \$4,672,042 cash in 1909; accounts collectable amounted to \$9,698,073 in 1910 and to \$5,116,925 in 1909; accounts payable in 1910 amounted to \$3,337,708 as against \$977,904 in 1909; total convertible assets in 1910 amounted to \$20,102,468, and total current liabilities amounted to \$10,809,662.

TRADE PUBLICATIONS.

Waterproofing Material.—The Barrett Manufacturing Company, New York, has issued a leaflet containing information regarding the use of its coal tar pitch on the back of the retaining walls around the excavation for the Pennsylvania Station, New York City. The information is in the way of a correction of that previously published in this connection by the Barrett company.

Coal Handling Machinery.—Catalogue No. 16, cloth bound, 8½ in. x 11½ in., and printed on heavy glazed paper, has just been issued by the Mead-Morrison Manufacturing Company, Boston, Mass. This catalogue contains a large number of half-tone illustrations of installations of the McCaslin overlapping gravity bucket conveyor as used for conveying coal, ashes, cold or hot cement clinkers, etc.

Pennsylvania New York Terminal Improvements.—Westinghouse, Church, Kerr & Company, New York, have just issued a booklet containing a complete description of the work done for the Pennsylvania Tunnel & Terminal Railroad and the Long Island Railroad in connection with the terminal improvements in New York City. The description is complete in every detail, including a number of illustrations showing the progress of the work.

Handling Coal, Stone, Gravel, etc.—Bulletin No. 42, just received from the Jeffrey Manufacturing Company, Columbus, Ohio, contains descriptions, with photographs of installations of Jeffrey conveyors, various types of screens, roll crushers, pulverizers, hoists, dump cars, larries, electric locomotives and coal cutting machinery. Booklet No. 28 shows Jeffrey conveying machinery for handling stone, sand, gravel, ores, etc. These publications will be sent to interested parties upon request.

RAILWAY STRUCTURES.

BELLEVILLE, KAN.—The Union Pacific plans to build a new roundhouse.

ELWOOD CITY, PA.—Work, it is said, has been resumed on

the bridge over the Beaver river from West Ellwood Junction to Ellwood City. The plans call for a bridge to carry tracks for street railways. Work was started on the piers some months ago but was stopped pending arrangements for crossing the tracks on both sides of the river. This has now been adjusted and construction work will be pushed to completion. H. W. Hartman, Ellwood City, is back of the project.

EL PASO, TEX.—Bids are wanted until October 1 by J. L. Campbell, engineer maintenance of way at El Paso, Tex., of the El Paso & Southwestern of Texas, for enlarging the freight house at El Paso. (Aug. 12, p. 297.)

FALLS CITY, NEB.—The Missouri Pacific is building a machine shop with four engine pits for running repairs, and a division office building.

FORT WILLIAM, ONT.—An officer of the Canadian Pacific writes that a contract has been given to A. C. Stewart for putting up a single lift bascule bridge, 125 ft. long, with plate girder approach spans, to be built over the Kaministiquia river. (Aug. 26, p. 375.)

GALVESTON, TEX.—See Texas Roads under Railway Construction.

HOUSTON, TEX.—The Southern Pacific is said to have given a contract to William Miller & Sons for putting up the building and the plumbing work of the new nine-story office building at Travis street and Franklin avenue in Houston. (Aug. 26, p. 375.)

INDIANAPOLIS, IND.—The Pennsylvania Lines West are preparing detailed plans for a new outbound freight house on Delaware street, between South and Merrill streets. The building will be 800 ft. x 30 ft., and of brick construction with slate roof. In connection with the house five tracks will be built with covered platforms between them.

JOLA, KAN.—The Missouri Pacific plans to build a new passenger station.

MARSHALL, TEX.—The Texas & Pacific is building a new truck shop between the freight car shop and the coach shop.

MELBOURNE, KY.—The Chesapeake & Ohio has started work on a new machine shop to relieve congestion in the company's repair shops.

OROVILLE, CAL.—According to press reports, the Southern Pacific has plans made for building the new passenger station at Oroville. (May 27, p. 1,328.)

PORTLAND, ORE.—Local press reports indicate that the railways entering Portland are approaching an agreement regarding the building of a union passenger station.

REDDING, CAL.—According to press reports, the Southern Pacific has plans made for putting up a new passenger station in Redding. (Feb. 4, p. 283.)

ROCHESTER, N. Y.—The New York Central is wrecking buildings preparatory to building a new passenger station.

SACRAMENTO, CAL.—The Northern Electric Co. has let the contract for building a bridge over the Sacramento river to the Missouri Valley Bridge & Iron Co. The bridge was mentioned in the *Railway Age Gazette* of August 5.

SANDERSON, TEX.—The pumping plant and water tank of the Southern Pacific were burned on August 23.

SPRINGFIELD, ILL.—See Springfield & Central Illinois Traction under Railway Construction.

STUEBENVILLE, OHIO.—An officer of the Pittsburgh, Cincinnati, Chicago & St. Louis writes that contracts will probably be let in October for putting up a brick passenger station in Steubenville. The structure is to be one-story high, 40 ft. x 240 ft.

STILLWATER, OKLA.—See Oklahoma Public Service & Interurban under Railway Construction.

SUMMIT, CAL.—The Southern Pacific plans to build a \$10,000 reinforced concrete passenger station.

SWEETWATER, TEX.—The Pecos & Northern Texas will build a roundhouse, yards and other facilities for making Sweetwater a division point. The company has about 100 teams grading on the yard and main line in that vicinity.

VIADUCT, TEX.—The Southern Pacific is replacing its bridge over the Pecos river. This structure is 2,080 ft. long and 328 ft. above high water mark of the river.

Late News.

The items in this column were received after the classified departments were closed.

Joseph E. Boker, first vice-president of the Chicago Car Heating Company, Chicago, resigned on July 25.

Frank L. Moe, western freight agent of the National Railways of Mexico at Chicago, has been appointed general western agent in charge of freight and passenger traffic, with office at Chicago.

C. E. E. Usher, assistant passenger traffic manager, western lines of the Canadian Pacific, at Winnipeg, Man., has been appointed passenger traffic manager, succeeding Robert Kerr, who is to retire, having reached the age limit, effective October 1.

R. D. Pusey has been appointed an assistant general passenger agent of the Louisville & Nashville, succeeding J. A. Boyd, assigned to other duties, and Milton Smith has also been appointed an assistant general passenger agent, both with offices at Louisville, Ky.

It is reported that the Argentine Government Railways have ordered the 118 passenger cars, reported in the *Railway Age Gazette* of May 13, from the Harlan & Hollingsworth Corp., and a number of freight equipment cars from the American Car & Foundry Company.

Lucius Tuttle, whose resignation as president of the Boston & Maine is announced in this issue, has resigned also as president of the Maine Central, and Charles S. Mellen, president of the New York, New Haven & Hartford, is now the acting president of both these companies.

The committee representing London bankers interested in the bill of lading question has issued the following statement: "The conference regrets that it cannot regard the bills of lading validation schemes submitted by the American Bankers' Association as affording the protection desired by European cotton accepting banks. The banks will decline from Oct. 31 to accept against bills of lading unless guaranteed through exchange buyers in America, both in regard to the signature and the possession of the cotton by the carriers at the time of issue."

A special train of the Norfolk & Western carrying President Johnston and General Manager Maher was wrecked on September 14. The locomotive, tender and two empty coaches left the track while running about 47 miles an hour past the Delorme (W. Va.) station. Fayette Woolwine, road foreman of engines, and the conductor and fireman were killed, and the telegraph operator at Delorme was so badly scalded that he died on the way to the hospital. The wreck was caused by the breaking of a bolt on one of the trucks under the tender.

The twenty-eighth annual convention of the Roadmasters' and Maintenance of Way Association was held at the Great Northern Hotel, Chicago, September 13-16. The secretary reports 114 new members and a total attendance of 200 at the convention. The committee report, Proper Care of Track Materials and Tools, was given and adopted on Tuesday. The report, Standard Switch Targets, was reported and discussed on Wednesday, and the association by vote favored the single target switch stand for all lines, both single and double track. New officers were elected as follows: President, Thomas Thompson, A., T. & S. F., Joliet, Ill.; first vice-president, L. C. Ryan, C. & N. W., Sterling, Ill.; second vice-president, D. T. Lynch, C. & B. Q., Alliance, Neb.; chairman executive committee, M. Burke, C., M. & St. P., Chicago; secretary and treasurer, W. E. Emery, chief engineer, Peoria & Pekin Union, Peoria, Ill. The next convention will be held in St. Louis, Mo. At the Thursday morning session the manufacturers gave five-minute talks, and in the afternoon the association discussed cattle guards, ties, tie plates, rail anchors and new and improved appliances. On Friday an automobile trip was arranged by the exhibitors, among which were the following firms: American Hoist & Derrick Co., American Steel & Wire Co., American Valve & Meter Co., the Buda Co., Duntley Manufacturing Co., Economy Separable Switch Joint Co., Thomas A. Malt, Positive Rail Anchor Co., Pruyn Reinforced Concrete Railway Tie Co., Rail Joint Co., Railway Specialty & Supply Co., Ramapo Iron Works, Vaughn Rail Support Co. and Verola Tool Works.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Utah Copper Co., Brighton, Utah, has ordered ten 16-in. x 24-in. cylinder locomotives from the H. K. Porter Co.

The Louisiana & Pacific, Long Bell Lumber Company, Kansas City, Mo., has ordered one mogul locomotive from the Baldwin Locomotive Works.

The China Copper Co., Santa Rita, N. Mex., reported in the *Railway Age Gazette* of July 15 as being in the market for locomotives, has ordered four 15-in. x 24-in. cylinder locomotives from the H. K. Porter Co.

The Union Railroad has ordered the ten consolidation locomotives mentioned in the *Railway Age Gazette* of August 26 from the American Locomotive Co. The engines will be built at the Richmond, Va., plant.

CAR BUILDING.

The Louisville & Nashville is in the market for 100 ballast cars.

The Solway Process Company, Detroit, Mich., is in the market for 50 fifty-ton gondola cars.

The Berwind Lumber Company, Pittsburgh, Pa., has ordered 10 forty-ton flat cars from the Pressed Steel Car Company.

The Niles-Bement-Pond Company, New York, is in the market for 20 fifty-ton gondola cars.

The Colorado & Southern has ordered 250 National dump stock cars from the American Car & Foundry Co.

The Atchison, Topeka & Santa Fe is said to have ordered 1,000 refrigerator cars from the American Car & Foundry Co. This item is not confirmed.

The Mexico North-Western is in the market for 200 logging cars. This equipment has been wrongly reported as for a Mexico Northeastern.

Lewis T. Lenaire, Tribune building, New York, advises that the 50 box cars, for which he is negotiating for a South American road, as reported in the *Railway Age Gazette* of April 15, have not yet been placed, but that definite information regarding their disposition will be available at an early date.

The Havana Central, reported in the *Railway Age Gazette* of August 26 as being in the market for freight equipment, has ordered 100 thirty-ton flat, 150 thirty-ton box and 140 cabooses from the American Car & Foundry Company. This same railway is now making inquiries for three baggage and six passenger cars.

MACHINERY AND TOOLS.

The Scullin-Gallagher Iron & Steel Co., St. Louis, Mo., has ordered a 10-ton, three-motor, traveling crane.

IRON AND STEEL.

The Chesapeake & Ohio is said to be in the market for 10,000 tons of rails.

The Western Maryland is said to be in the market for 10,000 tons of rails.

The Chicago & North Western is in the market for 1,000 tons of structural steel.

The Denver & Rio Grande is said to be in the market for 14,000 tons of rails.

The Missouri Pacific has ordered 770 tons of bridge steel from the Virginia Bridge & Iron Works.

The Chicago, Burlington & Quincy has ordered 1,000 tons of bridge steel from the American Bridge Co.

The San Pedro, Los Angeles & Salt Lake has ordered 12,000 tons of rails from the Colorado Fuel & Iron Co.

The Grand Trunk is in the market for 10,000 tons of 100-lb. rails. (See *Railway Construction*, March 4, 1910.)

The New York, New Haven & Hartford is in the market for 500 tons of bridge steel for a three-span double-track bridge.

The Cincinnati, Hamilton & Dayton has ordered 400 tons of bridge steel from the American Bridge Co. for a bridge over the Miami river.

The Southern Pacific has ordered 1,500 tons of structural steel from Noelke, Richards & Co. for an office building at Houston, Tex. (See *Railway Structures*, July 17, 1910.)

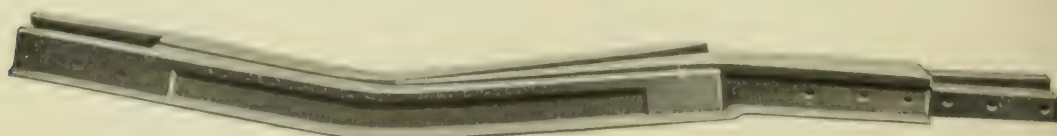
The Oregon Trunk has ordered 5,100 tons of bridge steel from the Pennsylvania Steel Co. for three bridges, one at Celilo, Ore., over the Columbia river, and two small ones over the Des Chutes river. The inquiry for this steel was mentioned in the *Railway Age Gazette* of April 15, 1910.

General Conditions in Steel.—Although the second week of September has passed, no marked improvement in the steel business has taken place. Unfilled orders of the United States Steel Corporation on August 31 were 3,537,128 tons, which is not far above the lowest figure ever reached, 3,027,436 tons on September 30, 1904. The remaining two weeks of this month will have to show a heavy increase in order to prevent a shrinkage of unfilled tonnage below the lowest level ever reported. The largest amount reported was on September 30, 1906, when 8,489,718 tons were yet unfilled. The July last report was 3,970,931 and that of June 30 was 4,257,794 tons. The pending contract for the New York City subways, which will require some 150,000 tons, rails and structural, provide the main topic of interest at present.

R-N-R Manganese Frog.

The maker of the manganese frog shown herewith, the Indianapolis Switch & Frog Company, Springfield, Ohio, has specialized on solid manganese construction for frogs and crossings. The idea in this type of frog is the elimination of the bolted construction. The track rails connect directly with the frog proper, without any alteration. But one pair of splices, instead of four, is required, and all rails are protected by manganese easers, intended to eliminate all joint and point pounding.

The test frog illustrated was subjected to 165 blows of a 1,250-lb. and 2,500-lb. weight from heights of from 3 ft. to 23 ft.,



Manganese Frog After Test.

The International of Great Northern is now receiving the wood working and other machinery for its Taylor, Tex., shops.

aggregating 1,659,475 ft. lbs., after which it showed no fracture or impairment of any nature.

A New Form of Grab Bucket.

The grab bucket illustrated was introduced by the Andresen-Evans Company, Chicago, and has a number of features interesting to excavating contractors as well as to men in charge of power plants and coal handling apparatus. It is designed for handling all classes of bulk materials, such as coal, ore, etc. The grab is made in two types, one to be used with two



Andresen-Evans Grab Bucket Handling Lump Coal.

planes and the other with three or four lines. Both types may be used on two-drum hoists.

The drawing of the two line type shows the feature which first attracts the attention of practical men; namely, that the closing chains always pull in a direction parallel to the resistance. This, with the long lever arm, gives a powerful digging action and it is not necessary to drop the grab in order to insure cutting action. The grab continues to sink during the loading process and excess material is forced out of the backs of the scoops. This insures a full load without packing and the



Open and Closed Positions of Two Line Grab.

grab is always closed before hoisting. The main advantages claimed for this grab are: Powerful digging action; wide opening over which the digging action takes place; positive opening; small head room required; small drop of scoops in opening; low center of gravity and wide base when open such that it will not tip over when digging on side of pile, and simplicity and rigidity of construction.

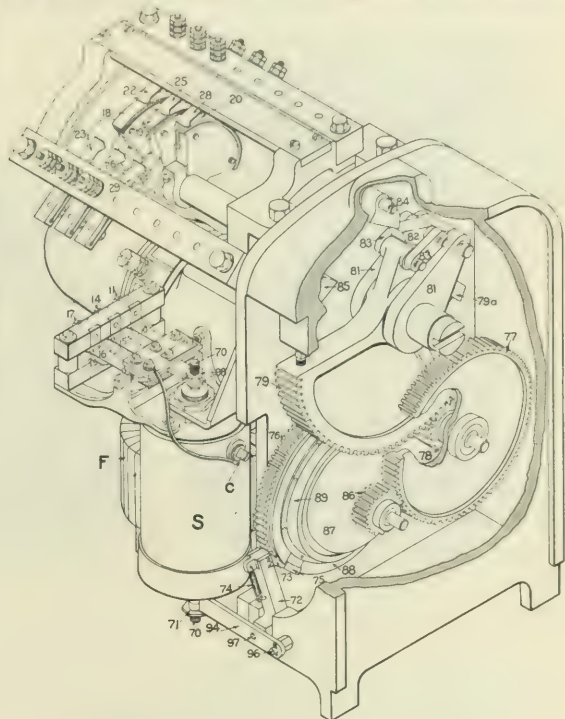
It is also to be noted that the grab is well braced in all planes, has castings of steel and bearings of phosphor bronze. This grab has been perfected after two years of service at

various plants, under different conditions and handling different materials.

The Union Style "T" Signal.

The Union Switch & Signal Company, Waterville, Pa., has recently put on the market a new type of signal known as the style "T." This signal is designed to meet all the conditions and requirements of modern block signal practice. It is a "top post" semaphore, adaptable to upper or lower quadrant two- or three-position indications, and designed to be placed on top of the signal post or clamped to it, as conditions require. Other distinctive features are a light and compact mechanism, in which great strength and high efficiency are secured, and a number of safety precautions, among which is the motor drive to the normal position.

The mechanism comprises a motor of the bipolar type, with a toothed armature and two independent shunt wound fields, a holding-clear device, consisting of a magnet and a lever arrangement circuit controller, a clutch, and a mechanical lock. One of the motor field coils is energized when the signal is clearing, the other when the signal is returning to its normal position.



Mechanism for Union Style "T" Semaphore.

One coil has less resistance than the other. This is to permit a greater generated current to flow when the signal is going to stop than when it is clearing, because in clearing the weight assists in stopping motion, whereas in going to stop the weight is added to the load to be overcome by the motor.

The construction of the pole pieces is such that the teeth of the armature pass into and out of the magnetic field gradually, there being no point at which the magnetic attraction is greater than at the points adjacent on either side. The forces on the armature due to the field alone are, therefore, balanced in all positions of the armature, and it is as free to rotate when the field is energized as it is when the field is not energized. Thus there can be no tendency to hold the signal clear, even though the field should be excited, with no current in the armature.

The circuit controller is operated by the holding clear magnet which has two coils, one to pick up and one to hold up its armature. When the magnet is energized the motor circuits for clearing the signal are closed; when de-energized the motor circuits for driving the signal to stop are closed.

A clutch is interposed between the motor and semaphore to

prevent straining or breaking any part of the mechanism if it should occur that the motor failed to hold the semaphore, as it would if the circuit happened to be open. Without this clutch some part would be certain to break or be unduly strained if the semaphore should drop from clear to normal without any retardation. If to secure the mechanism against strain were the only consideration a simple ratchet would answer the purpose, but when to this requirement is added that of driving the signal to its normal position by the motor, something more than a ratchet is required. The clutch must hold enough to permit the motor to exert its force on the semaphore, and must let go before the stress becomes great enough to produce a strain.

The mechanically operated circuit controller for opening the motor circuit when the semaphore has reached the position corresponding to the state of the track ahead, and for selecting the slot magnet circuits between the caution and clearing wires, comprises insulated sectors carried by the semaphore shaft, which co-act with brushes supported on and insulated by wooden bars carried on the frame of the machine. Three of these sectors are regularly employed; one for controlling the magnet circuits, another for controlling the motor circuits when the signal is clearing and a third for controlling the motor circuits

rods are free to turn in the bushings of the shafts as well as in the bearings in the frame, and by reason of their small diameter, and smooth hard surfaces, form bearings that are nearly frictionless. The semaphore shaft is made of high carbon steel, the hard smooth surface of which will not seize the bearings.

The style "T" is now being installed in connection with interlocking and block signal work on the Baltimore & Ohio, the Chicago, Milwaukee & St. Paul, the Great Northern, and other roads.

An Electric Fixture for Car Lighting.

Years of experience in the manufacture of car lighting fixtures has assisted the Safety Car Heating & Lighting Company, New York, in producing an electric fixture with many new and commendable features.

One design of this fixture, shown in Fig. 1, preferably uses the 40 candle power tungsten lamp, with a shade designed to insure brilliant illumination and at the same time completely diffuse the objectionable glare of the bare tungsten lamp. This shade is held securely by a shade holding device, Fig. 2, which is in successful use on several thousand fixtures. A slight pressure inserts the neck of the shade in the split cone grip and it is locked by screwing down the ornamental ring or nut. This securely holds the shade while preventing breakage from uneven pressure and allowing expansion of the shade due to heat.



Fig. 1



Fig. 2



Fig. 3

Electric Fixture for Car Lighting.

when the signal is returning to normal. The last mentioned sector has a notch cut in its periphery, for the purpose of opening the motor circuit, for an instant, just before the semaphore reaches the caution position, to permit of its stopping at this position if the state of the track ahead requires such a movement. Other sectors may be added if the signal is required to control circuits extraneous to its own government. A mechanical lock is provided, when required by the purchaser, to prevent the signal being cleared by hand.

The semaphore shaft is formed in three parts joined by tongue and groove couplings. One part carries the sectors of the circuit controller, another, the segmental gear, and the third the semaphore arm. This construction permits of the removal of the circuit controller without disturbing any other part, and allows the entire mechanism to be removed, leaving the semaphore arm in place.

Every precaution has been taken in the design of the signal to reduce friction to a minimum. Ball bearings have not been used, as they add considerably to the cost of the signal, and tests show that there is very little, if any, diminution of friction by their use. The motor has bearings of very small diameter provided with self-aligners. The bearings of the two intermediate shafts are formed by boring large holes through the shafts, in which short brass bushings are inserted at each end of the shaft. Through these extend small Stubbs' steel rods. The

Another feature is illustrated in Fig. 3. This shows the interior or electrical parts, designed to allow removal of the exterior or ornamental parts, including the shade and shade holder, without disturbing the electrical connections. This should be appreciated as a time saver by both the electrical department and shop foreman in repairing or relining cars. The illustrations show only one design of this type of fixture, but the construction allows great latitude in artistic treatment to harmonize with any interior finish or class of railway cars.

FOREIGN RAILWAY NOTES.

The total mileage of new railway projected in Bolivia in 1909 was 867 miles. A continuation of the main railway line under construction is needed to make a connection between the Argentine system of railways and to form part of a through route from Lima, Peru, to Buenos Ayres, Argentina.

By an executive decree of October 28, 1909, the government of Brazil was authorized to make a contract with the Great Western Limited for the extension of several lines leased to this railway company. The survey for these extensions have already been made, and work will shortly be begun.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY AND FRIDAY EVENING BY
THE RAILROAD GAZETTE CO., 110, ST. PETER'S ST., NEW YORK

CHICAGO: The South Bldg. CLEVELAND: Western Bldg.
LONDON: Queen Anne's Chambers, Westminster

W. H. BOARDMAN, President
E. A. SIMMONS, Editor
HENRY LEE, Secretary
The address of the country is the address of the offices.

EDITORS

W. H. BOARDMAN, Editor	ROY V. WRIGHT	B. B. ADAMS
SAMUEL O. DUNN,	ERNEST MCCUTTEGUE	W. E. HOSPER
<i>Western Post, Minn.</i>	G. L. FOWLER	E. J. LISTER
BRANDRED BOARDMAN	WILLIAM LORING	E. W. KRAMER
<i>Boston Post, Mass.</i>	S. W. DUNNING	H. H. SIMMONS
	CLARENCE DUMING	

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada.....	\$6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies.....	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49. FRIDAY, SEPTEMBER 23, 1910. NUMBER 13.

CONTENTS

EDITORIAL:

Editorial Notes.....	527
The Big Railways and the Little Railways.....	528
The Railway Headship of New England.....	529
The Illinois Manufacturers' Association's Search for Facts.....	530
The Commission's Impossible Task.....	531
Norfolk & Western.....	532
Wheeling & Lake Erie.....	533
Central of Georgia.....	534
New Books.....	535

LETTERS TO THE EDITOR..... 535

ILLUSTRATED:

Heavy Pacific Type Locomotive for the Vandalia.....	539
New York City Freight Terminals.....	542
The Electric Railways in Germany.....	545

MISCELLANEOUS:

The Testing Department.....	537
Roadmasters' and Maintenance of Way Association.....	540
Double Track in North Carolina.....	543
Train Accidents in August.....	543
Foreign Railway Notes.....	543, 545, 549

GENERAL NEWS SECTION..... 549

SUPPLY TRADE SECTION..... 561

WHEN some of the officers of a railway have grafting relations with supply companies, that railway is not the only company that is hurt thereby. Competing supply concerns, which otherwise would have a chance to get business from the railway, are injured, both directly and also indirectly in that the whole *morale* of the supply business is affected. Supplymen would rather be honest than not. This sounds like such negative praise as to be damning; but it really sums up the situation, and is, at least, in contrast to the idea that they delight

in sin for its own sake. For deal sure of grafting such as these, which have taken place on the Illinois Central road, dis-credit not only on railway officers, generally, but also on supply concerns generally, the innocent suffering in reputation along with the guilty. As a result of the notoriety given to the Illinois Central frauds the public has got the idea that business transactions between railways and supply concerns are usually tainted by fraud. Honest railway officers and honest railway supply men are too much disposed to look and comment with cynical indifference on improper relations between railway officers and supply concerns. If they had good reason to think that some railway officer or some railway supply man was picking the pockets of his friends or cheating them at cards they would regard and talk about him in a very different way. Is not "grafting" an offence that is equally bad and deserving of contempt? A railway officer occupies a position of trust. He is usually paid reasonably well for the performance of his duties to the road. For him to work for his own profit instead of for the profit of his employer is an infamous betrayal of trust; and the supply man who in any way, directly or indirectly, bribes a railway officer to violate his obligation to his railway is equally guilty with him.

"GOV. DRAPER has been urging the Boston & Maine to give better service and lower milk rates. This is in accordance with the recognized policy of this commonwealth. Massachusetts has no desire to own the railways but the state does retain the power to insist on such service as the needs of patrons demand, so far as this may be done without confiscation of private property." This is from the *Boston Advertiser*. The declaration of policy might be paraphrased by saying that the state does not desire to own the railways and that this is because railways ought not to pay any interest on the money invested in them. If the state goes as far as it can without confiscating the railways it will reduce transportation rates until the dividends realized by the stockholders are, say, one-half of one per cent. Probably it is fair to assume that in advocating a policy which would come next door to confiscation this editor was simply careless. He did not mean to be so radical as that. But these extreme statements by otherwise fair minded writers are just what the political demagogue thrives on. Mr. Mellen seems to be pursuing a liberal policy with the state of Massachusetts in this matter; and it is to be hoped that some at least of the newspapers are willing to let him make a living profit.

THE fact that the first attempt to construct a bridge across the St. Lawrence river at Quebec resulted in a disaster made no difference in the decision that such a bridge should be built. The investigation into the causes of the failure had not been completed before it was generally understood that it would be rebuilt. This was followed by an elaborate series of tests as to the strength of large members, which has resulted in a redesigning of those for the new structure, and it is thought that work is sufficiently advanced on the plans for construction to be continued without interruption to the end. The drawings for the superstructure have been so far completed that invitations for bids have been sent out, which will be opened on the first of October, when it is expected that proposals will be received from prominent builders in both America and Europe. The contracts to be let at that time will probably amount to about \$10,000,000. In the meantime contracts have been let for the removal of the debris of the old bridge, and a large amount of contractors' material is already on the ground for the prosecution of the work on the north pier, an attempt being made to get it above the water level before the end of this season. The responsibility for the new structure has been assumed by the Department of Railways and Canals for the Dominion of Canada, which has retained H. E. Vautelet, of Montreal, as

chief engineer, Maurice Fitzmaurice, of London, and Ralph Modjeska, of Chicago, as a board of engineers in charge of construction. The new bridge, like the old, will provide for two railway tracks, two trolley tracks, two highways and two sidewalks, all on the same level. It is the intention, however, to proportion the details not only for higher live loads but for lower unit stresses, which will add materially to the weight of the structure. The total load is about twice that of the old one that failed, but is so designed that the bottom chords, for example, have a strength about five times as great. As compared with the Forth bridge, it will be called on to sustain a load more than four times as heavy, and it is expected that the total weight of the whole will be between 74,000 and 75,000 tons. The new designs call for a superstructure 3,232 ft. long between the anchorages, with three short approach and three main spans. The main channel span has a length of 1,818 ft. and the suspended span one of 586 ft. In the erection one of two methods may be employed. The cantilever trusses are designed to permit of a cantilever erection of the suspended span, but it is also possible that the latter may be erected independently, floated to position and then raised to place. One of the principal changes made in the design is that the top and bottom chords of the cantilevers are straight. The depth of these over the piers is about 236 ft., while that of the suspended span is about 110 ft. Another change is to make a greater width between trusses, by which a greater stability will be secured, and this has involved the reconstruction of the piers, which must, of necessity, be longer than before. The calculations have been based on the results of tests to destruction of models of the chords and of nickel steel eyebars which have shown a uniformity of failure and behavior under stress, establishing the correctness of the estimates that have been made for the new work.

THE BIG RAILWAYS AND THE LITTLE RAILWAYS.

THE action of the Interstate Commerce Commission in ordering that the operation of the tariffs that the trunk lines have filed, canceling the allowances that they have been paying to the so-called "tap lines," shall be postponed until January 5, 1911, and announcing that the commission will enter on a general investigation of the question of the reasonableness and legality of the step which the roads propose to take, indicates that this subject is going to receive the very thorough consideration that it ought to have before it is finally settled. The fundamental prerequisite to a fair decision as to what roads should be given tap line allowances, it would seem, is a classification of the various lines owned by industrial corporations according to the nature of the services they render. That a little line, having only a very few miles of track and perhaps only one or two engines, which is owned by an industrial concern, and which does nothing but switch the products or the raw materials of this concern within the limits of its works or forests, is not a common carrier, no matter how it may try to hold itself out as such, is self-evident. It is no more a common carrier than would be a team and truck which the industry used to haul its raw materials and products to and from an adjacent railway station.

But, suppose that this little railway, while remaining in the ownership of an industrial corporation, not only offers to serve other individuals and concerns, but actually begins to handle traffic for all who tender it. What does it become then? This, for example, is the case with the Manufacturers' Railway of St. Louis, a letter from whose president, George I. Moore, we print in another column. It was originally organized and is still owned by one of the large brewing companies of St. Louis. At first it did a switching business only for this company. Subsequently, other industries were located on its lines, for which it also did switching. It published tariffs, filed them with the Interstate Commerce Commission, and, in short, did everything that a common carrier does except transport passengers. This is the case also with many of the logging railways in the Southwest. Suppose, further, that while continuing to be owned by an in-

dustrial corporation and to haul its products to junctions with trunk line railways, the road develops; as has the Louisiana & Arkansas, which is owned by the Buchanan lumber interests, into a railway having 255 miles of track, 28 locomotives and 1,251 cars, and doing a general freight and passenger business. What has it become then, and to what extent has it acquired a right to demand that through rates be made with it by the large connecting lines? These queries, we think, indicate the real nature of the question to be settled by the commission. It has got to be determined in the case of each tap line whether, not as a matter of law, but as a matter of fact, it is a common carrier. No doubt no line which is not a common carrier in fact is entitled to make through rates in connection with a common carrier. The queries also indicate how difficult it is going to be for the commission to draw the exact line which will separate the sheep from the goats. The tap line railway proper develops by such insensible gradations into a railway which actually is a common carrier that to say when it has ceased to be the one and begun to be the other will often tax a mind capable of making the finest and aptest distinctions. Yet in every instance this distinction must be drawn if injustice is to be avoided.

While it is of fundamental importance to make an accurate classification of lines owned by industrial concerns, according to whether they are or are not true common carriers, the task of fixing equitable relations between lines which are controlled by industrial corporations and the trunk line railways will not be finished when this is done. Reverting to the case of the Manufacturers' Railway of St. Louis: Formerly the trunk lines absorbed the switching charges that it made; in other words, fixed the same through rates from points on its lines as from points on their own lines in St. Louis and paid it out of the through rate for the switching services it rendered. After the Interstate Commerce Commission made its tap line ruling in the *Star Grain & Lumber Company* case, the trunk lines canceled the rates which they had made in connection with the Manufacturers' Railway, and they now charge their full St. Louis rates from their junctions with it. The consequence is that industrial concerns located on the Manufacturers' Railway alone have to pay switching charges to the Manufacturers' Railway, in addition to the through rates, while concerns located on the tracks of the trunk lines in St. Louis have to pay only the through rates. This obviously puts the shipper who is located only on the Manufacturers' Railway at a disadvantage as compared with one who is located on the tracks of the trunk lines. This is the gravamen of Mr. Moore's complaint.

Exactly the same thing is true of a shipper of lumber in the Southwest who is located on a tap line which he does not own, and from which the trunk line withdraws tap line allowances. A blanket rate of 18 cents is made on lumber from all points west of the Mississippi river and south of Little Rock, Ark., to St. Louis. In other words, the 18-cent rate is "blanketed" from Little Rock to the Gulf of Mexico, a distance of about 400 miles. Now, if any shipper of lumber in this territory is located on a trunk line his rate to St. Louis will continue to be but 18 cents, but if he is located on a tap line his rate will be the trunk line's rate of 18 cents plus whatever the tap line charges him for getting his lumber to the trunk line. The tap line allowances have averaged from 2 to 6 cents. One of the tap lines which carries on a general transportation business is the Tremont & Gulf, which has a mileage of over 100 miles. There are three or four large lumber mills located on it which are not owned by the same interests that control the road. If the trunk lines charged their full 18-cent rate from their junctions with it, and it charged the independent shipper rates equal to the allowances which the trunk lines have given it in the past, the sum of the rates which some of these shippers would have to pay to St. Louis would be as much as 24 cents, although other shippers located much farther from St. Louis, but on the tracks of the trunk lines themselves, would be paying but 18 cents. It is evident, therefore, that the mere cancellation of the tariffs which have been in effect would not put the relation between the trunk

lines and the small railway and shipper located on them on an equitable basis.

On the other hand, the difficulties in the way of securing implicit obedience to the provisions of the Interstate Commerce act prohibiting unjust discriminations, when trunk line railways are allowed to make rate allowances to railways owned by shippers are known to all persons familiar with the history of past railway regulation in this country. All the earnings of the Manufacturers' Railway of St. Louis ultimately find their way into the treasury of the brewing company that controls it. It is perfectly evident that if no restrictions were put on the amount that the trunk lines could pay to it for the switching services it renders, they might, through it, pay to the brewing company enormous rebates, not only in the form of excessive allowances for the services which the Manufacturers' Railway renders in delivering the brewing company's effervescent products to the trunk lines, but also in the form of excessive allowances for the services that it renders in switching goods to the trunk lines from other industries located on its tracks. That unfair discrimination has been and is now effected by improper divisions of rates between trunk lines and railways owned by large shippers is only too well known.

The commission, therefore, has before it the task not only of classifying the railways owned by industrial corporations as common carriers or otherwise, but also of determining on what bases it is reasonable and equitable for the trunk lines to divide their through rates with common carriers owned by industrial corporations. It may be said that the only way to prevent the unfair discrimination which is apt to grow out of the ownership of railways by industrial corporations having a large traffic to give to the trunk lines is to prohibit such ownership. But while it may be constitutional to prohibit a railway from engaging in any business but transportation, it pretty certainly would not be constitutional to prohibit an industrial corporation from owning stock in a railway sufficient to control it, unless this prohibition were made in pursuance of some provision in the industrial company's charter. Probably the law could ordinarily no more prohibit a private corporation from owning stock in a railway than it could prohibit a private individual from doing so.

Whatever action the government takes to prevent unfair discrimination in such cases must apply not to the ownership of the railway but directly to its rates. What is a proper division of a through rate when given to a railway owned by an industrial corporation for the transportation of commodities belonging to that industrial corporation is, like the question of whether a line is or is not a common carrier, a question of fact. No doubt the best criterion would be what the trunk line would ordinarily concede to a short line not owned by an industrial corporation for rendering similar services. If this test were applied to all the divisions of through rates which the trunk lines now give to railways controlled by industrial corporations, there is no question but that some of these divisions would be materially reduced. Mr. Moore, in the letter which we print elsewhere, is disposed to bewail the fate of the short railway. He thinks he sees indications of a disposition on the part of the big lines to so maltreat the little lines as to force their owners to sell them at a low price. It may be that the trunk lines have been at times somewhat ruthless in their dealings with short lines which were independently owned, but an investigation of their relations with railways, whether short or long, which are owned by industrial concerns having a large amount of traffic to bestow will show that they often have been and still are exceedingly generous in giving allowances and making divisions. There are some short railways owned by great industrial corporations in this country whose gross and net earnings per mile far exceed those of the greatest trunk line railways. Sometimes a small railway needs protection from a big one; but if the small railway happens to be owned by an industrial corporation with a large amount of traffic to give, the big railway is more apt to need protection from the small one!

THE RAILWAY HEADSHIP OF NEW ENGLAND.

THE withdrawal of President Little from the presidency of the Boston & Maine and the accession of President Mellen cannot be called unexpected. It was looked for at the last annual Boston & Maine meeting and was, presumptively, deferred only for outside reasons relating to legislative conditions in Massachusetts, rather than for reasons inside and corporate. However that may be, the headship of the Boston & Maine now passes to President Mellen officially as well as actually. He may and probably must act through a lieutenant. But the directive energy, the outlining of broad policies, and the responsibilities all vest hereafter in the New Haven corporation and its head. The two large systems, which together reach so near to a railway monopoly in New England, are merged and must ere long be welded. The interests of the one must be fully hereafter the interests of the other, only qualified for some years to come by the large minority interest in Boston & Maine stock. And, if the analogy of other railways is followed, not many years are likely to elapse before that minority interest is extinguished.

The horoscope of the headship of New England railways thus fully confirmed is filled with many signs and portents reaching out in directions far out of proportion to New England geography, though not out of ratio to that region, considered in its broader economic phases. As producer and consumer the six New England states are homogeneous. They import and consume raw material; they export a finished product. Such a homogeneity, in theory at least, implies a unity of economic interest and an interest best served by a unity of transportation interests—in other words, a monopoly—assuming of course that the monopoly is well and wisely conducted. But while New England is a concentrated region, even in that condition monopoly must be ramified and intricate. It has to protect its coast line and, in martial metaphor, own a navy. It must watch out against international attack via Canada. As a huge terminal for a great series of trunk lines westward it has its peculiar problems bearing on rates, demurrage and kindred matters. Six states, each with its legislature and in variant moods and tenses of anti-corporation sentiment, raise their annual or biennial crop of railway law-making; and a certain degree of state jealousy and undue local prejudice is bound to attach itself to corporate control focussed at one extremity of a string of states rather than at the center. No observer of railway events in New England during the last few years can doubt that had the focal point of control and policy been Boston instead of New Haven most of the acute frictions in Massachusetts would have been avoided.

Such a situation outlines clearly one line of future policy well nigh compulsory. While charter restrictions will for years to come maintain the New Haven as a Connecticut corporation, the operating energies must more and more center at Boston. This will, beyond doubt, insure to that city in a time not very remote the terminal facilities that the municipality craves—electrification of the suburban lines, the new subways between the two great stations and kindred improvements. One may also look confidently to higher development at that city of the New Haven system's coastwise traffic. But beyond such advances at Boston, important as they are, the main progress of the system under the new dispensation is likely to be outside of the city. The shorter railway route to the White mountains and northern New England summer resorts runs west of Boston and without break. There is the Canadian Pacific business pushing for exit and entry at New York City. The old Vanderbilt contract still stands athwart the New Haven's plan, not long ago seriously considered, of New York-Montreal quick service—but, in experience, such old restrictive contracts must give way to public necessity. Then there is the New York, Westchester & Boston project, mighty expensive already without return, but big with promise of suburban business. More remotely, there are the new extensions to give the Ontario & Western additional connection with the metropolis. Add the connecting line with the

Pennsylvania Railroad via Hell Gate and one does not find a lack of big railway propositions outside of Boston to be carried through along with the imperative rehabilitation of the Boston & Maine. In the line of side problems there are the handling and development of 1,300 miles of trolley roads and the Grand Trunk's invasion of Rhode Island—perhaps serious, perhaps to be compromised by concessions.

The railway headship of New England, thus rounded up and complete, has some other features of more than passing interest besides its assumed burdens. It has been carried through in stress and storm and after vigorous resistance lasting through several years; and, if the present public temper continues, it may be one of the last, if not the very last, big railway consolidations of the land—almost certainly one of the last in an old and intensive railway region of the country. The forecasts of a few years ago telling so insistently how "manifest destiny" pointed with unerring finger to the railway dominance in New England of either the Pennsylvania Railroad or the New York Central are heard no longer, nor are they, much less their fulfillment, likely to be heard from again.

THE ILLINOIS MANUFACTURERS' ASSOCIATION'S SEARCH FOR FACTS.

LA VERNE W. NOYES, president of the Illinois Manufacturers' Association, in an interview with the Chicago press on September 17, referring to the editorial in the *Railway Age Gazette* of September 16 regarding this association, said that the only purpose of the "line of inquiry" opened up by the association in the rate advance cases is to "get at the facts." The Illinois Manufacturers' Association looking for facts is a sight for gods and men. It never did such a thing before. It is about as apt to look for facts as a burglar with the spoils of his enterprise still on him is to seek for the police. If the association wants the facts regarding improper relations of the railways with big shippers disclosed, why does it go and ask the commission to ascertain them? Why does it not itself make them public? It has more expert knowledge on that subject than any other large organization of shippers in the United States.

For example, it could go back to the days before President Roosevelt began to enforce the Elkins act and tell how large concerns belonging to it showed a tireless persistency and a wonderful ingenuity in extorting rebates from the railways. It could tell, for instance, how the International Harvester Company, which is one of its leading members, organized as separate corporations two homoeopathic railways which were used to switch its products from its plants in Chicago to the trunk lines; and how it demanded and received from the trunk lines, in the form of divisions of the through rates on its products, over \$3,000,000 in rebates through its Illinois Northern road, and over \$500,000 through its Chicago, West Pullman & Southern Railway, within a few years. These figures are from sworn testimony. The Illinois Manufacturers' Association, in the statement it filed with the Interstate Commerce Commission in the rate advance hearings at New York, referred to the alleged fact that grafting to the extent of \$1,500,000 had taken place in connection with the repair of cars for the Illinois Central. The Illinois Central, however, has succeeded in getting some of this money back, and civil suits are pending for the recovery of more of it. Did anyone ever hear of the railways getting back that \$3,500,000 from the International Harvester Company or any part of it? If the International Harvester Company is so sincerely repentant over the past course of the railways in giving it rebates, why does it not step up to the "captain's desk" and return the money?

After having told of the way these big concerns got rebates up to five or six years ago, the Illinois Manufacturers' Association might, if it is so anxious to have the facts disclosed, tell how, as soon as rebating went out of fashion, it and its members individually began a campaign to recover the unfair advantages of which they had been deprived. Immediately after the Hepburn act went into effect Charles H. Deere, then presi-

dent of the association, announced in a newspaper interview in Chicago that the association believed that freight rates as a whole in the United States were too high, and proposed to begin a general campaign for their reduction. The impression sought to be conveyed was that the association was going to wage this war in the interest of the public. The extent to which the members of the association had previously extorted rebates indicates how virtuous its intentions really were. The association has been merrily waging its campaign for lower rates ever since. Its individual members have constantly put pressure on the railways to get, by published tariffs, the same favors which they used to get in the form of rebates. Some of them have had grievous increases in loss of and damage to freight, if the increases in the amounts of the claims that they have presented to the railways and insisted on having paid is any criterion. Apparently they go on the theory that a rebate by the name of a loss and damage settlement or by any other name smells equally sweet. Others have sought to get their unjust favors given the odor of legality by formal publication in the tariffs. The usual course is for the ABC manufacturing company to go to the DEF railway and offer to give the railway a larger amount of its traffic in consideration of a cut in the rate or the granting, perhaps, of some outrageous transit privilege. The shipper goes on shopping among the competing railways until at last he finds one that will yield to his solicitations. Then all competing roads are told that they must do likewise or lose all the concern's traffic. After an unjust discrimination once has been granted, each traffic manager fears, of course, to start a movement to withdraw it, because he knows such action will lead to his immediate punishment by the withdrawal of traffic from his road.

The railways recently have been trying, by raising rates that are too low, by withdrawing unfair tap line allowances, and by other means, to abolish some of the unfair discriminations which have been brought about in this way, and their efforts to make the big concerns and the big industrial communities pay as high rates in proportion as the little shippers and the small communities is the chief thing that has animated such organizations as the Illinois Manufacturers' Association to such wonderful activity in defense of the "public's" rights. Their zeal in trying, in the interest of the public, to keep down freight rates, is quite moving, in view of the heavy increases that they have made in the prices that they themselves charge the public.

In further pursuance of its desire to have the truth disclosed, the Illinois Manufacturers' Association might tell how it has issued various bulletins containing all manner of malicious misstatements regarding railway affairs. The public has no doubt wondered why railway officers have usually not answered these statements of the association. The association might enlighten the public on that point by telling it that the reason has been that each railway officer has known that if he sought to reply to them he would be punished by the issuance of a bulletin particularly attacking his road and by a reduction in the traffic that members of the association gave to it.

When the Illinois Manufacturers' Association, if it exercised a real zeal for truth, got through telling the facts in its possession about railway affairs, the public would know a great deal more about some phases of those affairs than it has ever known before. It would have some idea of the extent to which bribery and bullying in the form of the bestowal and withdrawal of traffic have been used by big shippers in getting and holding unfair railway concessions, and of the extent to which these shippers, and especially those belonging to the Illinois Manufacturers' Association, have resorted to all manner of sensational misrepresentation about railway rates in general, in order to divert public attention from the unfair discriminations that they were getting, and would have a clearer appreciation of the fact that the big shippers are no more carrying on their present campaign against the railways in the interest of the public than they formerly carried on their campaigns for secret rebates in the interest of the public. It would awaken to the fact that the

course that numerous big industrial corporations take to get low rates from the railways is exactly similar to the course that they take to get a high protective tariff from the government, and that their action in the one case is dictated by the desire to get from the railways unfairly discriminatory rates just as in the other case it often is dictated by a desire to get from the consumer excessive prices.

THE COMMISSION'S IMPOSSIBLE TASK

THOSE people who believe that railway transportation can safely and fairly be regulated strictly by statute are now looking to the Interstate Commerce Commission to set forth the legal basis for solving the problem, never solved hitherto, or what shall be the just prices for carrying several thousand commodities from and to some hundreds of places, by a large number of carriers of very different capabilities. The eight days' hearings which have been held by the commission in New York City must have afforded the public some decidedly useful information; but the public does not know it, and is simply bewildered. This is inevitable, for the investigation of so large and confusing a subject as the making of freight rates for 200,000 miles of railway—or 10,000 miles, for that matter—must necessarily begin with an avalanche of facts, and time must be allowed for citizens to digest these facts for themselves. The information that has come from these hearings is almost wholly negative. It has shown people what a lot of things about rate making cannot be known, and has given some inkling of how large a proportion of the evils that are known, and that shippers complain of, are incurable, except by the creation of other evils. This is useful progress.

Railway men have always claimed that the business of rate making was so far from being an exact science that the only rational course was to entrust the duty to enterprising, honest, public-spirited and responsible men and then let them disregard science and resort to compromise, whenever, in their judgment, that course should seem to produce the least violation of equity. (The first and the fourth of those adjectives are all-important, and must be taken together; for the public commissioner who lacks the incentive of responsibility to the railway enterprise which must get its living out of the business, is as likely to be a bad rate-maker as is the railway officer who realizes his responsibility to the owners of his road, but who lacks public spirit.) But the shippers' organizations do not accept the railway position, and they have engaged some smart lawyers and seem to be determined to bring out in the public hearings all possible facts which ought to have a bearing on the question, What is a reasonable rate?—and the commission must, of course, let them carry out their purpose. The commissioners know, of course, that these bewildering facts, covering a period of ten to twenty years and relating to a dozen or more roads, will be less useful in forming an opinion on a tariff—a single tariff for all those roads—than would be a single day's study of facts which are not so exact and voluminous, but which are already within their own knowledge. Possibly they may know, also, that these so-called shippers' attorneys are themselves well aware of the impossibility of treating this subject scientifically, and are only trying to kill time and help to delay a decision. That purpose has been charged or suggested in the newspapers. It has also been pointed out that these strenuous arguments against advances in freight rates well be found, in many cases, perhaps most, to be based on the real or supposed interest of a few merchants and manufacturers, although ostensibly they are in the interest of the whole public. The interest of the public is by no means identical with the interest of the shippers. But, whatever may be the weight of these considerations, the facts must be heard and the shippers must "be shown" all that they went to know, no matter how long a time it may take.

The only evidence produced that has been of appreciable value is that concerning the advance in wages and the expected increase in income. The statements of increases in wages are being criticised as inaccurate or misleading, and much time will be

spent, no doubt, in correcting them so that a true comparison can be made with the conditions of two or four years ago; but the comparison, when made, will be no more useful than the rough comparisons which have already been made; while the railways have to contend with the concrete fact that they are paying \$100 a month to men who could not earn \$75 in any other pursuit; and this simply because the labor unions have the friendship of President, Congressmen and newspapers.

The estimates of the probable increase of income if the freight rates are advanced have as little real value as have the details of payrolls, for they are exceedingly rough estimates at best; and, even assuming them to be illuminating, they can fairly be used only as side lights. The main justification for the proposed advances in these long distance freight rates is that they are far too low as compared with those for more moderate distances. This was brought out by some of the traffic officers who testified on the last day of the hearing. It ought to have been brought out earlier. This is only one example of the unsystematic way in which the railways' case was presented. Some of the New York papers have been severe in their condemnation of the railways' blundering, and there certainly has been a great deal of misdirected energy; but the correction of the blunders will not cure the difficulties, for almost the only value of the additional facts which may be brought out by the shippers' cross-questioning will be to give to the "average citizen" the enlightenment on the general subject to which we have referred. The principal basis of the commissioners' decision must be mainly that knowledge of the whole subject which they have acquired by their experience of the past ten years. The facts which they gather in their investigation of the immediate situation will be useful more as markers or guide posts than as data which can be dealt with mathematically. The most useful information that they will gather will not be the cold facts of the statisticians, but the less wordy but more vital facts, mixed with a good deal of opinion, such as have been presented by Vice-President Thayer, of the Pennsylvania Railroad, and as are expected from President Willard, of the Baltimore & Ohio. President Ripley, of the Atchison, gave some of this kind of information at Chicago. To the lawyers it may seem shockingly irregular to give a mere "witness" more credit for his opinions than for his facts; but the whole business of rate-making is full of irregularities! If the regular and formal methods of the lawyers had the power of reforming rate-making it would have been done long ago!

Paying dividends in past years on watered stock was touched on in the New York hearings, and has been brought up at Chicago this week. The commission will have to take cognizance of these statements and claims, for many railway stock issues have concealed from a large part of the general public extensive schemes for exorbitant dividends, which the public is determined to punish as crimes if it can find a way; but practically there can be no benefit in this line of investigation, for the sins of the past cannot be suitably punished by limiting freight rates in the present. "Guilt is personal," and an unfaithful public servant must be dealt with while he is alive and get-at-able. Besides, how can the commission measure the relative magnitude of the offenses of different roads?

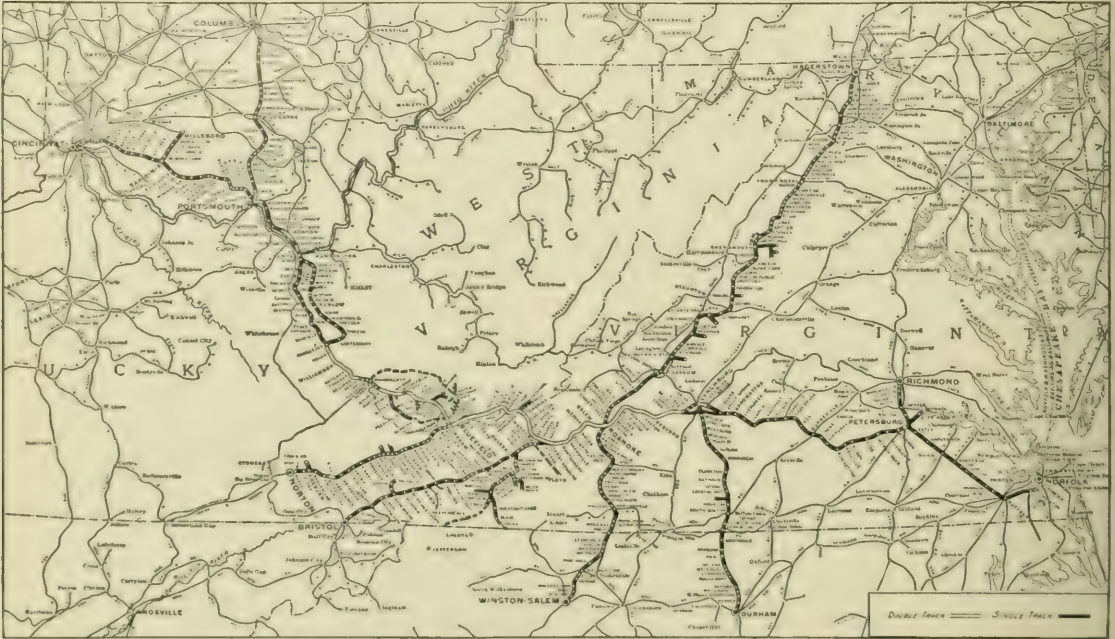
The reasons for raising rates are simple, and are plain to all: (1) the disparity between hundred-mile rates and thousand-mile rates; (2) the unprofitable nature of most of the passenger business (the public insists on low fares and therefore should make up the difference to the railways on freight carriage); (3) the increase in the "cost of living" for which the railways have had little or no recompense. There is a fourth important reason, the need of better stations and the abolition of grade crossings. The adjustment of this problem, for which the public and the railways are almost equally responsible, seems to be very difficult; but it cannot be ignored. The one (and only) possible reason for not raising rates is that the increase in the volume of traffic may sufficiently improve the profits of the railways and thus make unnecessary any increase in rates. Why don't the shippers try to prove that this will be the case?

NORFOLK & WESTERN.

THE opening of the United States Steel Corporation's new plant at Gary, Ind., has had a marked effect on the coal business of the roads operating both east and west of the West Virginia coal fields. This is well illustrated by the report of the Norfolk & Western Railway Co. for the fiscal year ended June 30, 1910. In 1909 the mileage of loaded freight cars north and eastbound totaled 98,750,697 miles, and south and westbound totaled 98,128,217 miles. In 1910 the loaded mileage north and east increased by 12 per cent., totaling 110,918,298 miles, while the loaded mileage south and west increased 21 per cent., totaling 119,055,094. The Norfolk & Western has been preparing for this increase in westbound tonnage, which is probably in good part bituminous coal, by heavy expenditures in the past few years on double tracking its line from the West Virginia

from freight was 25 per cent, as against the increase of 22 per cent. in gross revenue from freight. Revenue freight train mileage totaled 10,401,187 miles last year, an increase of 22 per cent. It will be seen, therefore, that freight train mileage increased just about in proportion to the increase in gross freight revenue, although not quite in proportion to the increase in tons carried one mile, since in 1910 the ton mileage totaled 6,722,495,887 miles, which is an increase of 25 per cent. over 1909. A lower train mileage cost, therefore, accounts for the saving in net earnings, and this lower train mileage cost is presumably quite largely due to improvements in track facilities.

It is also, perhaps, partially due to liberal expenditures that have been made for new rolling stock and motive power. In 1910 the company bought 26 locomotives and 3,919 freight train cars. Maintenance of equipment as a whole cost \$5,951,907 in



Norfolk & Western.

Not all the double-track that is now in operation is shown on this map because the company's new map has not been received yet.

coal fields west. Since June 30, 1907, the company has spent \$15,978,993 on road, of which \$8,542,118 was spent in 1910. Of the amount spent in 1910, \$2,742,364 was spent for additional main tracks. When the second track, now under construction, is finished, about January, 1911, the Norfolk & Western will have a double track from the West Virginia coal fields to Columbus, Ohio, with the exception of about 4½ miles of single track and gauntlet track in West Virginia. Nearly all of the coal that moves west on the Norfolk & Western originates west of Bluefields, and therefore has a grade in its favor almost the entire distance to Columbus. At Columbus this coal traffic in its entirety is turned over to the Pennsylvania Lines.

The economies effected by the improvements that have already been made, and especially by the double track work that has been completed, may be approximately estimated by a comparison of the train mileage statistics and the increase in net earnings from operation. In 1910 the Norfolk & Western earned, gross, \$35,000,000, of which \$30,000,000 was from freight revenue. This is an increase of 19 per cent. in gross revenue and an increase of 22 per cent. in the revenue from freight. Operating expenses amounted last year to \$21,000,000, as against \$17,700,000 the year before. This is an increase of 18 per cent., and the company figures that the increase in cost of handling freight was 19 per cent. The increase in net operating revenue

1910, comparing with \$4,919,435 in 1909. The following table shows the unit costs of maintenance:

	1910.	1909.
*Maintenance of way, per mile.....	\$1,346	\$1,242
*Repairs, per locomotive.....	1,808	1,300
“ “ passenger car.....	684	523
“ “ freight car.....	38	53

*Per mile of first, second, third, etc., track, the cost of two miles of siding and switch tracks being taken as equal to the cost of maintenance of one mile of main track.

†This is for repairs only and does not include renewals, depreciation or superintendence charges.

These expenditures are liberal, and when it is remembered that the company has spent, in addition to these sums for maintenance, \$2,573,598 out of income for improvement and betterment to the property, it is evident that the management is pursuing a policy of keeping its property in shape to meet more exacting requirements of operation, while at the same time it issues new securities only in accordance with conservative principles in regard to the upkeep.

Conducting transportation cost \$10,069,726 last year, comparing with \$8,346,992 the year before. The increases in various accounts going to make up transportation expenses are largely in those accounts in which the cost of wages is the predominating factor, while such items as fuel for road locomotives do not show proportionately increased cost.

Of the total tonnage carried by the Norfolk & Western

amounted in 1910 to 25,117,679 tons, between iron and furnished 12,980,000 tons. This tonnage of coal is greater by 1,000,000 tons than in 1909. The production of steel mills and iron furnaces shows increase almost in proportion to that of bituminous coal, and this would apparently indicate that the Wheel Company's plant at Gary not only benefits the Norfolk & Western by furnishing a market for its coal, but also furnishes a considerable tonnage of iron and steel products which it consumes.

The Norfolk & Western is in a strong position financially to carry out its program of betterment and improvement. During the year the company sold \$1,530,800 common stock held in its treasury since 1897, and it also offered to stockholders at par \$12,980,000 convertible 10 1/2 per cent bonds authorized in 1906. The unissued remainder of these bonds is \$8,431,000. During the year \$2,750,000 notes, due May 1, 1910, were bought before maturity, and the remaining \$9,682,000 notes were paid at maturity. On June 30 the company had on hand \$9,198,500 cash. This is \$6,612,708 more cash than the company had in its treasury at the close of the previous fiscal year. Total working assets amounted in 1910 to \$23,271,115, and working liabilities amounted to \$12,941,094.

The balance sheet is drawn up in accordance with the form prescribed by the Interstate Commerce Commission, but as Henry Fink, chairman of the board, remarked in commenting on the various statements in the report in which the directors say that while they were compelled to follow the orders of the commission it was against their business judgment to do so, "they have taken the liberty, in making a report to the stockholders of the company, of stating things as they are, as well as carrying out accounting theory." Since the reorganized company took over the operation of the road, October 1, 1896, there has been spent for new lines, branches and extensions, side tracks, yards, equipment, grade revision and changes of line, and for advances to subsidiary companies for construction purposes, \$76,861,770, of which sum \$53,519,422 was obtained from the sale of securities, and the remainder, \$23,342,448, was spent from income. The management, believing that the future requirements for additions and improvements will necessitate expenditures considerably in excess of the \$8,431,000 convertible bonds authorized in 1906 and as yet unissued, is to ask the stockholders at the October meeting to authorize an increase in the common stock from \$100,000,000 to \$150,000,000, providing that either stock or convertible bonds may be issued according to conditions in the bond and stock market.

The Norfolk & Western passenger station at Norfolk was completely destroyed by fire October 13, 1909, and since then the company has been using temporary quarters. Negotiations have been carried on with the Virginian Railway and the Norfolk Southern, and a plan has been made for building a joint passenger terminal for these three companies at Norfolk through the organization of a Norfolk Terminal Railway Company, whose securities are to be guaranteed by the three railway companies. The new passenger terminal will be near the site of the former Norfolk & Western station, and a seven-story office building and passenger station will be built at an estimated cost of about \$750,000, to be completed during 1911.

The following table shows the results of operation in 1910 compared with 1909:

	1910.	1909.
Average miles operated	1,945	1,925
Freight revenue	\$30,037,796	\$24,710,591
Passenger revenue	3,924,800	3,642,837
Total operating revenue	85,063,870	29,327,102
Maintenance of way	3,552,045	3,331,888
Maintenance of equipment	3,953,297	4,919,423
Traffic	551,806	487,106
Transportation	10,069,726	8,346,992
Total operating expenses	21,046,760	17,729,756
Taxes	1,118,065	1,008,800
Net operating income	12,899,155	10,588,546
Gross corporate income	14,044,392	11,569,658
Net corporate income	9,943,193	6,665,435
Additions and betterments	3,573,598	1,730,580
*Dividends	4,859,511	3,648,436
Surplus	1,117,056	1,286,417

*Including \$133,000 in 1910, and \$150,000 in 1909, payment on account of deficiency of sinking fund and interest on Norfolk & Western-Poconahontas joint bonds.

WHEELING & LAKE ERIE.

"WHEELING & LAKE ERIE" is the name of the main line and branches of the Wheeling & Lake Erie, shown as 2,521,340 tons. It will be interesting to note that the traffic density, as represented by the number of tons moved one mile per mile of road, in 1910 on the main line between Harris and Pittsburgh Junction averaged 5,196,340 tons, and between Brewster and Pittsburgh Junction the average was 5,617,699 tons. For the month of July, 1910, the traffic density between Brewster and Pittsburgh Junction was at the rate of 6,368,232 tons one mile per mile of road per annum, and the indications are that August will somewhat exceed this figure, which is probably the greatest traffic density of any single track railway in operation." Receiver Worthington makes this statement in commenting on the showing made by the Wheeling & Lake Erie for the fiscal year ended June 30, 1910, and it gives much information in regard to the general characteristics of the Wheeling. The road runs from Toledo, the lake terminus of the Wabash, to Pittsburgh Junction, where it connects with the Wabash-Pittsburgh Terminal, which gives the Gould roads their entrance into Pittsburgh. As is pointed out in the statement quoted, the road is single track.

The property was put into the hands of the receiver in June, 1907, on account of claims due the National Car Wheel Company totaling something over \$8,000,000. At the time of the receivership proceedings the company had a joint agreement with the Wabash to make up any deficiency on Wabash-Pittsburgh Terminal interest payment by the appropriation of 25 per cent. of the earnings from traffic exchanged with the Terminal company. With the permission of the court, the receiver abrogated this agreement, and shortly afterwards the Wabash also refused to recognize the agreement. At first it was proposed to reorganize the Wheeling & Lake Erie and the Wabash-Pittsburgh Terminal as one property, but in May, 1910, the committee who had charge of the reorganization, issued a statement in which they said that because of legal difficulties they found it unsatisfactory to try to link the two companies together in a reorganization plan, and they had decided to confine their efforts to a reorganization of the Wheeling & Lake Erie as a separate property.

The road is a good earner. In 1910, with an operated main line mileage of 522 miles, the property earned gross \$6,950,000, or at the rate of \$13,315 per mile. This gross revenue last year compares with \$5,600,000 earned the year before. Operating expenses amounted last year to \$4,800,000 and to \$4,200,000 the year before. There is shown, therefore, an increase of 23 per cent. in gross earnings, with an increase of but 14 per cent. in operating expenses.

At the time that the receiver took charge of the property he apparently found it in bad shape. He had, however, this advantage, that the territory through which the road operates has so great traffic possibilities that it was largely a question of providing facilities to handle this traffic to make possible a material increase in gross earnings. The receiver has issued \$4,002,340 receiver's certificates, of the proceeds of which \$3,661,000 has been, or is to be, spent for rehabilitation of the property and \$341,350 has been spent for payment of interest on bonds and for property taxes. An analysis of the receiver's balance sheet of 1910 shows that in addition to the payments from the proceeds of receiver's certificates, there has been \$184,171 spent from income for additions and betterments to the road, and \$512,967 spent from income for additions and betterments to equipment. The sum shown as spent from the proceeds of receiver's certificates includes something over \$200,000 spent in 1909 for what would under ordinary circumstances be charged to maintenance of way.

Details of operating expenses show that in 1910 maintenance of way cost \$770,000, as against \$620,000 in 1909; maintenance of equipment cost \$1,400,000, as against almost the same amount in 1909, while transportation expenses cost \$2,400,000 in 1910 and \$1,900,000 in 1909. This is a disproportionately heavy in-

crease in transportation expenses as compared with maintenance expenses. This increase in transportation expenses is largely due to increase in wages. For instance, station employees receive 20 per cent. more; yard conductors and brakemen, 24 per cent. more; yard enginemen, 27 per cent. more; road enginemen, 22 per cent. more; road trainmen, 25 per cent. more. This does not mean that the wages of individuals were increased by these per cents, but that the total sums paid in wages to the classes of employees increased this much.

The unit costs of maintenance are given in the following table:

	1910.	1909.
*Maintenance of way, per mile	\$1,114	\$1,255
†Repairs, per locomotive	2,771	3,176
" " passenger car	681	835
" " freight car	44	61

*Per mile of first, second, third, etc., track, the cost of two miles of siding and switch tracks being taken as equal to the cost of maintenance of one mile of main track.

†This is for repairs only and does not include renewals, depreciation or superintendence charges.

NOTE.—The maintenance of way in 1909 includes the sums spent from the proceeds of sale of receiver's certificates.

Mr. Worthington figures that if the Wheeling & Lake Erie had had proper facilities for repairing its locomotives, 14 locomotives which were repaired at outside shops at a cost of \$95,452, or an average of \$6,818 per locomotive, could have been repaired by the company itself at an average of \$3,537, effecting a total saving of \$45,934. The main shop building of the Brewster shops has been finished during the year, and the shops are now in operation and are taking care of all locomotives.

Passenger revenue on the Wheeling & Lake Erie is of comparatively slight importance, the total passenger earnings in 1910 being but \$570,000, while total freight revenue amounted to \$5,900,000, which is an increase of 23 per cent. over freight revenue in 1909. The total number of tons of revenue freight carried one mile amounted to 1,100,000,000, an increase of a little less than 24 per cent. over the ton miles of 1909. The average haul per ton was 110 miles in 1910 and 107 miles in 1909. To handle 24 per cent. greater revenue ton mileage, there was required a freight train mileage amounting to 1,800,000 miles, an increase of but 19 per cent. from 1909. The unbalanced traffic was about 40 per cent. of the total in both 1909 and 1910, but the average train load increased from 620 tons in 1909 to 640 tons in 1910. The average revenue per ton mile was 5.4 mills in 1909 and 5.39 mills in 1910.

Since 1907 the Wheeling & Lake Erie has shown a gain in amount of tonnage of manufactures handled larger proportionately than the gain in tonnage of any other class of commodities. In 1907 18.77 per cent. of the total tonnage was manufactures; in 1908 it was 18.45 per cent. of the total; in 1909, 21.49 per cent., and in 1910, 23.87 per cent. Products of mines in 1907 was 70.36 per cent. of the total tonnage, and in 1910, 67.58 per cent. Bituminous coal furnished 4,398,558 tons in 1910.

It will be seen from these traffic statistics and from the large increases in gross revenue within the past few years that the question of operating the road at a profit after the company has been reorganized depends largely on the conservatism which the reorganization committee may find it feasible to exercise in a recapitalization of the property. The annual report contains a balance sheet of the old company as of June 30, 1910, and also a receiver's balance sheet. Taken together, these two statements show that at present the company is capitalized at somewhere in the neighborhood of \$78,000,000, including stock, bonds, equipment obligations and receiver's certificates. If the road were to earn 5 per cent. on this capitalization, it would have to show net operating revenues of about \$1,000,000, while net operating revenues in 1910, the best in the history of the company, only amounted to \$2,200,000. If we disregard entirely the common and preferred stock of the old company, the road at present has outstanding bonds and stocks and receiver's certificates amounting to about \$11,000,000, the interest charges on which at 5 per cent. would be about \$2,000,000. This top-heavy capitalization of the old company was brought

about partly because the reorganization of the Wheeling & Lake Erie Railway, the predecessor company, in 1899 was not, apparently, drastic enough in scaling down capitalization, and partly because the Wheeling's credit was extensively used in the Gould attempt to form an ocean-to-ocean line. It would seem, therefore, that even with the comparatively good showing made by the road last year, it will be necessary, in a reorganization of the finances of the company, either to make heavy reductions in the nominal capitalization, or else to issue a considerable quantity of securities on which holders cannot expect to receive any substantial return for a number of years to come. The following table gives the principal figures of operation in 1909 and 1910:

	1910.	1909.
Average mileage operated	498	532
Freight revenue	\$5,928,370	\$4,804,332
Passenger revenue	698,115	624,895
Total operating revenue	6,626,487	5,429,227
Maintenance of way	766,714	617,957
Maintenance of equipment	1,389,685	1,380,978
Taxes	85,648	74,231
Transportation	2,366,947	1,947,807
Total operating expenses	4,776,954	4,200,718
Taxes	261,504	260,336
Operating income	1,012,878	1,172,591
Gross corporate income	1,945,175	1,146,906
*Net corporate income	537,450	27,432

*After the deduction of such mortgage obligations as the receiver has been ordered to pay by the court, and the deduction of interest on receiver's certificates and principal and interest on equipment obligations that the receiver has assumed.

†Includes mail and express.

CENTRAL OF GEORGIA.

THE new form of balance sheet prescribed by the Interstate Commerce Commission has compelled a statement which shows a considerable increase in the value of property investment of the Central of Georgia during the years 1908, 1909 and 1910. During these years the Central of Georgia has not paid any interest on its third income mortgage bonds, and it did not pay in 1908 or 1909 any interest on the first and second preference income bonds. The contention of the management of the Central of Georgia has been that the agreement with the holders of income bonds provides that net earnings shall be arrived at after the payment from income of such sums as the management thinks it proper to spend on the betterment and upkeep of the property. The rules prescribed by the Interstate Commerce Commission are that all sums spent for additions and betterments, whether charged to income account or to capital account, shall be shown on the balance sheet on the asset side as improvements to property since 1907, and on the liability side as appropriated surplus.

In the fiscal year ended June 30, 1910, the Central of Georgia earned total operating revenue amounting to \$12,100,000, comparing with \$11,200,000 in 1909. Operating expenses amounted to \$8,500,000 last year and \$7,900,000 the year before, leaving, after the payment of taxes, \$3,100,000 operating income in 1910 and \$2,900,000 in 1909. The company's income account is arranged to show no net income in either 1909 or 1910. The balance, which, after the payment of interest and expenditures for renewals and betterments, amounted in 1910 to only a little over \$1,000, and in 1909 to something less than \$3,000, was in each year credited to profit and loss. The income account, however, shows that the company spent \$1,247,678 in 1910 and \$877,567 in 1909 from income for additions and betterments.

The Central of Georgia presents a case in which the accounting theories of the Interstate Commerce Commission squarely meet and oppose the business judgment of the management of a railway. If the sums spent last year and in previous years for additions and betterments are not properly expenses necessary to keep the property in good condition, but are, as the form of the I. C. C. balance sheet presupposes, actually purchase of new property, then the income bondholders, who are at present suing the company to compel payment on their securities, have at least a prima facie case against the management. On the other hand, if these expenditures, while not happening to fit exactly into the square holes arbitrarily called operating ex-

penses by the I. C. C., are nevertheless expenditures that good business judgment says should be made on the property in order to conserve its earning power, then the case of the income bond holders appears without merit.

The Central of Georgia is the Atlantic seaboard connection of the Harriman lines. It has a line to Birmingham, Ala., where it makes physical connection with the Birmingham extension of the Illinois Central. Local business, however, is probably of considerably more importance to the Central of Georgia than is its through traffic exchanged with the Illinois Central. The map of the Central of Georgia shows a typical Southern railway; a network connecting points comparatively close together, important commercial cities—Savannah, Macon, Atlanta, Chattanooga, Birmingham and Montgomery—and with a large mileage of branch lines spreading out from these main lines. Thus the traffic is not concentrated on one main line and moved east and west or north and south, as the case may be, but is gathered by the feeders, moves to a distributing center, from where it is sent out to nearby local points.

Of the total freight tonnage, which amounted in 1910 to 1,973,801 tons, 20.71 per cent. was furnished by products of agriculture, 1.28 per cent. by products of animals, 22.61 per cent. by products of mines, 17.81 per cent. by products of forests and 47.56 per cent. by products of manufactures and miscellaneous articles.

The Central of Georgia is essentially a farmers and planters' railway. Besides the 1,031,540 tons of products of agriculture carried in 1910, 691,151 tons of fertilizer were carried and classified as manufactures and miscellaneous. If we add the tonnage of fertilizer to the tonnage of products of agriculture, it will be seen that nearly 35 per cent. of the total tonnage last year consisted of either products of the farm or raw material used in raising these products.

The ton miles of revenue freight last year totaled 744,546,658, an increase of 8 per cent. over the ton miles of 1909. The average revenue per ton per mile last year was 1.069 cents and 1.079 cents the year before. This high ton mile rate shows the small proportion of low grade tonnage carried by the road. The comparatively light average train load, which was 255 tons in 1910 and 257 tons in 1909, also reflects the character of the tonnage, and is also a result of large proportion of branch mileage.

Operating expenses as a whole amounted to \$8,500,000 last year, an increase of 7.80 per cent. over operating expenses in 1909. This increase was about equally divided in total amount between maintenance of way and transportation expenses. Maintenance of way cost \$1,900,000 in 1910, 21.85 per cent. more than in 1909, and transportation expenses cost \$3,700,000, or 7.36 per cent. more than in 1909.

The following table shows the principal figures for operation in 1910 and 1909, rearranged to conform to our usual method of stating results of operation:

	1910.	1909.
Average mileage operated.....	1,916	1,916
Freight revenue.....	\$7,961,474	\$7,430,497
*Passenger revenue.....	3,025,847	2,744,115
Total operating revenue.....	12,038,756	11,155,182
Maintenance of way.....	1,882,225	1,544,714
Maintenance of equipment.....	2,036,096	2,119,689
Traffic.....	377,013	321,621
Transportation.....	3,684,769	3,432,075
Total operating expenses.....	8,474,910	7,862,036
Taxes.....	540,619	487,827
Operating income.....	3,106,998	2,806,867
Gross corporate income.....	8,539,989	3,587,523
Net corporate income.....	1,319,389	1,053,265
Renewals, betterments and reserve.....	1,318,123	837,101
Surplus.....	1,216	216,164

*Not including mail, express, etc.

NEW BOOKS.

Proceedings of the International Railway Fuel Association. 192 pages; 6 in. x 9 in. Price, morocco 75 cents, paper, 35 cents. Published annually by D. B. Sebastian, Secretary, La Salle Street Station, Chicago.

The proceedings of the second annual convention of the International Railway Fuel Association, held at Chicago, May 23-26, 1910, have been issued by the secretary. The volume contains the stenographic report of the meetings, papers delivered and the discussions. The constitution and by-laws and a list of members of the association are also given.

Letters to the Editor.

THE CASE FOR THE SMALLER RAILWAYS.

St. Louis, Sept. 12, 1910

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Great concentration of power has of late years placed many of the transportation facilities within the control of a few interests, but the overflow of lesser undertakings cannot be altogether absorbed and assimilated. It is unfortunate that there seems to be a tendency on the part of some of the greater interests to antagonize and retard these lesser arteries of commerce, and for the moment it would seem that antagonism exists which might possibly result in some serious antagonistic alinement of interests that should work in complete harmony.

The question of a national organization of lesser lines, including all transportation properties that are not under the blanket protection of the American Railway Association, need not be taken as a movement that would antagonize anything that is right in the older and more powerful organization. The lesser lines, through their organization, could centralize their efforts to let the people know what they were doing and what they were trying to accomplish. They might, through publicity and fairness, convince all interested parties that they had some rights as small investors of capital—rights that should be protected under our constitution because they are rights.

The people of the United States will eventually be able to discriminate between the true and the fictitious transportation companies. Length of track alone will not furnish a proper solution. The service rendered is the unit of just comparison. The development made and services rendered are the objects of transportation life. I cannot believe that the master minds devoted to the solution of these problems will fail to hit on some plan that will enable all interests to work together for the common good.

It does seem advisable that the lesser lines form an association under proper classification, and that through their association and within their chartered rights they should endeavor to protect their operations and to help solve the great problems that are facing us in our immense commercial activities.

It would be unwise and revolutionary to set one great interest against another, to inflame the passions of the people against the larger corporations and to excite undue sympathy for the under dog. The people will not be interested in the affairs of corporations unless they see that by exercising an intelligent interest they can secure for themselves a certain benefit.

The population of our country has formed itself into two separate associations for political purposes, but there should be only one association when it comes to the question of industrial peace, harmony and progress.

The organization of the American Railway Association, which for many years has been under the very able management of W. F. Allen as its secretary, has accomplished great and lasting good, not only for the transportation companies subscribing to its constitution and by-laws, but to the general public as well. It has enabled roads to join together in harmonious action, and has afforded its members a protection that has given them a sense of security and has made them feel as though they could develop their properties with a reasonable assurance that the development would be protected; it furnishes a great central working power influencing in many ways the efficiency of our railway systems. For its good qualities it is to be commended, but there seems to be a great overflow which the American Railway Association does not care to admit to its membership.

Many of these small roads have very materially developed different sections of the country, which the larger lines, through their amicable associations, have refrained from developing for fear of creating strife among themselves. Many of these lesser lines are anxious to further develop the territory through which they operate. To do this they must employ large capital to secure labor and materials, and they are looking to the people of the United States for a just protection for their invested

money, because they invest this money for the people's benefit. Many of these lesser lines are trying, in their humble way, to help solve some of the problems that vex our large industrial interests in the cities, are trying to construct avenues of trade, to penetrate the forests for lumber, the mountains for mineral and coal, the great undeveloped prairies for grain, and to create communities that will add to the ranks of the consumer. Their operations may seem ridiculously small when viewed in connection with the vast undertakings of the more powerful lines, but, be that as it may, they could assist in the development of this country—its wealth and its citizenship—through a national organization created and supported by their many small interests.

They, too, would have a centralizing force, through which, at a minimum expense, a maximum effect could be obtained; they could plan for their future extensions, they could secure proper working arrangements with other lines, they could harmonize discrepancies in rates, they could open new avenues of trade and protect the producing and trade centers served by them.

GEORGE F. MOORE,
President, Manufacturers' Railway of St. Louis.

CONTROL OF THE TESTING DEPARTMENT.

New York, Sept. 12, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In his paper on the testing department, presented at the September meeting of the New York Railroad Club, S. B. Hinckley argued very strongly that it should be removed from the jurisdiction of the mechanical and placed under that of the purchasing department, because, when matters are as they are at present the outside supply house has no protection against favoritism, and because "if the testing department is directly or indirectly under the mechanical department head, or under the chief engineer, it is quite certain that materials, patent devices or mechanical specialties, not appealing to the chiefs of these departments will be found of no value and that reports which in any way reflect on the efficiency or economies of the mechanical or engineering department might be safely consigned to the dusty archives." This is certainly an ingenious if not an ingenious argument. The one great complaint that the mechanical department has always had against the purchasing department is that it is governed too much by price and favoritism in the purchase of supplies and not enough by merit. That it is apt to look more closely into discount than strict adherence to specifications, and that if it were not for these specifications drawn up by the mechanical department and its insistence that the goods delivered shall be in accordance therewith, discount would be the cock of the walk and the quality of supplies would be consigned to the demnition bowwows. This, to be sure, is a sweeping assertion that may need great qualifications in specific instances, but the state of affairs is quite natural and unavoidable. It is beyond reason to expect a purchasing agent to be familiar with the physical qualities of what he buys. He cannot be expected to appreciate the value, from an endurance standpoint, of the variation in the limit of elasticity of two steels. Why should he? He never uses them and does not even know where they are applied.

The intimation, too, is that the mechanical department is not so apt to be fair as the purchasing. Why? If there are any two departments on a railway that are known by their fruits it is the mechanical and the engineering. If they buy or permit to be bought any materials that do not give a safe and satisfactory service, they hear from it at once, and if they specify materials that raise the cost of operation in the slightest, they are asked to explain. Surely the purchasing department cannot be expected to take the broad view of ultimate economy that has been driven home to the users by years of varying experiences. And why this insinuation that the mechanical department is not to be trusted? Are the skirts of the purchasing department so perfectly free from suspicion and conviction of favoritism and graft that implicit trust is to be put upon it? As a matter of fact the supplyman who is willing to bribe goes to the bribeable man, regardless of the department he represents, provided

only that he has a voice in the purchase of supplies. If we could have a confession from men who are widely suspected of doing business in this way, we should probably be astounded at the scope of their operations, and should find all sorts and conditions of men to be included therein.

But this is aside from the question, the jurisdiction of the testing department. It may well be made an independent organization, and it may be urged that it should not be subordinated to any other; but however it may be conducted, this much is certain, that the results of its investigations should be immediately accessible to the users of the materials that it examines, and its operations should, to an extent, be guided by them, because there are such a multiplicity of conditions under which all railway material is used that it is only the man in the field who can say as to exactly what he wants. So if the liability to the influence of favoritism in the making of purchases is the only argument that can be advanced for the transference of the testing department from the mechanical to the purchasing, it had best be left where it is.

ENGINEER.

DROP FLANGE TEST.

Pittsburgh, Pa., Sept. 18, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I wish to call the attention of your readers to the remarkable results brought out by The Lobdell Car Wheel Co.'s drop flange test. A hammer is arranged on the same principle as the M. C. B. drop test, to fall directly on the *inside* of the car wheel flange, instead of on the hub of the car wheel, as provided for in the M. C. B. test. The hammer weighs 21 lbs. and falls 12 ft., giving a sledgehammer blow to the inside of the flange. It will be seen that this approximates as nearly as possible the shock the flange receives when it strikes a crossing, or is "whipped" at the end of a train against a curve. The M. C. B. test develops any strain that remains in the car wheel after it leaves the annealing pit, and, in addition, shows the grain of the mixture used in making the wheel, and also the depth of the chill, but it does not show strength of the flange to resist shock.

In making heavy cast-iron guns for the Government years ago, it was thought desirable to run the tensile strength of the metal up to from 30,000 to 33,000 lbs. per square inch, the cold blast charcoal pig iron of which the guns were made only giving from 20,000 to 22,000 lbs. tensile strength in the pig. This was accomplished by remelting the pig iron in an air furnace once, and sometimes twice, before it was put in the casting. The remelting ran up the tensile strength about 5,000 lbs. each time. It was found, however, that while the tensile strength was increased, the brittleness was also increased, so that the iron of highest tensile strength was least able to resist the shock of a hammer or the force of the powder in the charge.

Now this is just the difficulty with the present chilled iron mixtures for car wheels. The old wheels when remelted undoubtedly gain in tensile strength, if they are of good quality, but at the same time become brittle and weak under the shock the wheels receive in service, and this is especially true of the flange, the weakest part of the wheel.

The Lobdell drop flange test has shown by repeated experiments that nickel increases the tensile strength of the car wheel mixture, and instead of increasing the brittleness makes the mixture tougher, and the flange is better able to resist the shock to which it is subjected. A wheel that was nickelized, cast from an open hearth surface, stood 36 blows of this hammer test, while a standard chilled wheel broke under 5 blows.

This is really a remarkable discovery and contrary to all the experience of founders in the last fifty years. It opens a new field for investigation, as it is in no sense confined to car wheels, but can be taken advantage of wherever it is desirable to use a strong, tough cast iron, free from brittleness. It is a striking fact that this peculiarity of combining tensile strength and toughness, which is the essential difference between cast and wrought iron or steel, is only true of nickelized castings, and places them in the first rank of cast-iron mixtures.

ROBERT C. TOTTEN

THE TESTING DEPARTMENT.*

BY H. S. HINCKLEY.

Engineer at Tests, New York, New Haven & Hartford.

The testing department is the result of natural development in the modern organization of any well managed railway. The existence of such a department in itself demonstrates that money is saved by supporting it, and when we consider that the greater part of the economy is indirect and invisible, so far as actual accounting will show it is the more commendable to the shrewd manager that the management in appropriating thousands of dollars each year for its support. Only recently has a testing department been considered of any special value to the large corporations who heretofore have considered such a department one of expense only and one not necessary to secure the greatest possible economy of operation. To-day we rarely find a live railway corporation without its testing department.

Primarily the testing department works hand in hand with the department of purchases. The basis of all the work of an analytical and testing laboratory is the preparation and execution of the specifications for the material under investigation. In this class of work it is of the utmost importance for the purchaser or consumer to bear in mind that nothing should be embodied in the specifications for any material that will tend to increase the cost of that material to an amount over and above a price at which a satisfactory grade can be purchased in the open market and taken from the reserve stocks of the large manufacturers of that material. In other words, while the specification should be made sufficiently rigid to protect the purchaser from substitution of inferior or adulterated material, it should not go to the other extreme and place such restrictions on the method of manufacture that the manufacturer cannot produce the goods without upsetting the ordinary routine of his daily operations, and adopt, or be forced to adopt, methods entirely foreign to his common practice.

There are many manufacturers and contractors by whom the word "specification" is uttered with a feeling of irony—the word leaves a bad taste in their mouths; they consider specifications unnecessary, discriminating, and very frequently unfair. The engineering profession alone is responsible for this feeling, for the reason that so many specifications have been prepared without proper regard for the interests of the manufacturer or contractor and involve only the interests of the purchaser.

The work of the department is as closely related to commercial life as the traffic department or the purchasing department. The men of the testing department become familiar with the qualities and value of raw materials as well as with the manufacture of almost every conceivable product of our mills and factories. It is the desire of the testing department that it be considered as a bureau of consulting engineers and chemists and not a department whose main object is to find fault and offer destructive criticism. Our whole object is to build up—to formulate and have executed specifications that are satisfactory to both the manufacturer and the railway. Without specifications the only protection at hand for the railway is careful inspection and accurate records of the service of material bought on a guarantee basis.

We will admit that many classes of material are bought more economically on a guarantee basis than on specification, but of what use is the guarantee if it is everybody's business (which means nobody's business) to see that the guarantee is fulfilled? Among the supplies that may be more economically purchased on a guarantee basis are rubber goods, paints and possibly bearing metals. In the manufacture of these materials there are perhaps secret tricks of the trade which give to a particular brand its own particularly valuable characteristic, and a chemist may never be able to reveal just what treatment is given outside of mixing together various quantities of the separate ingredients which he is able to discover. The layman is not in a position to dictate to a manufacturer as to how he shall make his product; he may advise him what service he will expect from it, but he

is compelled to leave it to the manufacturer to produce the article.

As may be expected of a department just coming to its own—a department considered by short sighted and pennywise management as an unnecessary expense—the size and importance of the testing department on the railways of this country are small compared to what they should be. On a great many roads the men or men in charge of testing materials and equipment are employees of the mechanical department and report either directly or indirectly to the motive power official. This is a great mistake—it is just as absurd as it would be to have the auditor of accounts report to the cashier. The testing department should be independent of all mechanical or engineering departments, for the chief economical results are secured only by giving freedom to the department of tests in its work of checking the quality, handling and use of the materials purchased.

What the testing department should do is to show up the defective material, not only at the factory and mill, but after the material has reached its destination and has been applied to the equipment, road-bed or structures. From a disinterested point of view the testing department should follow up the service of material and apparatus applied to the locomotives and cars, or bridges and buildings, should be free to state plainly wherein one device or another was not economical, although possibly that device might be in the opinion of the motive power man, or the chief engineer, the best for the purpose. The necessary independent and unbiased investigations and reports are impossible from a subordinate to his superior when the subordinate knows that his reports may be embarrassing to the man to whom he reports. If the testing department is directly or indirectly under the mechanical department head or under the chief engineer, it is quite certain that materials, patent devices or mechanical specialties not appealing to the chiefs of these departments will be found of no value to that company, and that reports which in any way reflect on the efficiency or economies of the mechanical department or the engineering department might be safely consigned to the dusty archives and copies not forwarded to the man in charge of purchases.

The need of laboratory and service tests was naturally first felt by the mechanical department, and this class of work was handed over to men acquainted with technical investigations. These men were in many cases college graduates who had chosen railway work for their occupation. Some were special apprentices, others perhaps draftsmen or bright, young machinists' apprentices. They spent a portion of their time doing this test work and finally the whole time of one man was required to handle the work. This man was usually a chemist, for the mechanical test work could be handled by the force of the mechanical engineer or chief draftsman. On many roads to-day, and many of them large systems, this condition still prevails, and anyone taking the time to superficially look over the quality of material received by these roads will be impressed with the necessity for a quick development of the testing work and the proper organization of a testing department.

Even a single employee would produce good results if he was allowed to report to the proper official, but usually, if not always, where the test work is handled by one or a few men, they are subordinate to the mechanical officer and their efficiency practically eliminated thereby. The motive power and engineering departments are the departments using or having jurisdiction over most of the material and supplies purchased by the railway. Why should either of these departments have charge of examining and testing this material? Wherein is there any protection for the supply house which is on the outside, wherein is there any protection for the railway against favoritism, and how can the official in charge of purchases know the true relative merits of the various materials on which he has secured prices? As said before, the testing department should be independent of all operating and engineering departments. The man at the head of the department, the engineer of tests or whatever title he may have, should report to the highest official having any jurisdiction over the purchases. Only in this way and by such organization is the full benefit of a testing department secured.

While, as stated, the testing department should be directly re-

* Abstract of a paper presented at the September meeting of the New York Railroad Club.

sponsible to the highest official having jurisdiction over purchases, it should be the right and privilege of the heads of all departments of the road to request investigations, analyses or tests of any proposition, material or device in which they may be interested or may consider worthy of attention. Reports on these matters should be sent to the department head submitting the proposition and a copy of the report sent to the official to whom the head of the testing department is directly responsible.

The greatest single item of expense for a railway outside of payrolls and equipment is the coal bill. One of the greatest economies that can be instituted is to give practically full jurisdiction of the fuel supply to the testing department. By careful systematic checking of the coal shipments from the mines to its consumption at the firebox door—by correct sampling, analyses and tests, very material economies can be obtained. All of this work can well be handled by the testing department, and it is safe to say the visible saving from this one branch of the work will cover the cost of the maintenance of the testing department many times over.

Frequent statements are made that proper inspection and tests of bridge material cannot be handled economically by the testing department of a railway. These same people will say that it is better to employ the outside bureaus and pay a certain price per ton for the mill and shop inspection. This all depends on the size and importance of the testing department under consideration. It is easily possible to handle this work satisfactorily and economically if the railway can keep men busy in the territory where the bridge material is being fabricated. The same men can cover an area of one or two hundred miles radius and handle the inspection of other classes of material purchased within that area. These men should be resident inspectors in the city where the greater part of their work is located, and they should be reimbursed for all expenses incurred outside of their home city. In rare cases the outside bureaus should be used—this will occur when the tonnage to be inspected is too small to warrant the expenditure of salary and traveling expenses of the railway inspector. In handling the inspection of bridge material in this way the road secures more loyal and interested inspection than can be possible when the outside bureaus are given a blanket contract to handle the entire inspection of the bridge material. Naturally each road must decide on this matter as best suits its conditions and organization.

The inspection of new equipment—locomotives, cars, both passenger and freight, at the builder's shops, is another line of work that may very profitably be left to the testing department. This method of handling the work is not common, but where it has been tried, it has proven quite satisfactory. Owing to the fact that this work may at one time be rushed and at another dropped altogether, it is of no advantage to have men retained on the payroll of the testing department to handle this work alone. Practical men taken direct from the shops are best fitted for the work as they are acquainted with the standard practice of the company. On this account men should be selected from the shop forces and temporarily turned over to the testing department so far as reports are concerned. It is not necessary to remove them from the payroll of the mechanical department. This arrangement is quite necessary on account of the close connection of the material inspection with the use of the material in the construction of the equipment. Furthermore, the highest official in charge of the purchase is kept in close touch with the character of work and materials furnished by the builder.

Where a railway produces on its line of road a substantial percentage of its tie supply the testing department, which naturally handles the inspection of the ties and timber, can very handily have charge of the collection and distribution of the ties. The specifications for cross ties should be so drawn that it is made clear to the tie producer, that by the actual inspection of the tie the purchase of the accepted tie is completed by the railway. This is quite necessary to protect the road from dissatisfied tie producer who otherwise might say they would not accept the inspection of the road and haul away the ties which the company had accepted, and this would mean a loss of the inspectors' time as well as that of the men used in handling the ties.

So closely is the inspection and purchase of ties related that it becomes naturally the work of the testing department to handle entirely the cross tie supply. The inspectors are advised daily to whom the ties should be consigned and in the office of the engineer of tests are the complete records of purchase, inspection, shipment and disposition of all the cross ties as well as native timber. The cross tie and timber division of the work is further closely related to the test work in the case of treated ties or timber. Where the road is not equipped with its own treating plant the inspection of the process of treatment and analysis of the creosote oil used is naturally handled by the laboratory force.

The time is coming, and the day is not far off, when the eastern roads will find it advisable to treat a portion, if not all the ties used each year. There is money made in treating ties and timber, and a large portion of this money may be reclaimed by the road that is progressive enough to have installed either under its own management or that of a reliable creosoting company one or more creosoting plants on its own line of road. These plants should be located either in the center of the tie producing districts on its own line, or at some seaport to which ties can be shipped at reasonable rates. The supervision of such plants in case they are owned by the railway or the inspection of the work at these plants in case they are operated by outside companies should be handled by the testing department.

An additional advantage and an advantage resulting in substantial savings to the company maintaining its testing department is the prevention of legal suits against the company. The very valuable records and reports contained in the files of the laboratory are of permanent value in case of damage suits, traceable to material or equipment failures. Suits have been withdrawn entirely as a result of unanswerable evidence and proof incorporated in the reports of the laboratory assistants who have been detailed to investigate the claims made by the complainant's attorney. A representative case of this sort arose when an oyster grower made complaint that the waste water from a roundhouse being contaminated with oil was killing his young oysters in an oyster bed located near the roundhouse. Under the direction of the chief chemist a small oyster bed was planted in the vicinity of the seat of trouble, and enough evidence secured to eliminate all of the liability on the part of the railway company to the oyster grower.

In addition to the tests and analyses of material, the inspection of equipment and investigations on special subjects pertaining to all branches of railway work, the testing department is in a position to handle the manufacture of numerous supplies on which a great saving may be shown. Among such supplies may be named dry fire extinguishers, charges for liquid fire extinguishers, boiler compound, hectographs, electrolyte, polishes, inks, paints and disinfectants. The question of policy places certain limitations on the manufacture of material by the railway. In many cases economy might result should the company manufacture an article which is made by factories on the line of road, but in such cases it is invariably better policy and better business judgment to patronize the home company rather than compete with it.

Discussion.—Among those who took part in the discussion were: H. S. Hayward, superintendent motive power of the New Jersey division of the Pennsylvania; Robert Job, of Montreal Can.; Dr. P. H. Dudley, consulting engineer, New York Central & Hudson River; H. J. Force, chemist, Delaware, Lackawanna & Western; Geo. Post, Standard Coupler Company; C. E. Chambers, superintendent motive power, Central of New Jersey, and Eugene Chamberlain, chairman freight car repair pool New York Central lines. These gentlemen all demonstrated the value and importance of the testing department, but several of them took exception to Mr. Hinkley's suggestions concerning the relation of that department to the motive power and engineering departments; judging from the applause the greater portion of the large number of members present seemed to agree with them heartily. Unfortunately, Mr. Hinkley was unable to be present to reply to these arguments. The uselessness of having specifications and not having a test department to check the material was also emphasized.

HEAVY PACIFIC TYPE LOCOMOTIVE FOR THE VANDALIA.

Passenger service requirements have increased to such an extent on the Vandalia during the past few years that it has been found necessary to provide a heavier class of power for some of the trains. Until recently the standard passenger locomotive has been of the Atlantic type, having a total weight of 185,000 lbs., weight on drivers 107,500 lbs., cylinder, 21 x 26 in., and a maximum tractive effort 24,650 lbs. In December, 1909, four heavy Pacific type locomotives were ordered from the American Locomotive Company. Prior to the advent of these engines the Vandalia was one of the few important roads in the

country on which the Pacific type locomotive had not been adopted for at least the most difficult passenger service. In fact, because of the favorable service conditions, both freight and passenger traffic have hitherto been handled altogether by the lighter classes of motive power. The mogul type of locomotive is at present the standard class of freight power, the equipment including the heaviest examples of this type so far constructed. The last mogul engines built for the Vandalia by the American Locomotive Company had a total weight of 187,000 lbs., 159,300 lbs. on driving wheels, 21 x 28 in. cylinders, and a maximum tractive effort of 33,300 lbs.

The Pacific type locomotives here illustrated have been in service for two months on the St. Louis division. Although designed for fourteen car trains, it has not had occasion thus far

to make some minor changes in the front end arrangement, which was the Vandalia standard. After that they steamed freely and no trouble was experienced. "Schedule Time" and "Running Time" in the above table includes in each case all stops. Trains 21 and 14 between Indianapolis and Terre Haute make three and two regular stops, respectively. Between Terre Haute and St. Louis train No. 7 makes four regular stops, and train No. 20, three.

An examination of the coal consumption indicates that the engine was not pushed to the limits of its capacity on any of the runs. It will be noticed that the highest rate of coal consumption per square foot of grate area per hour is only 74.5 lbs. The total amount of coal used per trip, in view of the tonnage and speed maintained, is also creditable.



Pacific Type Locomotive for Heavy Passenger Service on the Vandalia.

country on which the Pacific type locomotive had not been adopted for at least the most difficult passenger service. In fact, because of the favorable service conditions, both freight and passenger traffic have hitherto been handled altogether by the lighter classes of motive power. The mogul type of locomotive is at present the standard class of freight power, the equipment including the heaviest examples of this type so far constructed. The last mogul engines built for the Vandalia by the American Locomotive Company had a total weight of 187,000 lbs., 159,300 lbs. on driving wheels, 21 x 28 in. cylinders, and a maximum tractive effort of 33,300 lbs.

The Pacific type locomotives here illustrated have been in service for two months on the St. Louis division. Although designed for fourteen car trains, it has not had occasion thus far

to make some minor changes in the front end arrangement, which was the Vandalia standard. After that they steamed freely and no trouble was experienced. "Schedule Time" and "Running Time" in the above table includes in each case all stops. Trains 21 and 14 between Indianapolis and Terre Haute make three and two regular stops, respectively. Between Terre Haute and St. Louis train No. 7 makes four regular stops, and train No. 20, three.

An examination of the coal consumption indicates that the engine was not pushed to the limits of its capacity on any of the runs. It will be noticed that the highest rate of coal consumption per square foot of grate area per hour is only 74.5 lbs. The total amount of coal used per trip, in view of the tonnage and speed maintained, is also creditable.

RECORD OF EIGHT TYPICAL RUNS OF VANDALIA PACIFIC TYPE LOCOMOTIVE.

RECORD OF RAILWAY TRAFFIC BETWEEN INDIANAPOLIS AND TERRE HAUTE														
Eng. No.	Train	Date.	Run.	Dist. mi.	No. of cars.	(Tons)	Sched. time incl. stops, h. m.	Run. time incl. stops, h. m.	Total water used, gals.	Approx.		Lbs. of coal per sq. ft. grate area.	Highest speed, m.p.h.	Exhaust tip, diam. in.
						Tot. wgt. incl. eng.				Total coal used, lbs.	Coal used pr. hr. lbs.			
1	21	7-12-10	Indianapolis to Terre Haute*	73	10	800	1 42	1 40	5,700	7,000	4,200	74.5	60	6 1/4
1	14	7-13-10	Terre Haute to Indianapolis†	73	10	825	1 50	1 50	5,700	7,000	3,818	67.5	60	6 1/4
1	21	8-3-10	Indianapolis to Terre Haute†	73	12	825	1 42	1 46	6,000	7,000	3,965	70.2	65	6 1/4
1	14	8-4-10	Terre Haute to Indianapolis‡	73	11	875	1 50	1 48	5,700	5,200	2,885	51.0	60	6 1/4
1	21	8-4-10	Indianapolis to Terre Haute‡	73	8	715	1 42	1 34	5,100	6,000	3,830	67.8	65	6 1/4
1	7	8-12-10	Terre Haute to St. Louis*	175	7	650	4 30	4 13	12,400	13,000	3,985	54.6	75	6 1/4
1	20	8-13-10	St. Louis to Terre Haute*	175	8	740	4 11	4 11	13,200	15,500	8,720	65.9	75	6 1/4
1	21	8-18-10	Indianapolis to Terre Haute**	73	9	710	1 42	1 36	5,800	6,000	3,750	66.3	75	6 1/4

* Engine steamed poorly, Indiana coal, heavy rain. † Indiana coal. ‡ Indiana coal, heavy fog and mist. § Indiana coal, fine and dirty, heavy quartering winds. ¶ Hard running train, Illinois coal. ** Indiana coal, rain and quartering winds.

to handle more than twelve cars to a train. It is reported that the service with trains of that size has been satisfactory and gives every indication that these engines will have no difficulty in meeting the more severe requirements during the winter. Particular mention is made of the easy riding qualities of the engines at high speeds. They are operating under easy grade and curvature conditions. There are, to be sure, a number of portions of the road of from three to ten miles long where the curves are numerous; but the sharpest curve on the division is only 3 deg. 48 min., and there are long, straightaway stretches with very few curves.

As to the grades, the total rise between St. Louis and Summit, a distance of 217.8 miles, is only 474 ft. This rise, which is

Although the design incorporates no new or unusual features, it is an excellent example of a straightforward, well proportioned design, carefully worked out to meet the particular conditions of service for which the engines were intended. As far as the cylinders and running gear are concerned, it is practically identical with the engines of the same type built by the American Locomotive Company for the Pennsylvania Railroad, the use of which was prohibited on the Vandalia road by the limit of 55,000 lbs. for the allowable load per driving axle. The principal differences between the two designs are a reduction of the boiler pressure from 210 to 200 lbs., and the use of a smaller boiler and firebox, the boiler of the Vandalia locomotives being 76 1/2 in. in diameter outside at the first ring, while this dimension

on the Pennsylvania locomotives is 79% in. The boilers of both locomotives are of the straight top type, and the tubes in each case are 21 ft. long. The firebox of the Vandalia engines is 108½ in. long by 75¼ in. wide, having a grate area of 56½ sq. ft., while that of the Pennsylvania locomotive is 111 in. long by 80¼ in. wide, and has a grate area of 61.8 sq. ft. These modifications in design result in a reduction of 14,000 lbs. in the total weight of the locomotive, the Vandalia engines having a total weight of 256,000 lbs. as compared with a total weight of 270,000 lbs. for the Pennsylvania locomotives.

Although the reduction of 10 lbs. in the boiler pressure reduces the maximum tractive effort of the engines 2,600 lbs. as compared with that of the locomotive built for the Pennsylvania, at 60 miles per hour, there is only 600 lbs. difference between the tractive efforts of the two locomotives calculated in accordance with the builders' formula.

The general dimensions and principal ratios are as follows:

General Data.	
Type	4-6-2
Fuel	Bituminous coal
Tractive effort	31,800 lbs.
Weight in working order.....	236,000 "
" on drivers	162,000 "
" of engine and tender in working order.....	401,900 "
Wheel base, driving.....	13 ft. 10 in.
" total	35 " 2½ "
" engine and tender.....	66 " 5 "
Ratios.	
Total weight ÷ tractive effort.....	8.05
Weight on drivers ÷ tractive effort.....	5.09
Tractive effort × diam. drivers ÷ heating surface.....	579.63
Total heating surface ÷ grate area.....	77.68
Firebox heating surface ÷ total heat'g surf., per cent..	4.42
Weight on drivers ÷ total heating surface.....	36.91
Total weight ÷ total heating surface.....	58.32
Volume both cylinders, cu. ft.....	13.58
Total heating surface ÷ vol. cylinders.....	323.19
Grate area ÷ vol. cylinders.....	4.16
Cylinders.	
Kind	Simple
Diameter	24 in.
Stroke	26 in.

Valves.	
Kind	Wilson piston
Diameter	14 in.
Travel	6½ "
Steam lap	1¼ "
Lead, forward gear.....	⅞ "
" back gear.....	⅞ "
" mid gear to equalize at 6¼ cut-off.....	¾ "

Wheels.	
Driving, diameter over tire.....	80 in.
" thickness of tire.....	4 "
" journals, main, diam.....	10½ × 14 "
" journals, others, diam.....	10 × 14 "
Engine truck, diameter	36 "
Engine truck, journals	6½ × 12 "
Trailing truck, diameter	55 "
Trailing truck, journals.....	8 × 14 "

Boiler.	
Style	Straight top
Working pressure	200 lbs.
Outside diameter of first ring.....	76½ in.
Firebox, width and length	75¼ × 108½ "
" plates, thickness...C, ¾ in.; T, ½ in.; S & B, ¾ "	
" water space.....	4½ "
Tubes, number and diameter	303, 2 "
Tubes, length	21 ft
Heating surface, tubes and firebox	4,195 sq. ft.
" firebox	194 "
" total	4,389 "
Grate area	56½ "
Center boiler, above rail.....	117 in.
Top smokestack, above rail	14 ft 10½ in

Tender.	
Tank, style	Water bottom
Frame	10 and 12 in. channel
Wheels, diameter	36 in.
Journals	5½ × 10 in.
Water capacity	7,500 gal.
Coal capacity	1½ tons

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.

The twenty-eighth annual convention of the Roadmasters' and Maintenance of Way Association, held in Chicago at the Great Northern Hotel, September 13 to 16, inclusive, was noticed briefly in the *Railway Age Gazette* last week (page 523). That the association has entered on a new lease of life seemed to be believed by all those present. The manufacturers, who had exhibits in rooms near the convention room, organized to have a comprehensive exhibit at future annual conventions. Arrangements for the next convention, which will be held in St. Louis during October, 1911, are to be made by the officers of the association and the manufacturers' representatives jointly. The constitution and by-laws were amended so that a president of the Roadmasters' association will not be eligible for a second term until after the expiration of one year after his term of office. A committee was appointed by the president, on motion of A. M. Clough, supervisor of track, N. Y. C. & H. R., to make such changes in the constitution and by-laws as may be necessary to provide for the organization of a ladies' auxiliary, this committee to report at the next annual meeting. All reports presented were well discussed and the discussions were so animated and took so much of the time of the convention that some subjects scheduled for discussion were omitted.

CARE OF TRACK MATERIAL AND TOOLS.

The committee on Proper Care of Track Material and Tools recommended piling untreated ties, when received in rude form direct from the forest, on high ground with good drainage. Ties should be placed in cross tiers with 6 or 7 ties in each tier, with plenty of intervening space for thorough drying out and seasoning, the top tier to have the ties closely spaced and with one end higher than the other for drainage, this last tier serving as a roof for the pile. Where 200 or 300 ties per mile are required for renewal each pile should contain not more than 60 to 70 ties. If the tie renewals will not exceed 75 to 100 per mile the ties should be piled in V-shaped piles, each containing about 15 ties. Sod should be removed from around all piles for a distance of at least 6 ft., and no grass should be permitted to grow within 50 feet of any pile. It was recommended that all ties be placed in piles with the heart side down, and that they be placed in the same manner in the road bed. In dealing with treated ties the committee recommended that ties treated with zinc chloride be piled in the same manner as untreated ties to secure proper drying. Creosoted ties should be piled as closely together as possible to reduce evaporation as much as possible. To guard against fire and to assist in preventing the evaporation of the creosote earth should be placed over the piles of ties.

Switch ties, head blocks, crossing plank and fence lumber should be ordered only as required, should be piled separately according to size and used as soon as practicable after being received. In piling new and usable rail great care should be exercised in unloading and handling to prevent bending or breaking. A foundation of old timbers is recommended and the rails should be piled in tiers, the greatest span not exceeding 8 ft.

Switch material, rail and joint fastenings, spikes, bolts, nuts, etc., should be available for instant use and stored in sheds built to protect them from inclement weather. Everything should be assorted by kind and size, and all bolts well oiled to prevent rusting, while crossings, frogs and switches kept in stock for any length of time should receive a coat of cheap dark paint. Each section should have a sufficient amount of emergency rail to take care of rail breaks, the amount necessary being one emergency rail for each two miles of track in good healthy condition. One pair of emergency angle bars should be placed with each rail. The proper place for storage is at or near mile posts.

TOOLS.

The report on tools and scrap was as follows:

"Each section should be supplied with a sufficient number of first class tools, the very best that money can buy, as there is no greater waste of money than for a section crew to work with in-

terior tools. The number of each kind would be governed by the number of men in each crew. In addition, each section should have a few pieces of extra tools for use in case of emergency, but no more than absolutely necessary to properly care for the work. A monthly inventory of all tools on a section should be rendered by the section foreman. In general, for ordinary repair work, the foreman should make his requisition on the roadmaster for tools and material once every thirty days, and the foreman should be furnished with a small surplus of tools and material blank on which he should enter all tools on his section which will not be used for the next thirty days; this blank should be pinned to his monthly requisition and forwarded to the roadmaster at the close of each month. This will enable the roadmaster to transfer tools and material from one section to another and thereby avoid making requisition for supplies which he has on his division available for use. A great deal of money can be saved each month by having a system of this kind or a similar one. All tools as soon as they become dull or out of repair, so they will not do first class work, should immediately be sent to the shops for repairs and they should be put in good shape and returned to the section from whence they came, without delay.

"The hand car with a section crew should be the very best that can be obtained. It should be light as possible, but sufficiently strong to carry six or eight men and the necessary outfit of tools. There is no greater waste of money than to have a section crew running a poor hand car; thirty minutes in the morning and thirty minutes in the evening, day after day, on account of a poor hand car, runs into money very fast. The foreman should give his hand car very close attention; he should inspect it every morning before going to work and see that all bolts are securely fastened and that all bearings are clean and well oiled.

"Motor cars have been in use on some entire divisions in the past year or so, and with good results and saving some money. We recommend this feature of the car question be given consideration.

"Track tools of all kinds should never be used for any other purpose than that for which they are made. Track shovels should never be permitted to be used in holding up the end of ties while tamping, in pulling ties out of track or putting in new ones; nor should they be used for spacing ties in the track. Claw bars should not be forced under the head of a spike by hammering the heel with a spike maul; sufficient wood from around the head of the spike should be cut with an adz or sharp pick to permit the claw bar to grasp the spike head. Nor should they be used between the tie and rail to lift the rail. This will break the claw in a great many cases, especially in cold weather.

"Lanterns should always be kept in first class condition, ready for an emergency call, except that they should not be left standing or hanging up in the tool house with the cup filled with oil, as this will spoil the oil and rot the wick.

"When through with the day's work, all tools should be conveyed to the tool house and locked up for the night. Track gages and track levels should be tested frequently to ascertain if they are true and correct.

"All scrap should be picked up daily and placed with the other scrap where it can be secured by the scrap crew when required. We would recommend the scrap be picked up once a month. The scrap bin for small scrap should be provided at each section tool house with two compartments, each 4 ft. by 4 ft.; one compartment for small track scrap and the other for car scrap. We would recommend scrap bin at every section tool house and all scrap should be picked up daily and placed in it at the close of the day's work. Whenever any old worn-out wooden cattle guards or other worn-out equipment of this kind is burned as rubbish, all the bolts, nuts, washers or other metal should be picked out and conveyed to the scrap bin. When old tie piles are burned, the ashes should be raked over, and the old spike stubs, which in many cases are quite plentiful, should be picked up by the track men and saved as scrap. Its value will more than pay for gathering it up and it will educate the men in the matter of economy.

Whenever any usable parts of cars or locomotives are picked up, such as draw bars, car doors, brake-shoes or any other usable material, they should be at once sent to the shops where they can again be made use of.

"In conclusion, we wish to say that the results obtained in the care of track material and tools, depend, in a larger measure than in any other part of their work, upon the interest taken in the matter by the foreman and his men, and we believe the surest way to bring about the results desired is to create a sense of the value of property among the men by continually impressing upon them the fact that all tools and material should be cared for just as conscientiously as if they were their own personal property. This impression will go fully as far as the most careful instructions."

The members present voted unanimously that hand cars be replaced by motor cars as rapidly as possible on all lines.

CATTLE GUARDS AND TIE PLATES.

The report on cattle guards was a recommendation of a certain kind of cattle guard, and the report on tie plates was a recommendation of a certain form of tie plate, both articles being widely advertised and well known. J. A. Kerwin (Mo. Pac.), offered as an amendment to the committee report on the plates that it be received as information, and that the association adopt as an addition to the report the report of the Committee on Tie Plates presented in 1906, which report contained practically complete specifications for tie plates and avoided reference by name to any in the market. The report on cattle guards was also received as information without the report being adopted as the opinion of the association.

SWITCH TARGETS.

The report of the committee on Standard Switch Targets caused a discussion that lasted half a day. The discussion wandered from switch targets to interlocking switches and block signaling, threatening at times to encroach far into the field of signalmen. A motion was finally passed declaring it to be the opinion of the association that a single target switch stand should be standard on all single and multiple track lines. The vote was very close, being 25 in favor and 24 against, the members voting against being in favor of a clear indication. The committee report showed four out of six members of the committee as recommending that no target be shown for main line movements.

RAIL JOINTS.

The report of the committee on Insulated Joints and Rail Fastenings was received as information and filed. No recommendations were made by the committee, the intention being to mention all the joints in common use and draw out discussion. The discussion brought out nothing new; every roadmaster present was experiencing trouble with every form of joint and rail fastening used on his line and each man present hoped to get light from the other members.

INDIVIDUAL PAPERS.

The paper on "Treated Tie Timbers," by J. L. Single, was received as information, it being merely a resume of practice in tie treating, and the convention adopted a motion favoring creosoted tie treatment. The last paper on the program was by W. M. Camp, who discussed the proper methods committees should pursue in conducting investigations and reporting to conventions of practical men assembled for the purpose of solving problems and assisting others engaged in similar work as themselves.

The officers for the next year, and the place and date of the next meeting were given in the *Railway Age Gazette* of September 16 page 523.

The following is a list of the exhibits:

American Hoist & Derrick Co., St. Paul, Minn.—Photographs showing the "American" railway ditcher in operation. Represented by Edward Coleman.

American Steel & Wire Co., Chicago.—American Woven Wire right of way fencing, and steel fence posts. Represented by J. M. Holloway and L. P. Shanahan.

American Valve & Meter Co., Cincinnati, Ohio.—Models of Economy switch stands, showing different mechanisms. Represented by J. T. McGarry and F. C. Anderson.

Bur Company, Chicago.—Motor cars; new style Paulus drills; jacks; helical gears for hand cars. Represented by C. H. Delano, George B. Shaw, and A. R. Dyer.

Duntley Manufacturing Co., Chicago.—Duntley-Rockford No. 4 railway

section car and Duntley-Rockford No. 2 railway inspection car. Represented by G. A. Graber, H. F. Worden, R. F. Finan and E. J. Cornish.
 Economy Separable Switch Point Co., Louisville, Ky.—Samples of the Palmer separable points. Represented by W. W. Mitchell.
 Thomas A. Galt, Sterling, Ill.—Steel railway tie. Represented by Egbert W. Auman.
 Indianapolis Switch & Frog Co., Springfield, Ohio.—Model of R.N.R. solid manganese frogs. Represented by J. C. Jameson.
 Luitwieler Pumping Engine Co., Rochester, N. Y.—Model of Non-pulsating pump. Represented by E. D. Williams.
 Pennsylvania Steel Co., Steelton, Pa.—Photographs and pamphlets showing the Never-Turn split bolt as applied to Manard anvil face frogs. Represented by R. E. Belknap.
 Positive Rail Anchor Co., Louisville, Ky.—Samples of Positive rail anchors attached to rails. Represented by W. W. Mitchell.
 Pruyn Reinforced Concrete Railroad Tie Co., Chicago.—Reinforced concrete tie. Represented by William H. Pruyn, Jr., and D. J. Avery.
 Rail Joint Co., New York City.—Standard Continuous, Weber and Wolhaupter rail joints and insulated rail joints. Represented by F. A. Poor, W. E. Clark, F. M. Hill, Charles Jenkinson and H. C. Holloway.
 Railway Specialty & Supply Co., Chicago.—Samples of P&M anti-rail-creepers. Represented by P. W. Moore, F. A. Preston, A. R. Sutter and George C. Johnson.
 Ramapo Iron Works, Hillburn, N. Y.—Ramapo patent safety switch stand No. 17. Ramapo solid rolled switch slide and malleable brace. Represented by Arthur Gemunder, W. B. Lee and W. C. Kidd.
 Vaughn Rail Support Co., St. Louis, Mo.—Samples of rail supports. Represented by T. E. Vaughn.
 Verona Tool Works, Pittsburgh, Pa.—Prentice Diamond stone ballast tamping bar. Represented by William Heckler.

NEW YORK CITY FREIGHT TERMINALS.

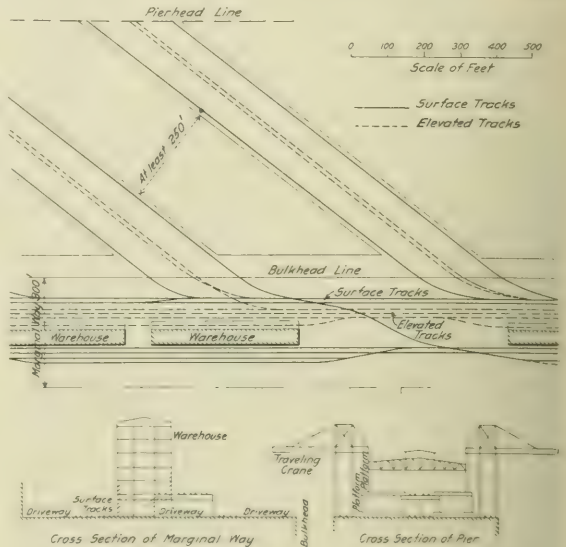
We are indebted to Gustave E. Lemmerich for the following comments on the terminal scheme proposed by Dock Commissioner Tomkins, briefly outlined in the *Railway Age Gazette* of July 22, p. 166:

The main features of the report are very good and on broad lines and it is more in regard to details that I would like to make some suggestions.

The report deals mostly with improvements on West street. The lower part of the North river on West street as far up as Canal street is to a great extent occupied by different railways, the space being used principally for delivering and receiving freight in small lots by trucks. North of Twenty-third street the railways have team yards, small freight houses, yards, etc. The business is mostly in car lots on team tracks and amounts to about one-third in cars, compared with the lower district. The increases in business have been considerably less than in the lower section. The close proximity of the railway facilities below Canal street to the wholesale and jobbing district accounts for this; the railways have built up at their respective locations a business, according to their facilities and their business abilities. The congestion of truck traffic in West street, below Canal street, is largely due to the fact that the railways have not enough lineal feet of frontage for receiving and delivering freight.

In any improvement plan these features should be given fair consideration. It might prove a pretty hard undertaking to take over the railway properties, leases, etc., for a nucleus of a joint freight terminal, but it might be considerably easier to assist the individual railways to enlarge their holdings and improve the same on modern and more economical lines. The city should assist in a rearrangement of certain streets, etc., to make feasible layouts possible.

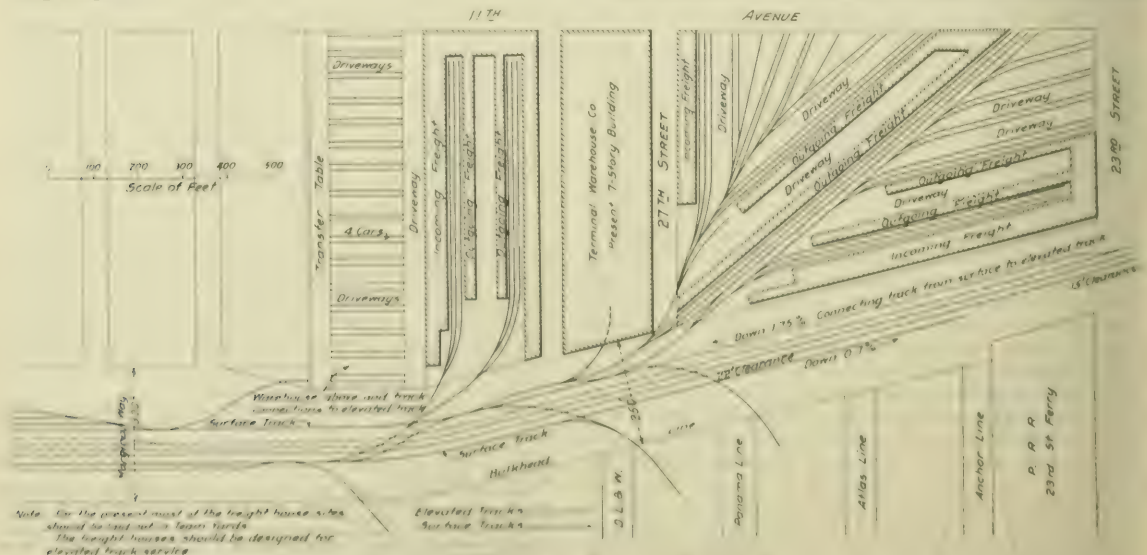
The district from Forty-second to Sixtieth streets is at present



Part of Typical Layout North of Forty-second Street.

ent the most available for modern ocean pier improvements. A modern ocean pier should be at least 150 ft. wide and about 1,000 ft. long, and should have at least 250 ft. of space between piers. To get this length, the piers have to be built on an angle to the bulkhead. The piers should be equipped with modern appliances for handling freight from ship to pier and also for transferring the same lengthwise in the pier. There should be elevators between the stories. They should also have track connections to the surface and elevated tracks.

The proposed elevated railway for freight in West street and



Suggested Layout near Twenty-third Street.

the proposed surface tracks at certain points will facilitate freight movements immensely. The elevated should be connected with the surface tracks at certain points.

By making the marginal way at certain districts 300 ft. wide, instead of 250 ft., terminal buildings could be placed alongside the elevated railway and one track could run inside of the building. The building could be 60 ft. wide at the elevated track level and above 40 ft. wide at the ground level.

The space under the elevated structure could be utilized for a roadway and the surface tracks could be at the other side of the building, making freight and warehouse facilities conveniently located to the piers and only occupying 40 ft. of width. This extra width of the marginal way might be also easier and cheaper to obtain than a solid block.

If the terminal buildings be located in blocks, they should be so arranged as to have a width of about 60 ft., built on similar lines as the new warehouses of the Bush Terminal Company, in South Brooklyn.

It will be a very hard matter to operate the transfer bridges if located in a bunch, as proposed, both as regards car floats and as regards switching of cars. These transfer bridges should be separated, so that several can be operated at the same time.

Several of the terminal buildings, as proposed near Canal street, should be provided for, if possible one for each railway, so that the railways could keep their individuality in freight receiving and delivery. The one terminal building, as proposed, would enormously congest the street traffic in that vicinity. Detail plans for these buildings should be very carefully studied. Of the two accompanying sketches, one indicates a pier and warehouse arrangement and the other shows different freight house and team yard layouts. For the present, most of the freight house site should, however, be laid out in team tracks. The transfer table layout for team yard might prove advisable when the property gets too expensive to waste room for the switches. The pyramid design shown in the cross section of the pier (which design is protected by copyright), gives platform space in front of the openings into the pier shed, so that freight may be dropped there by the crane and left temporarily instead of having to be swung into the shed at once.

This whole West Side improvement is of such vast importance that it demands the best talent of terminal engineers and transportation experts, and it should be treated the same as great architectural designs; that is, it should be open to competition.

DOUBLE TRACK IN NORTH CAROLINA.

An officer of the Southern Railway writes that the double track on that road between Greensboro and Charlotte has been extended farther than was shown in the map printed with our article of September 2, page 393. The work is now completed for the whole distance between the cities named, except for about five miles south of Concord. The terminus of the double track southward from Greensboro is one mile north of Concord; and that of the line north from Charlotte is at Coddle Creek, 16 miles from Charlotte.

In Prussia a passenger was directed to a car where the heating apparatus was frozen up, and during the whole journey didn't get thawed out. He caught cold, and brought suit for his doctor's bills. The court decided that not only had he failed to prove that the illness was due to the lack of heat in the car, but declared that the passenger had no claim to have the car heated at all, and on appeal this decision was affirmed. This is probably a continuation of the legal status which existed not so long ago on European railways, when cars were either not heated at all or so imperfectly that passengers were expected to carry wraps and rugs enough to keep themselves comfortable, as if they were in a stage coach.

TRAIN ACCIDENTS IN AUGUST.

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of August, 1910. This record is intended to include usually only those accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. It is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway for details or for confirmation.

Collisions.

Date.	Road.	Place.	Kind of Accident.	Train.	No. persons reported killed.	Inj'd.
1.	N. Y. C. & H. R.	Oriskany.	re.	P. & Ft.	1	0
7.	N. W. Pacific	Ignacio.	bc.	P. & Ft.	12	24
10.	Union Pacific	Lenape.	re.	Pt. & Ft.	2	1
11.	N. Y. N. H. & H. Maromas		re.	P. & Ft.	1	3
12.	Western Pacific	Oakland.	xc.	Pt. & Ft.	1	1
13.	Western Pacific	Marionville.	re.	P. & Ft.	1	1
14.	Seaboard A. L.	South Raleigh.	re.	P. & Ft.	1	14
15.	Ches. & Ohio	Handley.	xc.	Pt. & Ft.	4	6
16.	Chic. M. & St. P.	Tamalaak.	re.	P. & Ft.	1	5
18.	Nor. & Southern	Raleigh.	bc.	P. & Ft.	2	0
19.	Pennsylvania	Plymouth, Ind.	re.	Pt. & Ft.	1	2
21.	Cent. N.Y.	Northfield Falls.	bc.	Pt. & Ft.	6	3
21.	G. Rapids & Ind.	Northwa.	bc.	P. & Ft.	1	4
22.	Western, Md.	Edgemont.	bc.	Pt. & Ft.	5	3
22.	Texas & Pacific	Aledo.	re.	Pt. & Ft.	1	2
24.	Grand Trunk	Durand, Mich.	re.	P. & P.	10	7
26.	Georgia Nor.	Pecan City.	bc.	Pt. & Ft.	5	4
26.	Missouri Pac.	Blackwater.	bc.	Pt. & Ft.	5	1
28.	St. L., I. M. & S.	Van Buren.	bc.	P. & Ft.	1	2
29.	Balt. & Ohio	Newark.	xc.	Pt. & Ft.	1	2

Derailments.

Date.	Road.	Place.	Cause of derilmt.	Kind of train.	No. persons reported killed.	Inj'd.
5.	D. L. & W.	Anadomuk.	runaway.	Pt.	2	2
5.	Erie	Howells.	slide.	Pt.	3	0
7.	Pennsylvania	Canton, Ohio.	beam.	Pass.	0	0
9.	Dul. & I. R.	Ely.	d. switch.	Pass.	1	0
9.	Rock Island	Decumari.	washout.	Pass.	1	1
12.	Western Pacific	Oakland.	neg.	Pt.	4	14
*13.	Louisville & Nash.	Covington.	unx.	Pt.	1	2
*16.	Mo. Pacific	Horton.	unx.	Pass.	1	35
17.	Southern	Rockton, S.C.	d. track.	Pass.	0	15
22.	St. Louis & S. F.	Memphis.	unx.	Pt.	1	1
23.	C. St. P. M. & O.	Osseo.	unx.	Pass.	0	13
23.	Chic. & Alton	Coal City.	unx.	Pt.	1	2
28.	Rock Island	Little Rock.	unx.	Pass.	1	1
30.	Seaboard A. Line	Exley.	washout.	Pass.	2	..

The butting collision south of Ignacio, Cal., on September 8, in which 12 persons were killed and 24 injured, was between a northbound passenger train and a southbound work train. The engine of the work train pushed the passenger engine to one side and then plunged completely through the baggage car and smoking car of the passenger train. Most of the victims were passengers in the smoking car, all of the killed being passengers. The work train had been switching at Ignacio about two hours. It then received orders for the despatcher to proceed southward, but these were subject to the general rule requiring it to wait there for two northbound passenger trains; but it waited for only one, and the collision resulted. Both the conductor and the engine man of the work train had examined the train register at Ignacio, and both were men of experience. They set their train on the side track to await the arrival of the two northbound passenger trains, both of which were due within twenty-five minutes after the time at which the running orders were delivered to them. Things that they said in conversation with the agent, when they received their orders, indicated that they knew that they should wait at Ignacio for these two regular trains. The conductor claims to have absolutely forgotten that a second passenger train was due. The engineman was seriously injured and at last accounts was lying in the hospital, most of the time unconscious.

In the rear collision at Lenape, Kan., on September 10, two drivers were killed. A live stock train of the Rock Island road ran into the rear of a preceding freight of the Union Pacific, which was at a standstill. Both of these companies use the Union Pacific tracks at this point.

¹ Abbreviations and marks used in Accident List: re, Rear collision—bc, Butting collision—xc, other collisions—b, Broken—d, Defective—unf, Unforeseen obstruction—unx, unexplained derail, Open derailing switch—ms, Misplaced switch—acc, obsr., accidental obstruction—malice, Malicious obstruction of track, etc.—boiler, Explosion of locomotive on road—fre, Cars burned while running—P, or Pass., Passenger train—F, or Ft., Freight train (including empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly destroyed by fire—Dagger, One or more passengers killed.

The collision at Raleigh, N. C., on September 13 occurred at the Union Station at about 1 o'clock in the morning. A passenger train of the Seaboard Air Line, entering the station, struck an excursion train of the Southern Railway, wrecking one of its cars near the rear end.

The butting collision at Northfield Falls, Vt., on the morning of September 21, was between a northbound freight train and a southbound train, consisting of an engine and caboose. Both trains were running at a speed of probably 35 to 40 miles an hour. Both conductors, one engineman, one fireman, one brakeman and one unidentified man (supposed to have been a tramy in a box car) were killed and three trainmen were injured, but not seriously. The collision was due to the failure of the operator at Northfield to deliver a train order, which he had received, to the northbound train. The operator is twenty years of age and had been permanently employed at Northfield since July 14.

In the rear collision of eastbound passenger trains on the Grand Trunk, two miles east of Durand, Mich., on the night of August 24, about 11 o'clock, ten passengers were killed or fatally injured and 5 passengers and 2 trainmen were less severely injured. The wreck took fire and some of the passengers were burned to death. The leading train was No. 14. It had been stopped on account of the brakes sticking and the engineman and fireman of that train, who were under their engine, were badly injured. The following train was No. 4, which leaves Chicago 45 minutes behind No. 14. The rear car of No. 14 was a sleeping car and in this were most of the victims. This car was totally destroyed by fire. It appears from the reports that the flagman of the standing train went back with stop signals, but there is a conflict of testimony as to how far he went and whether he displayed his red light effectively. A coroner's jury found the brakeman (George M. Graham) guilty of gross negligence and the engineman (Charles Spencer) guilty of negligence, though the company had suspended Spencer, as the one chiefly or wholly to blame, and had kept Graham on his regular run. The newspaper reports say that the tail lights were dim or dead when the train left Durand and that Graham was a green man (there had just been a strike of trainmen).

The derailment at Analomink, Pa., on Sept 5 was due to a freight train of 62 cars becoming uncontrollable on a descending grade of 78 feet to the mile. At a sharp curve, the twenty-third car was derailed and, with the thirty-four cars next behind it, was ditched, most of the wreck being piled up in a narrow cut*. These cars took fire, probably from a car loaded with oil cake, and all of them with contents were burnt up. The forward part of the train ran a quarter of a mile farther, when the engine and twenty-two cars were derailed on a tangent, caused by diving wheel tires heating. They fell off, and the wheel centers struck a frog at a siding. The engineman and one brakeman were killed and two other trainmen were injured. The engineman was unable to control the train. The failure of the air was due evidently to improper manipulation. Upon starting down the grade, there was full supply of air, and there was also full steam pressure. The air and all the brake appliances were properly tested at the prescribed place, and as prescribed in the rules, before the train started down the grade. The engineman controlled the train properly for the first nine miles, and without calling for assistance, after which the conductor noticed on the caboose indicator that the train line pressure was diminishing. The train man, and also the fireman, went out on top of the train to set handbrakes, but the speed accelerated so rapidly that they were unable to check it.

From an account in the Washington (N. J.) *Star* we take the following particulars of this accident:

When the manifest freight, No. 52, ran down Pocono mountain last Friday morning so fast that a towerman could distinguish nothing more than a solid streak of cars, one of the operators called up the dispatcher at Scranton and said:

"No. 52 just passed here. She is running away."

"Oh, I guess she's not running away. She's just making good time," answered the dispatcher.

A minute or two later No. 52 was piled up in the worst wreck that the Lackawanna has ever experienced. Not that the loss of life was so severe, but out of the great train of 67 cars, only the six next to the caboose escaped complete demolition. The wreck occurred shortly before 3 o'clock near the Analomink station, about three miles north of Stroudsburg. The train parted in Hinds' cut, an eighth of a mile above the Analomink station, and here the rear end was wrecked, 37 cars piling up level with the 30-foot rock embankment. The engine and 19 cars continued their mad flight a mile and a half farther down the road on a perfectly straight line. At the point of a switch leading to a siding the engine left the track. This crash took place almost directly opposite Sherman Van Vliet's residence.

No pen can picture that terrible flight down the steep grades and around the sharp curves of the Pocono mountains in the darkness of night. The speed attained by the runaway train was remarkable. One operator says that seven miles were covered in four minutes. The swing of the freight cars was so great that trainmen could not make their way across the tops to apply the hand brakes. The hotel keeper at Spragueville, aroused by the whistle of the runaway engine, peered out of a window as the train passed. He says that the car wheels looked like rims of fire, due to the set brakes.

The Pocono mountain grade on this side is 28 miles long. It is thought that the train ran uncontrolled some nine or ten miles. That this distance was covered without accident is remarkable. The wreck occurred on the last curve before the straight track was reached. The prayer of the crew on the runaway train was that the straight track would be reached in safety. Therein seemed to lie their hope. Nearly half the train went around the last curve all right. Then one of the cars left the track and those which followed piled up.

The front part of the train rushed onward with speed unchecked. The wheels of the engine and cars were red hot. Finally, the tires on the engine drivers expanded, loosened up and the broken driving rod hammered the track for a distance of half a mile, some of the wheels remaining on the tracks and others pounding the ties. Spokes from the driving wheels were found in the creek along the route of the runaway and large parts of the broken driving rods were distributed along the embankment. The crippled engine, still traveling at tremendous speed, finally turned turtle and landed in Sherman Van Vliet's dooryard, the following 19 cars piling up in frightful shape immediately behind it.

George Cogizer of Scranton, aged 65 years, who had been an engineer on the Lackawanna road for 32 years, was engineer of the ill-fated train. His fireman was Wm. Boerman of Hoboken.

The fireman suspected that the train was running away and went into the engineer's cab to learn the trouble. Cogizer told him that the air wasn't working and that the train had the best of him. The fireman then went back on the train and, with the other members of the crew, started to set the handbrakes. The momentum of the train was too great and the heavy load got the better of the crew and gathered speed at every foot. Disaster came when the foot of the mountain was reached.

Engineer Cogizer stuck to his post and met death when the engine left the tracks and overturned. The engine turned a somersault, landing wheels uppermost, the tender going above it and lodging further on. The engineer was ground to pieces, portions of his body being gathered up the next day.

Head brakeman, Wm. Ryan, was the other man to lose his life. The exact manner in which he met his death is not known, no trace of his body having been discovered. He was probably cremated in the burning cars at Hinds' cut.

Fireman Boerman was thrown clear of the wreck and landed in a field near the track. Thos. Cannon, the flagman, was thrown from the cars and escaped luckily. Both these men sustained some broken bones and bad scalp wounds, but have since recovered sufficiently to leave the Monroe hospital. Cannon is about 60 years old and this makes the 17th wreck that he has experienced during his long railway career. What part conductor Robert

Roose of Scranton played in the wreck is not known. He was in the caboose and escaped without injury, but he seems to have mysteriously disappeared since the wreck.

The shattered engine, No. 384, still lies upside down in a field alongside of Van Vleet's home. The shattered cars, nothing remaining but twisted iron work and splintered timber, have been moved out of the way of traffic. There is not a car in the lot that bears any resemblance to a freight car.

It was in the cut at Hinds' crossing, however, more than a mile north, where the rear portion of the train was wrecked, that the great disaster occurred. The twentieth car in the train left the track at this point in coming around the sharp curve and plunged with frightful speed into the rock cut. The cars behind naturally piled on top of it and it almost challenges belief to state that the narrow cut, more than 30 feet high, was piled with wrecked cars considerably more than even with the top. Two or three carloads of granite blocks added to the momentum of the train and plunged their full weight into the mass of demolished cars. Behind them came some oil cars and with almost human malevolence these piled upon top of the wreckage and poured their contents upon the fearful heap. The red-hot wheels did the rest. The mass ignited and there was a fearful conflagration.

Flour and feed, saturated with oil, burned like inflammable material; baled hay added heat to the flames, and lumber and other materials contributed their part in making a roaring, seething mass out of the monstrous heap of wrecked cars.

Scranton and Stroudsburg firemen got there shortly after daylight and worked for several hours in fighting the awful 30-foot mass of burning wreckage in the cut, but nothing they could do with water or chemicals was of avail against the action of the oil-soaked mass and the heap was permitted to burn itself out.

How completely it did this may be explained in the statement that not a stick of wood as large as a man's hand was left of the 37 freight cars that were consumed. Nothing remained except the bent and twisted iron work and the carwheels and axles. Some of the carwheels had been subjected to such intense heat that they were melted into a mass. This statement hardly seems creditable, but it is true.

Practically the whole wrecking force of the Lackawanna hurried to the scene immediately after the wreck. The sight which greeted them was such, and the wreck was so extensive, that they didn't know where to begin to clean it up. Both tracks in Hinds' cut were blocked from Friday morning at 3 o'clock until Saturday afternoon at 3 o'clock, 36 hours. One track was opened at this time and No. 3 was the first train to go through. It was not until Monday that both tracks were reopened for travel. All passenger trains traveled over the Lehigh Valley from Scranton to Phillipsburg while the tracks were closed. No freight was moved Friday or Saturday and none was accepted at shipping points.

Of the five accidents to electric cars in the United States, which we find recorded in the newspapers in August, only one is reported as resulting in fatal injury. This was a butting collision at Rager, Ohio, on the 11th. One passenger was killed, and four were injured. On the Gorge railroad at Niagara Falls on the 15th there was a butting collision, in which 10 persons were injured, but it came very near precipitating a carload of passengers into the whirlpool rapids. According to a local paper, "the cars, each with a string of trailers—six in number—were crowded with tourists. The block signal system refused to work, and when the northbound car came from back of the abutment of the cantilever bridge the motorman applied his brakes, but they refused to work and the cars came together with terrific momentum, the northbound car being on a steep grade. The southbound car was turned around at right angles, and with its load of passengers balanced on the embankment, threatening any moment to topple into the rapids, in which case every person in it would have been swept to death. The front vestibules of both cars were reduced to kindling wood while the rear ones were also smashed by the weight of the loaded trailers."

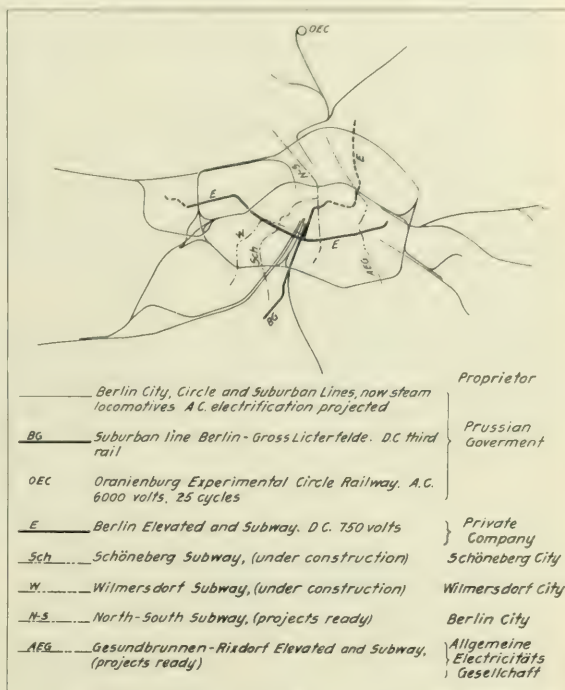
THE ELECTRIC RAILWAYS IN GERMANY.

BY WILLHELM WEICHMANN.

Government Chief Engineer, Royal Prussian Railway.

TRANSLATED INTO ENGLISH BY A. WALTER HERRICK.

While traveling in the United States during the past year and viewing the very interesting electric main line, city and inter-urban railways, I was obliged to confess my astonishment and to admit that Germany has not advanced as much in the electrification of railways as has the United States. This is not by any means due to the fact that Germany has not endeavored to advance in electric railway engineering. The reasons are



Map 1—Berlin City and Suburban Lines.

that the distances between cities are not as great in Germany as in the United States, and the German railway companies have been very cautious in investigating the practical electrifications of their main lines, as well as determining the necessary investment required.

However, electric railway science in Germany during the last ten years has made wonderful progress, and is well worth describing.

The electric railways may be divided into street railways, inter-urban railways and city and suburban railways. A part of the railways that we have in Germany, passing between two or more communities, have the characteristic of the street railway, that is, they do not travel under the signal system, because they are compelled to make so many stops, and a trip between two stops is composed principally of acceleration, coasting and braking.

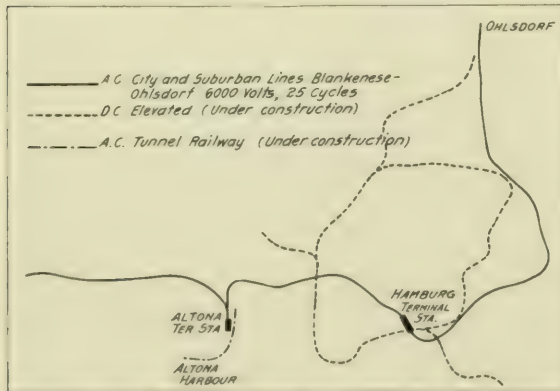
In Table 1 is found the most important data on street railways. Column "A" gives the figures on the various street railways in Germany, and in column "B" will be found those of Greater Berlin and 30 of its suburbs, part of these consisting of underground suburban lines. These figures refer to the year 1908. In the column marked "Items," 18 is composed of the operating expenses, which also include the premiums which are fixed by law for the insurance against sickness, accident and disability of employees. This item also covers the taxes and road maintenance.

In most cases these railways are operated on from 500 to 600 volts, current being transmitted over the usual trolley wire, and collected with the ordinary trolley wheel mounted on trolley pole; also, in some cases, collected on a bow. The fare on these railways is, in general, two and a half cents.

Some of the railways, which may be classed as light inter-urban railways, are used for the light traffic which passes to the more distant points outside of the large cities. While these hold a prominent place among electric railways, they do not terminate with the main lines. They are, of course, operated in the same manner as the street railways. These railways have made wonderful progress in the last 20 years, especially during the last few years, and are eventually taking the place of the steam railways. In the year of 1892 we had 11 interurban railways, and in the year 1908 this number was increased to 253, only 26 of which are electrified. Data of these railways is to be found in Table 1, column "C."

The city and suburban railways, which are elevated roads, traverse the city, passing over the beautiful iron and stone viaducts and subways which are to be found in Germany. They differ from the main interurban lines by their closer schedules, and the cars differ from those of the street railways, in their greater length and speed. The principal cities having suburbs connected by these railways are Berlin, Hamburg and the twin cities Elberfeld-Barmen. Data of these railways will be found in Table 2.

The Berlin elevated and subway railway was the first electrified railway in Germany. The first part was built in the years 1897-1902. These trains follow the routes outlined in Map 1, and start from the central traffic point in Berlin, which is Leipziger Platz, going in three directions. One branch is composed of the subways that run to the business centers of the city, and will be extended to the northern part of the city during



Map 2—Hamburg Electric Railways.

the next few years. The second branch is the elevated road, passing to the thickly populated residence districts, located in the southeastern part of the city. The third branch travels for a short distance on the elevated viaduct and then through the subway to the western part of the city, from which point it extends to Charlottenburg, this being one of the largest and most prominent suburbs of Berlin. This section of the road will also be increased in length very soon. It has its own power house, situated near Leipziger Platz; is supplied by direct current at 750 volts, and has a third rail system; but is so equipped that it can be operated on three-phase current, which is supplied from a sub-station in the western district.

In the near future a new and larger power house will be erected in this district. The number of passengers carried on these railways has increased from 20,000,000 in 1902 to 49,000,000 in the year 1908.

The Berlin-Gross Lichterfelde was formerly a steam road and

was electrified in 1903. It starts from the Leipziger Platz and runs to different southern suburbs. The trains run on a 10 minutes headway and consist of from three to four motor cars, which are coupled to the ordinary steam railway coaches. The owners of this railway purchase their power from nearby power houses at 1.67 cents per kilowatt hour.

The Schoeneberg Subway runs through the city of Berlin with its 2,000,000 inhabitants, through its various subways, and reaches

TABLE 1.—Data of Street Railways and Light Interurban Railways.

Items.	A All street railways.	B Greater Berlin (Berlin and 30 suburbs).	C Light interurban railways.
Population served	62,000,000	3,013,000	62,000,000
Total number of street railways.....	251	S	253
Total number, electric street railways.	204	S	26
Electric Railways:			
Number of motor cars	10,368	1,841	394
" electric locomotives.....	.....	.....	12
" trailers	7,352	1,293	279
" passenger cars	17,720	3,134	672
" freight cars	915	.....	290
" employees	50,000	11,000	2,000
Miles of all routes	2,360	247	270
Number of passenger-car miles.....	353,400,000	71,840,000	.....
" motor-car miles	262,900,000	53,350,000	8,074,000
" locomotive miles .....	.....	.....	53,000
" passengers	2,050,000,000	528,400,000	34,000,000
Invested capital	\$231,700,000	\$44,900,000	\$1,390,000
Revenue from passenger traffic	46,430,000	11,000,000	.....
Total revenue	48,100,000	11,300,000	1,900,000
Total expenses	39,800,000	7,300,000	1,430,000
Net earnings	18,300,000	4,000,000	470,000
Number of persons killed.....	256	28	15
Number dangerously injured	1,000	203	37

*Electric, steam, horses, cars, etc.

30 communities, which together comprise a million people. Among these, to the west and southwest, are the flourishing cities of Charlottenburg, with its 270,000 inhabitants; Schoeneberg, 160,000, and Wilmersdorf, 85,000, with their widely scattered residence districts.

These cities are always striving to protect their independence from Berlin, and are doing their utmost to encourage the comfortable and rapid transit of their citizens to and from the center of Berlin, with a view of securing more residents. On the other hand, the residents of the larger cities are also encouraging the building of subways. The only two now completed are the Schoeneberg and Wilmersdorf subways. The Schoeneberg subway makes connection with the Berlin City & Circle Railway at its southern terminus, and travels under several main streets of Schoeneberg, finally passing over the elevated and subway railways, until it reaches the heart of Berlin. The southern portion is almost completed.

The Wilmersdorf subway runs west, paralleling the Schoeneberg railway, then through the eastern corner of Charlottenburg, and continues not far from the Berlin elevated and subway railway, with which it has a joint terminal.

The city of Charlottenburg is also planning the construction of a subway to Berlin, but these plans have not as yet reached completion. Some weeks ago the province of Weissenau, which is northeast from Berlin, also communicated with the city of Berlin relative to securing a fast train connection.

The city of Berlin is planning to build a subway during this year, to run north and south, under the city. This railway will pass under the main streets of traffic, such as Friedrichstrasse, and will be obliged to accommodate a constant and great amount of travel. A surface railway is impossible in these narrow business streets, and is not allowed in similar streets in the immediate vicinity.

The motor cars of the proposed subway are to be equipped with d.c. motors, which are designed for a terminal voltage of a thousand volts. The power will be supplied by high tension, three-phase system, from the large power plants in the city of Berlin, and will be transmitted to underground adjacent substations and converted to the proper voltage for the motors.

Further fast train connection is being contemplated through the city of Berlin, from the northwest to the southeast and on to the adjacent city of Rixdorf, the construction of which will be part elevated and part subway, and will be d.c. motors. The

equipment will be furnished by the Allgemeine Elektrizitäts-Gesellschaft.

The Berlin City Circle & Subway Railway, shown on Map 1, branch out in all directions. Trains passing to the suburbs are marked in heavy lines.

Various stations of these roads are double track, and will eventually have four tracks, and the trains, for the present, will be driven by steam locomotives. The trains traveling through Berlin from west to east, and also within a short radius from the city, 75 minutes' haulage, and are composed generally of 10 coaches, with a seating capacity of approximately 480. In the past year plans have been made whereby these railways will be electrified. It is assumed that the system will be 10,000 volts, but on account of the high cost of its construction, it has been postponed until its practicability can be definitely ascertained from the experiments which will be conducted between Dessau and Bitterfeld.

The Blankenese-Ohlendorf City & Suburban Railway was the first single-phase railway of the world, and is the property of the Kingdom of Prussia. It was opened in 1907, after the Prussian railway department, during the previous year, had made exhaustive tests with single-phase current. The government is indebted to Mr. Wittfeld, private and chief assistant to the royal

will receive its power from sub-stations, power being generated at the central station at three-phase 6,000 volts. This road will be opened next year.

The cities of Barmen-Elberfeld and Vohwinkel, with a joint population of 300,000 people, are in the eastern part of Germany, where many thriving industries are located. In this section of the country there is a very narrow valley, in places only 1,500 ft. in width, and through the middle of this valley flows the Wupper river, a small tributary of the Rhine. The traffic through this valley is steadily increasing, but because of the very narrow streets an elevated road is impossible. Moreover, the river affords a good highway for traffic.

Along the mountainous shores of this river a railway has been built and where the valley broadens it passes over the streets. One difficulty in the construction of this railway was the many curves necessitated by the windings of the river, and the best method of construction was believed to be found in the suspension of the cars. Another thing to be considered was the comfortable accommodation of the public in these cars. Great study was given to overcoming the centrifugal forces which arose as the car made the various curves.

Operation of this monorail line was begun in 1900, and up to the present time there has not been an accident, blame

TABLE II.—List of City and Suburban Railways.

	Berlin and suburbs.					Hamburg and suburbs.		Elberfeld & Barmen.	
	—Working—	Under construction—			Completed.	Working Blankenese-Ohlendorf City & Suburban Railway.	Under construction. Hamburg Elevated State of Hamburg.	Suspended. Barmen Working. Railway (monorail) Private Company.	
	Berlin elevated Ry. Berlin and subway Private Company.	Suburban Ry. Berlin-Lichterfelde. Kingdom of Prussia.	Schoeneberg subway (1st part). Schoeneberg City.	Wilmersdorf Subway. Wilmersdorf City.	North-South Subway. Berlin City.	Berlin City Circle & Suburban Railways. Kingdom of Prussia.	Blankenese-Ohlendorf City & Suburban Railway. Kingdom of Prussia.		
Length of line constructed, miles.	11.1	5.8	0.0	4.6	4.7	6.0	17.4	8.25	
Miles under construction or projected.	3.2	0.0	2.1	4.6	0.0	2.0	3.4	8.25	
Reverted constructed.	4.9	0.0	0.0	4.7	4.0	1.0	1.2	0.0	
Subway constructed.	6.2	0.0	2.1	0.0	4.7	4.0	1.0	0.0	
No. of stations.	23	6	5	12	11	140	17	33	21
Avg. distance between stations, ft.	2,657	5,970	2,560	2,234	3,182	5,478	2,780	2,181	
No. of motor cars.	114	24	.....	.....	.....	.....	2x84	42	
No. of trailers.	87	.....	.....	.....	.....	.....	.....	8	
Total No. of passenger cars.	201	.....	.....	.....	.....	.....	.....	50	
No. of employees and workmen.	1,400	.....	.....	.....	.....	.....	.....	275	
Kind of current on the cars.	D.C.	D.C.	D.C.	D.C.	D.C.	A.C.	A.C.	D.C.	D.C.
Voltage on the line.	750	750	750	1,000	.....	10,000	6,000	800	500
Kind of transmission current.	3 phase.	Not existg.	3-phase.	3-phase.	.....	Sngl phase.	Sngl phase.	3-phase.	Not existg.
Voltage of the transmission current.	10,000	Not existg.	6,500	6,000	.....	50,000	30,000	6,000	.....
No. of substations.	6,580,000	2,200,000	.....	.....	.....	.....	.....	.....	1,760,000
No. of passenger cars.	18,600,000	.....	.....	.....	.....	202,500,000	34,100,000	11,090,000	.....
Estimated capital.	16,200,000	.....	.....	3,700,000	14,300,000	20,000,000	.....	10,700,000	3,700,000
Total revenue.	\$1,580,000	.....	.....	.....	.....	.....	.....	.....	316,000
Total expenses.	\$795,000	.....	.....	.....	.....	.....	.....	.....	154,000

Prussian railway ministry, who has accomplished wonderful work in connection with the electrification of this road.

The cities of Hamburg, with its 860,000 inhabitants, and Altona, with 175,000 inhabitants, are connected by this road, together with several nearby suburbs. The longest trains consist of eight coaches, two of which are close coupled, or in other words, termed double cars. There are, at the present time, approximately 84 in use, and 25 more will be delivered in the near future.

The trains are equipped with the multiple unit control system. This road possesses its own power house, which contains five turbo-alternators, the total amount of power delivered being 1,250 kw., and two similar turbo-alternators are at present in course of erection. The voltage generated in this power house is 30,000 volts, and is being transmitted to sub-stations and fed to the overhead wires at 6,000 volts, this being a 25 cycle system. Notwithstanding the fact that the atmosphere in the vicinity of Hamburg is very moist, this road has proven to be absolutely safe in operation. The route of this road is shown on Map 2.

The Hamburg elevated railway, which will use d.c. motors, is being constructed by the city of Hamburg. It will run in a loop around the middle of the city, from which three branches will extend. A small distance of the road in the old part of the city will be under the ground, but the greater part will be elevated over the new broader streets. It will be of the third rail system, the third rail carrying 800 volts d.c., and

for which could be laid to method of its construction. The radius of the sharpest curves on the line is 276 ft. The loop and at the ends of the line have curves of 26 ft. radius, over which the trains travel very slowly. The trains are composed of two coaches only. While this suspended railway is, without a doubt, a very interesting piece of engineering, it is not practical for heavy traffic, since the trains can only be composed of two coaches.

The larger part of the main line electric railways are under the direction of the states, since these railways would play a prominent part in the defense of the country in the event of war. Table 3 gives some very interesting data concerning the main lines which are electrified.

The Rhine Shore railway is owned by a private company and was put in operation in the year 1906. This road connects the two cities, Cologne with 460,000 inhabitants, and Bonn, 85,000 inhabitants. It has both local trains and fast expresses, the latter making one stop only between the cities. The trains have electric motor cars, with trailers. The trains making the frequent stops are equipped for 500 volts d.c., and the fast trains with 1,000 volts d.c., which is transmitted by an overhead wire. The voltage is transmitted direct to each motor, which is capable of developing 130 h.p. The motors, which weigh 5,000 lbs., are of the inter-pole type and run without sparking, width of the commutator segments being $\frac{1}{8}$ of an inch.

The power house is situated about midway between the two termini of the road, and consists of two generators of 330 kw.

capacity, the voltage generated being 1,000. This railway differs from the light interurban railways in that it has a signal system and contains bridges over the tracks, and the depots are larger.

A similar railway will be built within the next few years for passenger traffic between Cologne and Düsseldorf, the distance between these two cities being 25 miles, and also between Düsseldorf and Dortmund, 47 miles. This will probably be of the single-phase system.

The Prussian Government has devoted considerable time to the development of this railway, which is of the single-phase system. The road shown on Map 1 was built near Oranienburg for experimental purposes, and various locomotives and motor cars have been tried out here in the past few years. In the year 1907 the government designed an eight-wheel freight locomotive of 1,050 h.p., which has covered in test 600 miles in 20 hours. This test, combined with other numerous tests, has shown the possibilities of the electric locomotive.

The Dessau-Bitterfeld railway is 16 miles in length, and is part of the greater lines Magdeburg-Halle and Halle-Leipzig, total length of these roads being 95 miles. These, also, are owned by the Prussian Government. The road handles both

is situated in the extreme southwestern section of Germany, the southern part of which contains the Black Forest. The road has a 1 per cent. grade, and it is expected that the main part of this line will be electrified. Power will be purchased from a power house located on the Rhine and supplied at 6,800 volts, three-phase, 50-cycles, and will be converted at various sub-stations into single-phase, 15-cycles, and will then be stepped up to 10,000 volts to the overhead trolley, and probably will be stepped up to 30,000 volts at some sub-stations. Locomotives which are being built will be of the high mounted motor and side rod type.

The Royal Bavarian Railways, which run through the western part of Bavaria, are also to be electrified, and extensive hydro-electric plants are contemplated for the generation of power.

Power supplied to the electric railways thus far treated has been through the third rail and overhead wires. On certain stretches of various roads having very light traffic motor cars generating their own power are of great importance. This has been demonstrated in both the United States and Germany. It has been found impracticable to design steam motor cars, but

TABLE III.—List of the Electric Main Lines.

Items.	In operation		Under construction	
	Rhine Shore Railway.	Oranienburg Experimental Circle Ky.	Dessau-Bitterfeld, first part of Magdeburg-Halle-Leipzig Trunk Line, Kingdom of Prussia.	Altona Harbor Railway.
Proprietor	Private Company.			
Length of line, miles	17.6	1.1	16.1*	1.5
Maximum speed, miles per hour	50	Not stipulated.	78	10
Kind of current on the line	Direct cur.	Single phase.	Single phase.	Single phase.
Voltage on the line	1,000	6,000	10,000	1,500
Number of cycles on the line		25	15	25
Kind of current transmission			Single phase.	Single phase.
Voltage transmission			60,000	6,000
Number of cycles transmission			15	25
" " motor cars	10		0	0
" " trailers	10		0	0
" " locomotives	0		6	1

*The total length of Magdeburg-Halle-Leipzig is 95 miles.

passengers and freight, and are now using steam locomotives. The plan is to eventually erect a power house and electrify this road, current to be transmitted by overhead wires. In this vicinity lignite coal is found in abundance, and this fuel will be used for the production of power.

The government has already placed an order for two electric passenger and four electric freight locomotives, which will be of the high mounted motor and side rod type. The electrical equipment will be furnished by five of the large German manufacturing companies, one of which will furnish two locomotives and the others one locomotive each, there being a very interesting competition between these companies for the furnishing of the future electrical equipment. In the most of these locomotives the control will be through a potential and induction regulator. They will be equipped with Deri motors, the control of these being accomplished by the shifting of the brushes. It is contemplated that this road will be electrified during this year.

The Altona-Harbor Railway is shown on Map 3, and connects Altona harbor, which is 70 ft. deep, with the Altona terminal station. The greater part of the traffic is freight. The railway runs, for the greater part, through a tunnel under the streets of Altona, the trains at present using steam motive power. Due to the fact that the smoke question has been greatly agitated, the trains are run on a 70 minutes headway. It is planned to make this a single-phase railway. Traffic figures, etc., are given in Table 3, and a profile of this road is shown on Map 2. A locomotive for this road is at present being built, which will be equipped with induction regulator, and it is expected that the electrification of this road will be completed this year.

The Wiesenthal railway is owned by the Grand Duchy of Baden. The motor power of this system is steam, and the road

considerable experimenting has been conducted with the storage battery motor car or locomotive, also with the benzol electric motor cars. The Prussian Railway department especially has done much experimenting with the storage battery motor cars, and has in its service at present over 100. These are mostly of the double car type and have been designed by Mr. Wittfeld. The batteries contained in this type of car are placed on the front trucks. The batteries contain a charge sufficient for 90 miles.

The benzol electric cars and the storage battery cars are very strong rivals. About a year and a half ago one of the benzol motor cars was perfected in Germany, and this has proven so satisfactory that eight more were built, after the design of Mr. Wittfeld. The locomotive is similar to the American design. The benzol engine or gasoline engine is direct-connected to a generator, which supplies power for the motors, under the car body, and mounted on a specially designed frame which rests on the axles. The vibration from the machinery is, therefore, not transmitted to the passengers. The entire car, up to the motorman's cab, is designed for the use of passengers. This motor car carries benzol for traveling 125 miles.

The above gives an outline of the electric railways in Germany at the present time.

The Congo Railway has had to come down, and July 1 reduced rates on iron and steel wares, parts of engines, etc., from 45 cents to 8½ cents per ton mile, which amounts to \$37.40 per ton from Pittsburg to New York. The road is a short one, but it connects with thousands of miles of river navigation, connected by short sections of railway, above it; and at the extreme end are copper mines which cannot be worked at the old rates, and hardly at the new ones.

General News Section.

The Missouri, Kansas & Texas has increased the wages of telegraphers from \$7.00 to \$15 a month.

In a collision of express trains near Rottenmann, Austria, September 21, seven persons were killed and 29 injured, four of them fatally.

Near Oporto, Portugal, on the same day, an excursion train was derailed and 150 persons were injured, though none was killed.

The Cincinnati Car Demurrage Bureau has been disbanded, and in the matter of demurrage each road will look after its own interests.

Employees of the Atchison, Topeka & Santa Fe are taking measures to erect a monument to the memory of their late general manager, James E. Hurley.

In the Federal court at Lynchburg, Va., September 17, the Baltimore & Ohio was fined \$200 and the Norfolk & Western \$800 for violation of the safety appliance laws.

The new line of the Chicago, Milwaukee & St. Paul, between Hastings, Minn., and Cologne, is nearly, or quite, completed, and, by use of this line through freight from Chicago to the Pacific coast will be carried over a shorter route and will be kept out of the crowded St. Paul terminals.

The car repairers of the Southern Pacific in Texas, who went on strike about three weeks ago, have returned to work. The strike seems to have been settled under a temporary agreement which was to be followed by conferences between the officers of the road and representatives of the employees.

The Railroad Commission of Illinois has called upon the railways of the State to attend a meeting at Springfield, October 4, to consider a proposed order to increase the percentage of air-braked cars to be run in trains. At present the percentage required by the law of Illinois is 50. It is proposed to increase this to 75 per cent.

Charles W. Miller, United States District Attorney, has filed suits in the federal court in Indiana for penalties amounting to \$13,000 against the Grand Rapids & Indiana and the Pittsburgh, Cincinnati, Chicago & St. Louis, for alleged violations of the law in allowing or requiring trainmen to work for more than sixteen hours continuously.

Governor Stubbs, of Kansas, has called a meeting of governors and business men of western states, to be held at Topeka on September 22, to consider means of preventing the railways from advancing their freight rates. The governors invited are those of North and South Dakota, Nebraska, Oklahoma, Texas, Arkansas, Missouri, Illinois, Iowa, Wyoming, Colorado and Utah.

Prof. George F. Swain, of Harvard University and of the Boston Transit Commission, has been appointed superintendent of the work of appraising the property of the New York, New Haven & Hartford in Massachusetts, in accordance with an order of the last legislature. Prof. Swain reports to a special board consisting of the railway commissioners, the tax commissioner and the bank commissioner.

The passenger trains of the Worcester, Nashua & Portland division of the Boston & Maine are to be run into the Union station at Portland (going over the Maine Central from Deering Junction), instead of to the old station of the W., N. & P. at Preble street; and the freight trains of the W., N. & P. will begin and end their trips at Deering Junction, which is four miles from the Union station.

The New Orleans, Mobile & Chicago has paid to the State of Mississippi a fine of \$500 imposed by the court of Pontotoc county, for the action of the company in building a line around the town of Pontotoc, instead of through it, as ordered by the State Railway Commission. The State won its contentions in several lawsuits, but finally compromised with the road by securing this payment as a fine for contempt of court.

The New York State Public Service Commission, Second dis-

trict, has refused to authorize the New York Central to discontinue the use in the electric zone of bridge ticklers—warnings to prevent brakemen from striking their heads against overhead bridges. The company decided to abandon these guards, because in this zone it is no longer necessary for employees to go on the tops of cars. The petition of the road was opposed by the brakemen's brotherhood.

The Cincinnati, Georgetown & Portsmouth, which a few years ago was changed from steam to electric, is petitioning the Ohio State Railroad Commission to class it as an interurban line instead of a steam road. The C., G. & P. has a steam charter, but finds that under this instrument it must pay a tax of 4 per cent. on its earnings, whereas if classed as an interurban the rate would be but three-twentieths of one per cent. The company still operates a few steam locomotives to haul freight.

President Mellen is quoted in Massachusetts as saying that the Boston & Maine is preparing to use electric locomotives in the Hoosac tunnel. This tunnel is 5 miles long, and the line is double track. The electric power would be used from a point east of the tunnel to North Adams, which is about two miles west of the tunnel and which is a division terminal. With the heavy traffic now carried over this division of the road, the smoke nuisance in the tunnel is often oppressive. There is an ascending grade from each end to the center.

It is expected that the State Tax Commission of Ohio will permit the collection this year of the taxes on railway business by the old system, notwithstanding the fact that the last General Assembly enacted a law changing the method from a mileage basis to a computation on the earnings within the state. It was found that under the present system of accounting, the calculation of the taxes would require examinations of several millions of waybills. The railways on July 1 began separate accounting and will be able to make the desired returns a year from now.

Suit has been begun at Grand Rapids in behalf of the state of Michigan to collect \$3,000,000 back taxes from the Detroit-Grand Haven & Milwaukee, controlled by the Grand Trunk. Under its charter of 1860 the road pays only a tax of 1 per cent. on its capital stock. The stock is nominally \$2,517,140. The state contends that the capital actually invested in the road can be used as a basis for taxation, instead of the shares appearing on the company's books. The state seeks to set \$7,000,000 as the capital stock as a basis for taxation and thus collect additional taxes of about \$50,000 a year.

The Old Time Telegraphers' and Historical Association, at its meeting in Chicago September 9, voted to join in the movement for the erection of a monument at Turner, N. Y., the station from which was sent the first telegraphic train order. The committee in charge of this project now consists of: E. P. Griffith (Erie), chairman; C. Selden (Baltimore & Ohio), E. A. Chenery (Missouri Pacific), W. J. Camp (Canadian Pacific), J. B. Taltavall (*Telegraph and Telephone Age*), Col. W. B. Wilson, president Old Time Telegraphers' and Historical Association, and F. J. Scherrer, secretary of the same.

The members of the Traffic Club of St. Louis were the guests of the Kansas City Railroad Club of Kansas City, Mo., on September 17. The visitors were entertained by a ball game, which a team composed of members of the Traffic Club of St. Louis won by a score of 15 to 2. In the evening there was a dinner at which addresses were made by Mayor Darius Brown, Wallace A. McGowan, formerly president of the Kansas City Railroad Club; George J. Tansey, president of the Traffic Club of St. Louis; J. F. Holden, vice-president of the Kansas City Southern, and H. G. Wilson, transportation commissioner of the Kansas City Commercial Club.

The ferry from Oakland by which the Southern Pacific carries the traffic of its overland line across the bay to San Francisco is four miles long. To avoid this transfer the company has just opened a freight line around the southern end of the bay, which is over 50 miles long. The Bay Shore cut-off, which

is a part of this line around the bay, was completed some time ago, and has been described in the *Railway Age Gazette*. That part of the line which crosses the bay near its southern end, known as the Dunbarton cut-off, has just been finished and freight trains began running regularly over it on September 12. The Dunbarton cut-off connects Newark, on the east side of the bay, 27 miles from Oakland, with Redwood, on the west side of the bay, 29 miles from San Francisco. A line now under construction from Newark northeastward toward Sacramento will still further facilitate the movement of overland freight by shortening the distance between Newark and Sacramento. The principal bridge in the Dunbarton cut-off consists of pile trestle approaches, 1,002 ft. long on the east side, and 5,366 ft. long on the west side, and the bridge proper, 1,390 ft. long, including a draw span 310 ft. long. At the draw the water is 50 ft. deep with a tide variation of 12 ft. The Southern Pacific has bought, near Newark, 500 acres of land on which to establish yards.

Delay in Completion of the Moffat Road.

David H. Moffat, who is in New York on business connected with the Denver Union Water Co. and the Denver, Northwestern & Pacific Railway, says that as soon as financial arrangements can be made the railway will be completed to Salt Lake City and the tunnel constructed through the Continental divide.

Any arrangements that Mr. Moffat enters into for securing capital for the completion of the road will include the financing of the tunnel construction and the laying of a branch line to connect with the Denver & Rio Grande at Dotsero, about 75 miles northwest of Leadville.

At present the road is completed to Steamboat Springs, 210 miles from Denver. Its cost, including equipment, was approximately \$13,000,000, or about \$60,000 a mile. Cost of constructing the remaining 360 miles will be about half that per mile, as there are no more mountains to cross. The surveys have all been completed to Provo, the route following down the Bear river valley in northwestern Colorado and up the Du Chesne valley in Utah. Mr. Moffat expects to arrange for trackage rights from Provo into Salt Lake City. Cost of the tunnel has been estimated at between \$5,000,000 and \$6,000,000.

Mr. Moffat also owns the survey for the Denver & Rio Grande cutoff, which will save that road over one hundred miles into Denver. This branch, which will be about forty miles long, will follow down the Rio Grande river from a point near Orestod on the Moffat road, about sixty miles southeast of Steamboat Springs, to a junction with the Denver & Rio Grande at Dotsero.

"This is the greatest railway proposition in the world to-day," says Mr. Moffat. Anyone who talks with him about it can see that he has ambition to carry it to completion. Maybe the fact that E. H. Harriman told him the road could not be built strengthens this ambition.

Regarding Mr. Harriman he says: "We had a talk before I began the road, but we could not agree. Everything possible was done to block my plans for financing the road, but I put \$10,000,000 of my own money into it and built across the mountains. At present the road is earning all fixed charges, and if we were not paying for new equipment out of income, it would be showing 2 or 3 per cent. on the stock."

Mr. Moffat says that he is disinclined to put more of his own money into the road; but that if arrangements for further financing are not made before the \$1,000,000 notes of the Colorado Utah Construction Co., which is building the road, fall due next May, he will pay them off himself.

The Denver, Northwestern & Pacific is capitalized at \$10,000,000 non-cumulative 5 per cent. preferred stock, \$10,000,000 common and \$23,500,000 first mortgage 4 per cent. bonds. All the stock and \$20,000,000 bonds are to be issued for construction, the bonds at the rate of \$10,000 a mile. Of both classes of stock \$5,450,000 is outstanding, Mr. Moffat owning nine-tenths of it. Bonds to the amount of \$10,900,000 have been issued, of which \$8,000,000 are deposited as collateral for the \$1,000,000 notes of the construction company. One million are held in England.

Mr. Moffat realizes that his road will be of great value as a connecting link across the backbone of the continent for some of the large systems. He says: "You can say that the road has no entangling alliances or agreements with any trunk line. If I should part with it after it is completed, I would rather it would be to either the Chicago, Rock Island & Pacific, or the Chicago,

Burlington & Quincy." He pointed out when the Union Pacific was mentioned that it could probably not legally acquire the Moffat road. The interests of the city of Denver will also be a factor in determining what system gets the Moffat road.—*Wall Street Journal*.

Unsecured Claims Law Prevents Railway Construction in Texas.

B. F. Yoakum, chairman of the St. Louis & San Francisco, has written a letter to a committee of business men of Alice, Tex., informing them that the St. Louis, Brownsville & Mexico has rescinded its decision to build an extension of this road to Alice. A. T. Perkins, its vice-president, had indicated to the people of Alice just before he left for Europe a short time ago that the branch would be built. Mr. Yoakum explains that the decision not to build is due to the passage by the Texas legislature of the measure known as the "International & Great Northern bill," which was enacted to require any purchaser at foreclosure of this road to pay the unsecured claims against it before he could take title. Mr. Yoakum said in his letter:

"To round out our system in Texas so as to traverse large sections now remotely located from existing railroads, and waiting for them to aid their development, we have considered the construction of from 700 to 800 miles, and at \$35,000 a mile for building, ballasting, equipping and furnishing terminals, would require \$28,000,000, the majority of which would be spent for Texas materials and supplies (such as commissary, feed, etc.). The line from Kingsville north to Alice is a part of our general plan. To build and ballast the twenty-five miles necessary to reach Alice would, without including additional equipment necessary for that new mileage, cost approximately \$550,000 to \$600,000, as there is not much bridging and no heavy work to encounter, and would not cost up to the general average on a large construction mileage. As we go north from the Gulf coast of Texas we encounter a broken and more expensive country through which to construct, thereby increasing the general average cost."

He added that he knew nothing about the merits of the law in question, but that it had had the effect of making financiers regard Texas as a bad place to invest their money. He continued:

"There have been several people to see me in the last few weeks with new railroad enterprises in Texas. While this bill may be declared unconstitutional by the courts, I don't honestly believe that any new railroad enterprise whose mortgage does not ante-date the enactment of this law, can sell bonds at 50c. on the dollar, for new railroad construction in Texas, if such bonds are not guaranteed by some existing railroad system. I know of one specific case where the construction of approximately 350 miles of railroad was being financed through the Panhandle of Texas to the Rio Grande that has been indefinitely postponed, and will probably not be taken up again for some time, if at all. Investors of money, especially those of trust funds, or for estates, scrutinize very closely the character of investments, and they would not feel justified in buying a first mortgage bond which in reality would not, under all circumstances, prove to be a first mortgage; nor would they take the risk of buying a lawsuit with the State to test the validity of the law. I am afraid we are 'hung up' on new railroad construction for some time. The very fact that the bill did pass with only a vote of seven members of the House and four of the Senate against it may cause people to feel uneasy until the people who are earnestly working for the development of the state make it clear that they are not in sympathy with such legislation."

Pennsylvania Trespassers in Jail.

Tramp train riding is pretty popular, but it leads to the county jail nowadays. The report of the number of persons confined in the Dauphin county prison during the year 1909 has just been made public. It shows that 1,333 persons were committed for various offenses, of which number 1,763 served terms for illegal train riding and 335 for trespass. The total expense to the county was \$33,255.22. *Pennsylvania Record*. Dauphin county is that in which is situated Harrisburg, an important division terminal of the Pennsylvania Railroad. This road has pursued a vigorous campaign against the tramps.

Traffic News.

The Texas law, making the signature of an agent on a bill of lading the same in law as the act of the carrier, goes into effect November 1.

The railways of Texas hauled into Galveston during the month of August 143,841 bales of cotton, an increase of 89,943 bales over the amount handled in August, 1909.

The Tennessee Central now enjoys favorable traffic relations with both the Illinois Central and the Southern, the suits brought by these two companies against the T. C. having been amicably settled.

The Interstate Commerce Commission has suspended until January 5 a tariff presented by the Vicksburg, Shreveport & Pacific announcing advances in the rates on yellow pine lumber to points in many States.

Railway employees are asking business men in Kansas City to sign petitions to the Missouri railway commission, requesting it to make no further reductions in rates, on the ground that this will compel reductions in the wages of railway employees.

At the Ohio Valley Exposition, now being held in Cincinnati, the principal railways of the Southern states have combined to make a single large display of the agricultural, mineral and forest resources of the South. This exhibition fills 30,000 sq. ft.

Local freight agents are reported as now quite generally refusing to quote interstate freight rates in writing, unless the request for such rates is presented in writing. This is to guard against the penalty of \$250 for mistakes in making such quotations.

The committee of St. Louis railways which is seeking a location for a union ticket office in the business district between Broadway and Ninth streets and Chestnut and Locust streets, has finished its investigation, and it is understood that some action may be taken soon.

The tonnage raised in the Houston & Texas Central district prior to the agreement was handled by the Missouri, Kansas & Texas and the St. Louis & San Francisco systems. Under the agreement of 1909 the tonnage was to be moved over the Kansas City Southern line.

The traffic agreement entered into between the Kansas City Southern and the Union Pacific and the Southern Pacific on February 5, 1909, has been modified in part, giving to the Kansas City Southern the tonnage raised in the territory of the San Antonio & Aransas Pass in exchange for the traffic raised in the territory of the Houston & Texas Central.

The Railway Commission of Canada has ordered a sweeping reduction of freight rates on the White Pass & Yukon and forbids discrimination against other companies in favor of the Atlas Mine Company. Before November 1 the road must file a tariff showing the rate heretofore charged and the new tariff giving carload rates of \$1.75 per ton on ore and concentrates from Cariboo to Skagway.

The Western Pacific and the Atchison, Topeka & Santa Fe have entered into a traffic agreement under which through rates will be made by them between points on the Western Pacific in Nevada and northern California and points on the Santa Fe in California, Arizona and New Mexico. This arrangement will bring into existence a new through north and south traffic route competitive with the Southern Pacific.

The Interstate Commerce Commission on Tuesday last suspended a number of tariff changing "tap line" rates, and will hold an investigation into the matter. The number of tariffs suspended and the roads affected are as follows:

Chicago & Alton, 1; Chicago & Eastern Illinois, 2; Chicago, Rock Island & Pacific, 5; Galveston, Harrisburg & San Antonio, 1; Illinois Central, 1; International & Great Northern, 3; Kansas City Southern, 3; Missouri, Kansas & Texas, 3; Missouri Pacific, 15; St. Louis & San Francisco 2; St. Louis Southwestern, 9

The Boston & Maine has made considerable reductions in the rates on milk from points in Massachusetts to Boston. This announcement was made immediately after Mr. Mellen, of the

New Haven road, became president of the B. & M. It appears that the rates were subjected to an important advance a few months since and the present change restores, or partly restores, the old rates. Mr. Mellen says that the rates now announced are unreasonably low, but he proposes to refer the whole question to the Massachusetts State Railroad Commission and then abide by the commission's decision.

According to the original agreement, the Kansas City Southern became a through line between Kansas City and Galveston for the transportation of freight interchanged with the Harri-man lines. The agreement embraced interchangeable freight originating in Seaboard territory as well as points on and west of the Mississippi river. The earnings on this traffic alone, during the first year of operation, it was estimated, would amount to \$1,000,000 gross.

The Illinois Manufacturers' Association has advised its members to put in claims for rebates on all shipments made over the western lines during the period following June 1, when the railways were charging their increased rates, which afterwards were withdrawn under the agreement made between the roads and the President of the United States. The order, which was afterwards made by the Interstate Commerce Commission, authorized the roads to refund these excess collections, reporting such payments to the commission.

Under the modified agreement the Houston & Texas Central, which contributed its share of the tonnage to the Kansas City Southern at Shreveport, La., has been released in order to afford the St. Louis & San Francisco system an outlet to the Gulf. In exchange for the tonnage thus diverted from the Kansas City Southern, all the tonnage raised in the San Antonio & Aransas Pass territory is to be turned over to the Kansas City Southern. In all other respects the traffic agreement of February 5, 1909, remains as originally drawn.

The Freight Rate Hearings in New York.

Our report of these hearings, published last week, concluded the principal features of the testimony, except that given by C. S. Wight, freight traffic manager of the Baltimore & Ohio. Mr. Wight said that before considering advances in rates, consultations were had with shippers. The announcements had not been followed by complaints from any of his shippers. Speaking of the cost of carrying freight, Mr. Wight said that the Trunk Line Association spent \$200,000 yearly for the inspection of freight (to detect false classification). Asked why he did not prosecute shippers who thus tried to cheat the carrier, Mr. Wight said that it was not the duty of the railways to enforce the criminal statutes.

Mr. Thorne, attorney for the Corn Belt Meat Producers' Association, presented a protest against the admission of statistics and other evidence in such a way that the shippers did not have a chance to cross examine the men who were intimately acquainted with the evidence offered. To deny this privilege is a denial of "due process of law." Mr. Thorne asked the commission to institute an original investigation of the records of the railways, examining their officers and employees as to the alleged increase in operating expenses. One of the witnesses who could not be cross-examined was Mr. Thayer, of the Pennsylvania, who has been obliged to go to Europe because of ill health.

Other testimony will be taken at Washington, probably next month.

Shippers Representatives.

If the railways make full and candid disclosures of information as to the justice and reasonableness of the increased rates, on the other hand it behooved the shippers to exhibit a spirit of fairness and a desire to secure justice and no more. They are assuming to represent the interests of the public, but the interests of the public may not be altogether on the side of certain organizations of business men who may profit by low rates of transportation. Such organizations are apt to intrust the direction of their activities to officers and committees, or to counsel, who do not very distinctly represent the views of their membership. Those who appear against the railways are not actual shippers but representatives of associations constituted of those more or less directly interested in the cost of transportation. *Journal of Commerce*, New York.

See also issue of September 9

Name of road.	Mileage operated, end of period.	Operating revenue—			Maintenance—		Operating expenses—		Net operating income.	Dividends paid.	Reserve for depreciation.	Total.
		Freight.	Passenger.	Total.	Ways and structures.	Equipment.	Trans- portation.	General.				
Alabama Southern	309	\$213,567	\$107,947	\$321,514	\$47,813	\$89,973	\$10,759	\$29,414	\$29,414	—	—	\$29,414
Arizona Eastern	33	108,940	33,009	141,949	11,254	11,254	—	4,116	4,116	—	—	4,116
Atlanta & West Point	60	113,261	56,915	170,176	24,567	56,900	13,811	8,000	8,000	—	—	8,000
Atlantic Coast	992	82,614	10,377	92,991	18,767	17,915	167	4,161	4,161	—	—	4,161
Atlantic Coast & Atlantic	46	176,430	32,485	208,915	63,000	18,668	601	49,906	2,001	—	—	2,001
Atlantic Coast & Pacific	277	115,430	32,485	147,915	63,000	18,668	601	49,906	2,001	—	—	2,001
Central New England	1,915	615,284	1,008,918	1,624,202	180,121	151,407	32,140	151,407	151,407	—	—	151,407
Central Vermont	1,131	138,197	208,550	346,747	34,404	149,717	48,151	73,191	73,191	—	—	73,191
Chesapeake & Ohio	383	1,200,000	383,119	1,583,119	321,404	149,717	48,151	73,191	73,191	—	—	73,191
Chicago & Illinois	1,887	614,015	257,252	871,267	112,165	115,323	47,891	377,458	377,458	—	—	377,458
Chicago Great Western	616	339,980	141,947	481,927	70,816	18,756	177,909	11,661	11,661	—	—	11,661
Chicago, Indianapolis & Louisville	1,221	1,001,106	118,347	1,119,453	38,094	172,808	25,974	377,289	377,289	—	—	377,289
Chicago, Milwaukee & St. Paul	7,111	3,349,133	1,897,894	5,247,027	577,677	675,677	95,758	2,142,209	2,142,209	—	—	2,142,209
Chicago, Peoria & St. Louis	525	120,741	48,058	168,799	32,651	32,651	8,202	2,002	2,002	—	—	2,002
Chicago, Rock Island & Pacific	1,031	562,295	163,647	725,942	99,655	110,571	26,026	326,468	326,468	—	—	326,468
Chicago, St. Louis & Northern	1,337	567,808	136,340	704,148	110,571	110,571	26,026	326,468	326,468	—	—	326,468
Colorado & Southern	1,248	556,341	142,753	699,094	136,326	152,912	13,728	377,065	377,065	—	—	377,065
Colorado Midland	337	98,181	43,855	142,036	37,400	5,619	64,545	5,619	5,619	—	—	5,619
Cumberland & Pennsylvania	33	1,129,611	2,034	1,131,645	33,095	33,095	375	31,761	31,761	—	—	31,761
Denver & Rio Grande	2,523	1,229,911	367,730	1,597,641	8,063	33,095	375	31,761	31,761	—	—	31,761
Delaware & Maryland	293	1,926,228	43,407	1,969,635	12,126	12,126	26,026	326,468	326,468	—	—	326,468
Detroit, Milwaukee & Northern	84	19,558	71,280	90,838	9,975	108,466	1,466	327,354	327,354	—	—	327,354
Fond du Lac & Green Bay	1,338	491,154	229,287	720,441	126,465	126,465	1,987	29,909	29,909	—	—	29,909
Galveston, Harrisburg & San Antonio	307	125,873	71,130	196,003	41,196	41,196	9,996	96,514	96,514	—	—	96,514
Gulf & Ship Island	307	105,275	36,191	141,466	32,431	32,431	2,324	46,420	46,420	—	—	46,420
Illinois & Washington Northern	102	58,792	24,924	83,716	42,791	42,791	3,296	30,285	30,285	—	—	30,285
Indiana & Michigan	827	612,717	142,326	755,043	88,972	114,229	23,985	387,110	387,110	—	—	387,110
Kansas City Southern	96	91,180	3,985	95,165	17,170	13,378	1,879	3,381	3,381	—	—	3,381
Lehigh & Hudson River	170	84,171	1,310	85,481	10,084	8,755	964	20,492	20,492	—	—	20,492
Lehigh & New England	255	92,982	15,818	108,800	20,546	15,445	2,472	28,708	28,708	—	—	28,708
Louisiana & Arkansas	207	85,993	52,095	138,088	14,540	39,193	5,745	44,396	44,396	—	—	44,396
Louisiana Western	365	44,027	27,679	71,706	34,572	12,841	1,979	30,729	30,729	—	—	30,729
Missouri & North Arkansas	1,724	866,474	392,444	1,258,918	216,069	332,113	33,443	492,089	492,089	—	—	492,089
Mobile & Ohio	615	106,800	118,844	225,644	156,499	156,499	33,443	311,507	311,507	—	—	311,507
Monongahela	65	106,814	3,275	110,089	38,109	5,859	336	2,537	2,537	—	—	2,537
Morgan L. & Tex. R.R. & S. Co.	95	210,710	97,076	307,786	37,619	34,596	991	126,538	126,538	—	—	126,538
Nashville & Chattanooga	1,376	123,105	235,989	359,094	30,494	18,756	32,651	2,002	2,002	—	—	2,002
Norfolk Southern	192	74,413	80,496	154,909	38,193	38,193	3,269	103,110	103,110	—	—	103,110
Oregon & Washington	1,491	810,338	406,321	1,216,659	163,089	4,119	9,050	59,104	59,104	—	—	59,104
Oregon R.R. & Nav. Co.	1,595	1,188,776	524,635	1,713,411	129,915	129,915	23,227	424,438	424,438	—	—	424,438
Pacific Short Line	225	95,973	26,970	122,943	163,328	14,446	393,614	39,464	39,464	—	—	39,464
Piedmont & Northern	240	96,323	10,027	106,350	24,453	24,453	994	37,059	37,059	—	—	37,059
Pittsburgh, Shawmut & Northern	319	167,500	4,874	172,374	32,855	18,993	6,044	63,644	63,644	—	—	63,644
Railroad & Grand Island	472	167,500	4,874	172,374	32,855	18,993	6,044	63,644	63,644	—	—	63,644
St. Joseph & Grand Island	472	167,500	4,874	172,374	32,855	18,993	6,044	63,644	63,644	—	—	63,644
St. Louis & San Francisco	4,732	2,016,480	992,893	3,009,373	136,735	449,011	83,758	1,516,391	1,516,391	—	—	1,516,391
St. Louis, Brownsville & Mexico	494	72,855	43,286	116,141	38,185	15,055	2,127	54,713	54,713	—	—	54,713
St. Louis Merchants' Bridge Terminal	9	244,571	91,131	335,702	26,692	10,486	390	1,472	1,472	—	—	1,472
St. Louis Northwestern	703	326,384	246,399	572,783	107,792	58,177	9,241	155,495	155,495	—	—	155,495
St. Paul, Las Vegas & Salt Lake	1,105	1,001,106	118,347	1,119,453	38,094	172,808	25,974	377,289	377,289	—	—	377,289
St. Paul, Minneapolis & Northern	236	129,732	3,651	133,383	31,268	31,268	2,770	42,814	42,814	—	—	42,814
Southern	125	75,990	18,330	94,320	18,919	17,603	1,226	36,368	36,368	—	—	36,368
Southern Pacific Co.	6,147	4,136,825	3,142,710	7,279,535	97,957	98,695	171,170	2,066,248	2,066,248	—	—	2,066,248
Spokane International	141	62,896	23,083	85,979	19,270	5,006	2,038	24,768	24,768	—	—	24,768
Staten Island Rapid Transit	11	24,777	32,816	57,593	11,413	5,196	188	25,087	25,087	—	—	25,087
Sunset	36	66,707	17,994	84,701	7,900	3,118	32	13,880	13,880	—	—	13,880
Surf	34	44,682	34,700	79,382	34,700	34,700	3,106	7,101	7,101	—	—	7,101
Terminal R.R. & N.Y. & N.J. Harb.	458	201,889	88,667	290,556	52,330	54,573	8,109	109,368	109,368	—	—	109,368
Texas & New Orleans	248	40,648	33,092	73,740	18,259	2,038	2,038	3,165	3,165	—	—	3,165
Union Pacific	3,411	3,199,752	1,108,337	4,308,089	57,417	504,914	110,908	1,061,902	1,061,902	—	—	1,061,902
Union R.R. of Baltimore	31	40,792	9,261	50,053	12,413	10,794	604	3,103	3,103	—	—	3,103
Union R.R. of Pennsylvania	123	10,792	3,651	14,443	3,651	3,651	24	13,414	13,414	—	—	13,414
Western R.R. of Alabama	457	531,692	61,706	593,398	79,933	95,503	10,396	310,355	310,355	—	—	310,355

*Began operations on April 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. †Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. †††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. †††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. †††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ††††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. †††††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ††††††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. †††††††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ††††††††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§§§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. †††††††††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡‡‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§§§§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶¶¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ††††††††††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡‡‡‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§§§§§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶¶¶¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. †††††††††††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§§§§§§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ††††††††††††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§§§§§§§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. †††††††††††††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§§§§§§§§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ††††††††††††††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§§§§§§§§§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. †††††††††††††††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§§§§§§§§§§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ††††††††††††††††††††Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡‡Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. §§§§§§§§§§§§§§§§§§§§Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R. ¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶¶Began operations on July 1, 1910, succeeding Chicago, Cincinnati & Louisville R.R.

Hearings on Western Freight Rate Advances.

The hearings being held by the Interstate Commerce Commission for the purpose of determining the reasonableness of the advances in freight rates which the western railways are seeking to make were resumed at Chicago on September 19. Commissioners Clements, Lane and Clark presided. That the commissioners themselves took charge of the case, instead of leaving it in the hands of examiners, as had been previously done, was gratifying to both the shippers and the railway men. It had been felt by both sides that the proceedings were so important that no one was competent to guide them except members of the commission.

The first testimony introduced on the resumption of the hearings was that of the Illinois Central. M. P. Blauvelt, its comptroller, testified that if its operating expenses in the fiscal year 1910 had averaged as high as they are running now and the same traffic conditions had existed the road, after paying its fixed charges and regular dividends, would have had a deficit of more than \$1,000,000. The total investment in the property has been \$277,311,324, and its capitalization is \$285,000,000. The return on the actual investment in 1910 was but 4.6 per cent. In 1907 the road had a surplus of \$5,000,000. This had been reduced at the end of the fiscal year 1910 to \$233,928. In response to questions by counsel for the shippers, Mr. Blauvelt admitted that some of the increases in expenses of the road had been due to "grafting" in the repairs of its cars, the total losses on account of these frauds during the past two or three years having been between \$1,000,000 and \$1,500,000, of which between \$600,000 and \$700,000 occurred during the fiscal year 1910. He stated that \$300,000 of the money out of which the road had thus been defrauded had been recovered, otherwise it would have had no surplus at the end of the fiscal year.

He said that the net operating income of the road increased with comparative regularity from 1890 to 1907, when it was \$16,545,108. In 1908 it was \$13,417,000, in 1909 it was \$15,464,230 and in 1910 it was \$12,787,921, a decrease of nearly \$4,000,000, as compared with 1907. C. M. Kittle, statistician of the operating department, testified that payments for injuries to persons and damages to freight were 540 per cent. larger in the last ten years than they were in the previous ten years. He referred to various increases in expense that had been caused by government regulation of safety appliances, hours of labor, etc.

One of the attorneys for the shippers, Clifford Thorne, is making a race for the position of railway commissioner of Iowa by aiding in the trial of these rate cases. In connection with the testimony regarding the increases of loss and damage claims, Mr. Thorne asked if the witness had any record of the amount of rebates paid prior to 1904 which might throw light on the question of whether the cessation of rebates had any effect on the increase in the claims. T. J. Norton, general attorney for the Santa Fe, asked: "Are we to understand that Mr. Thorne intends to make a refund of the rebates received illegally by his clients and that that is the reason why he wants this information? His clients should come into the court with clean hands before asking such questions."

Counsel for the Western Live Stock Association and the Illinois Manufacturers' Association filed statements with the commission giving long lists of facts which they desired the commission to require the railways to present. Attorney S. H. Cowan, representing the Western Live Stock Association, said that the question of what are reasonable earnings for a railway cannot be ascertained without having the value of the properties officially ascertained by the commission. He asserted that the annual reports of the roads do not fairly represent the amount of profits they are making. Among data the commission was asked to require are statistics showing the cost of the properties, amount of earnings invested in them, the way that all their capital stock and bonds have been placed, the amount received for them, etc., in other words, the shippers desire the roads to be required to show the relation between the capitalization of the properties, the original investment in them and their physical value.

W. L. Clark, vice-president and general manager of the Illinois Central, testified regarding the need for American railways in general and the Illinois Central specifically to make great improvements in their facilities in order to give the public both speed and safe transportation. He referred to the comparatively small number of railroads that are equipped with block signals, and especially with automatic signals, and said that a great in-

crease in the mileage of signals is necessary in order to reduce accidents. He declared that about 80 per cent. of accidents are due to the human element—to mistakes and carelessness of employees. In order to reduce the number of accidents due to the human element, it is necessary, among other things, for the roads to provide good places for their employees to spend their time at the end of their runs, so that they may get rest and recreation in comfortable circumstances. Mr. Park also referred to the constant demands of the public for better railway stations, for new branch lines, etc., and to the increasing need for railways to build second track, sidings, etc., in order to handle the traffic. All these things increase the fixed charges which the railways must meet, and unless they can earn enough not only to pay their operating expenses, fixed charges and dividends, but to have a comfortable margin of earnings to spend on the properties and to put aside as surplus, they are unable to raise the capital necessary to make the required improvements. He said that the Illinois Central now has demands from communities along its lines for at least 100 new freight and passenger stations, and unless it is able to earn more money it will not be able to meet demands such as these, most of which are perfectly reasonable. The railways, he said, are not indisposed to provide the public with the improved facilities that it demands, if the public will only let them earn enough money to provide them.

Rock Island Lines Adopt Bill of Lading Signature Certificate.

The Rock Island lines have adopted the bill of lading signature certificate, the use of which has been recommended by the American Bankers' Association, in connection with export and domestic cotton bills of lading. The signature is in the following form and must be attached to order bills of lading issued by Rock Island agents covering cotton destined to all points beyond the Rock Island lines' rails:

(Form 118 Uniform.)
 Bill of Lading Signature Certificate No.
 THE CHICAGO, ROCK ISLAND & PACIFIC RAILWAY COMPANY
 hereby certifies
 That is its regularly appointed
 Agent at and as such is authorized to sign Bills of
 Lading in accordance with the regulations of this Company, and that the
 signature on the attached order notify bill of lading No.
 dated covering Bales of Cotton
 (Place of issue) (Date)
 marked
 is his signature.
 (Date.)

The certificates will be issued in book form with original, duplicate and stub and numbered consecutively, and will be charged out to the agents in the same manner as passenger tickets, and a check will be made of these documents the same as of passenger tickets.

The original certificate must be signed by some official or employee who is personally acquainted with the agent issuing the bill of lading and familiar with his signature, and when signed must be attached to the bill of lading with mucilage or paste.

INTERSTATE COMMERCE COMMISSION.

Another Case of Discrimination in Distribution of Coal Cars.

W. F. Jacoby and Isaac C. Weber, trading as W. F. Jacoby & Co., v. Pennsylvania Railroad, Clark Brothers Mining Co. : same. Opinion by Commissioner Harlan.

The substantial points on which discrimination is claimed are as follows: The mine of the defendant, known as Falcon No. 2, has substantially the same capacity as the mine known as Eureka No. 27 of the Berwind-White Coal Mining Co. During 1902, 1903 and 1904 the defendant gave orders to make the Berwind-White Coal Mining Co. a special allotment of 100 coal cars daily. That company had contracts for supplying coal for certain steamships sailing from New York. Complaint had been made that these steamers were frequently delayed because of lack of coal, and the defendant felt that it was warranted in making that special arrangement with the coal mines that had undertaken to supply them with fuel. We see no grounds on which such discrimination can be justified by the commission. It must be condemned in strong terms as an undue preference. During 1906 and 1907 the Berwind-White mines were daily in receipt of coal cars in large numbers and were therefore kept

in operation almost continuously while the complainant received an inadequate supply of cars and were not able, therefore, to run their mine to the best advantage. The defense is largely explained by the fact that the Hewitt-White company owned a large number of private cars. Under the rules of the defendant, as explained in *Hillsdale Coal & Coke Co. v. Pennsylvania Railroad*, the ownership of these private cars resulted in a special allotment to the office of that company. This is held to be a discrimination against complainant but in the *Hillsdale* case, the question of reparation will be considered later. (11 L. E. C. 296.)

STATE COMMISSIONS.

The Wisconsin Railroad Commission has ordered the Northern Pacific to reduce its rate for switching cars from the Minneapolis, St. Paul & Santa Fe Main to the western part of the city at Superior, Wis., from \$3 to \$1.50 per car.

Because the Indiana Railroad Commission has been put to considerable expense during the year in employing attorneys to defend the commission against the unusual number of actions by railways, William J. Woods, chairman, and J. F. McClure, member of the commission, both of whom are attorneys, will appear and defend a number of the minor suits, the hearing of which will be had soon.

The New York State Public Service Commission, Second district, has appointed Walter I. Sweet, of Port Richmond, New York City, to be assistant chief of the division of telephones and telegraphs, at a salary of \$3,000. Mr. Sweet will be in charge of the office of the Second District Commission in New York City. He has had extensive experience in telegraph and railway service and has, for several years, been with the New York and New Jersey Telephone Company.

The Nebraska Railway Commission has granted the petition of the Union Stock Yards of South Omaha that they be allowed to increase their switching charges. Estimates of the stock yards company and of the railway commission regarding the value of the switching property used by the stock yards differed widely, and the commission decided in fixing the rates not to take into consideration the value of the stock yards company's property, but to allow it to increase its rates on the ground that the rates it proposed to charge were reasonable and just for the services performed.

COURT NEWS.

The state of Texas has sued the Pecos & Northern Texas for a penalty of \$10,000 for failing to obtain the approval of the State Railroad Commission to the plans of a new station at Canyon City. Plans were submitted and rejected and then the company went ahead and put up its building according to plans which had not been approved.

Railway Developments in South Africa.

The American Consul-General in South Africa is quoted as saying that one of the most striking indications of the healthy and prosperous condition of the country is the increase in railway receipts, and even more the demand for rolling stock and equipment, which has necessitated the immediate placing of orders amounting to \$3,500,000. Besides the branch lines now under construction in the Transvaal, Natal and Cape Colony, and other extensions in all these colonies sanctioned by the British government, the Cape-to-Cairo road probably will be completed by August, 1911, as far north as the Star of the Congo mine, across the Belgian frontier, to tap the rich copper deposits in the Tanganyika district, which will produce, it is stated, from 60,000 to 90,000 tons of copper annually. If these expectations are fulfilled, it is the intention to build a railway within the next few years from this copper district to the West Coast at Lobito bay, thus materially reducing the present long journey to England via Cape Town by steamer and railway from Northern Rhodesia and Katanga.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

G. W. Martin, vice-president and general manager of the Pittsburgh & Susquehanna Valley, at Philipsburg, Pa., has resigned to go to another company.

Charles G. Stanim, assistant auditor of freight accounts of the Cleveland, Cincinnati, Chicago & St. Louis, the Cincinnati Northern and the Peoria & Eastern, with office at Cincinnati, Ohio, has resigned to engage in other business.

C. H. Naylor, for many years connected with the auditing department of the International & Great Northern, has been appointed auditor of the Beaumont & Great Northern, with office at Onalaska, Tex., succeeding E. S. Kane, resigned to engage in other business.

Operating Officers.

J. W. Dean, general superintendent of the Colorado lines of the Denver & Rio Grande, with office at Pueblo, Colo., has resigned.

R. F. Carr has been appointed inspector of train and station service of the St. Louis & San Francisco, with office at Springfield, Mo.

A. D. Chittenden has been appointed assistant to the general manager of the Bessemer & Lake Erie, with office at Pittsburgh, Pa.

M. A. Powers has been appointed general manager of the Philipsburg & Susquehanna Valley, succeeding to the duties as general manager of G. W. Martin, vice-president and general manager, resigned.

O. Cornelisen, formerly general superintendent of the Chicago Great Western at Chicago, has been appointed superintendent of the Kansas City Southern, with office at Pittsburg, Kan., succeeding F. B. De Garmo, resigned.

T. A. Dempsey, superintendent of dining cars of the Denver & Rio Grande at Denver, Colo., has been appointed superintendent of dining service of the Missouri, Kansas & Texas, with office at St. Louis, Mo., succeeding F. E. Miller, resigned.

L. B. Allen, general superintendent of the Chicago, Burlington & Quincy at Burlington, Iowa, has been appointed general superintendent of the Nebraska district, with office at Lincoln, Neb., succeeding W. B. Throop, assigned to other duties. F. L. Johnson, division superintendent at Chicago, has been appointed general superintendent, succeeding Mr. Allen. N. H. Young, superintendent of terminals at St. Louis, Mo., succeeds Mr. Johnson and B. B. Greer succeeds Mr. Young.

R. J. Parker, general superintendent of the western lines of the Atchison, Topeka & Santa Fe at La Junta, Colo., has been appointed general superintendent of the Eastern district, eastern lines, with office at Topeka, Kan., succeeding F. C. Cox, promoted. J. M. Kurn, superintendent of the New Mexico division at Las Vegas, N. Mex., succeeds Mr. Parker. F. L. Myers, superintendent of the Rio Grande division at San Marcial, N. Mex., succeeds Mr. Kurn, and Frank E. Summers, trainmaster on the Missouri division at Marceline, Mo., succeeds Mr. Myers.

George F. Malone, who has been appointed superintendent of car service of the Baltimore & Ohio, with office at Baltimore, Md., was born October 13, 1868, at Shelby, Ohio. He began railway work in October, 1889, as a clerk in the car service department of the Cleveland, Lorraine & Wheeling, now a part of the Baltimore & Ohio, and was later car tracer and then car service agent on the same road. In December, 1901, he was appointed chief clerk in the car service department of the Baltimore & Ohio, and since 1902 he has been assistant superintendent of car service of the Baltimore & Ohio system.

Milton Benjamin Bayer, whose appointment as superintendent of the Oregon & Washington, with office at Tacoma, Wash., has been announced in these columns, was born February 15, 1880, at Kendall, N. Y. He attended the public schools, and

began railway work with the New York Central in 1897 as an operator on the Oswego district. Later he was operator and despatcher on the Watertown district, and from December, 1901, to April, 1906, he was despatcher and assistant chief despatcher on the Delaware, Lackawanna & Western at Buffalo, N. Y. He then went to the Northern Pacific first as despatcher and later as chief despatcher at Tacoma, Wash., and in April of the present year he was made supervisor of transportation of the Oregon & Washington at Tacoma, from which position he was recently promoted to superintendent of the same road. The position of supervisor of transportation has been abolished.

James R. Kearney, who has been appointed superintendent of transportation of the Baltimore & Ohio, at Baltimore, Md., was born March 29, 1859. He was educated in the common schools at Altoona, Pa., and began railway work in 1876 as a messenger boy in the car service department of the Pennsylvania Railroad. He was later a clerk in the car record office of the same company at Altoona, and from March, 1880, to May of the following year held a similar position with the Illinois Central. He was then for six months car accountant of the Illinois Midland, now a part of the Vandalia, and then returned to the Illinois Central, remaining as clerk in the car record office of that company until May, 1882, when he went to the St. Paul, Minneapolis & Manitoba, holding successively the positions of clerk and chief clerk in the car record office of that company and its successor, the Great Northern. He entered the service of the Baltimore & Ohio in 1899, and in 1901 was appointed superintendent of car service, which position he held at the time of his recent appointment.

Frederick Conrad Fox, whose appointment as general manager of the western lines of the Atchison, Topeka & Santa Fe, with office at Amarillo, Tex., has been announced in these



Frederick C. Fox.

columns, was born October 9, 1863, at Marysville, Ohio. He received his education in the public schools and began railway work in August, 1880, with the Atchison, Topeka & Santa Fe as an operator. In 1884 he was made relief agent on the New Mexico and Rio Grande divisions, and for four years from December, 1885, acted as agent at various stations. He was then appointed a chief despatcher on the Rio Grande division, and from 1892 to 1897 was trainmaster on the same division. He was then transferred to the New Mexico division and was promoted to superintendent of the Western division in 1900. For two years from January, 1901, he was superintendent of the New Mexico and Rio Grande divisions, when he was transferred to the Middle division. In April, 1905, he was promoted to general superintendent of the Western grand division, and a few months later was transferred, with the same title, to the Eastern grand division, which position he has held to date. His recent appointment as general manager of the western lines becomes effective October 1.

The following rearrangement of territory of the superintendents of the Missouri, Kansas & Texas has been announced: A. E. Boughner, superintendent at New Franklin, Mo., will have jurisdiction over the St. Louis, Boonville and Hannibal divisions and Columbia branch, with office at Sedalia, Mo.; J. L. Walsh, superintendent at Parsons, Kan., will have jurisdiction over the Sedalia, Kansas City and Parsons divisions and over the Iola and Eldora Springs branches, with office at Parsons; N. J. Finney, superintendent at Sedalia, will have jurisdiction over the Cherokee, Neosho and Joplin divisions, with office at

Parsons; W. E. Williams, superintendent at Denison, Tex., will have jurisdiction over the Muskogee, Choctaw, Tulsa and Wilburton divisions and Coalgate branch, with office at McAlester, Okla., and W. E. Brown, superintendent at Oklahoma City, Okla., will have jurisdiction over the Shawnee, Oklahoma, Osage and Guthrie divisions, with office at Oklahoma City. J. M. Gayle has been appointed assistant superintendent, with office at Sedalia, Mo.; K. A. Easley, trainmaster at Parsons, Kan., has been appointed an assistant superintendent under Mr. Walsh, and W. Wackher an assistant superintendent under Mr. Finney, both with offices at Parsons; R. L. Gardner, trainmaster at Dennison, Tex., has been appointed an assistant superintendent, with office at McAlester, Okla., and T. F. Gardner has been appointed an assistant superintendent, with office at Oklahoma City, Okla. The office of trainmaster has been abolished at Parsons and at McAlester.

Charles W. Galloway, general superintendent of transportation of the entire Baltimore & Ohio system at Baltimore, Md., has been appointed general superintendent of the Baltimore & Ohio Southwestern, with office at Cincinnati, O., succeeding W. H. Brimson, resigned. James R. Kearney, superintendent of car service, at Baltimore, Md., succeeds Mr. Galloway as superintendent of transportation, and George F. Malone, assistant superintendent of car service, succeeds Mr. Kearney.

Charles W. Galloway, who has been appointed general superintendent of the Baltimore & Ohio Southwestern, with office at Cincinnati, Ohio, succeeding W. H. Brimson, resigned, was born



C. W. Galloway.

December 11, 1868. Mr. Galloway entered the service of the Baltimore & Ohio in April, 1883, as a messenger boy in the operating department in Baltimore, and since that time has been in the continuous service of that company. He studied telegraphy and stenography, and from a clerkship was appointed private secretary to the late Thomas Fitzgerald, in April, 1891, which position he filled for six years. In September, 1897, he was made trainmaster of the Baltimore division, becoming assistant superintendent at Cumberland, Md., in April, 1898.

He was appointed superintendent of the Cumberland division in July, 1899, where he remained until November, 1901, when he was transferred to Baltimore in a similar capacity. He was appointed superintendent of transportation of the entire Baltimore & Ohio system December 20, 1906, and advanced to general superintendent of transportation July 1, of this year, which position he held at the time of his recent appointment.

Traffic Officers.

E. M. Marens has been appointed a contracting freight agent of the Atlanta, Birmingham & Atlantic, with office at Kansas City, Mo.

G. F. Diekroeger, contracting agent of the Canadian Pacific Despatch, has been appointed westbound agent, with office at St. Louis, Mo.

J. T. Buckner, commercial agent of the Missouri, Oklahoma & Gulf, with office at Denison, Tex., has resigned to engage in other business.

O. A. Foote has been appointed a commercial agent of the Macon & Birmingham, with office at Macon, Ga., succeeding J. G. North, resigned.

Peter Palmateer, assistant passenger agent of the Atchison, Topeka & Santa Fe at Buffalo, N. Y., has been appointed pas-

singer agent, with office at Buffalo, succeeding Charles A. Marsh, deceased.

J. W. Govey has been appointed a traveling freight agent of the Lehigh & Lake Erie, with office at Brownsville, Pa., succeeding G. R. Williams, resigned.

H. W. Cunningham has been appointed a commercial agent of the Chicago Great Western, with office at Kansas City, Mo., succeeding J. H. Dangel, resigned.

Robert F. Hyde, constant claim agent of the Trinity & Brazos Valley at League, Tex., has been appointed claim agent of the Houston Belt & Terminal, with office at Houston, Tex. E. D. Stagg succeeds Mr. Hyde.

D. M. Davis, city passenger agent of the Chicago & North Western at Des Moines, Iowa, has been appointed a traveling agent, with office at Sioux City, Iowa, succeeding E. H. Lowderbaugh, resigned to engage in other business.

D. L. Hyde, joint agent of the Illinois Central and the South Dakota Central at Sioux Falls, S. D., has been appointed contracting freight agent of the Illinois Central, with office at St. Louis, Mo., succeeding A. L. Masso, resigned.

C. B. F. Lincoln has been appointed passenger and freight agent of the San Pedro, Los Angeles & Salt Lake, with office at Ocean Park, Cal. J. L. Moore has been appointed city passenger and freight agent, with office at Santa Ana, Cal.

J. L. Kenealy, traveling freight agent of the Buffalo & Susquehanna, at Wellsville, N. Y., has been appointed a soliciting agent, with office at Buffalo, succeeding I. I. Van Allen, transferred to the operating department. R. E. Ball succeeds Mr. Kenealy, with office at Wellsville.

A. A. Burke and E. G. Ranney have been appointed traveling passenger agents of the Canadian Pacific, both with offices at Boston, Mass., succeeding W. H. Snell and James Burdon, transferred. Thomas McNeil has been appointed agent at Antwerp, Belgium, succeeding S. E. Cruse.

T. W. Wuerpel has been appointed a commercial agent of the St. Louis & San Francisco, the Chicago & Eastern Illinois and the Evansville & Terre Haute, with office at Monterey, Mexico. B. B. Wise has been appointed a traveling freight and passenger agent, with office at Mexico City.

J. W. Gantz, commercial agent of the St. Louis & San Francisco and the Chicago & Eastern Illinois at St. Louis, Mo., has been appointed general agent in the freight department, with office at St. Louis, succeeding A. D. Murray, resigned to engage in private business. F. J. Lawler, soliciting freight agent, succeeds Mr. Gantz.

C. A. Florence, general eastern freight agent of the Illinois Central at New York, has been appointed assistant general freight agent in charge of import and export traffic, with office at Chicago. L. F. Klein, commercial agent of the Missouri Pacific at Philadelphia, Pa., succeeds Mr. Florence, with office at New York, effective October 15.

Gabe Filleul, western passenger agent of the National Railways of Mexico at Chicago, has been appointed general agent, with office at New Orleans, La. Incident to the appointment of Frank L. Moe as general western agent at Chicago it should have been mentioned that he will have charge of both the passenger and freight departments at Chicago.

Robert Kerr, passenger traffic manager of the Canadian Pacific, at Montreal, Quebec, having reached the age limit, will be retired on October 1, as previously announced in these columns. Mr. Kerr was born in August, 1845, at Toronto, Ont., and began railway work in 1866 as warehouse clerk, and later held various positions with the Northern Railway of Canada. In 1879 he was appointed through freight agent of the same road. From 1879 to 1884 he was general freight and passenger agent of the Northern & Northwestern, now a part of the Grand Trunk. In June, 1884, he went to the Canadian Pacific as general freight and passenger agent of the Western and Pacific divisions at Winnipeg, Man., remaining in that position until January, 1896, when he was appointed traffic manager of the lines west of Lake Superior, and since June, 1899, he has been passenger traffic manager of all lines on the same road.

Engineering and Rolling Stock Officers.

George Beckingham, roadmaster of the Grand Trunk at Montreal, Que., has been appointed general roadmaster of the Eastern division, with office at Montreal, succeeding David McCone, promoted.

C. D. Swingly, division engineer of the Connellsville division of the Baltimore & Ohio at Connellsville, Pa., has been appointed division engineer of the Pittsburgh division, with office at Pittsburgh, succeeding L. P. Rossiter, resigned. Phillip Petri, division engineer of the Ohio division at Parkersburg, W. Va., succeeds Mr. Swingly, and G. T. Warren, division engineer of the Shenandoah division at Winchester, Va., succeeds Mr. Petri. E. T. Brown, division engineer of the Philadelphia division at Philadelphia, succeeds Mr. Warren, and J. Tordello, assistant division engineer of the Cumberland division at Cumberland, Md., has been appointed assistant division engineer of the Pittsburgh division at Pittsburgh, succeeding C. Johnston, resigned.

Purchasing Officers.

F. A. Bushnell, purchasing agent of the Spokane, Portland & Seattle and the Astoria & Columbia River, at Portland, Ore., has been appointed purchasing agent of the Oregon Trunk, the Oregon Electric and the United Railways Co., and storekeepers will report to him at Portland.

OBITUARY.

F. M. Darrah, commercial agent of the Rock Island Lines at Atchison, Kan., died at Atchison on September 17.

Geather Jackson De Vilbiss, superintendent of motive power of the Hocking Valley at Columbus, Ohio, a brief mention of whose death in the accident caused by the derailment of



G. J. De Vilbiss.

a northbound passenger train on the Hocking Valley September 12, was made in these columns, was born July 31, 1875, at St. Joe, Ind. Mr. De Vilbiss attended the common schools and later studied mechanics through a correspondence school. He began railway work in 1889 as an apprentice on the Wabash Railroad and was later made roundhouse foreman on the same road at Peru, Ind. He then went to the Grand Trunk as general foreman of the Battle Creek shops, but was compelled to resign this position on account of ill health. His next position was roundhouse foreman of the Chicago, Rock Island & Pacific, which he resigned in 1904 to go to the Baltimore & Ohio as a master mechanic. In 1907 he was appointed superintendent of motive power of the Hocking Valley, which position he held at the time of his death.

The Russian authorities have increased the capacity of their freight car stock simply by issuing a decree. It has been found, this decree says, that the present cars, hitherto limited to loads of 750 poods, are capable of carrying and may be loaded with 900 poods. This latter weight is almost exactly 32,500 pounds. In the late 70s and the 80s in this country, it is said, some companies thus increased the capacity of cars by a paint brush, marking 30,000 lbs. instead of 20,000. In 1880 Russian freight cars were changed from 610 poods capacity to 750, but then, in many cases at least, stronger springs were added.

Railway Construction.

New Incorporations, Surveys, Etc.

ATCHISON, TOPEKA & SANTA FE.—It is announced that the Pecos & Northern Texas, building a branch from a point on the Coleman-Lubbock line near Lubbock, Tex., southwest to La Mesa, 55 miles, and the 16-mile section of the Coleman cut-off, from Lubbock to a connection with the La Mesa branch, is to be opened for operation on October 1.

BALTIMORE & OHIO.—An officer writes that this company recently bought a plot of ground in order to carry out the grade elimination work in South Baltimore, Md. (Aug. 19, p. 332.)

BOWDON RAILWAY.—An officer writes that a contract has been given to J. W. Wright, Jr., Union Springs, Ala., to build from Bowdon, Ga., northeast to Harmony, on the Central of Georgia, 12 miles. It is expected that the line will be finished in about 60 days. J. L. Lovvorn, president; J. M. Terrell, vice-president; A. E. Fleming, secretary and treasurer, and H. P. Harris, chief engineer. Bowdon.

CHICAGO & NORTH WESTERN.—This company on July 31, 1910, had under construction 354 miles of new lines, including the following:

Bellefourche Valley, from Bellefourche, S. Dak., to Newell, 23 miles.

Doland & Southeastern, from Doland, S. Dak., to Iroquois, 40 miles.

James River Valley & Northwestern, from Gettysburg, S. Dak., to Blunt, 43 miles; Onida to Hitchcock, 55 miles.

Milwaukee & Northwestern, from near Milwaukee, Wis., to Clyman, with connecting lines, a total of about 52 miles; Clyman to Necedah, 89 miles; Wyeville to Sparta, 23 miles.

Sioux City, Dakota & Northwestern, from Hinton, Iowa, to Hawarden, 23 miles.

COLUMBIA & MONTGOMERY.—This company is said to be planning to build an extension from Berwick, Pa., northeast to Wilkesbarre, about 35 miles. The company has under consideration the question of building other extensions.

CRYSTAL CITY & UVALDE.—An officer of this company, which now operates 53 miles of line from Uvalde Junction, Tex., to Carrizo Springs, is quoted as saying that an east and west line will be built from Crystal City west to Eagle Pass, 40 miles, and from Crystal City east to Aransas Pass, about 225 miles, if the required bonuses of \$250,000, for the Eagle Pass line, and \$200,000, for the extension to Aransas Pass, are raised by the land owners and people along the route of the proposed extensions. It is thought that the amounts will be raised and contracts signed for the construction of the extensions soon.

DELAWARE, LACKAWANNA & WESTERN.—It is expected that track laying will be started soon on sections of the new cut-off being built by the Lackawanna Railroad Co. of New Jersey between Slateford, Pa., and Port Morris, N. J., 28 miles. The line will not have any grade crossings, and it is expected that the work will be finished in about one year. (Apr. 8, p. 969.)

DENVER, NORTHWESTERN & PACIFIC.—See an item in General News regarding this road.

FORT WAYNE & TOLEDO (ELECTRIC).—An officer writes that the company has secured franchises through the various towns and obtained most of the right-of-way from Fort Wayne, Ind., northeast via Maysville to Hicksville, Ohio, thence via Farmer to Bryan, 45 miles, with a spur line north to Montpelier, 10 miles. The company expects to finish the first 15 miles from Fort Wayne to Harlan this fall. Work is now under way putting up a number of bridges. Five of the bridges have already been finished, as well as a 500-ft. trestle near Bryan. R. T. Bastress, general manager, Harlan, Ind.

GARDEN CITY, GULF & NORTHERN.—An officer writes that contracts have been given to A. J. Canady, Scott City, Kan., and to S. S. Shaw, Garden City, for building extensions of this road. The plans call for an extension from the present northern terminus at Scott City, north to the Union Pacific in the northern part of Logan county, 35 miles, and another extension

from Garden City south to Liberal, about 70 miles. (Sept. 9, p. 482.)

GILMORE & PITTSBURGH.—An officer writes that work is about completed on the line as located from Armstead, Mont., west to Salmon City and to Gilmore, Idaho. The line to Salmon City is now open for business and it is expected to open the remaining section to Gilmore about October 15. No plans for any immediate new construction work have been made. (July 3, p. 1390.)

GULF COAST & PROVIDENT CITY.—An officer is quoted as saying that financial arrangements have been made, and work on the line is to be started at once. The projected route is from Pierce, Tex., north to connect with an east and west line to be built from Glen Flora, west to Provident City. E. Reinbold, chairman, Kansas City, Mo. (April 22, p. 1064.)

GULF, COLORADO & SANTA FE.—An officer writes regarding the reports that the Santa Fe is seeking an entrance into Waco, Tex., by securing trackage rights over an existing line or building a new line, that for the present at least the company does not contemplate an entrance into Waco. The proposition has been under advisement for some time. (A., T. & S. F., Sept. 9, p. 482.)

GULF, DELTA & NORTHWEST.—An officer writes that a charter has been granted this company and surveys are made, but that it is undecided when work will be started. The plans call for a line from Port Barre, La., north to Moreauville, 35 miles. O. H. Williams, 602 Maison Blanche, New Orleans, may be addressed.

HAGERMAN VALLEY & WESTERN.—Incorporated in Idaho with \$200,000 capital and office at Hagerman, Lincoln county, Idaho, to build railways in Idaho. The directors include: J. W. Morton, H. A. Stroud, E. M. Bell, H. E. Secor and A. H. Brailsford.

HAMPDEN RAILROAD.—The Massachusetts Board of Railroad Commissioners has granted this company a certificate of public exigency for building the proposed line to Bondsville, about 25 miles. At Bondsville connection is to be made with the Massachusetts division of the Boston & Maine and the New London Northern division of the Grand Trunk system. R. D. Gillett, Westfield, and F. T. Ley, Springfield, are directors. (July 29, p. 205.)

HUDSON & MANHATTAN.—See an item in General News regarding proposal of this company to build a new subway under Broadway, New York City.

INTERNATIONAL & GREAT NORTHERN.—An officer writes that a preliminary survey was made by the I. & G. N. down the Nueces river for 15 miles for some large land owners. It has not yet been decided to build a line through this section.

IOWA ROADS.—According to press reports, surveys are being made from Des Moines, Ia., southeast to Carlisle, thence to Knoxville or Dallas, and southward to Chariton, continuing south to Seymour or Allerton. It is thought that this is a project of the Rock Island. H. L. Jackson, Hammond, Ind., is in charge of the surveys.

FAIRCHILD & NORTHEASTERN.—An officer writes that contracts will probably be let next spring for building an extension from Nix Corners, Wis., southwest via Brackett to Caryville, about 40 miles. The principal revenue of the line will be derived from hauling grain, live stock and lumber. (Aug. 16, p. 332.)

LACKAWANNA RAILROAD CO. OF NEW JERSEY.—See Delaware, Lackawanna & Western.

LAKE ARTHUR, JENNINGS & NORTHERN.—According to press reports, surveys are now being made for this line. The projected route is from Jennings, La., north to Alexandria. B. B. Bliss, E. P. Fox, general manager, Jennings. (April 29, p. 1114.)

MIDLAND PENNSYLVANIA.—Construction work is said to have been started by this company, which was recently organized in Pennsylvania, with a capital of \$430,000. The projected route is from Sellersburg, Dauphin county, Pa., northeast via Gray and Gordon to Ashland, in Schuylkill county, 14 miles. W. E. Harrington, president, Philadelphia. (Aug. 12, p. 294.)

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—Work is said to have been started on new division terminals at a point about

from the Stearns Point, Wis., passenger station. Tracks will be laid as far as the Plover river.

MOBILE, LOUISIANA & TEXAS—See Southern Pacific.

NEW YORK, NEW HAVEN & HARTFORD.—An official writes that the company has under consideration the question of double-tracking a portion of the line between Fall River, Mass., and Warren, Bureau has not yet been completed and contracts for the work will not be let for some time to come. The work includes grade reduction, improvements of alignment and the construction of a section of grade crossings. Under an agreement with the city of Fall River, a new combination double-track, railway and highway bridge will be built, replacing the present single-track structure known as the Slades Ferry bridge. The general plan of improvement includes a tunnel under a portion of the city of Fall River, to connect with the Watuppa branch, thus establishing a continuous route between Providence, R. I., Fall River, Mass., and New Bedford.

NEW YORK, ONTARIO & WESTERN.—A contract is said to have been given to the McDonald Construction Co., Scranton, Pa., for double-tracking the line between Pleasant Mount, Pa., and Woodstock, nine miles, also from Woodstock to Hancock, N. Y., an additional nine miles. The contract is said to be valued at \$400,000. It is understood that the company intends to eventually double-track the entire branch from Hancock to Scranton.

NEW YORK, WESTCHESTER & BOSTON.—This company has completed about 65 per cent. of the line between West Farms (New York City) and Mount Vernon, exclusive of the rails and power. About 18 miles has been finished or is under construction. It is expected that the line will be finished in about one year between West Farms and Mount Vernon, and on the branch line from Mount Vernon to White Plains. (Aug. 26, p. 373.)

NORFOLK & WESTERN.—The report of this company for the year ended June 30, 1910, shows that work is now under way on branch lines and extensions as follows: Petersburg Belt, to be 8.91 miles long, with connecting tracks aggregating 1.69 miles; this line is now under construction from Poe, Va., to a point west of Addison on the main line, thence continuing around to the south of the city of Petersburg. The new line will form a second track between the points named, and will furnish a low-grade line for through traffic and for interchange of business with the Atlantic Coast Line and the Seaboard Air Line, avoiding the heavy grades and curvatures of the old line through Petersburg. It is expected that the work will be finished and the line ready for business early in 1911. The Allisonia branch, 0.6 mile, has been built to an iron ore tippie on Big Red Creek, near Allisonia, Va. Right-of-way has been secured for extending the Dry Fork branch 1.72 miles, from Canebrake, W. Va., to a point below the mouth of Beech creek, and 0.8 mile is under construction to Operation No. 4 of the New River-Pocahontas Consolidated Coal Co. Right-of-way has been secured for the Beech Creek branch from the Dry Fork branch to the Indian Creek branch at the Virginia state line, 1.56 miles, also for the Indian Creek branch from the Beech Creek branch at the West Virginia state line to Cedar Bluff, Va., on the Clinch Valley district, 12.22 miles, and for a Y connection, 0.37 mile, at Cedar Bluff. Construction work is under way on 3.22 miles at Summit tunnel. The Dry Fork branch and connections will form a continuous line from Jaeger, W. Va., to Cedar Bluff and will provide a western outlet to the coal lands on the Clinch Valley district. Right-of-way for the North Fork branch of the Tug Fork branch from Jeanette, W. Va., 4.31 miles, with a branch, 0.87 mile, to projected coal operations, has been arranged for. Satisfactory progress has been made on the Winston-Salem Southbound, building from Winston-Salem, N. C., to Wadesboro, about 88 miles. On this line 83 per cent. of the grading, 78 per cent. of the masonry work and 75 miles of the roadbed are finished, and 18 miles of main track has been laid. The line is being built jointly with the Atlantic Coast Line. Right-of-way is being secured for extensions of the Guyandotte & Tug Fork Railroad and connections. During the year 75.87 miles of main track was laid with 85-lb. rail, 17 miles of the Durham district with resawed 75-lb. rail and 7.02 miles of the Clinch Valley district with resawed 85-lb. rail. Additions were made to division yards at Williamson, W. Va.; East Portsmouth, Ohio, and Columbus. This work included an entirely new eastbound yard at East Portsmouth. A number of passenger and freight sta-

tions were both enlarged, and new houses for freight cars and other small plants were built, and some shop material was carried out.

NORTHWESTERN PACIFIC.—This company is now in process for bids to build about 30 miles of line between the northern and the southern sections of the line. Work is already under way from Willits, Cal., north to Outlet Creek. One of the sections to be let is from Outlet Creek, north to the Covelo bridge, and the other section is from Dyerville, on the northern section, south to Fort Seward. On this section the Island Mountain tunnel will involve the heaviest construction on the line.

OREGON TRUNK RAILWAY.—This company has filed maps in Oregon for a line from a point at the summit of the Cascade mountains in central Oregon, westerly, passing north of Fish lake, thence southwesterly to a point near Eagle Point, in Jackson county. (Sept. 2, p. 440.)

PENNSYLVANIA ROADS (ELECTRIC).—A company is being organized by Philadelphia capitalists, with \$180,000 capital, to build an electric line from Dillsburg, Pa., southeast to Dover, 14 miles.

ST. LOUIS, BROWNSVILLE & MEXICO.—Work has been finished on the extension of the Tres Palacios branch and it is expected that train service will be started this week between Buckeye, Tex., and Collegeport, about 17 miles. (Aug. 5, p. 263.)

ST. LOUIS SOUTHWESTERN.—Work is said to have been started on an extension from Hamilton, Tex., west to Comanche, 32 miles. The grading contract has been let to Thompson & Scott, St. Louis, Mo., who have sublet grading work on 10 miles to J. S. McSpadden. (July 1, p. 54.)

SOUTHERN PACIFIC.—According to press reports the line under construction for several years for Morgan's Louisiana & Texas, from Lafayette, La., northeast to Port Allen (opposite Baton Rouge), will be finished and put in operation by October 1. The work has been considerably delayed in overcoming the difficulties encountered in crossing Atchafalaya river. (June 17, p. 1568.)

TEMPLE-NORTHWESTERN.—Track laying is said to have been started from Temple, Tex., northwest. It is expected that the first 10 miles will be finished by November. The line is eventually to be extended northwest to Benjamin, in Knox county, a total of about 210 miles air line. W. J. McDaniel, president, and W. E. Dozier, chief engineer, Temple. (Sept. 2, p. 440.)

TEXAS CENTRAL.—Renewal work on this road, which has been under way for some time, is nearing completion. About 35 miles of the line has been laid with 80-lb. rail, replacing lighter sections. This required about 5,000 tons of rail. Rapid progress is being made on the new branch from De Leon, Tex., to Cross Plains, about 41 miles. (July 1, p. 54.)

TEXAS ROADS.—See an item in General News regarding new lines in Texas.

WHEELING & LAKE ERIE.—The report of this company for the year ended June 30, 1910, under date of September 1, shows that grade reduction work is now under way on the Toledo division. This work between Bolivar, Ohio, and Zoar is finished except some small ballasting and surfacing, and replacing with stone some of the temporary bridge seats on bridges that were raised. Work has been under way for several months cutting down the summit between Pryor and Smithville, the material being used to lift the track on a long fill between these stations. Similar work is under way between Smithville and Creston, also between Wellington and Brighton. The work of removing the company's tracks from the C. & P. right-of-way far enough to allow that company to lay second track, has been finished. This included putting up about 1½ miles of riprap wall along the Ohio river. About 87,000 cu. yds. of fill was placed. The relocation of line and yard tracks at Cleveland was finished during the year. On the Sugar Creek & Northern, 5 miles of second track was laid and five passing tracks, each 3,600 ft. long, a total of 3.41 miles. In the east yard ¼ of the track laying was finished and all the track laying in the west yard. The total track laid during the year was: 26 new industrial sidings, aggregating 4.33 miles, 3.41 miles of main tracks, 5.13 miles of passing tracks, 0.65 mile of team tracks and 22.22 miles of yard and other company tracks.

Railway Financial News.

New Incorporations, Surveys, Etc.

CENTRAL OF GEORGIA.—See editorial comments on the annual report in another column.

CHICAGO & ALTON.—A press despatch says that negotiations have about been completed for the purchase by the Chicago & Alton of the Toluca, Marquette & Northern, now in the hands of receivers. The T., M. & N. runs from Rutland, Ill., to Granville, 27 miles.

CHICAGO, ROCK ISLAND & PACIFIC.—The C., R. I. & P. Railway has declared a quarterly dividend of 1½ per cent., which compares with a quarterly dividend declared at this time last year of 1¼ per cent. Three months ago 1 per cent. was declared. It is explained that the 1½ per cent. dividend is sufficient to meet the interest charges of the C., R. I. & P. Railroad since the retirement of the St. Louis & San Francisco bonds.

DELAWARE, LACKAWANNA & WESTERN.—Stockholders of the Newark & Bloomfield, a four-mile road running from Newark Junction, N. J., to Montclair and operated under lease by the Delaware, Lackawanna & Western, have voted to increase the capital stock from \$103,850 to \$1,600,000. The D., L. & W. owns \$97,700 of the stock at present outstanding. The proceeds of the sale of the new stock is to be used for improvements. There are no bonds having a lien on the road, and the lease to the D., L. & W. provides for 6 per cent. dividends on the stock.

DULUTH, SOUTH SHORE & ATLANTIC.—For the fiscal year ended June 30, 1910, the company, with an average mileage operated of 607 miles, had total operating revenue of \$3,302,147, comparing with total operating revenues of \$2,719,338 in 1909. Operating expenses amounted last year to \$2,269,248, comparing with operating expenses in 1909 of \$1,979,518. After the payment of taxes in 1910 of \$225,918, and in 1909 of \$203,600, there was left net operating income of \$815,572 in 1910 and \$544,086 in 1909. After the payment of interest on bonds and other interest and rentals, the net corporate loss amounted to \$351,715 in 1910 and to \$201,447 in 1909. The larger loss in 1910 is accounted for by the fact that the company received less income from other sources of operation than in 1909 and paid very much greater sums for rentals, etc. In 1909 the other deductions (rentals, etc.) amounted to \$28,937, and in 1910 other deductions amounted to \$352,391.

Of the total operating revenue last year, \$1,723,312 was furnished by freight and \$415,438 by revenue from the carriage of iron ore. The increase in freight revenue was about evenly divided proportionately between iron ore freight and other freight, and the total increase amounted to \$504,661. Passenger revenue last year amounted to \$988,367 and in 1909 to \$915,124.

Under operating expenses, maintenance of way cost \$527,683 in 1910, an increase of \$82,402 over 1909; maintenance of equipment cost \$361,459, an increase of \$33,668; traffic expenses cost \$107,909, an increase of \$7,025, and transportation expenses cost \$1,193,180, an increase of \$166,109.

The total number of tons of freight carried one mile amounted to 249,466,756 tons, comparing with 171,817,333 tons in 1909. The average haul of through freight was 111 miles, as compared with 98 miles in 1909; but the average haul of local freight was 33 miles in 1910 and 35 miles in 1909. The average receipts per ton per mile for haul freight amounted to 8.57 mills in 1910 and to 9.51 mills in 1909. The number of passengers carried one mile totaled 39,231,325 in 1910 and 37,137,717 in 1909. The average distance carried was 54.5 miles in 1910 and 52.5 miles in 1909. The average receipts per passenger per mile for all passengers were 2.519 cents in 1910 and 2.464 cents in 1909. Ores furnished 49 per cent. of the total tonnage carried in 1910, comparing with 38 per cent. of the total tonnage in 1909. Lumber and other forest products furnished 19 per cent. in 1910, as against 26 per cent. in 1909.

KANSAS CITY SOUTHERN.—See an item in regard to this company in Traffic News.

MAINE CENTRAL.—This company has bought the property of the Sebasticook & Moosehead. The line runs from Pittsfield,

Me., to Mainstream, 15 miles. The property was presumably sold under foreclosure.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—The company is to issue \$3,600,000 new bonds. The fact that this new issue of bonds was approved by the directors at a meeting held about two weeks ago has just been made public.

MOBILE TERMINAL & RAILWAY CO.—F. J. Lisman & Co., New York, have bought \$175,000 of the company's first mortgage 6 per cent. bonds of September 1, 1910-1935, and are offering these bonds at par. Principal and interest are guaranteed jointly by the Alabama, Tennessee & Northern and the Tombigbee Valley. The Terminal company was incorporated in Alabama to buy 24 acres of real estate fronting on Mobile harbor. The company has \$500,000 authorized stock outstanding and \$500,000 first mortgage 6 per cent. bonds, of which the \$175,000 bought by the New York bankers is all that has been issued.

NEWARK & BLOOMFIELD.—See Delaware, Lackawanna & Western.

NEW ORLEANS & NORTHEASTERN.—An annual dividend of 6½ per cent. was paid on September 3. In 1909 5 per cent. was paid and in 1908 4 per cent. was paid.

NEW YORK & HARLEM.—The directors have declared a semi-annual dividend of 1½ per cent., payable Oct. 1. This is the dividend payable out of rental received for the Fourth avenue lines from the Metropolitan Street Railway. The rental of \$400,000 a year is equivalent to 4 per cent. on the company's stock, and formerly that rate was paid, but the directors have decided to accumulate a sufficient fund to provide for payment of certain taxes in dispute with the city if it becomes necessary to do so. This is the first dividend payable out of the Fourth avenue street car lines for a year. There has been no interruption, of course, in the 10 per cent. dividend paid as rental by the New York Central & Hudson River.

OREGON SHORT LINE.—Stockholders (which means the Union Pacific and the directors) will be asked to vote on October 12 to authorize an increase of the capital stock from \$27,460,100 to \$100,000,000.

SAN ANTONIO & RIO GRANDE.—F. W. Matthews has been appointed receiver of this road, which runs from San Juan, Tex., to Chapin, about 10 miles.

SEBASTICOOK & MOOSEHEAD.—See Maine Central.

SOUTHERN INDIANA.—The reorganization plan, as outlined in these columns in our issue of August 12, page 295, has met by no objection from any of the stockholders, the *Commercial and Financial Chronicle* says, and has practically been adopted. The *Chronicle* says that negotiations are pending for the sale to eastern parties of \$2,100,000 of the new first mortgage bonds at something above the price at which Chicago banks were willing to underwrite the bonds. From the proceeds of the sale the floating debt will be paid and \$200,000 left in the treasury.

TENNESSEE CENTRAL.—See an item in regard to this company in Traffic News.

TOLUCA, MARQUETTE & NORTHERN.—See Chicago & Alton.

UNION PACIFIC.—See Oregon Short Line.

VERMONT VALLEY RAILROAD.—This subsidiary of the Boston & Maine has sold to Lee, Higginson & Co., Boston, \$1,500,000 first mortgage 4½ per cent. bonds, of October 1, 1910-1940. These bonds are issued to refund \$800,000 first mortgage 5 per cent. bonds coming due October 1, and also to provide for the payment of certain construction work financed by the Boston & Maine. The bankers are offering the bonds, which are a legal investment in Massachusetts, Connecticut, New Hampshire and Maine, at 104½, to yield 4.25 per cent.

WABASH PITTSBURGH TERMINAL.—The receivers have been authorized by the court to bring a suit against the managers of the Pittsburgh Toledo syndicate, who financed the building of the Wabash Pittsburgh Terminal. The suit will be for an accounting for money received from the sale of Wabash Pittsburgh Terminal bonds.

WHEELING & LAKE ERIE.—See editorial comments on the annual report in another column.

Supply Trade Section.

John B. Milliken, comptroller of the Tucker-Wheeler Company, Asperger, N. J., has accepted a position as treasurer of the Yale & Towne Manufacturing Company, New York, with headquarters at New York.

The Chicago Steel Car Co., Chicago, has filed a trust deed covering \$3,000 on bonds, the proceeds to be used in extensions and improvements to the company's plant at Harvey, Ill., made necessary by demands for an increased output.

To facilitate handling its rapidly increasing business in the Middle West, the Bunkerhill Furnace Company, New York, has opened a branch office in the Fisher building, Chicago, with A. L. Stevens, an experienced furnace engineer, in charge.

The annual report of the Westinghouse Air Brake Company, New York, just issued, for the year ended July 31, shows net earnings of \$4,653,102, as against \$2,039,273 in 1909. After charging off \$129,824 for depreciation, etc., a surplus of \$4,223,278 remained, as against \$1,920,557 in 1909.

The Baldwin Locomotive Works, Philadelphia, Pa., request the announcement that a man giving the name of N. A. Nathan, who is operating among certain western manufacturers, claiming connection with the accounting department of the Baldwin Locomotive Works, has no connection with that company.

The Griffin Wheel Company, Chicago, has let the contract to Kelly Bros., Tacoma, Wash., for building an addition to the Tacoma plant. The addition to the main shop will be 436 ft. long, 100 ft. wide, and will cost about \$49,000 without equipment. Several small accessory buildings are included in the contract.

Charles Goble, mechanical superintendent of the Railway Audit & Inspection Company, Philadelphia, Pa., has been made district manager at Chicago, with office in the Calumet building. Mr. Goble has been with this company for the past five years, previous to which he was interested in electric and steam railway enterprises.

The Glacier Metal Company, of Richmond, Va., is placing on the market a new ribbonized plastic metallic packing for steam, air, water, gas, ammonia, etc. This packing is satisfactorily made, from an alloy of white metal, into fine shreds or ribbons, and is therefore very pliable. It will not score the rods nor show corrosion when in contact with acids.

The Isthmian Canal Commission will receive bids until October 14 for condenser, motor-driven engine lathe, valve-resetting machine, snatch blocks, punches and dies, rivet sets, machine bits, cold-shuts for steam shovels, coupler knuckle pins, manganese-steel plates, clam-shell bucket, electric fans, water gages, fire brick, lumber, etc. (Cir. No. 606.)

The Pawling & Harnischfeger Company, Milwaukee, Wis., makers of electric traveling cranes and hoists, announces that Arthur Fritsch has been appointed manager of the Chicago office, located in the Monadnock block, to succeed W. E. Kreamer, resigned. Mr. Fritsch was formerly connected with the engineering and sales department of the Allis Chalmers Company, Milwaukee, Wis.

The Association of Railway Electrical Supply Manufacturers announces that the top floor of the La Salle hotel, Chicago, has been reserved for exhibits at the convention of the Association of Railway Electrical Engineers to be held at that place September 27-30. Particulars can be obtained by writing to W. E. Ballantine, in charge of exhibits, care of Willard Storage Battery Company, 320 Dearborn street, Chicago.

Three-quarters of the fiscal year of the Western Electric Company, New York, which closed with August last, indicated that there has been no occasion to revise the estimate of a gross business, \$61,000,000, for the year, which estimate was made last February. The gains which this company has recorded consistently during the current year continue. The month of August showed an increase in business equal to a gain of 50 per cent.

over the corresponding month of 1909, and the same was the case of July over the preceding July. The probable showing of \$61,000,000 for the present year is a record only for 1909, when gross sales were somewhat more than \$69,000,000.

The Hicks Locomotive & Car Works, Chicago, was, on September 19, placed in the hands of the Commercial Trust & Savings Bank, as receiver. The Chicago officers of the company explain that it has suffered, together with other railway equipment companies, in the slump of business during the last three years. The receiver will continue to operate the plant, and it is expected that it will soon be working full force.

Owing to the great increase in business in the vicinity of Atlanta, Ga., and Rochester, N. Y., the H. W. Johns-Manville Company, New York, has recently opened new offices in each of these cities. The Atlanta office is in the Empire building, with W. F. Johns, who has been traveling in this territory for the company for a number of years, in charge. The Rochester office is at 725 Chamber of Commerce, with H. P. Domine, formerly with the Buffalo branch of the company, in charge.

The Vulcan Iron Works, Wilkes-Barre, Pa., have received the following locomotive orders: Marion Steam Shovel Co., Cleveland, Ohio, one 18-in. x 24-in. four-wheel switcher; Edward J. Gay Planting & Manufacturing Co., Plaquemine, La., one 10-in. x 16-in. Forney plantation locomotive; American Hominy Co., Indianapolis, Ind., one 15-in. x 24-in. four-wheel saddle tank switcher; the Berlin Mills Co., Portland, Me., one 17-in. x 24-in. double end locomotive, and the Lehigh Valley Coal Co., New York, one 10-in. x 16-in. six-wheel saddle tank locomotive.

The U. S. Indestructible Gasket Company, 50 Church street, New York, is building a new plant in Brooklyn, N. Y., which will have a space for machines 10 ft. wide and 500 ft. long. The building is of semi-fireproof construction, steel sash being used, and well lighted. This new plant affords greatly increased facilities for the manufacture of the company's products, consisting of gaskets, washers, discs, rings, multiple disc pump valves, diaphragms, stampings, formings, punchings, dies and specialties of all kinds, including corrugated, flat and grooved copper, lead, steel, bronze, Ames alloy, indestructibleite, Norway and Swedish iron, monel metal, sparkite, copper-asbestos, wire, paper and other gaskets, also washers, discs, rings and shapes of any metal, fibre, asbestos, leather, cork, mica, felt, rawhide, canvas, etc., of every size, shape and thickness.

W. B. Doddridge, whose work as a railway expert at St. Louis, Mo., has attracted considerable attention, began railway work as telegraph operator on the Union Pacific in 1867. The end of the line at that time was at North Platte, Neb., and Mr. Doddridge remained in the position of operator during the construction of the line to a connection with the Central Pacific at Promontory. Later he was made agent at Ogden, Utah, which was at that time the most important junction in the West. Subsequently he was made superintendent of the western division of the Union Pacific, from Green River to Ogden, and later general superintendent, having in charge the construction of the Utah & Northern into Montana. This work was followed by the building of the Oregon Short Line from Granger, Wyo., to Huntington, Ore. In 1884 Mr. Doddridge left railway work and became associated with Marcus Daly as manager of construction and operation of the Anaconda smelter in Montana. In 1886 he returned to railway work as superintendent of the Missouri Pacific lines in northern Kansas. In 1889 he became general manager of what is now the St. Louis Southwestern, with office in St. Louis. In 1893 he was made general manager of the Pacific system of the same road, which position he held until 1900. Since that time Mr. Doddridge has been engaged in expert work, including the making of physical and business examinations of railway and other properties, both for railway companies and financial interests, and also acting as expert witness for the railway companies in the recent injunction suits in the western states involving two-cent passenger rate

matters and maximum freight bills. He is also at the present time receiver of the North American Lead Company of Missouri, knowledge of which business he obtained while manager of the Anaconda smelter. His office is at 3965 Westminister place.

Track Supply Association Organized.

A meeting of representatives of supply concerns which are interested in proper exhibits being made in connection with the meetings of the Roadmasters and Maintenance of Way Association was held in Chicago on September 16 to consider plans for making exhibits in connection with the meeting of this association at St. Louis in 1911. On motion of J. M. Holloway, of the American Steel & Wire Company, a resolution was adopted providing for the election of a president, vice-president and secretary-treasurer, and an executive committee composed of these officers and two other members of the proposed association, who are instructed to confer with the Railway Appliances Association with a view to securing its approval or disapproval of this plan. The resolution provides that if the Railway Appliances Association does not care to exhibit at the meetings of the Roadmasters, this new organization shall do so.

The following officers of the new association were elected: President, William Goldie, Pittsburgh; vice-president, J. M. Holloway, Chicago; secretary-treasurer, A. C. Holloway, Chicago; members executive committee, John McKinnon, Kalamazoo, Mich., and W. C. Kidd, Hilburn, N. Y. The concerns represented at the meeting were those which exhibited at the meeting of the Roadmasters' Association in Chicago last week, a list of which is printed elsewhere in this issue.

TRADE PUBLICATIONS.

Great Northern.—The Great Northern's 16-page booklet on colonist fares to the northwest also includes descriptive matter and maps.

Great Northern.—A booklet, describing the advantages of traveling on the Oriental Limited has been issued by the company. There is also an itinerary in the booklet which will prove a convenient reminder of train connections.

Northern Pacific.—A small wall card has been issued by the traffic department of the Northern Pacific, bearing a map of the line, and also a large half-tone impression of a Mallet locomotive such as are used on the mountain divisions.

Precision Instruments.—Kolesch & Co., New York, have just published a circular regarding the Richter drawing instruments, which should be of interest to the engineering profession generally, as it contains illustrations, prices, etc., of a large number of drawing instruments.

Concrete Mixer.—The Chicago Concrete Machinery Co., Milwaukee, Wis., has issued a 10-page pamphlet describing the various styles of Chicago concrete mixers. A convenient table giving capacities, outputs, power consumption and weights for the various sizes is included.

The Mechanigraph.—Topping Brothers, New York, have just issued an attractive paper board book describing their mechanigraph, a device used for making transparent a mechanical drawing paper, so that blueprints may be made direct from it, doing away with the necessity of making a tracing.

Chicago & North Western.—The passenger department of the Chicago & North Western has issued four pamphlets, giving facts about colonist rates to the Pacific coast, improved train service to southern California, law fares to the West and Northwest and through passenger schedules from Chicago.

Electric Interlocking System.—Bulletin No. 49, just received from the Union Switch & Signal Co., Swissvale, Pa., on the subject of the multiple unit electric interlocking system, contains a detailed description which should be of particular interest to those in the signal engineering departments of railways.

Chicago, Burlington & Quincy.—A folder has been issued by the passenger department of the Burlington Route advertising the eighteenth National Irrigation Congress, to be held in Pueblo,

Colo., September 26-30, 1910. The information it contains regarding the congress and the city will be of interest to all prospective attendants.

Lifting Magnets.—The Electric Controller & Manufacturing Co., Cleveland, Ohio, has issued a pamphlet describing, with photographs and drawings, the lifting magnets which it manufactures. A large circular accompanies the catalogue and describes the Dinkey ventilated controllers, made for both direct and alternating currents.

Electrical Equipment.—The General Electric Company, Schenectady, N. Y., in Bulletin 4754, describes in detail its d.c. and a.c. motors for use in steel mills; in Bulletin 4761 its Sprague-General Electric Type M control system, which bulletin supersedes the previous one on this subject; and in 4764, its line of Mazda compensator and low-volt lamps.

Vanadium Steel.—The Carnegie Steel Co., Pittsburgh, Pa., has just issued a pamphlet containing some general information about the vanadium steel which it manufactures. Arranged in tabular form are shown the 14 types of this steel, giving the application of the different types and the approximate heat treatment in each case. The physical properties are also given.

Rotary Snow Plow.—The American Locomotive Company, New York, has just issued bulletin No. 1005, which contains information regarding the use of rotary snow plows on a number of railways. The information given was obtained from the railway officers and gives their experience with this equipment. A number of half-tone illustrations show these plows in operation.

Electric Equipment.—The General Electric Co., Schenectady, N. Y., has issued bulletin No. 4749, on alternating current switchboard panels; bulletin No. 4755, on the electrification of the Cascade tunnel of the Great Northern Railway; bulletin No. 4763, on the isolated plant, direct-current combination generator and feeder panels—which supersedes previous bulletins on this subject; and bulletin No. 4767, on large motors for steel mills.

Locks and Hardware.—A new loose-leaf catalogue, bound in green cloth, with red leather back and corners and gold stamping, containing about 900 pages, with more than 4,000 illustrations especially made for this work, and printed on heavy paper, has just been issued by the Yale & Towne Manufacturing Co., New York. This is a general catalogue, covering the company's locks and hardware, including Yale turret locks, Yale mono-locks, door closing devices and miscellaneous hardware.

RAILWAY STRUCTURES.

BLOOMINGTON, ILL.—The Chicago & Alton advises that the work to be done this year includes the building of a 44-stall roundhouse, which will be 430 ft. in diameter; a 600-ton coaling station, two 100,000-gal. water tanks, connected to four new 12-in. water cranes, and two double-track cinder pits 200 ft. long. The new roundhouse adjoins one of the old roundhouses and will be approached by seven yard tracks about 1,650 ft. long. Other improvements are planned but will not be started this year.

CADILLAC, MICH.—The Ann Arbor is asking for bids until October 10 for building a one-story, 165-ft. x 35-ft. brick, stone or concrete passenger station to cost about \$20,000.

CINCINNATI, OHIO.—The Chesapeake & Ohio has let the contract to a local contractor for filling the long trestle over which the road enters the city.

HOLDREDGE, NEB.—The Chicago, Burlington & Quincy has let the contract to T. J. Leake & Co., Chicago, for building the passenger station mentioned in the *Railway Age Gazette* of May 20. The cost is given as \$35,000.

KANSAS CITY, MO.—The Missouri Pacific is building a locomotive repair shop, 153 ft. x 334 ft., to cost about \$136,000.

REXING, PA.—Plans are said to have been approved for building a bridge over the Lebanon Valley Railroad at Tulpehocken street.

TACOMA, WASH.—The Chicago, Milwaukee & Puget Sound is having final plans made for the passenger station to be built in Tacoma. All necessary property has been secured and temporary structures provided to care for the business until the new building is ready.

Late News.

The items in this column were received after the railroad department's noon closing.

In a fatal collision of electric cars on the Fort Wayne & Western Valley interurban road, 7 miles north of Bluffton, Ind., on Wednesday morning last, 12 persons were killed and a large number injured. The northbound car carried no passengers, but the southbound was filled with people from Bluffton destined for a fair at Fort Wayne. The cars met on a curve at full speed, and the southbound was forced full way through the length of the northbound car, so that L. A. Spillman, of the northbound car, was seriously injured, but immediately ran back around the curve and stuck a flag in the ground to stop a following car.

In the hearing now being carried on before the New York Public Service Commission, of New York, Second district, it has been brought out that the Buffalo, Rochester & Eastern has placed in the possession of James F. Jackson, former chairman of the Massachusetts Board of Railroad Commissioners, facts and information to show that the promoters of the Buffalo, Rochester & Eastern are financially able to carry out their plans for building a road from Buffalo to Albany. The names of the people who are back of this project are not made public, but Mr. Jackson filed an affidavit in which he says that the information filed with him showed unquestionably that if the New York Public Service Commission would grant a certificate of necessity and convenience to the B., R. & E. they would be able to build the proposed line.

In the freight-rate hearing at Chicago on Wednesday Mr. Park estimated that 25 or 30 millions ought to be spent on the Illinois Central to put it in condition satisfactorily to serve the public, besides five millions for automatic block signals, the maintenance of which would cost \$500,000 a year. William Ellis, counsel for the Chicago, Milwaukee & St. Paul, said that its book cost in 1901 was \$224,228,833, on which the net return earned was 6.4 per cent. The book cost in 1910 was \$280,828,179, and the net return was 5.76 per cent. The capitalization in 1901 was \$227,421,700, and the net return was 6.4 per cent. The capitalization in 1910 was \$424,813,231, and the net return 6 per cent. The net return includes interest received on securities owned and some other income not received from operation. The estimated cost of reproducing the property, based on valuations made by the state commissions in Wisconsin, Minnesota and South Dakota, would be \$293,318,963, or \$40,203 per mile. He thought that the cost of reproduction would really be more than this. He gave very complete figures, showing costs and results of operation for the years 1901 to 1910, inclusive. He showed that from 1901 to 1910 the expenses had increased \$7,753,456, solely because of increases in unit costs of labor and materials. In other words, if the road had done only the same business in 1910 as it did in 1901 the freight expenses, owing to the increases in unit costs, would have been this much greater.

In a suit brought by the stockholders to make permanent an injunction against the railways of Minnesota, forbidding them to make the freight rate reductions ordered by the State Railroad and Warehouse Commission and the State legislature, the master in chancery, appointed by the United States Circuit Court, finds that the rates prescribed are both confiscatory, and unconstitutional, in that they are an interference with interstate commerce. The Minnesota legislature passed a law three years ago fixing passenger fares at 2 cents a mile and making drastic reductions in freight rates. A temporary injunction was granted restraining the company from putting into effect the reduced freight rates, but the passenger rates had already been put in effect when the suit was brought. The present finding of the master, if sustained by the courts, will make permanent this injunction. According to newspaper accounts of the master's findings, he fixes 7 per cent. as a fair return for a railway to earn on the investment in its property, and he finds that the Great Northern, the Northern Pacific and seven other roads could not earn this return on their investments if the reductions in passenger rates and freight rates were made. The newspaper accounts say that the master accepted as correct the valuation of the Northern Pacific and the Great Northern made by these companies themselves, in preference to taking the valuation made by the State Railroad and Warehouse Commission, which was very much lower.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Alaska & Hail Point is in the market for two locomotives. This item is not confirmed.

The Central Lumber, of Grand has ordered 10 Mallet locomotives from the American Locomotive Company.

The St. Louis & O'Fallon has ordered one prairie type freight locomotive from the American Locomotive Company.

The Pere Marquette has ordered 10 consolidation freight locomotives from the American Locomotive Company.

The Paulista Railway of Brazil has ordered one 10-wheel passenger locomotive from the American Locomotive Company.

The Brownwood Southwestern, reported in the *Railway Age Gazette* of April 22 as being in the market for a number of locomotives, advises that it is not now in the market for this equipment, but that it expects to be in the near future.

The Baltimore & Ohio order for 50 Mikado locomotives, as reported in the *Railway Age Gazette* of July 8, was subsequently changed to 40 Mikado and 10 Pacific, the order for which latter is being wrongly considered as a separate one.

The St. Paul & Des Moines, reported in the *Railway Age Gazette* of August 5 as having ordered two consolidation locomotives from the Lima Locomotive & Machine Co., has increased this order to three. The details of the additional engine are the same as those given in the *Railway Age Gazette* of August 12.

CAR BUILDING.

The Chicago, Burlington & Quincy is in the market for six all steel postal cars.

The Manistee & Grand Rapids is in the market for one passenger-horse car.

The Pennsylvania Lines West are said to be in the market for freight equipment. This item is not confirmed.

The New York Central & Hudson River has ordered 10 all-steel postal and 10 all-steel combination postal and baggage cars from the Pressed Steel Car Company.

The Kansas City, Mexico & Orient, reported in the *Railway Age Gazette* of August 19 as being in the market for 11 passenger cars, advises that the ordering of this equipment has been indefinitely deferred.

The Winston-Salem Southbound will receive five new cabin cars from the Norfolk & Western. The latter company is also preparing plans and obtaining prices on 100 box cars and 50 gondola cars for the Winston-Salem.

The Carolina, Clinchfield & Ohio, reported in the *Railway Age Gazette* of July 8 as being in the market for 250 box and 100 stock cars, advises that it has received bids on this equipment, and that the order will probably be placed in the near future.

The San Antonio & Aransas Pass, reported in the *Railway Age Gazette* of September 2 as in the market for four passenger cars, has ordered two 70-ft. combination cars from the Hicks Locomotive & Car Works and two similar cars from the American Car & Foundry Company.

The New England Coal & Coke Company, Boston, Mass., advises that it is not in the market for the 300 hopper cars, as previously reported in the *Railway Age Gazette*. The report evidently grew out of the fact of this company's desiring to obtain information as to the price of hopper and gondola cars, for which reason figures were requested from several car builders.

MACHINERY AND TOOLS.

The Erie has ordered ore handling machinery for a plant near Cleveland, Ohio. The reported cost is \$500,000.

The Chicago, Burlington & Quincy is buying some machine tools, but the orders are not definitely placed as yet.

The Lake Shore & Michigan Southern has ordered the generators for the Elkhart, Ind., shops, and will soon buy motors with a total capacity of 5,000 h.p.

The Isthmian Canal Commission will receive bids until October 14 for a motor-driven engine lathe, valve reseating machine, punches and dies, rivet sets and machine bits. (Cir. No. 606.)

The Missouri Pacific is receiving prices on the following tools: Two horizontal boring machines, 15 vertical boring and turning mills, 11 planers, 6 universal radial drills, 14 drill presses, 5 sensitive drills, 3 wheel lathes, 2 tire turning lathes, 32 engine lathes, 11 turret lathes, 3 tool lathes, 13 bolt lathes, 10 shapers, 5 draw cut shapers, 3 slotters, 2 universal milling machines, 3 double emery grinders, 5 single emery grinders, 2 universal grinders, 3 twist drill grinders, 3 grindstones, 2 hydraulic wheel presses, 5 double head bolt cutters, 3 portable boring bars, 2 valve facing machines, 3 pipe cutting machines, 2 centering and drilling machines, 13 steam hammers, 3 bevel hammers, 4 forging machines, 3 blowers, 8 oil furnaces, 2 flue furnaces, 4 flue cutting machines, 29 blacksmiths' forges, 4 boilermakers' forges, 27 anvils, 3 automatic cut-off saws, 3 rip saws, 6 band saws, 2 belt-driven hack saws, 3 hollow chisel mortisers, 1 chain mortiser, 10 electric motors, 1 double punch and shear, 2 single punch and shears, 2 single shears, 5 single punches, 1 hand power punch, 2 hand power shears, 3 plate bending rolls, 2 timber planers, 1 pneumatic clamp and 1 air compressor.

IRON AND STEEL.

The Central of New Jersey is in the market for 300 tons of bridge steel for a bridge at Bayonne, N. J.

The Chicago, Burlington & Quincy has ordered 700 tons of bridge steel from the American Bridge Co.

The Chicago, Milwaukee & Puget Sound has ordered 9,000 tons of 85-lb. rails from the Lackawanna Steel Co.

The Lake Shore & Michigan Southern has ordered 400 tons of structural steel for a coaling station from the Fort Pitt Iron Works.

The Chicago & North Western has ordered 1,620 tons of bridge steel from the American Bridge Co. for a bridge over the Wisconsin river.

General Conditions in Steel.—Chairman E. H. Gary, of the United States Steel Corporation, this week issued a statement to the effect that there is no justification for the reports of a coming wide-open cut in steel prices. New business being offered at the present time, while large, is less than the total producing capacity of the mills. Although there has been a shading of prices on some commodities by small producers, the principal manufacturers are disposed to maintain fair prices.

An Improved Circuit Tester for Blasters.

One of the principal dangers to which those engaged in blasting are exposed is in encountering unexploded charges of dynamite in the debris. There has always been difficulty in detecting unexploded charges, particularly in floor shots, and until recently the blaster has had to depend on his eye to determine whether all of the holes had fired or not. This is, however, unsatisfactory, because in a number of instances it has been found that the wires and tamping from the hole were not blown out although the dynamite had exploded perfectly. Although the difficulty of locating a missed hole after the blast has been fired still remains, it is now possible for a blaster with care to determine with a great deal of certainty that each of the electric fuses in a blast are in good condition before the shot is fired. A device known as the Du Pont galvanometer or a circuit tester has been invented and placed on the market by the E. I. Du Pont Demours Powder Company, Wilmington, Del., which not only indicates whether an electrical circuit is closed or open, but also indicates within practical limits the

amount of electric resistance in the circuit. A blaster may connect the two leading wires to the galvanometer after the holes are all connected up and the galvanometer will indicate not alone whether or not the circuit is complete, but also if there is leakage through bare connections, etc.

It frequently happens that the leading wires become frayed and the insulation removed in places, and this bare wire may fall over an air or steam pipe or a rail, thereby producing a short circuit through the pipe or rail. When the blaster tests his leading wires on the Du Pont galvanometer under these circumstances, it will immediately show a short circuit and the blaster, knowing that the resistance should be calculated from the number of electric fuses he has connected in series, instantly sees that something is wrong and does not attempt to fire the blast until the wires are lifted clear from the iron.

In locating a break or broken wire in a large floor blast, the instrument can be attached successively to the double lines of bore holes at the ends so that the line containing the break is quickly found, after which the electric fuses in each bore hole are gone over separately. It is, of course, not possible to determine positively after a blast has been fired whether the protruding wires from any bore hole are connected to a live electric fuse or not, as the end wires are usually stripped and crumpled together by the blast when it fires, giving an indication of a closed circuit.

FOREIGN RAILWAY NOTES.

The Russian authorities have ordered that only Russians may hold the higher employments on the railways of the west border on which troops would be mobilized in case of war, and as a very large part of this border is Russian Poland, and Poles naturally hold many positions on the railways, this may result in many changes.

The Egyptian State Railways (1,402 miles) earned gross 5 per cent. less in 1909 than the year before, yet at the rate of \$11,114 per mile. But it is singular among the railways of the world in having been able to reduce expenses a little, and the net was at the rate of 5.1 per cent. on the capital, against 5.3 in 1908; said capital being at the rate of \$73,370 per mile. The government recently took over a 30-inch line 121 miles long from the Nile westward to the Oasis of Kharga. There is no water except at the termini, and tank cars carry a supply for the engines. Its traffic is said to have developed "satisfactorily," but as it took in but \$16,200 (\$134 per mile) in the seven months it was open, the people on the oasis probably were the "satisfied" party. The new lines in upper Egypt, built chiefly for military purposes, in 1909 for the first time very nearly earned their expenses, falling short but \$640. Besides these there are 762 miles of "light railways" in Egypt, of 30-inch and 1 meter gage, owned by three different companies. These earned gross \$1,599 and net \$672 per mile, their earnings having been 9 per cent. less and their expenses 12 per cent. more than 1908, when they earned net \$921 per mile, the decrease in net being 27 per cent.

It is said that three representatives of the British contracting firm of Pearson have just commenced a close survey of the coastwise route from Sevastopol to Alushta, which lies south of Yalta, for the purpose of building a narrow-gage, single-track electric railway. Previous surveys of the same route have been made by Russian engineers, but those are deemed untrustworthy by Messrs. Pearson. The two largest landowners through whose estates the new line will run are M. Ushkoff and Count Steenbock-Fermor, and it is owing to their influence that the Ministerial permission for the construction of the line was obtained. It is understood that the undertaking will be financed entirely by British capital. Much now depends upon the report of Messrs. Pearson's engineer-surveyors. Many of the rocky eminences lying along the Crimean riviera will need to be tunnelled, involving an outlay which may possibly prove prohibitive. At present the overland communication between Sevastopol and Yalta is maintained by an excellent motor car service over the well-macadamized Voronovski chaussee, which was built before the Crimean war.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED WEEKLY, EXCEPT DURING THE MONTHS OF JUNE, JULY AND AUGUST, BY
THE RAILROAD GAZETTE COMPANY, 381 FIFTH AVE., NEW YORK.

CHICAGO: Telephone 1192

CLEVELAND: Williamson Bldg.

LONDON: Agnew & Sells' Chambers, Westminster

W. H. BOARDMAN, President

E. A. SIMMONS, Editor

HENRY LEE, Secretary

The address of the company is the address of the officers

EDITORS:

W. H. BOARDMAN, Editor

RAY V. WRIGHT

B. B. ADAMS

SAMUEL O. DENNIS

LINSEY McCULLOUGH

W. E. HOOPER

Western Editor

G. L. FOWLER

J. F. LISTER

BRADFORD BOARDMAN

WILLIAM FORSYTH

F. W. KRAEGER

Eastern Editor

S. W. DENNING

H. H. SIMMONS

CLARENCE DEMING

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico..... \$5.00 a year.

Canada..... \$6.00 a year.

Foreign Edition (London)..... £1 12s (\$8.00) a year.

Single Copies..... 15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49. FRIDAY, SEPTEMBER 30, 1910. NUMBER 14.

CONTENTS

EDITORIAL:

Editorial Notes.....	565
The Bluffton Collision.....	566
Let the Government Go Ahead and Prosecute and Appraise the Railways.....	566
Some Specific Facts for the Illinois Manufacturers' Association.....	567
Chicago & North Western.....	568
Chesapeake & Ohio.....	569
New Books.....	572

LETTERS TO THE EDITOR.....	573
----------------------------	-----

ILLUSTRATED:

American Ingot Iron: Its Development and Production.....	574
Philippine Railway Company Lines.....	579
Development of Articulated Locomotives.....	582

MISCELLANEOUS:

Fair Rentals for Passenger Cars.....	578
Transportation and Traffic in Switzerland.....	585

GENERAL NEWS SECTION.....	587
---------------------------	-----

SUPPLY TRADE SECTION.....	602
---------------------------	-----

making up their reports, oblivious to all things outside, instead of taking care, as they should, that either their subordinates or themselves go through all the passenger cars of the train frequently for the purpose of seeing that everything is satisfactory to passengers. All of the conductors to whom this order is addressed are running on lines east of two well known cities, Erie, Pennsylvania and Pittsburgh, Pennsylvania, and west of the Atlantic Ocean. If this defect were to be cured by force instead of by moral suasion or exhortation we should be inclined to suggest a radical reduction of prices for seats in "drawing rooms," so that such rooms would be constantly occupied by passengers. Then there would not be so many secluded spots. The art of politeness in a trainman includes the keeping of an open ear, at all proper times, to all who may properly speak to him.

THE railways will not fear unjust regulation by individual states in future if the findings made last week in the Minnesota rate case by Master in Chancery Otis are sustained by the Circuit Court which appointed him and by the Federal Supreme Court. For, of course, if the Circuit Court does uphold his findings, the case will go to the Supreme Court. Part of the rates in question were fixed by the Minnesota Legislature; and others by the State Railway Commission; and most of them were lower than the corresponding interstate passenger and freight rates made by the carriers. The effect was to force the roads correspondingly to reduce their interstate rates. The master held that this was an unconstitutional interference with interstate commerce. If this is correct, most of the rate laws passed and orders issued by legislatures and commissions in the South and West during the last three years are unconstitutional, and the states' power to regulate railways is very limited. The second ground on which the master found the rates unconstitutional was that they were confiscatory. He held that when a railway is economically and honestly operated the stockholders are entitled to a return of at least 7 per cent a year upon the value of the property; and that the Great Northern, the Northern Pacific and the Minneapolis & St. Louis, the roads involved, are so operated. He found that the valuations of the Northern Pacific and the Great Northern made by the state commission were unfair, and that the value of the Northern Pacific is about 30 per cent more than its capitalization, and the value of the Great Northern about 75 per cent more than its capitalization. If the holdings of the master as to this phase of the matter are correct a great majority of the railways of the country will be able to satisfy the courts that their values exceed their capitalizations, and that they are now not only not earning excessive returns, but are not earning fair returns. It would be easy to attach too much importance to Master in Chancery Otis' report. It is quite possible the decisions of the courts will be quite different. But as a straw indicating how the wind blows it may be significant.

THESE are buzzing as well as parlous times, big with the long and more or less noisy discussion of rates, "regulation" and revaluation. But in the general din one of the most familiar elements of the general question has been well-nigh forgotten. A corporation has been often defined as a legalized and chartered person, and, in the contemplation of such an incorporated person, the real person—the stockholder—has faded into the background overmuch. The actual interests in such contentions as the present are threefold—stockholder, railway corporation and public—while the open contention is between the last two. The public criticism which whacks at the corporation rarely or never seems now to look at the fundamental stockholder behind. Yet he is there, the main party at interest, and in his position as an investor no different from the merchant who invests in goods and ships them. Let us take a simple illustration derived from the hue and cry on "revaluation," "original investment," "fair return" on property and the rest, and apply it, not to a speculative railway property, but to an old dividend-paying one. "Fair return" in such a case is reckoned on the par. Yet the stock may not have sold at par for thirty or forty years. It

OUR readers may have noticed now and then recently an article or two on the subject of politeness; if so, we are glad. But while musing on the question of how far the influence of the "printed page" has, in this instance, produced results, we are confronted by a newspaper item to the effect that one of the best roads in the country has found it necessary to issue a general order calling its conductors to account for neglect of one of the simplest elements in their duty as promoters of the comfort of passengers. This order says that both the train conductors and the Pullman conductors have too generally indulged in the practice of retiring to some secluded spot in the train and there

has changed hands, in blocks larger or smaller, during that period thousands of times. It has been distributed above par in the division of estates, given to trustees, counted above par in numberless exchanges for other than railway property; nor does the "widow and orphan" appeal become a mere sentiment when applied to a railway property like the New Haven, a majority of whose shareholders are women. Are such a class to be held responsible for, say, the 80 per cent. stock dividend of the New York Central in the days of Commodore Vanderbilt, which, though remote and not questioned legally, must have its place in any ratio of New York Central capital to actual value of plant? The public, as represented by its official agents, must, of course, deal with the corporation and its officers in examining rates, capitalization and kindred matters. But may not incidental reference, at least, be made to the fact that the corporation is at bottom an intermediary and that the person, not behind but in front of the gun, is the man, woman or child, the trustee or the savings bank, happening under a different state of affairs from the present to have acquired a railway stock certificate? In the whirl and onset of the attack on the railways, may not some attention be called to the stockholder's existence, to his original purchase of his fraction of a railway property under what seemed stable conditions of law, if not its direct guarantees, and to his elemental innocence?

THE BLUFFTON COLLISION.

THE terrible butting collision of electric cars near Bluffton, Ind., last week, killing two-score people, must have come as a sad lesson to the officers of the railway company and to the citizens and legislators who had thought that their law, passed in 1907, requiring the use of the block system, would prevent the occurrence of such disasters. The law did not touch such cases as this, and its moral effect on the management of those roads which it does not reach appears to have been nil. The main lesson, that the block system is the only practicable remedy, and that without it the only reasonable and effective safeguard for the lives of passengers is a severe limitation of speed, has been reiterated in these columns so many times that we will not here enlarge on it. We can imagine a road so well disciplined as to attain a high degree of safety while running its trains or cars under the time table and train-despatching system, but it is only by the exercise of the imagination; no one has ever produced any satisfactory evidence to that effect. The roads that have accomplished the best results by the old methods give no assurance that good results will continue. Therefore, those methods must be rejected.

The reader who wants the general lessons must be referred to articles that have been printed a hundred times; but we may note one or two circumstances of this case. The first is that another collision of the same kind occurred three days later, fifty miles from Bluffton, killing six persons. The point of this is that collisions *just like Bluffton* occur frequently. The records show this every month. It is only by good luck that they kill only six or one, instead of 40. The railway manager or the legislator who defers radical remedial measures because of a light death record is playing with fire—or, more appropriately, with fire and dynamite combined. But to any one who is determined to stick to the death record as his main guide of action it may be pointed out that this record is sure to be worse with cars that carry scores of passengers on the cow-catcher—which is virtually what the electric cars do—than where the front of the train is made up of a buffer consisting of a hundred tons of steel, coal and baggage.

Another lesson is the weakness of the Indiana block system law. It applies only to steam roads earning \$7,500 a mile annually. It is obvious that electric cars can smash themselves even more readily than the cars of standard railways; and even if the law were to be made applicable to electric roads, the money limit would still be subject to criticism, for a line too weak or too poorly located to earn a half of \$7,500 finds no difficulty in gathering carloads of passengers at five or ten cents a head, and

running such cars by methods which defy the plainest lessons of experience. If the people of Indiana expect to safeguard the lives of people who travel on the railways of that State they will have to do something better than pass laws which are too crude to fit the conditions and entrust their enforcement to commissioners who get their knowledge of the subject from mass meetings in which trainmen discuss questions that are out of date and railway lawyers urge reasons for not complying with any law.

A third lesson of such a collision as this should be addressed to Congress and to the legislatures of other States. Legislation concerning the block system may or may not prove beneficial. Indiana's law is weak, as we have noted; and those roads in that State which already had the block system in force have disputed the commission's powers of regulation. The law of Massachusetts seems to have produced no effect whatever, and Missouri has made no progress. Congress has had Mr. Esch's bill before it for half a dozen sessions, but has not passed it, nor even discussed it to any effect. The Interstate Commerce Commission has repeatedly recommended the passage of this bill, but the recommendation has fallen on deaf ears, and the commission goes on recording from 100 to 150 rear and butting collisions a month. Now, as we have intimated, legislation may or may not be wise. It cannot be a cure-all, in any event. But there is no excuse for allowing the whole question to go by default, as is done in Congress. No other remedial measure having been put in force, or even suggested, this measure—the federal bill—should be taken up and thrashed out. The reasons for the passage of a federal law, as set forth in these columns on December 23, 1904, remain the same now as then. The more enterprising roads have made much progress in the last six years without compulsion, but many other roads are laggards. The electric roads are not the only sinners. Many steam roads still employ methods of A. D. 1860 in train management.

LET THE GOVERNMENT GO AHEAD AND PROSECUTE AND APPRAISE THE RAILWAYS.

THE governors of some western states and representatives of a number of organizations of shippers met at Topeka, Kan., on September 22 and adopted resolutions demanding that the federal government enforce the Sherman anti-trust law against the railways for having combined to raise their rates, and that Congress pass a law requiring the Interstate Commerce Commission to make a "most searching investigation into the actual physical valuation of all the railway lines in the United States."

The government began a suit against the western railways at Hannibal, Mo., a few months ago for alleged violation of the Sherman act. Soon after at a conference at the White House between President Taft and a committee of railway presidents, it was agreed that the roads should submit the reasonableness of the proposed advances in their rates to the Interstate Commerce Commission, and that the prosecution should be dropped. The railways have carried out their part of the agreement. For them to be prosecuted now would be a breach of good faith. But a little thing like a breach of good faith does not trouble the conscience of such an organization as the Illinois Manufacturers' Association or of statesmen hungry for political pie. J. H. Johnston, traffic manager of the Oklahoma Traffic Association, withdrew from the Topeka meeting because he could not countenance the adoption of resolutions which asked the President of the United States to do an act of dishonor. Mr. Johnston is too thin-skinned. He cannot hope to measure up to the high standard of the Illinois Manufacturers' Association as long as he allows any sentiment of honor to influence him.

Regardless of the question of good faith, it seems probable that the railways ought to court rather than fear action against them under the Sherman law. It is a question if the supreme court of the United States would hold now, as it did in the Trans-Missouri Freight Association case, that every agreement between carriers regarding rates, whether reasonable or unreasonable, is prohibited by that law. Since then the Hepburn act and the Mann-Elkins act have given the commission power to reduce

betterment work to reduce the cost of maintenance of equipment expenses, they took as a standard or placed the same spent by the North Western per unit of equipment. The low cost of maintenance charges on the North Western has been due in the first place to a very efficient organization in the motive power and rolling stock departments. The low charge *per locomotive* is also probably due in part to the use of light motive power. In 1910 the company put into service 65 heavy locomotives for freight, but the higher cost per locomotive of maintaining this heavy motive power could not have affected appreciably the unit costs in 1910, since the equipment was not put into service until the latter half of the fiscal year and being new, did not need any extensive repairs. As a matter of fact, however, the very severe weather was the primary cause for the heavy increase in maintenance of locomotives, and in part accounts for the higher cost of repairs to passenger train cars. There was one time during the year at which the congestion in the repair shops was severe, and this, together with the increased cost of labor, is sufficient to account for the much higher average cost of repairing locomotives. The lower cost of repairing freight train cars is presumably due to the fact that the company bought a large amount of equipment, especially freight equipment, in 1910, the total number of freight cars bought during the year being 5,860, and these new cars, needing few, if any, repairs, brought down the average for each car in service. But even with the higher maintenance of equipment costs in 1910 than in 1909, these charges amounted to but 17.54 per cent. of total operating expenses, as compared with 18.17 per cent. for the preceding fiscal year.

Transportation expenses in 1910 amounted to \$29,677,354, or 56.90 per cent. of total operating expenses. This compares with \$24,700,000 in 1909. It will be seen that there is an increase of 20.31 per cent. in transportation expenses in 1910, as compared with 1909. Of the total transportation expenses, 61.54 per cent. was for labor, 25.94 per cent. was for fuel for locomotives, and 12.52 per cent. was for supplies and miscellaneous items. If we may assume that the ratio of increase, due to an increase in rates of compensation, as compared with the increase in the number of employees, is about the same in the transportation department as the average for all operating expenses, about 14 per cent. of the increased cost of labor was due to higher wages per employee. The other heavy increase in transportation expenses, beside the cost of labor, was in the amount paid for fuel for locomotives. The increase in this one item totaled \$1,700,000 and was due to severe weather conditions and to the suspension of mining operations in the coal fields of Illinois and Iowa during the strike. If these explanations are sufficient to absolve the company from any charge of padding its expense account, as far as maintenance of equipment and transportation expenses are concerned, there remains only maintenance of way.

In this department, again, the increased cost of labor figures to a large extent, but from a study of the details of the maintenance of way accounts it is evident that severe weather conditions were responsible for the higher cost not directly chargeable to a higher grade of maintenance. For instance, removal of snow, sand and ice cost \$706,719 in 1910, comparing with \$232,989 in 1909. This is an increase of more than 200 per cent.

Traffic statistics show a year of heavy business. Freight revenue amounted in 1910 to \$49,536,839, an increase of 13.57 per cent. over 1909. The tons of freight carried one mile totaled 5,562,587,719 tons, an increase of 14.37 per cent. The average haul, however, was 141 miles in 1910, as against 148 miles in 1909, and the average revenue per ton per mile was 8.9 mills in 1910, as against 9 mills in 1909. The North Western does not publish statistics covering the proportion of the various classes of commodities carried, so that there is no way of telling how large a proportion of the total tonnage is furnished by low-grade commodities such as coal; but from the nature of the country through which the road runs, the proportion of low-

grade tonnage is probably not very high, so that an average of less than 9 mills per ton per mile indicates a comparatively low freight rate on grain and such commodities. The average train load, which was 261 tons in 1910 and 260 tons in 1909, also indicates a comparatively small proportion of low-grade tonnage.

Passenger revenues last year amounted to \$18,431,017, an increase of 9.22 per cent. over 1909. The passengers carried one mile totaled 1,012,742,855, an increase of 8.64 per cent., the average distance each passenger traveled being 35.29 miles in 1910 and 34.59 miles in 1909. The average rate per passenger per mile was 1.82 cents in 1910 and 1.81 cents in 1909.

During the year the company sold to stockholders \$30,592,800 additional common stock. No bonds were sold during the year. The total capital stock outstanding on June 30, 1910, amounted to \$154,854,486, of which the company had in its treasury \$2,337,877. The charges for construction during the year amounted to \$30,394,422, which includes \$11,032,992 spent in previous years on the new Chicago passenger terminal and carried as an item in suspense, and \$5,951,408 spent for additional equipment.

The balance sheet has been so rearranged, to conform with the requirements of the Interstate Commerce Commission that it is not comparable with the balance sheet of 1909, but it shows the company in a very strong position as regards working assets. These assets amounted to \$66,773,573, of which \$18,503,988 was cash. Working liabilities amounted to \$13,048,377, there being no floating debt.

Under Railway Construction News, elsewhere in this issue, are given the principal improvements and new construction that the company has undertaken and completed during the year.

The following table shows the results of operation in 1910 and 1909:

	1910.	1909.
Mileage operated	7,629	7,638
Freight revenue	\$49,536,839	\$43,619,091
Passenger revenue	18,431,017	16,875,068
Total operating revenue	74,175,685	65,978,471
Maintenance of way	10,774,338	8,422,265
Maintenance of equipment	9,149,217	7,845,969
Traffic	1,257,756	1,127,864
Transportation	29,677,354	24,666,868
Total operating expenses	52,153,619	43,191,239
Taxes	2,979,513	2,714,632
Operating income	18,985,612	20,056,693
Gross corporate income	21,525,371	22,610,755
Net corporate income	12,298,497	13,935,294
Dividends	9,832,038	8,764,503
Surplus	2,466,459	5,170,791

CHESAPEAKE & OHIO.

"AS a trunk line between the Atlantic seaboard and Chicago, the Chesapeake & Ohio has taken a distinct step forward. The distance from tidewater, at Newport News, to Chicago, via Chesapeake & Ohio lines, is 940 miles, comparing favorably with the length of lines of other systems from tidewater, at New York, to Chicago, ranging from 906 miles to 998." This is a rather modest statement made by the management of the development and extension of the Chesapeake & Ohio during the past year. Not only has the C. & O. got its own line from Cincinnati to Chicago through the purchase of the Chicago, Cincinnati & Louisville, but it has also acquired a line from Gauley Bridge, W. Va., and Charleston to the Great Lakes, through the purchase of a majority of the stock of the Hocking Valley and a part interest in the stock of the Kanawha & Michigan, thus gaining two lines north of the Ohio river. The C. & O., as one of the most important of the soft coal roads, has been a conservatively and well-managed road, whose policies up to the time that control of this property was bought by the present management in January, 1909, were directed in the interest of the Pennsylvania Railroad. The Pennsylvania, because of public feeling against the control of a road by its competitor, had thought it advisable to sell its interest in the Chesapeake & Ohio to Kuhn, Loeb & Co., who held the property until they could find a suitable purchaser. When the present management took the property they had just completed the sale of the Colorado & Southern to the Chicago, Burlington & Quincy. In the C. & O. they found a property that had been well maintained, that was earning a considerable margin over

the 1 per cent. dividends that were being paid, and that had a high credit—a property that had been storing energy. The theory, probably, on which they made their investment was that here was a trunk line, the possibilities of which as a through line, and especially as a through line from tidewater to Chicago, had never been developed.

There was undoubtedly opposition to the Chesapeake & Ohio's entrance into the territory north of the Ohio river. At the time the Baltimore & Ohio bought control of the Cincinnati, Hamilton & Dayton it probably would have been glad to have bought the Hocking Valley instead of the C. H. & D., but was unable to do so. Control of the Hocking Valley at that time was held jointly by five roads, the Pennsylvania, through the Panhandle, owning two-sixths, and the Baltimore & Ohio, the Chesapeake & Ohio, the Lake Shore & Michigan Southern and the Erie each owning one-sixth. The Lake Shore's opposition

of the tonnage of coal that the C. H. & D. is receiving from the C. & O., and even after the improvements now planned are carried out the C. & O. will have a surplus of coal to turn over to other lines besides the H. V.

Before examining the new properties bought by the Chesapeake & Ohio, it is well to analyze the showing made by the C. & O. itself in the fiscal year ended June 30, 1910. The company earned 10 per cent. on its outstanding stock after the payment of interest on the funded debt. It is now paying dividends at the rate of 5 per cent. Gross operating revenue amounted last year to \$31,237,169. This is an increase of \$4,600,000 over 1909 and an increase of 133 per cent. over the gross operating revenue of 1900. Operating expenses last year amounted to \$18,936,699, an increase of \$2,569,861 over expenses of 1909. Net operating income after the payment of taxes was \$11,426,726, an increase over the previous year of 21 per cent.;



Chesapeake & Ohio System.

The Kanawha & Michigan is shown by a crosshatched line. The line from Cincinnati to Chicago is the new Chicago Line and the line from Pt. Pleasant to Toledo is the Hocking Valley.

to the C. & O.'s taking the Hocking Valley was lessened by the fact that the Lake Shore acquired the Toledo & Ohio Central and a part interest in the Kanawha & Michigan. There are therefore two competing lines running north from the Ohio river, one controlled by the C. & O., consisting of the Hocking and the K. & M., and the other controlled by the Lake Shore and formed by the T. & O. C. and the K. & M. It may incidentally be mentioned that the K. & M. may build a bridge across the river at Deepwater and make a connection with the Virginian at the instance of either the C. & O. or the Lake Shore.

The Chesapeake & Ohio at present turns over a large volume of its westbound coal traffic, amounting last year to between one and two million tons, to the C. H. & D., to be carried to the Great Lakes. By the purchase of the Hocking Valley the C. & O. will be able to ship coal over that line to Toledo.

The Kanawha & Michigan itself has valuable coal lands tributary to its lines, and it may be assumed that its coal traffic to the Lakes will be divided between the Hocking Valley and the Toledo & Ohio Central. At present the Hocking Valley's facilities for handling coal at Toledo are not adequate to take care

net corporate income after the payment of interest amounted to \$6,290,486, an increase in 1909 of 57 per cent. The increase in expenses was just about equally divided between maintenance and transportation.

The following table shows the unit costs of maintenance:

	1910.	1909.
*Maintenance of way per mile.....	\$1,345	\$1,164
Repairs per locomotive.....	2,350	2,113
Repairs per passenger car.....	793	819
Repairs per freight car.....	68	68

*Per mile of first, second, third, etc., track, the cost of two miles of siding and switch tracks being taken as equal to the cost of maintenance of one mile of main track.

†This is for repairs only and does not include renewals, depreciation or superintendence charges.

Sixty-six per cent. of the total revenue tonnage carried by the C. & O. is furnished by bituminous coal. Last year the company carried 22,982,229 tons of freight, of which 15,000,000 tons was bituminous coal. The ton mileage last year totaled 6,123,131,875, an increase of 20 per cent. over the ton mileage of 1909. This increase of 20 per cent. in ton mileage was handled with an increase of but 17 per cent. in operating expenses and an increase of 16 per cent. in transportation expenses.

The average revenue per ton per mile of all freight on the

any rate or prevent any advance in rates that is unreasonable, whether made by a single railway or a combination of railways. This makes so clear the intention of Congress to give over the regulation of interstate rates solely to the commission that it seems not improbable that the court would hold that the Sherman law no longer applies to railways in its full rigor. This would be in line with its decision that the Hepburn act, by implication, abolished the original jurisdiction of federal courts to determine the reasonableness of rates and vested that authority exclusively in the commission. If the court should hold that the Sherman act still applies to railways just as it did in 1897, this would bring the inconsistency between that law and the Interstate Commerce Act so forcefully to the attention of the public that it might lead to much needed remedial legislation.

Probably also the railways should not further oppose the demand for a valuation of railways. It is contended by counsel for the shippers that there must be a valuation as a means of determining whether the advances in rates the railways are now seeking are reasonable. The commission has in the past ordered many reductions in rates without the guidance of a valuation. Why can it not just as easily determine without a valuation whether advances are reasonable? As a matter of fact, it will have to do so in the pending cases. It can suspend advances in rates only for a maximum of ten months, and it could not possibly make a valuation within that time. As to the matter of valuation generally, and without any relation to the specific cases now pending, the railways probably will make a mistake if they further oppose the project. The resolutions adopted at the meeting in Topeka ask for a physical valuation. The decision of the supreme court in the Nebraska rate case indicates that not merely the value of the physical property of a railway, but all the factors that make it worth anything as a going concern must be taken into consideration in regulating rates. The railways certainly have nothing to lose by letting the shippers and politicians influence the government to make a valuation which will prove absolutely worthless the first time it is put to the test of litigation. Nor have the railways as much to lose as to gain from an appraisal that shall take proper account of all the elements that enter into the value of a railway.

The *Railway Age Gazette*, in common with many other persons and publications, has in the past opposed valuation of railways. This has been done because it has been believed that valuation is not the proper basis of rate-making and that any attempt to fix rates as a whole on that basis will be either futile or demoralizing. But the agitation for a valuation is gathering strength and probably will continue until it is successful. An attitude of opposition toward it on the part of the railways simply makes the public think they are afraid to have their assets inventoried. In every rate case attorneys for the shippers seek to make it appear that the roads are grossly over-capitalized. The result is constantly to mislead and inflame the public and to do more harm than a valuation could do. A fair valuation would simply involve the waste of several millions of dollars of public money and show that the railways as a whole not only are not over-capitalized, but are under-capitalized. In the long run it would do less harm, no matter how unwisely and unfairly it was used, than do the current misrepresentations of railway capitalization and the unwise and unfair regulation of rates that results from them.

SOME SPECIFIC FACTS FOR THE ILLINOIS MANUFACTURERS' ASSOCIATION.

THE charge is made by La Verne W. Noyes, president of the Illinois Manufacturers' Association, in a newspaper interview at Chicago, that the editorial in the *Railway Age Gazette* of September 23, regarding his organization, is "just a wild shower of malicious generalities." Mr. Noyes evidently desires us to be more specific in our statements of fact about the relations between members of the Illinois Manufacturers' Association and the railways. We shall do so.

One of the leading members of that association is Deere &

Co., of Moline, Ill., large manufacturers of farm implements. Before the Hepburn act went into effect all rates from Pittsburgh to Moline were based on the combination on Chicago; for example, the rate on iron and steel from Pittsburgh to Chicago was 18 cents, and from Chicago to Moline 8 cents, making a total of 26 cents per 100 lbs. At that time Deere & Co. received a rebate from the railways of 5 cents per 100 lbs. on all its shipments of iron and steel from Pittsburgh to Moline. As soon as the Hepburn law went into effect this company began soliciting the railways to make it a rate which would put it on the same basis it was on in the good old rebating days. The railways finally made it a through rate of 23 cents. Their traffic managers felt, however, that this was unfairly low and later raised the rate once more to 26 cents. The traffic manager of Deere & Co. then began a campaign for the restoration of the 23-cent rate in precisely the way that the *Railway Age Gazette*, in its issue of September 23, described as being followed by members of the Illinois Manufacturers' Association in getting unfair railway concessions. The files of the railways groan with the letters they received from him. Finally he got the 23-cent rate restored. *It is to-day the only rate in existence between Pittsburgh and Moline which is on less than the normal trunk line percentage scale to Moline of "122 per cent. plus."* If it is a fair rate, then every other rate between Pittsburgh and Moline is unfair. As a matter of fact, the granting of this 23-cent rate simply amounts to a published rebate of 13 per cent. to Deere & Co.

The *Railway Age Gazette* has said that members of the Illinois Manufacturers' Association are being given unfair advantages in the form of excessive allowances to tap line railways that they own. One of the members of this association of which this is true is the Commonwealth Edison Co., of Chicago. This company owns large coal mines in Illinois. It also owns a little railway called the Chicago & Illinois Midland, which hauls coal from these mines to junctions with the trunk lines. The distance that the Chicago & Illinois Midland hauls the coal is 5 per cent. of the total distance to Chicago. The through rate to Chicago is 75 cents, and of this the Chicago & Illinois Midland gets a division of 15 cents, or 20 per cent. The Interstate Commerce Commission held in the Illinois Northern case that a tap line rendering such a service as the Chicago & Illinois Midland does was not entitled to receive more than \$3.50 a car. The allowance made to the Chicago & Illinois Midland amounts to \$6 a car. In other words, the Commonwealth Edison Co., through its tap line, is receiving on every car of coal that this tap line handles what amounts to a published rebate of \$2.50 a car.

All the large meat packing concerns in Chicago belong to the Illinois Manufacturers' Association. They own the large packing concerns at points on the Missouri river. Seven years ago they bribed the Chicago Great Western, by a contract giving it a large percentage of their business, to reduce the proportional rate on dressed beef from the Missouri river to Chicago from 23½ cents to 18½ cents. The latter rate has been regarded by almost every traffic man in the country as excessively low. Last spring some of the railways started a movement to put the rate back to 23½ cents. The packers used the power that the control of a large amount of traffic gave them to get the Chicago & Alton to refuse to act with the other railways in raising the rate. The consequence is that the 23½-cent rate is now applied from Omaha, Neb., and St. Joseph, Mo., to Chicago, while the 18½-cent rate still applies via the Alton from Kansas City. The retention of the lower rate from Kansas City is an unfair discrimination against St. Joseph and Omaha. The making of the 18½-cent rate at all was and is an unfair discrimination against the shippers of practically all other kinds of traffic.

One of the complaints made by the Illinois Manufacturers' Association in the statement filed by its counsel, William Duff Haynie, at the rate hearing in New York, was that the railways had depleted their revenues by giving rebates to shippers and being fined for it. A few years ago the Burlington gave certain rebates to the Illinois Steel Co., which is a member of the

Illinois Manufacturers' Association. William Duff Haynie at that time was general counsel of the Illinois Steel Co. For giving those rebates the Burlington and two of its officers were fined an aggregate of \$60,000. Did Mr. Haynie advise the Illinois Steel Co. to accept the rebates, or did it accept them contrary to the advice of its counsel? And are these particular fines the ones the paying of which caused Mr. Haynie to deplore the reckless and unlawful way in which the railways have depleted their revenues?

Critics of the railways may say that they are at fault for allowing such grossly unfair discriminations as we have mentioned to exist. That is true. They ought to eliminate them from their tariffs. It is for the purpose of helping them to do so that the *Railway Age Gazette* is calling attention to them and intends to call attention to more of them in the future.

Mr. Noyes also expressed doubt as to whether the International Harvester Co. ever received any rebates, as charged by the *Railway Age Gazette* in the editorial in its issue of September 23. The Illinois Manufacturers' Association has talked so much

from the railways amounting to \$500,000 through the West Pullman switch road, and over \$3,000,000 through the Illinois Northern switch road.

Mr. Noyes having complained that the statements previously made in this paper regarding members of his association were generalities, we submit the foregoing facts as sufficiently specific.

CHICAGO & NORTH WESTERN.

THE Chicago and North Western for years has had a reputation for highly efficient maintenance of its property, and especially of its equipment, through the expenditure of very economical sums. There is probably no other railway in the country whose equipment is kept in as good repair at as moderate a cost as the North Western's. Before the classification for operating expenses was prescribed by the Interstate Commerce Commission, the North Western, in one of its annual reports, showed exactly what was spent for equipment, maintenance proper and what additional sums were spent for betterment or replacement. Of course, since the form prescribed by the



Chicago & North Western.

in the statements it has filed with the commission and issued for public consumption about rebating that we supposed its president knew all about the subject. Are the only people that he has any knowledge of ever having received rebates those who do not belong to his association? Is his knowledge of the affairs of concerns which do not belong to his association greater than his knowledge of those that do? Regarding rebates that have been received by the International Harvester Co., we beg to refer him to Interstate Commerce Commission Reports, Volume X, page 385, where he will find an opinion of the commission written by Commissioner Charles A. Prouty, entitled, "In the Matter of Divisions of Joint Rates and Other Allowances to Terminal Railroads." In this opinion he will find that the Interstate Commerce Commission used the following language:

"The International Harvester Co. owns the capital stock of the Illinois Northern and a controlling interest in the Chicago, West Pullman & Southern, operating as terminal connecting roads in and about the city of Chicago between the plant of the harvester company and various other industries and connecting roads leading to the Missouri river and other sections of the country. Until recently the charge received for services by those roads was a switching charge amounting to from \$1 to \$3.50 per car for the Illinois Northern and \$3 per car for the Chicago, West Pullman & Southern. These lines now receive, in many instances, a division of the rate which on lines reaching the Missouri river is 20 per cent. This amounts on from machinery to \$12 per car of 20,000 lbs., as against the former maximum of \$3.50 per car. A charge of \$3.50 per car by the Illinois Northern and of \$3 by the Chicago, West Pullman & Southern would be reasonable for these switching services, and charges for such services in excess of these sums amount to unlawful preference in favor of the International Harvester Co."

In a suit brought on July 11, 1905, by R. B. Swift, a former officer of the McCormick branch of the Harvester trust, it was shown that up to September 30, 1902, the trust received rebates

commission has gone into effect, other railways have made this same distinction, but the North Western was a pioneer in this nice accounting.

While the report meets the requirements of the Commission in giving details of expenses and betterment expenditures, it leaves something to be desired in the matter of description of property, weight of rails in track, miles ballasted, etc., and gives only meager details of traffic and car and train mileage statistics.

Last year the total operating revenue of the North Western amounted to \$74,200,000, comparing with \$65,980,000 in 1909. Operating expenses in 1910 amounted to \$52,200,000, comparing with \$43,200,000 in 1909. This entirely disproportionate increase in operating expenses left the company with a smaller net income in a year of heavy increases in traffic than it had in the previous year. Since maintenance expenses are the only ones that even the most fanciful of railway critics could possibly accuse a company of padding, it is of especial interest to study what has happened in the case of a road like the North Western. Last year maintenance of way cost \$10,770,000, an increase of \$2,350,000 over the previous year; maintenance of equipment cost \$9,150,000 in 1910 and \$7,850,000 in 1909. The following table shows the unit costs of maintenance:

	1910	1909
*Maintenance of way per mile.....	\$1,065	\$846
†Repairs per locomotive.....	2,300	1,029
Repairs per passenger car.....	580	464
Repairs per freight car.....	37	46

*Per mile of first, second, third, etc., track, the cost of two miles of siding and switch tracks being taken as equal to the cost of maintenance of one mile of main track.

†This is for repairs only and does not include renewals, depreciation or superintendence charges.

When the Atchison, Topeka & Santa Fe first began their

C. & O. is low. In 1910 it was 4.07 mills and in 1909 4.1 mills. The average revenue per ton of coal was 3.16 mills in 1910, which is slightly less than in 1909; and the average revenue per ton of freight other than coal was 6.5 mills in 1910, which is also a decrease from the average revenue of 1909. To handle profitably such a large percentage of low-grade tonnage at such a low-ton mileage rate, a line must have grades and equipment that will make possible a low operating ratio. Last year the operating ratio of the Chesapeake & Ohio was 60.6 per cent. This compares with 61.5 per cent. in 1909, and in this connection it is interesting to note that the average revenue train load in 1910 was 701 tons, comparing with 675 tons in 1909. This is a very heavy train load indeed and could only be handled over a road on which the grades were low and the roadbed and equipment fully up to modern standard practice. The Chesapeake & Ohio standard rail is a 100-lb. section. Its roadbed is well ballasted and it has a maximum grade of 30 ft. to the mile opposing eastbound traffic. The maximum grade opposing westbound traffic is 60 ft. to the mile, but from the situation of the coal fields on the C. & O. it is possible to haul coal westbound over a line with much lower grades than the maximum grades mentioned would indicate. The coal fields tributary to the C. & O. lie in the New River and Kanawha regions. Of the 15,000,000 tons carried last year it is probably safe to say that about 5,000,000 tons moved east and the remaining 10,000,000 moved west. The tonnage moving west largely originated in the Kanawha district and had a maximum grade of only 30 ft. against it, and that a single grade for but a few miles. The coal tonnage moving east over the James River division originated in the New River region; it is hauled over the one 30-ft. grade opposing eastbound traffic, and after this for almost the entire remaining distance to tidewater it seems from the profile that the coal can almost be carried by gravity. There are short branch lines running up into the coal mining region, and all of these lines, like ribs, slant down to the spine, represented by the main line of the C. & O.

On the completion of the second track, now under construction, the C. & O. will have two lines of track from Newport News, at tidewater, to Cincinnati, with the exception of nine miles in West Virginia and 48 miles in Kentucky, and the management figures that, if the present volume of traffic continues, it will be necessary to double-track the remaining 48 miles in Kentucky during the ensuing calendar year. Plans, surveys and estimates have been made for doing all of this double-track work, which will necessitate changing three tunnels which are now single-track to double-track. In the past few years a great deal of money has been spent on this second-track work. During 1910 37 miles of second track were completed, and since the close of the fiscal year 10 additional miles have been put in operation.

Last year the earnings of the Chesapeake & Ohio and its traffic returns did not show any of the advantages that may be expected to accrue to the road through its ownership of the shortest line between Cincinnati and Chicago and its ownership of a very important north and south line connecting the C. & O. main line with the Great Lakes. It will be of interest to see what the cost of the new properties has been to the C. & O. and what are the possibilities of developing these properties. The annual report of the C. & O. does not give any information about the physical condition or earning capacities of either its new Chicago Line or its Kanawha & Michigan-Hocking Valley Line to the Great Lakes, the latter two companies issuing their own reports.

The Chicago Line was in the hands of a receiver until June, 1910, and was bought by the Chesapeake & Ohio of Indiana under foreclosure sale. This is a subsidiary company, which has issued its securities to the C. & O. in exchange for advances made to it by the parent company. The Chicago Line is single track and, as we have said, the shortest route between Cincinnati and Chicago. Its entrance into Chicago is at present over Illinois Central tracks, which entrance, while having a number of advantages, is comparatively expensive, it is understood. The com-

pany can gain an entrance into Chicago, however, over the Chicago & Alton and the Lake Shore & Michigan Southern tracks at what would probably be more satisfactory arrangements than those that it now has with the Illinois Central. The Chicago Line, which is 85 per cent. tangent, is laid with 70-lb. rails and is in fair shape. Its grades are low, with the single exception of the grade out of Cincinnati for a few miles. Tentative plans are being considered for building a large yard at the top of this hill out of Cincinnati, and, since trains would in all probability have to be broken up in crossing Cincinnati from the C. & O. line to its Chicago Line, it seems likely that it will be found economical to handle traffic in light train loads up this grade and have through trains made up for Chicago in the yards at the top of the hill. To bring the line up to Chesapeake & Ohio standards eventually it will be necessary to relay the road with 90 or 100-lb. rails. A certain amount of ballasting will also be necessary.

The Hocking Valley is at present in much better physical shape than the Chicago Line, but it will be required to meet rather more exacting conditions and to be capable of handling traffic on a lower operating ratio than will the Chicago Line, because its tonnage will be more largely coal and ore. Stockholders of the Hocking Valley have been asked to increase the capital stock from \$11,000,000 to \$26,000,000; since the stock is quoted at above par, the ten to fifteen million dollars that the sale of this additional stock should bring will provide the company with funds for all the additional facilities needed in the near future for handling increased traffic. Its great advantage to the C. & O. lies not only in affording the company an outlet for its coal to the Great Lakes, but also in the opportunity that will be afforded for developing a movement of ores from the Great Lakes south into the Guyandot Valley. The region around Huntington, W. Va., is rich in possibilities of development as an iron manufacturing center, and the advantages of the establishment of new iron furnaces and iron and steel manufacturing plants along the lines of the C. & O. are obvious.

As to the cost of these two lines, the annual report of the C. & O. gives full information. To finance the purchase and to pay for the improvements, costing, in 1910, \$3,509,377, that the company is making on its own lines, the C. & O. sold \$31,000,000 convertible 4½ per cent. bonds during the year, on which the interest charges will amount to about \$1,400,000 a year. Last year the company paid about \$231,500 interest on these bonds. If we add the difference, \$1,168,500, to the total amount that the company was paying last year in interest and its funded debt, we find that the C. & O. earned pretty nearly double its 1911 interest requirements in 1910. As a result of the acquisition of the two new lines, the C. & O. has in its treasury among its unpledged assets securities with a market value of, roughly, \$20,000,000, taking the \$8,000,000 that the company has already advanced to its Indiana subsidiary for the Chicago Line at par, and figuring the Hocking Valley stock at 125 and the Kanawha & Michigan at 75. These free securities could, of course, be used as collateral to secure an issue of collateral trust notes or bonds. The company is not, however, in any immediate need of further financing.

Moreover, the balance sheet of the C. & O. for June 30, 1910, which, it may be mentioned, is an unusually simple and intelligible exhibit, shows the company in a strong position as regards working assets. The total working assets, exclusive of materials and supplies, are carried at \$12,207,967, of which \$7,740,333 is cash. Total working liabilities amounted to \$7,678,055, of which \$2,170,000 is loans and bills payable, against which the company has pledged equipment notes of equal amount. The only funded debt maturing in 1911 is \$2,000,000 first mortgage Peninsular division 6 per cent. bonds. In addition, the company has guaranteed a note of the Hocking Valley Railway for \$2,500,000.

As has been said, the Chesapeake & Ohio was paying 1 per cent. dividends on its common stock when the present management took hold of it. In 1909 this dividend was raised to 4 per cent., and in the last quarter of the fiscal year 1910 the directors put the stock on a 5 per cent. annual basis. On the

showing made in 1910 this action seems fully justified; moreover, it follows logically from the policy that had been pursued ever since the reorganization of the company in 1890. In the 20 years since that time net income, after deducting operating and interest charges, amounted to \$35,234,044, while the amount paid in dividends during the same period, including the dividend paid in 1910, totaled \$9,485,117. The stock, therefore, has been earning an equity of about \$3 to every \$1 paid in dividends, and it is logical that this equity should in time accrue to the benefit of the stock.

The following table shows the operations of the Chesapeake & Ohio proper, excluding the newly acquired lines in 1910, compared with 1909:

	1910.	1909.
Average mileage operated.....	1,937	1,897
Freight revenue.....	\$94,001,200	\$20,885,511
Passenger revenue.....	5,002,205	4,424,004
Total operating revenue.....	\$1,237,169	26,630,718
Maintenance of way.....	3,391,032	3,101,151
Maintenance of equipment.....	5,858,843	4,988,939
Traffic.....	535,208	466,042
Transportation.....	8,509,434	7,326,683
Total operating expenses.....	18,936,699	16,366,838
Taxes.....	873,744	801,600
Net operating income.....	11,426,726	9,462,280
Gross corporate income.....	12,588,091	10,171,143
Net corporate income.....	6,290,486	4,012,127
Dividends.....	2,668,486	1,255,814
Surplus.....	3,621,869	2,756,313

NEW BOOKS.

Practice and Theory of the Injector. Third edition. By Strickland L. Kneass, C.E. 171 pages; 6 in. x 9 in.; cloth. John Wiley & Sons, New York. Price, \$1.50.

Due to the changes in the design of locomotives since the publication of the second edition of this book, changes which have reacted on the method of feeding boilers and consequently on injector design, the present revision became necessary. Many of the heavy articulated types have no available space within the cab for an injector of the required capacity, and the trend is again toward the non-lifting form. Motive power officers are recognizing the advantages of utilizing waste products for heating the feed water or purifying it of scale bearing salts, and are giving more attention to the details of the boiler feeding accessories, which make for economy of operation as well as for the safety of both the passenger and employee. In the alterations and in the additional chapter of this third edition, special reference is made to modern accepted practice. It has been the object of the author to present solutions of some of the most interesting problems, with illustrations drawn from practical tests, and to describe in detail the functions of different parts of the injector.

Strikes. When to strike, how to strike. By Oscar T. Crosby. New York. G. P. Putnam's Sons, 1910. 202 pages, 7 1/2 in. x 5 1/2 in., price \$1.25 net.

This little book should be read by every man who belongs to a labor union and by any person who is at all uncertain as to his views about the theory and philosophy of strikes. It is in large print—only about 200 words to the page—and therefore is easy to read, and the author writes both clearly and forcibly. The first half of the book is, or seems to be, almost wholly theory, though there is plenty of fact and illustration, and the style never tires the reader. On the moral side the author sets forth just what is and what is not to be found in the strike as it usually manifests itself; but, on the legal side, he gives up the profitless task of trying to set forth what is or is not legal—which would require 40 answers for the 46 states—and discusses what *ought to be* legal. In the latter part of the book Mr. Crosby deals more directly with actual conditions in the industrial world. He sees very clearly and accurately and presents his whole subject with real impartiality. He points out that the real competition is not between capital and labor, but between workers and workers; that in no way the rank and file of employees strike not against the impersonal thing known as capital but against the managers, who are really workers. The most instructive chapter in the book, and the longest, is the ninth: "Who Will Furnish Higher Wages?" This will well repay a second reading by any workman who thinks that he can compel an employer to pay high

wages when the business will not warrant an increased expenditure. The only way to secure the production of a larger fund from which wages can be paid is to co-operate with the manager or employer in more efficient production. While avoiding the expression of opinion, devoting himself mainly to a discussion of principles, the author declares himself in favor of the short day, eight hours or less, for workers in all irksome, indoor, treadmill and uninteresting occupations, and of the piecework principle for increasing efficiency. He holds that arbitration cannot be a universal cure for labor troubles, and that the sympathetic strike does not pay, and the boycott and picket are looked upon favorably, at least in principle. The publishers are so anxious to please their British readers that they use British spelling to the extent of introducing "waggons," "organise" and "tram-car," as well as "honour" and "endeavour." Next we know they will be labouring to legalise the introduction of British schedules in all of our print-shop work. Thus the complacent Englishman will grow more complacent, whilst the poor Yankee, though desirous of sticking to home customs, must worry along as best he can.

Everyday Freight Rules and Tariff Manual. Compiled and issued by Charles E. Bell (chief clerk, General Freight Department, Southern Railway). 81 pages; 11 in. x 8 in. Price, \$1.

The object of this book of freight rules is to show in a comprehensive manner the practice of railways in the arrangement of tariffs. It includes the rulings and interpretations of rulings made by the Interstate Commerce Commission on the matter of arrangement of tariffs and in regard to the form and substance of these tariffs. The subject is a particularly intricate one and is given especial interest at present by the provision of the Mann-Elkins amendments to the act to regulate commerce. By one section carriers are made liable for mistakes of

their agents in quoting rates, and penalties are fixed for mistakes. It becomes, therefore, more than ever necessary for agents to be thoroughly familiar with the construction of tariffs and to be able to correctly quote a rate. While it is not any more important now than it was previously for shippers to be able to make their own investigations as to rates, this subject is of so great importance that any attempt to make the investigation of tariffs more easy for shippers is to be heartily welcomed.

The *Everyday Freight Rules* has two primary uses. In the first place, it should serve as a text book, from the study of which a railway agent or shipper should be able to learn how to use railway tariffs. This object the book under review serves very well indeed. The subject is treated as simply as such a complicated subject very well can be. The book contains numerous illustrations of the use of tariffs, and in these examples gives full explanations. Any student who is making a careful study of the use of railway tariffs can easily provide himself with a number of examples.

The second use of the book is to enable the shipper or agent to check up rates with the help of the rules and examples laid down in the *Everyday Freight Rules*.

The other object of the book, and the one for which it will probably be used most by railway agents, is to furnish an indexed compendium of the interpretation and rulings of the Interstate Commerce Commission in regard to what may be lawfully included in a tariff. The *Everyday Freight Rules* is divided primarily into (1) an index, (2) a set of definitions of terms, (3) a set of rules and Interstate Commerce Commission rulings in regard to routing, transit privileges, changes in rates, filing tariffs, etc., and (4) a set of typical tariffs, together with examples of their use. The first requisite of such a book should be an exhaustive index. In this respect the *Everyday Freight Rules* leaves something to be desired. If one has made a careful study of the book, and is already familiar with the use of tariffs, the index given should be ample; but from the point of view of a shipper or agent whose experience has not been great and who has not previously made a study of the book as a whole it would have been desirable to have made a more complete index to the subject matter. For instance, "private sidetrack" is given in the definition of terms, and reference is made to a conference ruling defining a private sidetrack; but under the general index there

is not loading "private material." We do not mean to imply that an intelligent investigator could find what he is looking for in the book, but it would seem that some advantage would have been gained, especially for the unsophisticated investigation—and such are not lacking either among shippers or railway agents—if the general index had been made so complete that a knowledge of the arrangement of the rest of the book would not have been necessary. This defect is not of vital importance, however, because the book is just as large as any publisher that expects who wishes to use it ought not to be willing to make a study of its arrangement before undertaking to look for information on a given subject.

The book fills an actual need of both shippers and railway agents, in that it brings together in a handy form the rules that govern loads in the Interstate Commerce Commission's regard to freight shipments and rates. The Interstate Commerce Commission's own publications are so voluminous, and the most important ones deal with freight and with passenger tariffs, and often with a number of other subjects that do not come directly under either of these heads, that a segregation of rules applying only directly to freight is well worth while.

Letters to the Editor.

COURTESY TO FELLOW EMPLOYEES.

Van Buren, Ark., Sept. 2, 1919.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

From a considerable number of articles appearing in the *Gazette* bearing on courtesy, I judge that it is the idea of some that courtesy is not being taught railway employees. On this railway regular monthly class meetings are held, in which train and engine men are instructed on courtesy, rules and other things that are of benefit to employees and the company. The letter of W. L. Park, which I believe you printed, has been copied and distributed here.

I believe that courtesy is being taught railway employees quite generally, and employees are being disciplined for not being courteous and polite. Good results will be had from the publicity given this important feature of railway operation by the *Gazette*.

R. F. CARR,
Trainmaster.

EXTRACTS FROM CIRCULAR RECEIVED FROM MR. CARR.

The patrons of the company have no way of knowing but that a discourteous employee is carrying out the policy of the road; it therefore behooves every one to be very careful at all times and guard against incivility to any one, whether patron, citizen or fellow employee. If citizens, they are likely to be patrons, and by your very acts you may determine to what extent they shall become patrons. You should be courteous and polite to fellow employees in order to get the habit. Courtesy is the most essential feature of the operation of a railroad; it outranks service. If courtesy and service were equal and the standard of either for any reason had to be lowered, I would by all means say lower the service, and, if possible, raise courtesy in proportion.

On a certain well-managed road a passenger said: "Why, when they are asked a favor that they can't grant, they decline in such a way that leaves the impression that they regret their inability to comply with your request. * * * It is true it takes a little longer to get a car over the road than over the X. & Y., but when you make inquiry about your freight you always find a willing employee that is anxious to tell you all about it and explain why it is late in arriving. Then, again, when you have occasion to file a claim for freight that is damaged or short, which is seldom the case, the agent does not look at you as though you were a thief trying to rob the company, nor does he require you to answer a dozen foolish questions as though he were fishing for a loophole through which to evade the claim. * * *"

This road was one not financially or physically as well

equipped as the X. & Y., but what they lacked in being able was more than made up for by the employees, who had learned the value of courtesy. Such conversations as this can be heard at any time around hotels and on trains.

THE CAR DEMURRAGE BUREAUS.

By A. W. JOHNSON, General Manager,
Cleveland, Ohio, Sept. 16, 1919.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The essay on "The Car Demurrage Bureaus," in your issue of September 9, if written some fifteen years ago, would have been received as "current literature," but in this era, when the tendency is away from permitting some one else to do for you what you can and should do better yourself, the arguments in favor of maintaining superfluous bureaus are a wasted literary effort.

The conditions now surrounding the handling of car equipment, its loading, movement and unloading, compared with those of the period when the old car service associations were organized, are, as we all know, entirely different. There is no need for lengthy analysis of the dissimilarity. We all recognize the value of co-operation and uniformity of practice along certain lines in railway administration. By a slow process of evolution, the underlying principles of car demurrage have now taken exact form, and instead of the disjointed and dissimilar codes of rules and regulations in effect in different territories we have an exact and uniform practice, sanctioned by federal approval, and issued as a legal code of rules and charges in the form of a tariff.

During the years in which the car service associations were in a formative state, their main province was to induce their members to play fair, and the managers were umpires, as well between the railways and the shippers as between the companies themselves. Gradually there came into existence a class of demurrage experts; campaigns of education were successfully conducted to enlighten the shipper and educate him to co-operate with the railways, and the varied "interests," great and small, were finally brought to see that the true policy was to co-operate and thereby help themselves while helping the railways. Great latitude, however, was assumed by car demurrage experts in interpreting and applying the rules in certain territories, and the tendency toward preferential treatment of certain large owners of cars, who were also large consumers of raw material, had to be curbed. Car service collections, as a source of revenue, were frowned on. Managers of car service associations were mainly concerned in securing release of cars, a duty naturally falling on the railway owning or handling them, but often neglected.

The evolutionary progress finally reached a period when governmental regulation took a hand in the interpretation and application of the principles surrounding the problems. The shipper as well as the railway has come to recognize the futility of evasion of responsibility for an exact compliance. The rules are of uniform application, and it only remains for the railway company to enforce them honestly.

The comments of the author of the article referred to on the continued need of supervision by a corps of inspectors to spy out derelictions of the companies in evading the law are a direct indictment of the good faith of those railway officers who long ago reached the conclusion, verified now by their own experience and the significant action of a large number of others, that an efficient and harmonious enforcement of car demurrage regulations can be secured without the intervention of the machinery of a demurrage bureau.

The writer "led off" in the abandonment of this form of adjunct in enforcing car service rules, and he has no reason to change his opinion that car demurrage bureaus are an entirely superfluous appendage to a well ordered railway car record department.

A. W. JOHNSON,
General Manager.

AMERICAN INGOT IRON—ITS DEVELOPMENT AND PRODUCTION.*

By GEORGE L. FOWLER,
Associate Editor, *Railway Age Gazette*

In the *Daily Railway Age Gazette* of March 16, 1910, there appeared a short description of the general characteristics of American ingot iron. The material is, however, so interesting and valuable, both from a metallurgical and from a commercial standpoint, that it deserves more than this passing notice, for it furnishes the strongest support we have yet had on a large scale of the soundness of that somewhat complicated hypothesis—the electrolytic theory of corrosion.

DEVELOPMENT OF THE PROCESS.

In 1905 the Department of Agriculture published a bulletin by Allerton S. Cushman on the corrosion and durability of fence wire. He drew the conclusion that the presence of manganese in the metal was responsible for the premature rusting, because, so far as he had carried his investigations at the time, he had found that the rapidity of the corrosion increased with the amount of contained manganese. Meantime the American Rolling Mill Co., Middletown, Ohio, had been at work in an attempt to cut down the manganese in its low carbon steel, and had proceeded somewhat on the principle that has been attempted in the reformation of drunkards: the gradual reduction of the daily potion. The company had commenced by reducing the amount of manganese thrown into the ladle of its open hearth product, and gradually cutting it down until none was put in at all. The manganese, as is well known, is used, in ordinary steel work, as a deoxidizing agent, and to counteract the effects of the high sulphur that commonly obtains. The reason is that the sulphur has a stronger affinity for the manganese than it has for the iron, forming a grey sulphide of manganese that appears in small scattered particles, which, some authorities maintain, has no detrimental effect on the metal, whereas the black sulphide of iron tends to segregate and form patches of some magnitude and thus weaken the metal. In addition to this, it (the black sulphide of iron) is more soluble in the molten iron than the sulphide of manganese, so that the latter is more likely to separate and not be included in the cold metal. But the experience of the American Rolling Mill Co. proved this addition of manganese to be unnecessary. After the use of manganese in the ladle had been entirely done away with, the process was continued by going to the furnace itself and reducing the amount put in the bath. By gradual reductions here, the use of manganese in the furnace was also eliminated.

By this method, then, the manganese content of the metal (it was a very mild steel) had been cut down from .35 to .30 per cent., and thence by small changes of .05 per cent. or less, until it had been reduced to .15 per cent. A prominent scientist recommended that a metal be made containing .10 per cent. manganese or less. The specification was a pretty stiff one, but the prize was worth the struggle and the work was started at once with that .10 per cent. as the goal. By a careful selection of stock, using pig and scrap as low in manganese as could be obtained and extending the time of heating, the percentage was gradually reduced until the limit imposed by the specification was reached.

But if a .10 per cent. manganese content gave better rust-resisting qualities than .15 per cent., it necessarily followed that a further reduction would improve the product still more. Then followed a long series of experimental heats for the reduction of the manganese and sulfur. When the manganese had been cut down to .06 per cent. the carbon stood at from .04 to .04 per cent., and the average analysis of the metal produced was about as follows:

Carbon	.06 to .08 per cent.
Manganese	.06 " .08 "
Sulfur	.010 " .016 "
Phosphorus	Trace " .001 "

It will be seen from this that little or no attention had been paid to the last two impurities, and it was not until the point indicated by the above analysis was reached that the thought came up of attempting a cut in these impurities as well as to

obtain a further reduction of the carbon and manganese. As it stood, a metal was produced that was about 99.85 per cent. pure, and a further elimination of impurities meant an output that would approach very closely to a pure ferrite.

There were two strong commercial incentives toward attaining this result. The electrolytic theory of corrosion had been promulgated a few years before, and, as evidence was accumulated, it pointed more and more directly toward the probable soundness of the hypothesis. And as this theory indicated the probable great resistance to corrosion of a pure and homogeneous metal, that is to say, of a ferrite of uniform density, it was evident that the commercial possibilities of such a material were very great.

The second incentive was the growing demand for a pure iron for use in the construction of the cores of electrical machinery. A metal that had high magnetic permeability and which would not take on a permanent magnetization was wanted.

The attainment of both of these results was promised if the metal, pure as it was, could be still further improved. So a program was mapped out by which all of the impurities were to be cut down to a minimum. The method pursued was to first cut out the addition of the usual .030 or .040 per cent. of phosphorus that was considered necessary in order to have the metal pour readily and roll well. The phosphorus already in the metal, as well as the excess sulphur, was eliminated by the addition of a carefully selected and very pure limestone, that formed combinations with calcium, which passed off in the slag. That this work might be carried to the utmost limit great importance is attached to the quality of the limestone, which is selected with the greatest care, and is of an average analysis that will be given later.

The silicon, of course, disappeared at an early stage of the purification, and was entirely gone, as we have seen, in the iron produced when the manganese stood at from .06 to .08 per cent. with the carbon a point or two lower. In fact, under working conditions, the silicon is about all gone by the time the charge is melted. This is followed by the phosphorus, then the carbon and manganese; the phosphorus disappearing at a fairly low temperature.

PRESENT PRACTICE.

At the end of the effort a general specification was issued, and the mill is held rigidly to it, that the total impurities shall not exceed .06 per cent., a point away below what was declared two years previously that, for manganese alone, would have given the best non-corrosive metal in existence.

That this specification is met and lived up to at the furnaces is shown by a reference to the records of the heats. An analysis is, of course, made of each heat, and recorded. That record was turned over without reservation, for the investigation upon which this article is based, and heat after heat would run from .055 to .058 per cent. of total impurities. Once in a great while it would rise to .061 per cent., but this was so rare as to be out of the running. Two analyses, taken at random, are given as representative of hundreds in the record. They are:

Sulfur	.029 per cent.	.028 per cent.
Phosphorus	.004 "	.004 "
Carbon	.01 "	.01 "
Manganese	.01 "	.02 "
Total impurities	.049 per cent.	.05 per cent.
Purity of metal	99.941 "	99.945 "

It will be noticed in this that the silicon has been entirely eliminated from the ingot metal.

Like most other things of importance, the method of working and the furnace practice is exceedingly simple. In fact, like the standing of an egg on end, it is very easy—*if you know how*. And, like the proverbial production of a silk purse from a sow's ear, this pure metal cannot be obtained from anything but the best of materials. For that reason the greatest care is exercised in the selection of the scrap. Miscellaneous materials will not do at all. There is in the company's yard a pile of thousands of tons of what would be called first-class scrap—pipes, bars, etc., which cannot be used because of the impurities that it contains, jumps the sulphur. Carefully selected materials must therefore be used.

*Copyright, 1910, *Railway Age Gazette*, Inc.

The heating is conducted slowly and until the metal in the bath becomes fairly quiet, a condition which the aluminum added to it makes it possible to attain. The temperature is also high, 2,900 deg. Fahr. being the minimum at which the tapping can be done. It runs from this up to 3,200 deg. Fahr.

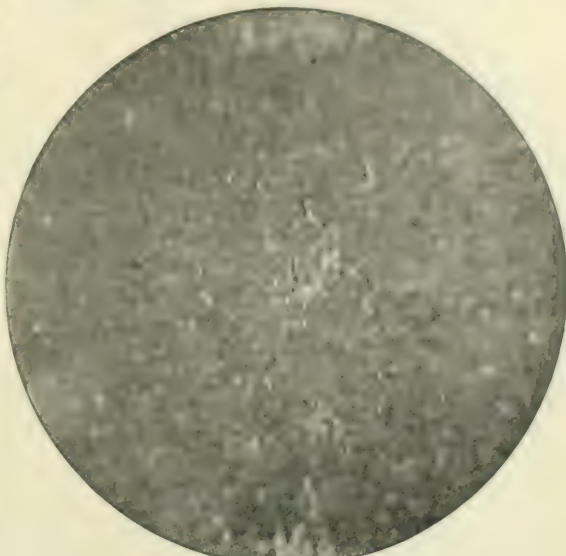
From the furnace the metal is run into a 60-ton ladle. The metal is poured into ingots of 250 and 1,800 lbs., bottom pouring being used. At present only the lighter weights are rolled at Mid- deltown, the heavy being sent to outside mills, though it is the intention in the new works which are being built to use top pouring and 6,000 lb. ingots, as it is thought that the hot metal coming in at the top until the last will afford a better opportunity for the escape of the gases.

This explanation cannot yet be accepted as having been demonstrated to be true beyond all doubt, but is the most plausible one that has been formulated up to the present.

The cropping from the head of each ingot is about 10 per cent. at the length.

As the melting progresses samples are taken at 15-minute intervals toward the end of the heat for carbon and manganese determinations. It is found that as the oxidizing ingredients are added the manganese first drops down to just above the carbon content, then the two move in approximately parallel lines until

taking 25 grams of the finely divided metal, heating it in a platinum boat in a quartz tube heated to redness and passing over it a stream of hydrogen which had previously been raised to the same temperature by passing through another quartz tube heated to redness. The hydrogen is first dried by passing through caustic

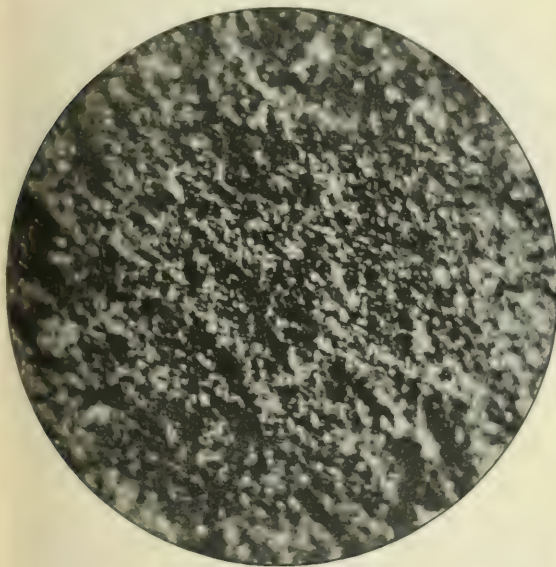


Ingot Iron, After Acid Test.

Magnified 14 diameters.

tic soda and sulphuric acid, and as it leaves the first tube the water formed is absorbed in phosphoric anhydride, the moisture in the metal is absorbed in phosphoric anhydride and weighed.

The effect of the oxygen in the metal is immediately noticed when the sheets are galvanized. Its presence causes a blistering of the zinc and a sheet that is defective; it is for this reason



Wrought Iron After Subjection to Acid Test.

Magnified 14 diameters.

the carbon has fallen to about .01 per cent. Beyond this it remains stationary and the manganese continues to drop, crossing and becoming the lower of the two.

Knowing now the detrimental effects of an excess of oxygen in the metal and the consequent necessity of keeping it down, every metallurgist and furnace man will appreciate the nicety and delicacy of manipulation required to maintain such a balance that the carbon, manganese, sulphur and phosphorus shall be eaten away to a minimum and not leave an excess of oxygen or something else equally detrimental.

Up to the present comparatively little has been done toward the elimination of the injurious nitrides, but these are now to be subjected to a systematic attack in the new research laboratory that is nearing completion.

It has been found in the manipulation of the metal and the rolling into sheets, in which the whole output of the mill goes, that the included oxygen has a very important influence on the behavior of the metal in the rolls and the character of the finished output. For that reason, oxygen determinations are made of every heat and every effort made to keep it down. The maximum permissible is .04 per cent. The determination is made by



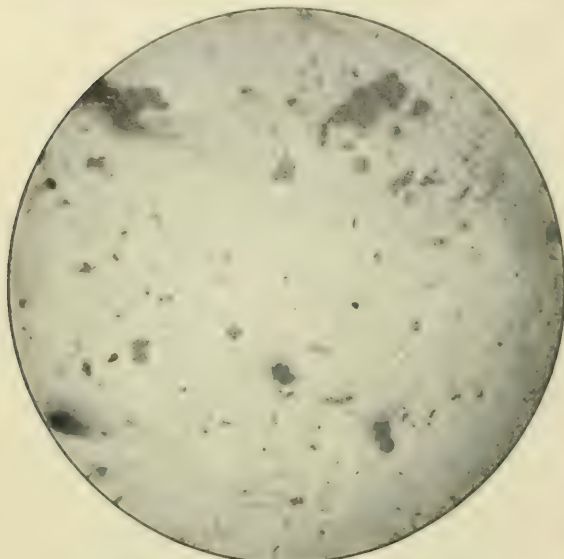
Steel After Acid Test.

Magnified 14 diameters.

that this mill is one of the few in the country, if, indeed, there is any other, that makes a regular and systematic oxygen determination of every heat. It is not as a matter of purely scientific interest that this is done, but as a commercial necessity to meet the requirements of the business.

PROPERTIES OF THE METAL.

Now, having produced a metal of 99.94 per cent. purity, what of its physical properties? It is soft, ductile and easily worked and welded if treated in the proper manner. For welding a low melting flux is needed. In the works of the company a common



Polished Cross Section of Ingot Iron.

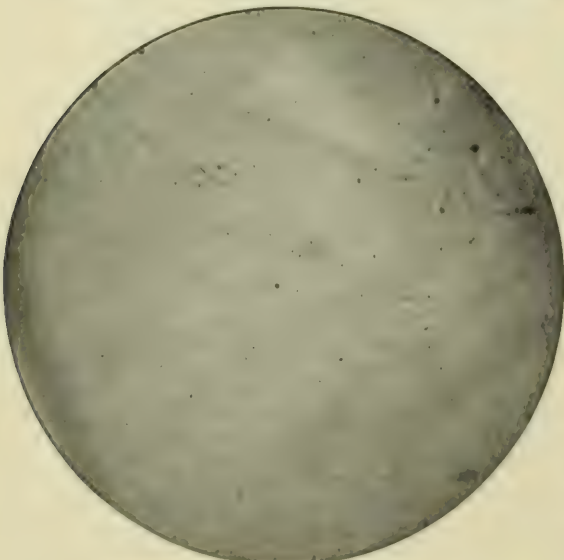
Magnified 34 diameters.

river sand is used in preference to borax. This sand has approximately the following composition:

Silica	95.93 per cent.
Iron	97 "
Oxide of iron	1.62 "
Oxide of aluminum	1.28 "
Lead .....	.20 "

With this the welding can be readily done.

In working, the metal acts something like steel. Its hardness



Polished Cross Section of Wrought Iron.

Magnified 34 diameters.

by the Brinell test is 520, annealed, and 180, unannealed. The general physical properties of a test specimen 8 in. long are:

Limit of elasticity	41,250 lbs. to 46,700 lbs.
Tensile strength	49,700 " " 53,900 "
Elongation	25 per cent.
Reduction of area	50 per cent. to 65 per cent.

For the sake of a comparison two tests of wrought iron are given as follows:

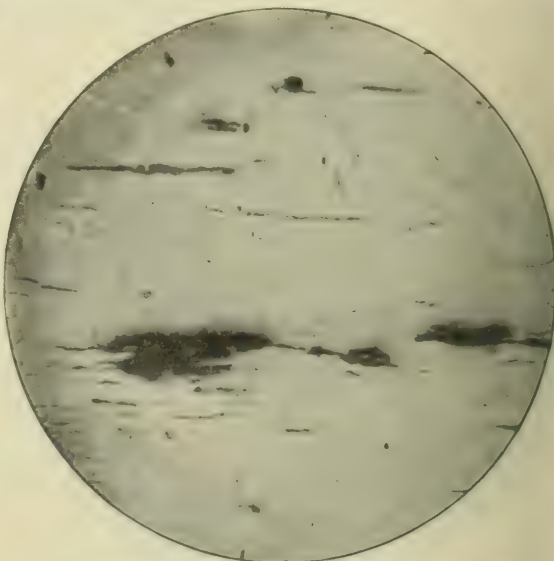
Iron	Swedish. Charcoal.	English. Wrought.
Limit of elasticity	27,104 lbs.	28,000 lbs.
Ultimate strength	59,916 "	49,600 "
Elongation	16.7 per cent.	17.2 per cent.
Reduction of area	56 "	59 "

From this it will appear that the purification of the metal has been of great benefit in adding to its physical properties by an increase of strength, the raising of its limit of elasticity, and of about doubling the ductility as represented by the percentage of elongation and the reduction of area. From this it is fair to conclude that the slag included in ordinary wrought iron is decidedly detrimental to its strength and ductility.

Now, as to that final quality, resistance to corrosion, that was the goal set at the outset of the work.

Briefly, the electrolytic theory of corrosion is this:

"When two substances of different polarity are immersed in a suitable electrolyte, an electric current is set up and the substance from which the current flows tends to dissolve." Hence rusting depends upon the presence of impurities in the metal or on a variation in the homogeneity of its structure for the development of this electric current. Under ordinary conditions, water is the



Polished Longitudinal Section of Wrought Iron.

Magnified 34 diameters.

electrolyte and forms the necessary connection between the impurities and the pure metal. The current thus set up is active in the liberation of hydrogen due to the solution of the metal. Oxygen also appears to be necessary, and, in the electrolytic theory, it serves to remove the layer of gaseous hydrogen which may accumulate on the surface of the iron, and also combines with the metal in solution, forming the oxide of iron or rust.

It is not claimed for ingot iron that it is absolutely non-corrodible, but that it is very much less so than any other metal of which iron is the base. It has been extensively used for corrugated culverts, but as to what the actual life will be it is impossible to state, as none have been in use for a sufficient length of time to give any indication as to when the ultimate failure will occur.

The best approach to what will happen is shown by a laboratory experiment, using sheets of cast iron, charcoal iron and steel analyzing approximately as follows:

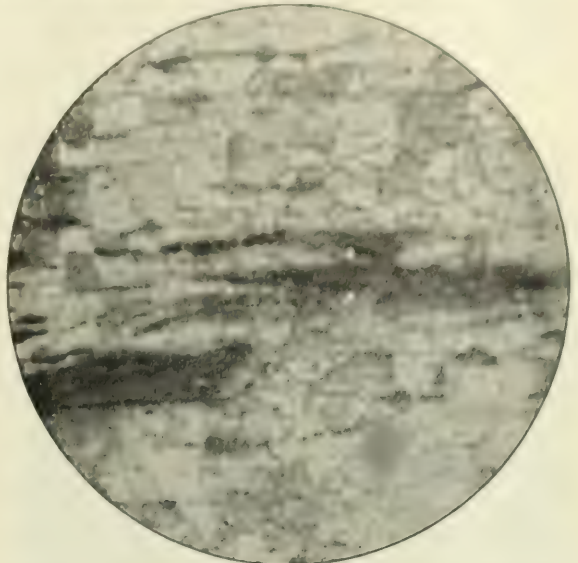
	Steel.	Charcoal Ingot iron.	Cast iron.
Carbon	1.4	0.70	0.70
Manganese .....	.35	.000	.015
Sulphur .....	.030	.001	.016
Phosphorus .....	.131	.013	.003
Silicon	Trace	.020	.001

Each plate measured 1 in. by 7 in. by 1.16 in. and they were sub-

merged for three hours in a bath consisting of a 25 per cent solution of sulphuric acid. The loss of the ingot iron was 2.42 per cent, of the charcoal iron 59.2 per cent, and of the steel, 50.5 per cent. The surface of the steel was left rough, about as the fine emery cloth. That of the charcoal iron was very rough and pitted, while in the case of the ingot iron it was quite smooth, the tool marks not even being obliterated, as shown by the photograph. These differences are brought out to a slight extent by the photographs, which show small sections of these surfaces magnified nine diameters.

In addition to these statements regarding the characteristics of the metal three microphotographs are shown, which bring out very markedly the difference existing between ingot iron and ordinary wrought iron. These photographs were taken with a magnification of 87 diameters. In the case of the two of wrought iron, one is from a section cut parallel to the direction of rolling and the other at right angles thereto. In the former the elongated filaments of slag are very clearly shown; while, in the cross-section, they appear as minute spots, so numerous that they cannot fail to

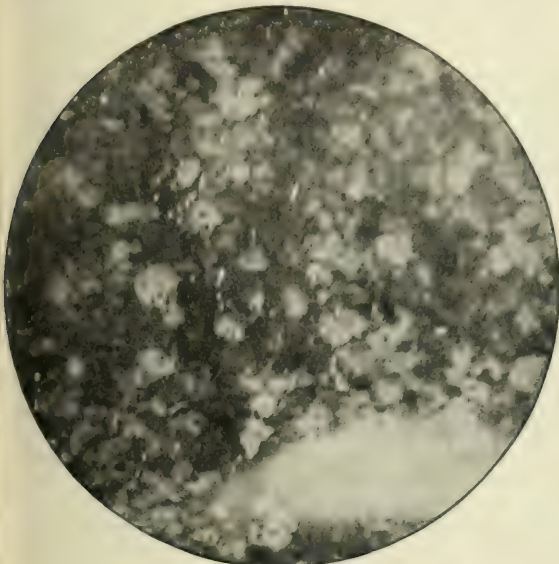
Norway. In a case where the maximum value of the magnetizing force was 50 Gilberts, the residual magnetism in lines of force per square centimeter was 8,350 for unannealed Norway iron and 3,770 for the annealed. With the ingot iron the values for the unannealed and annealed were 7,250 and 3,220, respectively.



Etched Longitudinal Section of Wrought Iron, Showing Slag Streaks.

Magnified 87 diameters.

It is a common statement in the textbooks that pure iron is not a commercial product and this is true in the sense that a perfectly pure iron has not yet been put upon the market, but the metal under consideration approaches this ideal purity so closely and the physical characteristics are so nearly identical with what would be expected from a pure iron that it may be considered as such from



Etched Cross Section of Wrought Iron.

Magnified 87 diameters.

have a weakening effect upon the tensile strength of the metal. This has already been alluded to in the comparison of the strength of ingot, Swedish and English irons.

On the other hand, the microphotograph of the ingot iron shows the crystalline structure of pure iron with the minute spots of the impurities scattered through. It is noticeably free from the slag spots and streaks that characterize the wrought iron and presents an almost typical structure of pure iron.

The second property that it was desired to obtain by the production of a pure metal was that of high electrical conductivity, as compared with steel or Norway iron. A test of this made with strips of annealed steel sheets of about .10 carbon showed that the conductivity of the ingot iron as compared with the steel was in the proportion of 6.37 to 7.27 in favor of the ingot iron, or approximately 14.1 per cent. better than the steel.

This was followed by a test on the conductivity of copper wire, an unannealed bar of Norway iron and a bar of ingot iron. In this the commercial copper wire was taken as 100; the Norway iron was 11.8 per cent. and the American ingot iron was 12.85. This is a rather lower showing than that given in the textbooks, but serves to indicate the relative conductivity as compared with the Norway iron. It is well known that an exceedingly pure iron is required for the cores of the magnets of electrical machinery, in order that the residual magnetism may be reduced to a minimum.

In this respect, too, the American ingot iron is superior to the



Etched Ingot Iron.

Magnified 87 diameters.

a commercial standpoint; and, aside from the scientific interest that it possesses, as demonstrative of the probable truth of the electrolytic theory of corrosion, it does possess the great practical values of high resistance to corrosion, good electrical conductivity and low magnetic retentivity.

FAIR RENTALS FOR PASSENGER CARS.

The report of the Committee on Conducting Passenger Transportation of the Association of Transportation and Car Accounting Officers, presented at its recent meeting at Colorado Springs, showed, from figures submitted by 16 representative railways that the increased cost of providing and maintaining passenger

that steel costs from 50 to 100 per cent. more, according to class of car. In view of this enormous increase, the committee asked for comparative figures of the cost of maintenance of steel and of wooden construction; but owing to the limited period during which all-steel cars have been in passenger service it was unable to obtain any useful information for this purpose.

The rate of depreciation, shown in the table given herewith, for all-steel cars, is 4 per cent. as compared with an average of 3.5 per cent. against wooden cars; but this is arbitrary, at best, and is not to be taken as indicating a necessity for charging off a greater rate of depreciation against all-steel cars, for the figures for steel were furnished by but two companies, both of which charge off 4 per cent. against both wooden and all-steel cars; while the figures for wooden equipment were received from 16 roads and the average represents rates ranging from 2½ to 5 per cent. It is obviously impossible at this time to definitely fix the rate of depreciation on all-steel passenger cars.

As the present mileage and per diem rates, as between railways, for passenger cars, were made by the American Railway Association about 20 years ago, and, as these increases in cost make these old rates very low, the committee recommends rates as follows:

Joint Service Rates.

Coaches and chair cars, 3 to 5 cents a mile, according to seating capacity.

Tourist and colonist cars, 3 cents a mile.

Dining, café, club and parlor cars, 5 cents a mile.

Combined passenger and postal cars, 5 to 5 cents a mile, according to length. Baggage-express, combined baggage-express, and mail storage, 1½ and 3 cents a mile, according to length.

Combined baggage-mail and combined baggage-mail-express, 2 to 4 cents a mile, according to length.

Per Diem Rates.

Coaches and chair cars, \$5 to \$8 a day, according to seating capacity.

Tourist and colonist cars, \$5 a day.

Dining, café, club and parlor cars, \$8 a day.

Combined passenger and postal cars, \$5 to \$3 a day, according to length.

Baggage, express, combined baggage-express, and mail storage, \$3 to \$6 a day, according to length.

Combined baggage-mail and combined baggage-mail-express, \$4 to \$7 a day, according to length.

Under the present practice of charging an arbitrary rate of \$5 a day for coaches and \$3 a day for baggage cars, etc., when lent on a per diem basis, regardless of capacity, the custom has prevailed of lending the poorest cars available. By providing a sliding scale of rates, according to seating capacity and length of car, an incentive is created for the lending road to provide the borrower with a better grade of cars; or, at any rate, the tendency to always pick out the poorest cars is largely or wholly neutralized.

The recommendations of the committee were not adopted by the association; the reason for non-action being apparently the

CLASS OF CARS.	NO. OF CARS OWNED	COST.	PRESENT ANNUAL AVERAGE MILEAGE PER CAR.	PRESENT AVERAGE ANNUAL COST OF MAINTENANCE.	RATE OF DEPRECIATION PER YEAR.	SEATING CAPACITY CARRYING PASSENGERS.	LENGTH OF BAGGAGE CARS, ETC.
Coaches—							
Regular							
Non-Motor							
Road B.	300	\$15,994.61	45,896	**	4½	88	69 ft. 7¾ in.
D	51	11,798.00	31,190			70	64 ft. 0¾ in.
Regular							
Motor							
Road D.	50	19,798.00					
Suburban							
Non-Motor							
Road E.	55	8,923.00					
Suburban							
Motor							
Road D.	132	12,313.49	26,438			52	51 ft. 4 in.
E	125	13,020.00				64	
Experimental							
Non-Motor							
Road A.	x 1	11,600.00	31,675			72	
C	1	13,135.72				78	
Combined Passenger and Baggage Cars—							
Road B.	51	14,500.00	46,592		4½	42	70 ft. 4½ in.
Baggage Cars—							
Road B.	30	10,500.00	67,780		4½		60 ft. 3¼ in.
A.	6	6,100.00					60 ft. 1½ in.
Dining Cars—							
Road B.	47	21,400.00	105,372		4	30	71 ft. 8½ in.
Postal Cars—							
Road A.	1	8,850.00	44,437				60 ft. 1¼ in.
B.	47	14,500.00	107,802		4½		70 ft. 0¾ in.
Postal Storage Cars—							
Road B.	27	11,000.00	134,972		4½		60 ft. 3¼ in.

* Car was in shops from January 11, 1909, to April 30, 1909.

** No record kept.

† Interest 5 per cent.

and baggage cars, as compared with 20 years ago, is from 50 to 100 per cent., according to class, with an average increase in seating space of cars carrying passengers of but approximately 25 per cent. and with an average increase in length of baggage cars, etc., of but approximately 15 per cent.

The cost of all-steel cars as compared with wooden shows

PASSENGER EQUIPMENT CARS (WOODEN CONSTRUCTION).										
CLASS OF CARS.	No. OF CARS OWNED TO-DAY	INITIAL COST.		PRESENT ANNUAL AVERAGE MILEAGE PER CAR.	PRESENT AVERAGE ANNUAL COST OF MAINTENANCE.	RATE OF DEPRECIATION PER YEAR.	SEATING CAPACITY OF CARS CARRYING PASSENGERS.		LENGTH OF BAGGAGE CARS, ETC.	
		Cost 20 Years Ago.	Cost To-day.				30 Years Ago.	To-day.	30 Years Ago.	To-day.
Coaches	10,115	\$4,905.06	\$9,488.11	42,812	\$529.28	3.44	50 to 72 avg. 61	62 to 86 avg. 75	.....	.....
Comb. Pass and Baggage Cars	1,791	4,268.99	7,687.44	36,813	489.65	3.25	15 to 44 avg. 31	30 to 53 avg. 42	45 to 80 ft. avg. 62 ft.	60 to 75 ft. avg. 68 ft. 6 in.
Chair Cars (owned by Railroad).....	628	6,494.80	9,796.77	78,650	964.72	3.74	43 to 60 avg. 48	53 to 85 avg. 69	.....	.....
Sleeping Cars (owned by Railroad)...	367	14,569.14	19,401.00	81,785	627.38	3.385	25 to 48 avg. 30	30 to 64 avg. 52	.....	.....
Parlor Cars (owned by Railroad) ...	329	9,614.71	13,616.67	37,870	556.01	3.45	24 to 43 avg. 33	30 to 53 avg. 39	avg. 60 ft.	60 to 75 ft. avg. 69 ft.
Tourist Cars (owned by Railroad)	145	5,900.00	11,863.00	68,739	550.00	3.55	.....	56	.....	.....
Colonist Cars (owned by Railroad)...	304	5,325.00	9,842.50	61,353	547.53	3.4	50 to 70 avg. 50	50 to 72 avg. 65	.....	.....
Baggage Cars	2,740	3,084.18	5,193.98	68,430	503.76	3.55	.....	.....	40 to 50 ft. avg. 51 ft.	40 to 70 ft. avg. 60 ft.
Express Cars	513	2,694.00	3,968.74	60,898	351.63	3.75	.....	.....	40 to 50 ft. avg. 46 ft. 8 in.	43 to 60 ft. avg. 52 ft. 3 in.
Dining Cars	465	11,332.80	16,960.35	94,498	888.62	3.14	20 to 40 avg. 28	30 to 40 avg. 31	60 to 79 ft. avg. 69 ft.	60 to 80 ft. avg. 71 ft.
Comb. Baggage and Mail Cars	1,612	3,455.74	5,760.59	69,371	491.32	3.53	.....	.....	40 to 60 ft. avg. 52 ft.	50 to 70 ft. avg. 61 ft.
Postal Cars	500	4,235.48	6,942.83	88,011	544.32	3.44	.....	.....	30 to 64 ft. avg. 54 ft.	50 to 64 ft. avg. 61 ft.
Postal Storage Cars	70	3,749.80	5,463.79	169,794	605.39	4.4	.....	.....	40 to 64 ft. avg. 55 ft.	60 to 64 ft. avg. 61 ft. 5 in.

objection of one or a very few interests. As in most inter-railway negotiations nowadays, a single objector seems to have more power than any number of progressives. There is no justification in logic or equity for maintaining arbitrary and excessively low rates on passenger cars. In dealing with freight cars, the magnitude of the accounting problem and the great complexity of the interchange question introduce such great difficulties that simplicity and uniformity are necessary, and a sacrifice of equity is warranted; but the work of accounting for passenger cars is comparatively simple. Why should not adequate rates be collected by every lender?

PHILIPPINE RAILWAY COMPANY LINES.*

The Philippine Railway Co. was organized to build lines on the islands of Cebu, Panay and Negros, about 100 miles on each. Work was begun in 1906 by J. G. White & Co., who had represented the syndicate of bankers who promoted the company.

The lines proposed penetrated jungle and wild lands not before inhabited, lacking roads, bridges or even trails in many sections.

Cebu island, about 100 miles south of Manila, has an area of 1,762 square miles, with a population of 590,000. Along the line of railway there is a population of about 310,000, or about 5,158 to the mile of line. The density is about 515 in the territory feeding the line. Cebu, the principal city, has a population of 56,000. The island produces hemp, tobacco, sugar, copra, corn and rice. The export of hemp from Cebu makes it the leading shipping port for that product in the Philippines.

The island of Panay lies about 300 miles south of Manila, with an area of 4,600 square miles and a population of 745,000. The line of railway serves a population of 315,000, or 3,500 a mile, with a density per square mile of 200. The land is fertile along the railway and most of it is under cultivation. The principal products are rice, copra, tobacco, sugar, hemp, native cloths and dried fish. Iloilo, with a population of 45,000, is the southern terminal of the line and is the largest sugar port in the Philippines. It is the outlet for not only all the sugar of Panay, but of the rich island of Negros as well. Much land suitable for sugar cultivation has been made available by the railway and a large increase in production may be expected.

In Negros, with an area of 4,881 square miles and a population of 460,000, the railway will serve about 250,000, with an average of 3,720 per mile of road and a density of 150 per square mile of territory affected. The western half of the islands is the great sugar producing region of the Philippines.

*An abstract of an article in the *Far Eastern Review*, to whom we are indebted for the photographs.

and it is the section through which the railway will operate. The capital of western Negros, Bacolod, is the terminus of the proposed line, and it will be connected with the terminus at Iloilo, in Panay, by a railway ferry over a distance of 25 miles. As Negros is without a good harbor, it is the purpose of the company to construct one at Bacolod. The principal products are sugar, copra and rice and lumber. Large tracts of sugar lands will be opened up by the railway and the production of sugar in the island should rapidly increase with improved transportation facilities and a permanent market.

The construction of the line in Negros will not include any heavy grading, but as there are a number of wide and deep



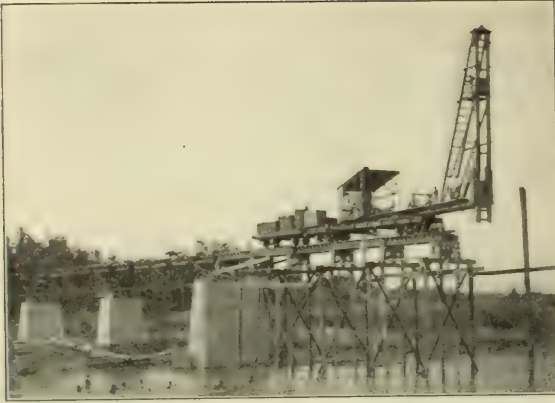
Standard Finished Track; Cebu.

rivers to cross, it will bring up the cost, while the pier and breakwater work at Bacolod will add a heavy charge to the construction of the line. Its successful operation will depend largely upon the development of the sugar industry. Definite location of the line has been completed, but no construction work has been done up to this time.

Much of the grading on the Cebu line was exceedingly heavy, and this, with the large number of rivers and streams to bridge, made the construction very costly, although no engineering difficulties were encountered. The necessity of combating the floods of the rainy season had to be considered in the construction of bridges, and while many of the streams are insignificant



Work in Rolling Country; Panay.



Bridge Construction; Panay.



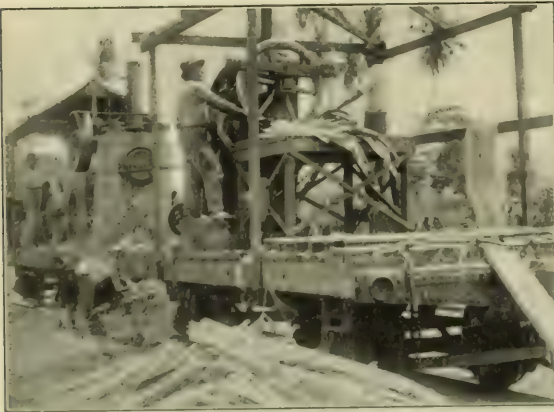
Bridge in Cebu with Enlarged Foundations on Account of Soft Bottom.



Standard Third Class Station.



Heavy Fill Work.



Traveling Maguey Stripping Machine.



Combination First and Second Class Coach.



Passenger Station and Office Building.

in the dry season, during the heavy rains they become swollen torrents. In all, on this line, the bridges aggregate over a mile in length, all built of concrete and steel.

At sub-grade the standard width of the roadbed was built 14 ft. on the shoulders with allowance for shrinkage and heavy rains. In conformity with the Philippine Government regulations the gauge is 3 ft. 6 in., as provided for all the railways in the islands. Australian ties were used in the early construction, but the native hardwood tie was later substituted and is now used exclusively by this company in all its construction. The ties are 6 in. x 8 in. x 7 ft. and native hardwood is expected to last at least 15 years. The maximum grade is 1 per cent. and

and tobacco growing industry in Cebu gives promise of large returns, and with better transportation facilities and prices the native will be encouraged to do his share. In the meantime an effort is being made to increase the supply of work animals with government aid and a well organized campaign against rinderpest is to be maintained.

The line in Panay was, last May, nearly ready to be opened from Iloilo to Capiz. The work of construction has been conducted from both ends simultaneously. The line from Iloilo to Passi, about 34 miles northward, is across an alluvial plain intersected by a few heavy ridges, the latter making very heavy work. From the latter point to Dumarao it crosses the watershed that practically divides the island of Panay into two great fertile plains. The southern approach to the summit is a maximum grade of 1 per cent. and on the north approach the grade is $1\frac{1}{2}$ per cent. for about a mile. The balance of the line from the watershed to the northern terminus at Capiz is across level country interrupted by irregular ranges of hills. The construction in the flat country is exposed to serious floods during the rainy season and it was necessary therefore to make fills from 15 to 25 ft. high. This, together with the heavy work in the hills and the many rivers to bridge, brought the cost up very high. The total grading is estimated at almost 4,000,000 cu. yds. and the steel and trestle bridges aggregate in length over $1\frac{1}{2}$ miles. The Panay river bridging aggregated 2,250 ft. of steel.

The main terminal is at Iloilo, and at this point the company has secured a site on the waterfront for large warehouses with a depth of water alongside of 24 ft. so that freight may be



Cot-Cot River Bridge.

the maximum curvature is 6 deg. The construction over the swamps and low lying agricultural lands was in many places very costly, as roadbed sank in some instances from 5 to 8 ft. In all, 1,860,000 cu. yds. of earth were moved. Ballast pins were located in the river beds and gravel used exclusively.

There are 22 station buildings, divided into first, second and third class, built of reinforced concrete; indeed, in all the buildings concrete and steel were used. This class of permanent construction was believed desirable even at a much higher first cost, in view of the serious deterioration caused by the climate and the activity of the white ant, as well as the security from loss by fire. Sixty pound steel was used for the entire line with the exception of 20 miles near Cebu laid with 70-lb. steel.

For maintenance of track Filipino labor is utilized under the supervision of white foremen. The mechanics in the shops include natives and Chinese working under white supervision. Filipinos are also employed for clerical work, as well as agents and operators, and the management has found them very satisfactory in each of these capacities. The conductors and engineers are Europeans, but it is expected that Filipinos will be substituted, with the exception of a few Europeans retained as instructors. As evidence of the accuracy of the native operators, the standard code of the American Railway Association is used in dispatching by telephone, and so far there has been no complaint as to their ability or adaptability to work accurately and speedily. There are eight regular mixed trains, four daily in each direction, making from 25 to 30 miles an hour.

The railway company is endeavoring to encourage the natives of Cebu in the cultivation of maguay and, co-operating with the Philippine Agricultural Bureau, has already distributed over 2,000,000 plants free of charge. In addition to this, the company has a maguay stripping machine which is installed on a flat car and moved from point to point to strip the plant without charge. The result has been great interest among the native farmers in this industry and it is expected that the export of this product alone will result in many millions of dollars coming into the province. An effort is being made to induce the farmer to undertake the best methods of culture and already the improved returns received on the better quality of fiber have impressed the planter with the advantages of giving his best attention to the growing plants. The development of the sugar



Standard 100-Ft. Span Bridge; Cebu.

transferred to vessels at minimum expense and maximum expedition. The site was practically an island forming one bank of the Iloilo river and much of the ground had to be filled in. The foundations for these buildings were laid on reinforced concrete piles. The central machine shops, etc., for both Panay and the Negros divisions, are located here. The shops are so equipped that the company can build its own locomotives.

In all, on the Cebu and Panay divisions there are 14 locomotives, 32 passenger cars and 184 freight and work cars.

The same standards are maintained in Panay as in Cebu, as well as the character of the skilled and unskilled labor.

As in Cebu, but perhaps more serious, has been the damage to industry by the rinderpest and surra among the stock, and at present many formerly prosperous communities are suffering from extreme poverty. From statistics available not over one-fifth of the rich improved lands are now under cultivation and, instead of a steady development of wild lands and the annual increase of the area under culture, many sections do not produce one-tenth of the returns of, say, a decade ago. The company is assisting the native to develop this section by distribution of seed and encouraging industry. In this the Philippine Government is giving generous support. With work animals or machinery, Panay province would become one of the most prosperous in the archipelago.

DEVELOPMENT OF ARTICULATED LOCOMOTIVES.

BY C. H. CARUTHERS.

An articulated locomotive is generally understood to consist of two distinct trucks, each of which contains the complete running mechanism of a single locomotive, but receives steam from a boiler common to both, to which they are attached by such side or center bearings and steam connections as will permit them to independently follow the curvature of the lines upon which they are operated.

The first of the type was built in 1831 at the West Point



Plan of the Double Boiler on the "South Carolina," Built in 1832.

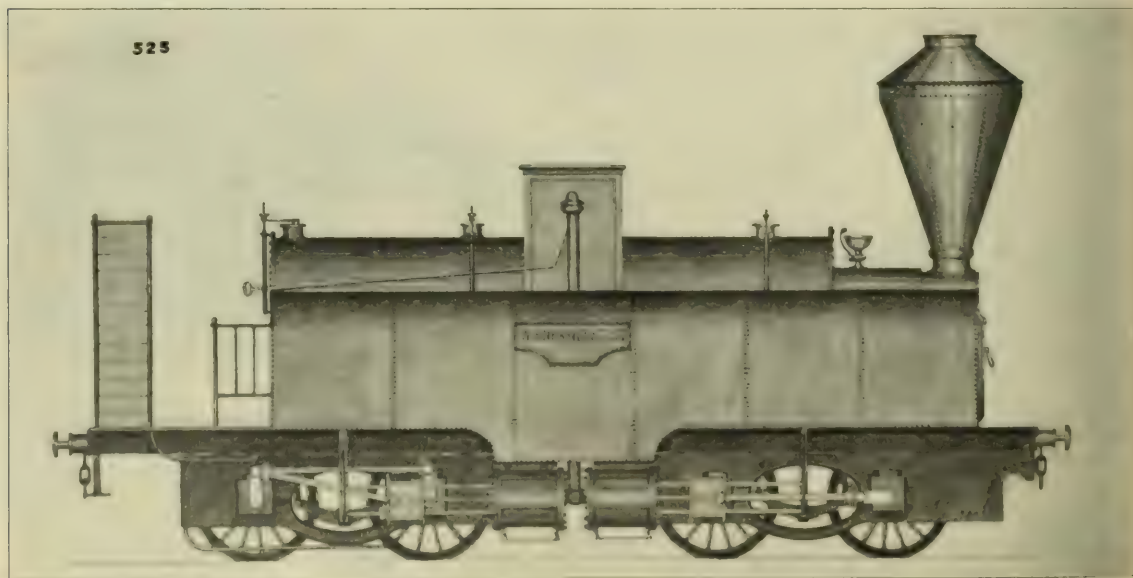
Foundry, from designs by Horatio Allen, for the South Carolina Railroad, upon which it was placed in service in 1832. It was named South Carolina and had two trucks with one pair of driving wheels and one pair of leading wheels in each, the driving wheels at the inner ends of the trucks. The center of each driving axle formed a single crank and but two cylinders in all were used. These were not on the trucks, but were placed at opposite ends of the engine at the bottom of the smoke-

which two parallel barrels extended in each direction, each pair terminating in a single oval smokebox surmounted by a tall smokestack. This entire combination was carried on the two trucks by suitable transverse plates and swivelling castings, practically as the body of an eight-wheel car is carried to-day.

In Clark & Colburn's "Recent Practice in the Locomotive," 1860, this engine is aptly described as a "locomotive in which the boiler of a single engine might be said to be placed upon the independent running gears of two ordinary locomotives," and the statement is added that by the end of 1833 four of these machines had been built and placed in service on the South Carolina Railroad.

Next in order, according to statements in an article in *Engineering* (London, England) of November 14, 1873, page 396, is Seraing, built in 1850 at Semmering, Austria, for the Semmering Railway. In this machine no weight was carried on the trucks at the pivotal points, but on the four bearing surfaces on each. This engine, the article referred to concludes, "soon proved a failure."

Hermann von Littrow, of Neustadt, near Vienna, Austria, a few years ago contributed an interesting article on Austrian locomotives to an American technical journal, and among the numerous illustrations accompanying it was one of an engine named "Neustadt" which is stated to have been built at Neustadt in 1851 for the Semmering Railway, "with its beautiful Payerbach Loop." The name plate on the side of the water tank of this engine is inscribed "Wiener-Neustadt," which is the name given to the shops in which it was built many years after the date assigned to it, but this plate may have been substituted for the original inscribed "Neustadt," in later years of its service. It was



Articulated Locomotive Built at Neustadt, Austria, in 1851, for the Semmering Railway.

boxes to which they were rigidly attached with sufficient inclination to enable their centers to coincide with those of the driving axles, to which they were connected by rods fitted with "ball" brasses, probably somewhat similar to those used by M. W. Baldwin in the parallel rods on the flexible trucks with which he for many years equipped his six and eight wheel connected locomotives. Although no mention is made of the fact in any of the numerous articles consulted about this engine, it is probable that similar connections were used in the valve gear, which is said to have had two eccentrics to each engine, and was doubtless of the "drop hook" type so generally used in early engines.

The boiler had a single smokebox at its center from the ends of

not unlike the Meyer type of articulated engine, having apparently a single boiler carried on two swivelling trucks with the cylinders at their inner ends. A peculiar rectangular construction at the center of the boiler contains the throttle valve, and from its sides the steam pipes are carried to the cylinders. Mr. Von Littrow states that the engine was not very successful, and that no others of the design were built.

From the data at hand I find it somewhat uncertain whether two articulated engines were built in the years 1850 and 1851, as just referred to, or whether the writers of the articles quoted from may not refer to the same engine. Each assigns a different name, place of building and date of construction to the engine he writes of, but the reference to only one in the historical sketch

referred to and the fact that both authors locate their engines on the Semmering Railway, lend color to the idea of reference to the same engine.

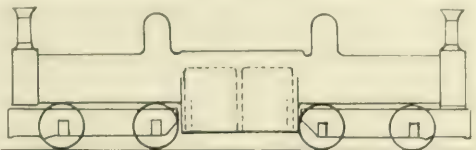
About 1861 Robert I. Fairlie, an Irish engineer, designed the articulated engine known by his name and during a number of years following many of these were built, especially for narrow gage and mountainous lines. This type generally has two swivelling trucks with their cylinders placed at the outer ends. The boiler is carried on a separate frame which rests upon the trucks through the medium of transverse bars and swivelling castings in such a manner as to permit independent movements of either truck in passing around curves. As usually built, the Fairlie boiler exactly resembles two ordinary locomotive boilers rivetted together at the side and roof sheets with the back heads removed, and the fire doors placed in the sides of the fireboxes, and with a cab about the size of that of an ordinary engine covering the central space between the two domes.

Some Fairlies built in later years have two distinct boilers with a firing gangway between, thus avoiding the use of fire doors in the sides of the fireboxes, as the usual double construction requires. In such instances, both boilers were carried on a single continuous frame, as where the standard boiler of the type was used, and the steam and swivelling connections to the trucks were the same.

In the issue of *Engineering* (London, England), for August 21, 1874, a double page inset contains eighteen small reproductions of erecting cards showing twenty-one of these engines that had up to that time been placed on various railways in Europe, North

past years built a number of engines for various American and Mexican railways with the running gear of the forward truck arranged on the Fairlie principle, and the tender carried on an extension of the engine frame and supported by a six-wheel truck without any self-propelling devices. In 1892, however, the latter firm built an engine for the Sinnmahoning Valley Railroad, in which the Vaucrain system of compound cylinders was applied to both trucks.

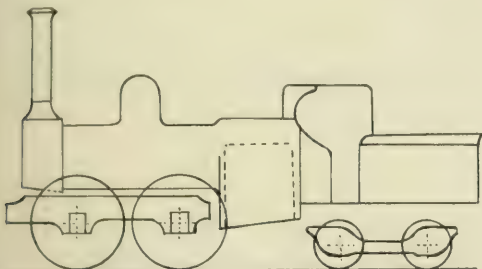
Although the resemblance of the Fairlie engines to the earlier Austrian designs may have been noticed, it is distinctly stated in the article referred to in *Engineering* that Mr. Fairlie was not even aware of the existence of these machines until after the construction of those built from his own designs.



"Little Wonder," Festiniog Railway (Wales).

4 cylinders	8 1/2 x 13 in.
Number of tubes	218
Diameter of tubes	1 1/2 in.
Diameter of driving wheels	28 in.
Weight, service	43,680 lbs.

The next link in the chain of articulated engines is the "Meyer." This type was designed by J. J. Meyer and his son, Ad. Meyer, of Brussels, Belgium, and my records indicate that their first locomotive was named "Avenir" and was probably built about 1873. The accompanying illustration of No. 300, built at the shops in Brussels, of the "Compagnie Belge pour la Construction de Machines et Material de Chemin de Fer (M. Charles Evrard, Director), Brussels," in 1873 for the Central Railway of Belgium, and exhibited in the same year at the exposition in Vienna, Austria, is partially reproduced from a most excellent set of drawings appearing in *Engineering*, London, of July 11, 1873, pages 35-36, and will convey a fair idea of the type, which it will be seen is practically a Fairlie with an abnormally long boiler of the single locomotive type. The cylinders of No. 300 are located on the inner ends of the trucks. One striking point in which the Meyer differs from the Fairlie is that no frame is provided for the boiler in the Meyer, but at the forward end a shallow rectangular box of wrought iron is riveted to the under side of the shell from a point some distance behind the smokebox and extending



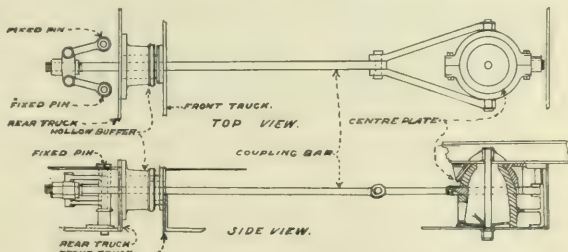
Fairlie Engine for the Great Southern & Western (Ireland).

2 cylinders	15 x 20 in.
Number of tubes	176
Diameter of tubes	1 1/4 in.
Weight, service	280,304 lbs.

America and South America. Eight have three pairs of driving wheels in each truck, and the weights range, as far as given, from 82,320 lbs. to 102,816 lbs. The cylinders vary from 11 1/2 in. x 18 in. to 17 in. x 22 in. Twelve of the lot have only two pairs of driving wheels in each truck, and range in weights from 43,680 lbs. to 51,520 lbs., and in diameter of cylinders from 8 1/4 in. x 13 in. to 13 in. x 20 in. One of the preceding twenty was used on a 5 ft. gage, six on gages of 4 ft. 8 1/2 in. and thirteen on gages ranging from 23 1/2 to 43 in. The twenty-first engine was for the Great Southern & Western Railway of Ireland, and only used steam in the forward truck, which contained two pairs of driving wheels and two 15 in. x 20 in. cylinders. The rear truck contained two pairs of small wheels and merely carried the tender, which was built on an extension of the engine frame.

One of the most notable of these was "Little Wonder." According to a description published in a guide to the London & North Western Railway of England, in 1876, this engine had each truck fitted with two cylinders, or four in all, of 8 1/2 in. x 13 in., and two pairs of drivers, or four pairs in all, 28 in. in diameter; and on the heavy grades of the Festiniog Railway in Wales, of only 23 1/2 in. gage, on which it was used, and often with three or four curves in the length of its train, it drew a maximum load of 61,600 lbs., consisting of itself, 3 passenger carriages (1st, 2nd, and 3rd class), 1 guard's van, 6 goods wagons and 112 empty slate wagons; the whole covering a length of 1,200 ft.

Both William Mason and the Baldwin Locomotive Works in



Truck Coupler for Meyer Engine.

forward almost to the front end of the latter. To the under side of this box is attached a phosphor bronze cap which fits upon the hemispherical top of an iron casting upon the frame of the forward truck near its center. Both this casting and the phosphor bronze cap are hollow and afford a passage way for the exhaust steam to reach the stack, the nozzles being located on top of the iron box in the smoke arch, and the flexibly connected exhaust pipes leading into the inner end of the casting on the truck. At the firebox end the boiler rests upon sliding plates which in turn move on two bearings of phosphor bronze, placed in suitable brackets on each side of the frame.

A hollow buffer is fastened centrally between the inner ends of the trucks and through this buffer passes a drawbar, attached at

one end to the rear truck by a rather unique device, and at the other to the front truck by a ring encircling the cast iron center bearing.

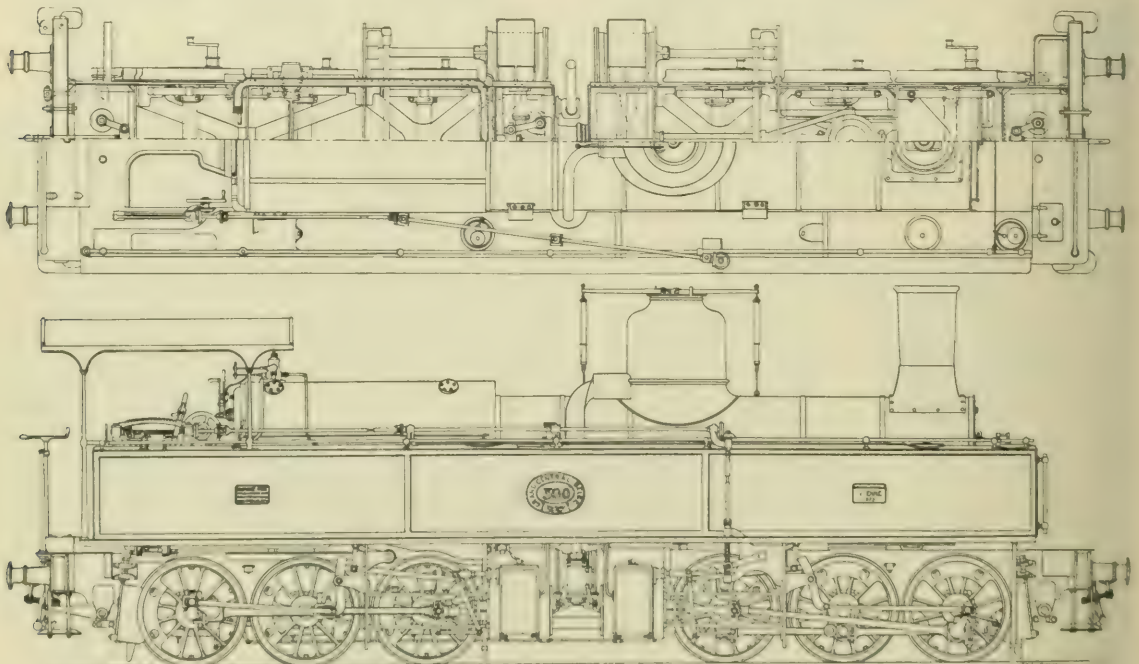
Two reversing apparatuses are used, one a lever and the other a screw. Two throttle valves with separate levers are also used, and both these and the reversing appliances can be operated together or independently, thus enabling only one or both trucks to use steam at the pleasure of the engineman. The brake of the rear truck is controlled by a hand screw, and that of the forward truck by a steam cylinder. The tanks and coal bunkers are bracketed to the sides of the boiler, although it is stated in *Engineering* that on "Avenir" they were fastened to the sides of the trucks.

About 1888 Anatole Mallet built the first of the type now so widely known as the Mallet articulated compound. It differs in many respects from those already described. The rear truck is connected rigidly to the boiler, the center lines of each coinciding; the forward truck does not swivel on center plates, but is coupled to the rear truck by a large pin passing through an extension of its frame at the rear which interlocks with the forward

greatly adding to the efficiency of the type by dividing the boiler and using the forward part as a feedwater heater; an arrangement which not only appears to be very successful in road service, but also enables single engines to be increased in efficiency by the addition of a forward truck with this improved extension of the boiler: thus converting them into Mallet compounds at a moderate cost.

Although the usual form of the Mallet compound is built with the cylinders of each truck at the forward end, a half tone in my possession shows one built a few years ago for the Northern Railway of France (du Nord) in which both sets of cylinders face as on the Meyer engine.

Some one has remarked that there is danger of the articulated engine being overdone in America. If this is the case it is unfortunate, as when the reaction sets in it might blind the eyes of railway men to the desirable features of the type. Perhaps the only indication of such a condition is in the design recently illustrated of a foreign development of the articulated engine in which the boiler is shown supported on huge longitudinal girders which are further extended at each end to receive water tanks



Articulated Locomotive (Meyer's System); Built for the Central Railway of Belgium in 1873.

transverse plates of the rigid truck, a unique system of transverse plates on the forward truck which enables it to both sustain the part of the boiler directly above it and at the same time permit the independent radial motion of the truck on curves; the use of high pressure steam in the cylinders of the rigid truck only where ordinary connections are used and the danger of leakage thereby eliminated; and the use of low pressure steam in the forward cylinders where flexible connections are used, thus enabling even these connections to be comparatively free from the leakage which is alleged to have given considerable trouble in the engines in which high pressure steam is used in both sets of cylinders. All connections are flexible.

According to a publication owned by the Baldwin Locomotive Works, "Record No. 65," page 29, it is stated that the first Mallet compound built in America was completed for the Baltimore & Ohio by the American Locomotive Co., in 1904, and that this engine has been followed by numerous others from the same company and from the Baldwin Locomotive Works.

The latter firm unquestionably is entitled to the credit of

and coal bunkers, and have the trucks located very close to the ends, one at each, the idea evidently being to use an unusually large boiler and deep firebox, yet keep both closer to the rail than is permissible on the usual articulated machine.

Standing beside one of the "Mallets" recently, and noting the various attachments with their numerous rods, pipes and fittings, I recalled an incident related several years ago in a railway journal regarding the Fairlie engine used on the Denver & Rio Grande. This story was to the effect that after the installation of that machine on the line, the only engineman successful with it was an Englishman. Coming under discipline, he was once suspended ten days, and being of a kindly disposition volunteered to show his substitute the details of the engine. After listening patiently for a time the latter blurted out, "Say, you take the engine and I'll take the ten days."

The writer is again indebted for data and other assistance tending to confirm the accuracy of many of the statements in the foregoing paper, to the Baldwin Locomotive Works and J. Snowden Bell, Esq.

TRANSPORTATION AND TRAFFIC IN SWITZERLAND.*

BY LOGAN G. McPHERSON.

Although 70 per cent. of her area of 15,973 square miles is mountainous, and which all told is but half that of the state of Maine, Switzerland has maintained not only national independence, but a creditable position in industry and commerce.

The soil produces food only about sufficient for the needs of two-thirds of the population of about three and one-half millions. Yet although the country is obliged to import much of grain and of meat for its own consumption, it is a large exporter of certain foodstuffs, mainly the products of milk. With the exception of limestone, largely used for building, the mountains have little of the minerals or ores of economic importance, yet in the manufacture of metal goods Switzerland has a world wide fame which is shared by her weavings of silk and of cotton. The abundant water power that was long ago directly utilized now serves to generate electricity for which a wider field is hoped, even to the extent of the complete electrification of the railways. At this time, however, the factories are mainly dependent upon steam generated by coal, which must be imported from other countries.

Under these conditions it is evident that Switzerland cannot in competition with other nations produce the bulky and heavy manufactures. The efforts of her workmen must perforce be devoted to the fabrication of the lighter and more delicate articles to the value of which skill and excellence of workmanship contribute in the greatest degree and crude material in the least. Adapted to this economic necessity is the high intelligence and the patient perseverance of the Swiss people that have brought a skill in handiwork which has augmented through the generations, and an adaptability that quickly led to the deft utilization of the elaborate machinery devised for the watch-making, the cotton, silk and leather industries.

The compact of 1848 by which the cantons were welded into the Confederation gave to Switzerland the national character essential to industrial and commercial growth. Custom houses were abolished in the interior and established on the frontier. The nation was in a position to discuss propositions for material improvement and naturally the new means of transportation that had attained a forward development in other countries, was among the first subjects to be considered.

The history is clearly and instructively set forth by Placid Weissenbach, president of the General Direction of the Swiss United Railways. A commission appointed in 1850 submitted a scheme for a system of railways designed to supply the transportation needs of the republic. Discussions as to whether the lines should be built and operated by the state or by private companies were conducted by men of ability. Those who favored state ownership pointed out that railways were but streets of greater importance and therefore the nation should develop and maintain them; that the railways could only be developed to their full usefulness by being kept in the hands of the state; that inasmuch as the railways of the surrounding countries were principally state-owned and state-operated, it would be doubtful if the railways of Switzerland could properly protect their interests if they were not likewise controlled; that if the railways were left in private hands there would be conflict between their owners, who would seek individual profit, and the state whose aim would be to utilize them in the national interests; that private companies would seek to develop only those railways that promised commercial profit, to the neglect of the lines needed for the facility of the postal service and the military necessities of the government; that the owners of private railways could with their large staffs of officers and employees be formed into an organization that would be a state within the state, susceptible of use in opposition to the national welfare. On the other hand it was argued that the construction and operation of railways by private companies would be of a far higher degree of efficiency, as their interest would be in the direction of economy and efficiency; that in the light of previous

experience the activities of private companies could be regulated so that they would not conduce to injury; that it was beyond the province of the state to incur expenditure for other than the national defense; that the construction or operation of railway lines would involve the state in obligations more extended than it ought to assume; that for the government to take shares in different companies would be to make it a factor in the stock market; and that subventions of the government to enterprises whose profit was not assured was inexpedient in practice and unsound in principle.

The latter views prevailed. The feeling against national control over the railways became so strong that by statute of June, 1852, the Confederation was divested of power to make concessions for railway building, this authority being left with the cantons. The law provided that the building of railways was to be under private enterprise which must obtain authorization from the cantons which must submit new projects to the Confederation, which was obliged to give its approval unless it was apparent that their carrying out would be to the disadvantage of the country from a military standpoint.

The first railway in Switzerland had been built by private capital to connect the eastern cantons by way of the Rhine valley with Basel, which had had rail communication with Germany since 1844.

Under the regime inaugurated by the law of 1852 there were constructed in the next ten years 716 miles of railway connecting one and another of the principal towns of Switzerland. It was with great difficulty that capital was obtained; the lines were completed only through pecuniary aid extended by the cantons and at great loss to the private investors. Notwithstanding this, additional lines were projected to meet the growing demand. The separate authority exercised by the different cantons over the railways within their respective limits rather early developed friction that debarred the adoption of a general policy for the movement of traffic. This cantonal disagreement was brought to a crisis in the discussion leading to the convention participated in by Germany, Italy and Switzerland for the building of the St. Gothard Tunnel. The law of 1852 had been drawn especially to define the relations between the private railway companies and the cantons. It did not particularly enter into the relations between the cantons and the Confederation in the control of railways. By 1869 a readjustment admittedly was necessary. To encourage the building of the railways the cantons had been liberal in extending privileges to the railway companies. As the lines were completed they came into antagonism with each other, and with the cantons, and their tariffs were the cause of public complaint. As in many cases one railway traversed two or more cantons, it was difficult to bring it under regulation.

After much discussion and not a little friction a new law was enacted on December 23, 1872, which put the general control of the larger transportation questions under the confederated government. It was no longer bound to consider only such concessions as came up to it through the cantons and to give its consent unless they seemed inimical to the military interests of the country, but it was empowered to pass upon concessions directly, the law especially enjoining that it promote means of communication with Italy and the Mediterranean. The law also provided penalties for derelict concessionaires, and for uniformity of construction and in methods of operation throughout the Confederation. The federated government was given absolute authority over tariffs, and provision was made for the settlement of disputes between the railways and the Confederation. It was definitely stated that while it was not the intention to deprive the cantons of adequate jurisdiction, the law was aimed at making the control of the railways national rather than cantonal. One reason for this had been the arbitrary attitude often assumed by the railway companies, and another the necessity for the maintenance of a national policy that would not deter investment in new and needed lines.

Concessions under the new law brought the length of the

*A preliminary report to the National Waterways Commission.

Swiss railways up to 1,653 miles in 1884. The capital expenditure to this time amounted to over \$176,000,000, the average exceeding \$100,000 per mile. The original concessions of many of the railway companies provided for the optional purchase by the government at the end of a specified period. Many of these periods terminated during the decade beginning with 1880. The Federal Council, after consideration beginning in 1883 of the governmental action that would be advisable, reported that the railways were capitalized too high and that they had paid larger dividends than ought to be allowed in the future, but stated that the financial condition of the Confederation was such as to prohibit any definite proposal to avail of the repurchase provisions of the concessions. The national assembly stood 67 votes to 59 in opposition to repurchase at that time.

The taking over the railways by the government had, however, been for many years, and continued to be an uppermost topic of public discussion. Those in favor argued that the railways of adjoining countries were passing into the hands of the state, the action of Germany being especially cited. They argued that if the Swiss government followed these precedents tariffs could be reduced for the benefit of commerce and that the profits of the lines would inure to the government instead of to the private companies, which were largely owned in foreign countries. The accumulation of public opinion in favor of government purchase led to the enactment in 1897 of a law authorizing such purchase and specifying the conditions under which it was to be effected. It was stated that the uniform operation of the lines was a desideratum, that if it were not undertaken by the government it likely would be sooner or later by a large shareholding company that would seek the greatest profit, whereas the government would operate the lines as highways for the benefit of the nation; that the centralized governmental administration would be more economical than that of the private companies; that tariffs could be reduced and made uniform; that the state would make use of the profits for the development of the lines and not in its general expenditure, therefore making expenditures for development that a private company would not be willing to incur.

The law provided that the government lines should be known as the "United Swiss Railways." It was desired that the administrative organization be made independent of political influence and yet that it be so closely connected with the government that there would be no danger of its becoming a state within a state, a body that might come into conflict with the government itself. The general control of matters of policy was placed in the Federal Council—the Bundesrath—and the direct administration of the railways under the control of a General Direction and an Administrative Council. Under these are the district directors for each of the five districts in which the lines were divided, under whom are district railway councils. The Administrative Council scrutinizes the accounts, examines the annual statements and confirms the draft of the railway budget. It has charge of the tariffs and classifications, approves the general plan of train schedules, adjusts the relations with other lines, including those of foreign countries; regulates competitive traffic and has ultimate decision in regard to construction and additions whether of plant or equipment. The general direction has charge of the employees and the actual operation, preparing plans for submission to the Administrative Council.

Pursuant to this law lines have been purchased by the government, amounting to 1,845 miles, on December 31, 1909, leaving 973 miles outstanding in the hands of private companies.

As the various railways were taken over by the government their concessions expired, leaving them without authorized tariff schedules. By way of providing for the promised uniformity of charges, the government under date of June 27, 1901, enacted a tariff to apply on all lines of the Swiss United Railway. A draft of this tariff had been sent by the Railway Council to the Swiss Commerce and Industry Association, the Swiss Trade Association, the Swiss Pressants Union and the Swiss Railway Union for their comments and recommendations, which these bodies promptly forwarded in detail.

The short distances traversed by the Swiss railways have rendered unnecessary any elaborate classification of freight and have not developed the necessity for a tapering tariff. The earliest tariffs were based upon the weight and the space occupied by goods. Modifications were subsequently made according to the value of the commodities. Different railways adopted different schedules and dissatisfaction was thus created which led to a reform of the tariffs by the government in 1882. The general framework then adopted was retained in the act of June 27, 1901. There is the quick service of piecegoods, i.e., package freight, for which a double charge is made; two classes of piecegoods at ordinary speed, one class for wagon-loads of five tons, another for wagon-loads of ten tons, and three special tariffs applied to wagon-loads of various specified commodities. Each tariff provides for a terminal charge which is graded and for a transportation charge which is at a fixed rate per kilometer. These tariffs are subject to increase on the lines ascending mountains and especial tolls are levied for transport over bridges and through tunnels. Reductions may be made on bulk goods in transit traffic, i.e., traffic that crosses Switzerland on its way from one country to another.

While retaining this framework of the freight schedules the law of June 27, 1901, adopted the lowest rates that had been in effect on any road to apply over the entire state system. It made a similar adjustment of passenger rates, adopting the lowest schedule in effect to apply generally. It retained the provision for three classes of passengers, stipulating that on fast express trains provision for third class passengers, and if necessary for second class, might be dispensed with; that provision for the three classes of passengers must be made on ordinary express trains, but that on local trains need be provision for third class only. It was specified that at least three trains a day should be run in each direction over the entire length of each line, stopping at every station, and that additional accommodation should be provided when necessary.

A charge is made for all baggage except that carried by hand and not exceeding 22 lbs. in weight. Commercial products or utensils for the use of the passenger are carried free up to the weight of 55 lbs. This is evidently a concession to the poorer people, and to the workmen who carry products made in their homes to the place of sale. It was estimated that these reductions in the rates on both passenger and freight traffic would find more than compensation in the increase of traffic. The results of the first year or two seemed to carry out this supposition, but later the net revenues have fallen off.

Under the state control salaries of the administrative officers have been reduced, with the result that some of the ablest men have left the railway service to be succeeded by fonctionnaires of inadequate experience and ability, who regard their positions as governmental offices. The wages of the rank and file of the service have been increased, and the increase in the train service has added greatly to the expenditures. The result of this policy is evidenced by the fact that for the year 1908 the account of the United Swiss Railways shows an excess of expenditure over income of \$1,080,000, in the expenses being included the interest upon the capital and the amortization which the repurchase law specifies shall be completed in 60 years.

The General Direction of the United Swiss Railways states that this condition is largely due to the economic depression. It admits, however, that rates in some cases have been unduly lowered and says that their increase is contemplated. It also admits that the increases in the wages of employees and the extension of the train service have been factors in bringing about the deficit. In ten years railways that under corporate operation were fairly profitable and prosperous have under the control of the state become a drain upon the taxpayers. This has happened in a country so small that there is little or no contention and rivalry between one region and another, where because of their high intelligence and patriotism, the inhabitants have maintained a political organization that long has been cited as a model of government by the people for the people.

General News Section.

The Pere Marquette Railroad is to install telephones for train despatching on its Toledo division.

According to an Indianapolis paper the Evansville & Terre Haute has let out all of its passenger conductors with one exception. The officers have declined to give any reason for the act and the conductors are equally reticent.

Dr. Arthur T. Huxley, president of Yale University and chairman of the commission appointed by President Taft to investigate the subject of the regulation by federal law of the issue of money, stocks and bonds, has gone to Europe, where he will make some study of the subject.

An Associate, La., on the night of September 26, four masked men robbed a mail car of the Southern Pacific. This car was one of three belonging to a train which had just been brought across the Mississippi river on a ferry boat. It is said that the robbers overlooked packages containing \$125,000.

In a dispute between the Denver & Rio Grande and its firemen concerning wages, Chairman Knapp, of the Interstate Commerce Commission, has been asked to name the third member of a Board of Arbitration to which it has been agreed to refer the matter. Mr. Knapp's coadjutor on the Mediation Board, Dr. Neill, is now in Europe.

Officers of the Pennsylvania Railroad are reported as saying that the station agents at many of the more important stations of the road will receive an increase of pay. These agents, with all other employees, received an increase of 6 per cent. last spring. Since then the conductors and trainmen and some other classes have received an additional increase.

Commencing October 2 the passenger trains of the Charlotte Harbor & Northern will run through between Boca Grande, Fla., and Tampa, using the tracks of the Seaboard Air Line between Bradley Junction and Tampa. The northbound train leaves Boca Grande 6.15 a.m. and Arcadia 8.20, arriving at Tampa at noon; the southbound leaves Tampa at 4 p.m.

Today—September 30—is "rice day" in the southwest. The Southern Pacific and other railways are observing the day by serving rice in various ways and calling attention by their menu cards to its excellence as a food. The question of granting reduced rates to bridal couples because of the encouragement of the rice industry which they foster has not yet been taken up.

The Western Pacific is running fast trains for fruit from Stockton, Cal., destined to Chicago and New York. Delivery will be made in Chicago in seven days and in New York in nine or ten days. Arrangements have also been made by the Western Pacific for a coast-to-coast through package merchandise car over the Lackawanna, the Wabash, the Missouri Pacific and the Denver & Rio Grande.

Cincinnati papers say that a number of railways in Ohio are going to establish a state bureau for supervising demurrage matters. The purpose seems to be to have an advisory committee, or board, similar to that which was organized last year in Michigan, which will keep fully posted concerning the action of the roads in this matter, offering criticisms where necessary, yet having no administrative authority. It is said that all of the demurrage bureaus doing business in Ohio will soon be discontinued.

A meeting of shippers, members of railway commissions and public men was held at Topeka, Kan., on September 22 to formulate plans for opposing advances in freight rates. It was called by W. R. Stubbs, Governor of Kansas, who was one of the principal speakers. Resolutions were adopted demanding a physical valuation of railways to determine if railway earnings are too high, and the prosecution of the railways for alleged violation of the Sherman law by entering into agreements to raise their rates. A committee was appointed to wait on President Taft with a copy of the resolutions.

The Louisville & Nashville has ordered a complete equip-

ment of Western electric signaling and telephony for trains operating on the Cumberland Valley and Kentucky divisions, from Cincinnati to Western, 301 miles. There will be 200 circuits, four train wires and two message circuits with a total of 160 stations. The message wire circuit is to be used for general railway business extend from Paris to Cincinnati, from Cincinnati to Corbin, and from Corbin to Norton. The Louisville & Nashville already has Western Electric train despatching equipment between New Orleans and Mobile, 140 miles.

According to Boston papers, ex-President Tuttle, of the Boston & Maine, will have a "vacation salary" of \$50,000 for one year; which means, we suppose, that his regular salary will be continued for that length of time after his retirement; and, further, it is said that afterwards he will have \$10,000 a year for an indefinite period. A Massachusetts paper, commenting on this report and assuming that the new president will get the same salary as the retiring one, observes that perhaps the proper thing for the Boston & Maine to do with its freight rates would be to reduce them instead of advancing them.

The United States district attorney at Chicago has brought suit against the Chicago & Alton for alleged violations of the hours of service act prohibiting any railway from working any trainman for more than 16 consecutive hours. The government charges two specific violations of the act. The declaration alleges that the employees in question left Bloomington on a freight train at 5:30 a.m. on July 6 and were not relieved until they arrived at Joliet at 9:50 p.m. on the same day, and that they left Bloomington at 5:30 a.m. on July 25 and were not relieved until they arrived at Joliet at 10 p.m. on the same day.

The business interests of many Texas cities are said to be greatly aroused over the action of the legislature at its recent special session in passing the "International & Great Northern bill," and the next legislature, which meets in January, will be asked to repeal the obnoxious measure. It is claimed that its enactment has caused the abandonment of a number of railway projects. Many towns—Abilene, Seymour, Dublin, Breckenridge, Graham, Stamford, Quanah, Dalhart, Lubbock, Wichita Falls and others—are putting considerable money into new railways, and they fear that they will lose their money already invested in surveys, rights of way, etc. The West Texas Commercial Congress will discuss the subject at its next meeting in October.

Chief Engineer Kittredge, of the New York Central, who appeared before the Public Service Commission of New York at Albany last week in opposition to the application of the Buffalo, Rochester & Eastern for a certificate of necessity, said that the New York Central contemplated making improvements and additions to its property which would give it a six-track railway from Buffalo to Albany; and he gave items from a list of contemplated expenditures as follows: \$18,000,000 for Buffalo; in Rochester \$2,000,000 was being spent and \$1,400,000 contemplated; Syracuse improvements, \$6,000,000; Rome, \$2,000,000; Utica, \$3,000,000, and between Utica and Albany, \$1,096,000.

F. B. Freeman, chief engineer of the Boston & Albany, testified that since 1907 that road had spent \$14,000,000 on improvements and had added 77 miles of tracks. The company can now handle 1,800 freight cars a day each way. The company has received no complaints of delay in the delivery of freight for some time.

Mr. B. F. Looney, who, we suppose, is a member of the Texas legislature, writing to the *Dallas News*, in defense of the recent action of the legislature in passing the law to compel the new owners of the International & Great Northern to agree to settle damage claims pending against the company to the amount of over \$2,000,000, says that "Mr. Freeman, the receiver, expended for betterments and paid interest to eastern bondholders out of the current earnings of this road \$3,500,000, instead of paying the claims of Texas creditors for current expenses that accrued for a year and over preceding the receivership, aggregating \$2,250,000, thus diverting from its proper channel the current earnings of said company and violating the rule of equity announced by Chief Justice Waite in *Burnham v. Bowen* (11

U. S. 783)." Mr. Looney further explains, in answer to a charge that the bill was purposely framed so as not to aid George Gould in collecting a claim of \$5,000,000 which he holds against the road, that this claim is for money advanced over five years ago in connection with the extension of the road to Fort Worth. Not being a liability for current expenses incident to the operation of the road, it does not come within the rule which has been laid down by the courts of equity for the settlement of the status of claims against railways which are not in liquidation.

The Pennsylvania Railroad's premiums to trackmen, for 1910, six in number, were distributed last week at Harrisburg at the close of the first day of the general manager's 38th annual track inspection, on which the general manager was accompanied by his entire staff of officers, including some 350 men in the operating department. The special main line committee this year consisted of Joseph T. Richards, L. R. Zollinger, H. A. Jaggard, J. B. Baker and E. B. John. Their awards were as follows: First premium, \$1,200 (of which \$800 goes to the supervisor and \$400 to the assistant supervisor) for the best line and surface between Jersey City and Pittsburgh and Philadelphia and Washington, was awarded to Supervisor George Goldie, Jr., and Assistant Supervisor R. R. Nace, who have charge of the track from 62d street, West Philadelphia, to Wilmington. The four premiums of \$800 each (\$600 to the supervisor and \$200 to the assistant for the best line and surface on a main line superintendent's division) were awarded as follows: W. F. Rench and S. L. Church, West Philadelphia to Tullytown; G. R. Sinnickson and H. A. Gass, West Philadelphia, to Coatesville; J. A. Burchenal and E. C. Silvius, Durward to Longfellow, Pa.; F. L. Pitcher and W. W. Hubley, New Florence to George, on the Pittsburgh division. The improvement premium of \$1,000 (\$700 to the supervisor and \$300 to the assistant) for the greatest improvement in line and surface was awarded to H. E. Waters and Frederick Evans, Baltimore to Springfield, Md.

President Ripley on 10 Years' Increase in Railway Capitalization and Investment.

President Ripley, of the Santa Fe, has given out an interesting statement in reply to an assertion of United States Senator Cummins, of Iowa, that the railways of the United States increased their capitalization \$3,500,000,000 in 10 years without making any equivalent increase in the investment in their properties.

"The implication, of course, is," says Mr. Ripley, "that it was a voluntary increase in capitalization with no consideration whatever. While I have not been able to identify the particular 10 years the senator had in mind, it undoubtedly is true that between 1898 and 1908 the railroads of the country added more than \$3,500,000,000 to their capitalization, and it is as surely untrue that this was done without the investment of independent capital.

"In the 10 years, 1898 to 1908, the nominal capital of the railways increased from \$10,818,554,031 to \$16,767,544,031 or \$5,948,990,796. Of this increase no less than \$3,964,046,794 was in funded debt, and only \$1,984,944,002 was in stock. Of these increases at least \$1,630,000,000 stock and \$782,000,000 funded debt is in the treasuries of the railways, leaving an approximate increase of \$3,182,000,000 funded debt and \$355,000,000 stock, a total of \$3,537,000,000 in the hands of the public.

"This is in substantial agreement with the reports of the Interstate Commerce Commission, which show that \$12,833,591,510 was the net capitalization of the railways in 1908, against \$9,297,168,000 in 1898, an increase of \$3,536,423,000 in 10 years. The significant feature of this increase is that 90 per cent. was in funded debt, in other words, borrowed money, which is independent capital.

"Now, what have the railways added to their property during these 10 years to balance this invested capital? To begin with, they have added 45,124 miles of line and 88,312 miles of all track to their fixed irrecoverable investment. Senator Cummins has put a value of \$70,000,000,000, or over \$60,000 per mile of track, on all railway property. Its net capitalization is over \$98,000 per mile of track. Deducting \$8,000 per mile to cover the cost of equipment, etc., and multiplying 88,312 miles of track by \$90,000, accounts for \$2,649,360,000 of this independent capital invested.

"The railways had 21,464 more locomotives in 1908 than in 1898, costing on an average over \$20,000 apiece and so representing a capital investment of over \$429,280,000 in 10 years. But this takes no account of the average increase of 20 tons in the 36,234 locomotives of 1898. As each ton would cost at least \$200, the 36,234 locomotives representing those of 1898 now represent an added investment of approximately \$145,000,000.

"The number of passenger cars has increased from 33,595 in 1898 to 45,292 in 1908. The increase of 11,597 at \$8,000 per car, represents an added investment of \$92,776,000 in 10 years.

"Between 1898 and 1908 the number of freight cars increased from 1,248,826 to 2,100,784, or 851,958, representing at the reasonable average of \$1,000 an additional investment of \$851,958,000. Moreover, so great has been the advance in the capacity of cars that it has added an average of 10 tons to the cars of 1898, and \$30 per ton is a conservative estimate of the value of this increase, representing an added investment of \$374,647,000 in this incidental line alone.

"Between 1898 and 1908 there has been an increase of 54,528 in the number of cars in company service, such as cars for work trains, etc., representing at \$500 apiece, an added investment of \$27,264,000.

"Reballasting, rebridging and realigning 245,333 miles of track of 1898 at \$500 per mile represent \$122,666,000 of added investment.

"Besides these definite expenditures, track elevation and the elimination of grade crossings have cost at least \$200,000,000 added capital expenditure; new stations \$200,000,000, and addition to terminal property \$200,000,000, to say nothing of the millions expended in replacing 50 to 70 pound rails on 245,333 miles of track with 75 to 100 pound rails.

"Independent capital provided for \$3,537,000 of this addition to railway property and the balance of \$1,625,000,000 was included in operating expenses, or came out of surplus earnings, which under the British system would have been divided among the stockholders."

A Railway's Gift to the Farmers.

On January 1 the Duluth & Iron Range will voluntarily mail to the treasurer of St. Louis county a check for the taxes on 457,426 acres of land and all the timber on it, ignoring the fact that both lands and timber are exempt from taxation under the gross earnings law.

The act will be the result of an agreement between County Auditor Halden and the officers of the road, which has been under consideration for fully a year past, and it will be one of the most public-spirited and generous steps ever taken by a corporation. As a result of the agreement, the road voluntarily places on the tax rolls of St. Louis county nearly 500,000 acres of land and millions of feet of timber on which, under the law, no effort could or would be made to collect taxes.

The gross earnings law of Minnesota provides that railways shall pay a tax of 4 per cent. of their gross earnings to the state treasury and that this sum shall be in lieu of all other taxes and assessments.

Some years ago an attempt was made to tax lands held by railways under grants from the federal and state governments, under what was known as the Anderson law. Prior to the organization of the steel corporation the railways carried that law to the supreme court of the United States, where it was held that the gross earnings tax was in lieu of all other taxation, that it covered lands held under federal and state grants, and therefore no other taxes could be assessed against any such property.

Submission to taxation is therefore purely voluntary, and a recognition of the fact that unless its lands pay their share of the cost of development, while they are awaiting settlement, they are an impediment to such development. Railway property is exempt even from street assessments. Repeated efforts have been made to have gross earnings taxes apportioned to the districts from which it is collected, but without avail, and Duluth, probably more than any other city in the state, feels the effect of this law. With at least \$3,000,000 worth of railway property in the city limits, the problem has many times been a most pressing one.

At times efforts have been made to have the railways agree to pay local assessments, and Duluth secured such an agreement from the Wisconsin Central before it was granted a franchise to

enter the city. But such agreements have been signed under a club, as it were.

The concession is the more remarkable, owing to the class of people it will benefit. It will not be the big shippers, nor will it be the wealthy or influential citizens of Duluth, but the poor settler who is working to get the wild but productive land of northern Minnesota under a plow; the man to whom ready money is a rare sight and to whom taxes are an unusual terror; the pockets of the pioneers in the great north country.

The credit for securing this action lies between County Auditor Halden and the officers of the United States Steel Corporation. * * * In the town of Lavelle, last year's tax rate was \$9.90 per \$1,000. With the Iron Range lands added to the tax rolls to share the burden this tax rate would be reduced to \$8.84 per \$1,000. In the town of Cotton, last year's rate of \$12 per \$1,000 would be cut to \$8.22 per \$1,000. Other cases show similar benefits.—*Duluth Herald*.

Wrecks in Kansas and Indiana.

In a wreck due to a washout on the Chicago, Rock Island & Pacific at Clayton, Kan., on the morning of September 23, 16 persons, the majority of them passengers, were killed and 13 injured. The locomotive and the mail car of the train ran, without warning, into a flood 20 feet deep, which had been formed by a cloudburst. A fill 1,000 feet long had been badly washed. Parts of the wreck, in which were some of the passengers, were carried off some distance by the raging stream, and the passengers were drowned. The conductor, the engineer, the fireman and one brakeman were among the killed.

Near Tipton, Ind., last Saturday a butting collision of electric cars on the Indiana Union Traction line killed three passengers and a motorman and injured a half dozen other passengers. The passenger car, northbound, carried 30 or 40 passengers, but the southbound car was a freight. Every passenger in the smoking compartment of the passenger car was killed. The southbound car had run past the proper meeting place.

This collision occurred almost exactly three days after the similar disaster near Bluffton, about 50 miles away, where 40 persons were killed.

Rapid Transit in New York.

The New York State Public Service Commission, First district, is to give hearings this week on a proposal to open for traffic the Steinway tunnel, otherwise known as the Belmont tunnel, under the East river from 42d street, Manhattan, to Long Island, and it is said that the Interborough Rapid Transit Company, which controls the ownership of the tunnel, is now ready to turn it over to the city, provided it can have a satisfactory contract for operating it, and provided, also, that the city will allow it (the Interborough) to build an additional main track throughout the length of the Second avenue and Third avenue elevated railways in Manhattan, thus making those lines three-track. The proposals also include tentative plans for the following routes:

Two-track elevated route from the 143d street station of the Third avenue elevated throughout private property—Willis avenue and Bergen avenue to a connection with the Westchester avenue line of the rapid transit railroad now operated by the Interborough.

Three-track elevated route from Third avenue and Pelham avenue through Pelham avenue to Webster avenue, along Webster avenue to Gun Hill road, through Gun Hill road to White Plains road.

Two-track elevated route from Eighth avenue and 149th street through McComb's Dam lane to Central avenue bridge, over Central avenue bridge and its approach to 162d street, through 162d street to River avenue.

An elevated route through Second avenue and 59th street to Queensboro bridge.

The city has hitherto opposed the construction of additional elevated tracks but now it is reported that the Public Service Commission looks upon the proposal with favor. Mr. Wilcox, chairman of the commission, says that the Interborough proposes a fair exchange. "If there were no elevated lines in the city," said he, "I do not think I would be in favor of building one. But that is not the question. Here we already have our elevated lines, and our traffic conditions are deplorable. It would

be better to make these elevated lines as efficient as possible as long as they are in existence. The third track proposed by the Interborough would, I am told, increase the carrying capacity of the lines 30 per cent. In the Bronx, the result, so far as darkening the streets is concerned, will be the same, whether we extend our subways or our elevated roads, for our subways are elevated in the Bronx. Something must be done to better transportation facilities in New York, and the addition of a third track on the elevated roads will undoubtedly do much to solve the problem."

Mr. Hedley, general manager of the Interborough, says that the construction of a connecting link between the Steinway tunnel and the present subway at 42d street and Vanderbilt avenue would cost \$1,500,000. The Steinway tube, he says, has cost the Interborough \$9,000,000. It was finished over two years ago and has remained unused because of disagreement about the franchise.

World's Coal Production and Consumption.

The production of coal in the five principal coal-producing countries of the world in 1908 and 1909 was as follows:

	1908.	1909.
United Kingdom	261,524,000	263,771,000
Germany	145,298,000	146,067,000
France	36,044,000	336,633,000
Belgium	23,175,000	223,182,000
United States of America	371,288,000	3290,326,000

*Tons of 2,240 lbs. †Provisional figures. ‡Including lignite.

In Germany and in France the production of coal increased throughout the period covered by this table, and was in 1909 greater than in any previous year. In the United Kingdom, Belgium and the United States the production in 1909 though greater than in 1908 fell short of that of the year 1907. The excess of the output of 1909 over that of 1908 was, in all cases, with the exception of the United States, small. The aggregate output in 1909 of the five countries named was 860,000,000 tons, or an increase of 23,000,000 tons on the output of 1908, but less by 36,000,000 tons that of 1907. Of the remaining countries included in the tables, Russia alone has a production exceeding 20,000,000 tons.

The total known coal production of the world (exclusive of brown coal or lignite) in 1908 was about 950 million tons, of which the United Kingdom produced more than one-fourth.

The consumption of coal in some of the chief consuming countries is shown in the following statement:

	1908.	1909.
United States	360,935,000	*379,055,000
United Kingdom	176,928,000	177,745,000
Germany	129,845,000	129,738,000
France	52,995,000	*54,327,000
Russia	*28,808,000	Not yet available
Austria-Hungary	25,028,000	available
Belgium	22,515,000	*22,455,000

*Provisional figures.

The consumption of coal per head of population in the countries included in the preceding table is shown in the following statement, which applies to 1908:

United Kingdom, 3.96 tons; United States, 4.14 tons; Belgium, 2.11 tons; Germany, 2.05 tons; France, 1.35 tons; Austria-Hungary, 0.51 tons; Russia, 0.19 tons (provisional figure).—*Journal of Commerce*.

To Guard Against Loose Wheels.

The derailment of a passenger train at Stoa's Nest, England, on the London, Brighton & South Coast, January 29, which killed five passengers in the train and two persons standing on the platform, was reported in the *Railway Age Gazette* of February 4, 1910, page 267. The Board of Trade report, signed by Lieut. Col. von Donop, which has just come to hand, says that the cause of the derailment was a loose wheel. The evidence that this was the cause seems quite conclusive. The train was running about 45 miles an hour. Col. von Donop finds in the board's records only two previous cases of this kind; one in 1895 and one in 1898, both on the Great Western. In the earlier case, the axle had been turned a trifle too small, and in the other one the wheel was not sufficiently tight. After those accidents, the Great Western adopted the practice of making a back test pressure of 50 tons on all wheels passing

through the shops, and since that action has had only one case of a wheel shifting on its axle. In that case the cause was a hot box. Also, since 1898 the Great Western has used an apparatus which automatically marks on a tape the pressure required during the whole operation of pressing a wheel over its seat. Similar precautions are now being taken by the Brighton road. All the wheels of its main line trains have been especially gaged. As far as Col. von Donop can learn, no other railway in England makes these careful tests, and, therefore, he calls the attention of all of them to the action of these two companies.

Economy in Transportation.

America's pre-eminence in all of the arts which annihilate time and space, and which thus add to the wealth of the world and the happiness of mankind, is pretty well known already; but every now and then the facility with which we make use of our varied resources is illustrated in new ways, and our self-congratulations must be repeated. The latest instance is the following from the *Telegraph and Telephone Age*:

"Probably the smallest sum of money ever sent by telegraph was forwarded recently by a New York stock broker to Seattle. Having been advised by the postmaster that there was an unstamped letter addressed to him in the Seattle office, he immediately sent by wire the two cents necessary to have the letter forwarded. The letter when received was found to contain a good order, together with a check, so he was well repaid for the extra expense involved in getting the letter."

The Railway Appliances Association.

John N. Reynolds, secretary and treasurer, 303 Dearborn street, Chicago, in the course of his preparation for the exhibition of railway appliances used in the construction and maintenance of steam and electric railways to be held at the Coliseum, March 20 to 25, inclusive, 1911, is mailing space application blanks to prospective exhibitors. This exhibition is to be held in connection with the annual meeting of the American Railway Engineering & Maintenance of Way Association.

The circular contains general information useful to exhibitors in making application for floor space, etc. The price of space will be 40 cents per sq. ft. on the main floor and 25 cents per sq. ft. on the balcony. This balcony is an addition to the space previously available. The membership fee will be \$25 for each firm, which fee will include three badges.

Application for space, to be considered in the first allotment, must be filed in the office of the secretary not later than November 1; and those applications filed after that date will not be considered until all previous applicants have been served. The first allotment of space will be to those who exhibited at both previous exhibitions held at the Coliseum.

The exhibition will be opened to the public on Monday, March 20, at 1 p.m. and each and every day thereafter at 8 a.m. and will close every evening at 10 p.m.

Railway Employees' Meeting in New York City.

A meeting of members of the four principal railway brotherhoods, the enginemen, firemen, conductors and brakemen, which was held in New York City on Sunday last, was attended by about 3,000 members, who, according to the resolutions adopted, were from the Erie, Lackawanna, Long Island, Reading, New Jersey Central, Lehigh Valley, Central New England, Central Vermont, New York, New Haven & Hartford, New York, Ontario & Western, Pennsylvania Railroad, Boston & Maine, Boston & Albany, Delaware & Hudson, New York Central, Buffalo & Susquehanna "and all other railway lines in the eastern territory."

Declaring that the organizations propose to continue to insist on higher wages, more favorable working conditions, shorter hours and adequate compensation for members injured or killed and also declaring that the 2,000,000 voters directly dependent on the railways interests in this country for a livelihood ask for nothing short of a square deal, the meeting adopted resolutions as follows:

Resolved: That we assert our collective and individual efforts against those who are interested in otherwise antagonistic to the interests from which we derive our livelihood.

We, as employees, fully realize that as a practical proposition theories

laid aside—the earnings of railways must be sufficient to pay all charges and expenses with a substantial and assured margin of profit in order that the conditions may continue to improve; that the safety and convenience of the public may be conserved and protected, and that necessary extensions may be made to keep pace with the growth of our common country. We further recognize that our welfare, as employees of the railways of the United States, is dependent upon the prosperity of the employing company, and that the investor has the right to protection and consideration as well as the employee

Resolved, That we earnestly request the Interstate Commerce Commission to consider the proposed increases in the transportation rates of our employers in a broad-minded manner, and from the standpoint of their general knowledge of railway conditions as they exist; that technicalities and impractical theories may not be allowed to override well known facts; and that such disposition may be made of the matter as will foster and encourage the efficiency of the service, the welfare of the rank and file, and the maintenance of standards best calculated to enhance the development of the properties. . . .

It is said that the employees of the Pennsylvania Railroad, many of whom were present, had had an interview with the general manager of that road, Mr. Myers, and that their action was in compliance with a request from him. According to a Philadelphia paper:

"Mr. Myers asked the employees whether they would support the company's stand on the freight rate question if they thought the management was right. He was assured that the indorsement would be given. Mr. Myers confers regularly with representatives of the employees, but other conferences have been held at which the rank and file have been present. In every instance the general manager has qualified his suggestion that the men indorse the company with these words, 'If you think we are right.'"

Association of Railway Electrical Engineers.

The third annual convention of the Association of Railway Electrical Engineers was held in Chicago at the La Salle hotel September 27-30. Reports were received from the various committees appointed to consider the subjects of illuminating standards; specifications; train-lighting practice, and accounts and reports. J. G. Heninger presented a paper on the illuminometer in railway practice; B. A. Stowe a paper on ventilation of railway cars, and S. F. Nichols one on electrical operation of drawbridges. On Monday evening there was an informal dance and reception. On Tuesday there were automobile trips, and on Wednesday a matinee party. The banquet was on Thursday.

In connection with the convention, the following firms exhibited and were represented:

Adams & Westlake Company, Chicago.—Represented by R. M. Newbold. American Pulley Company, Philadelphia, Pa.—Axle pulleys and bushings for car lighting. Represented by C. E. Brinley.

Automatic Annunciator Company, Chicago.—Automatic annunciator in operation. Represented by H. Kiper, Percy P. Hinkley, Lewis Cole, J. J. Comer.

Baird Electric Company, Chicago.—Railway train despatching telephone system for steam and electric railways in practical operation. Represented by E. P. Baird and A. E. Case.

Benjamin Electric Manufacturing Company, Chicago.—Electric lighting specialties and fixtures. Represented by H. E. Watson, Knott.

Central Electric Company, Chicago.—Okonito wires, cables and cords and tapes; Columbia lamps, carbon gum, tantalum and mangan. Diehl tung steel oscillating and exhaust; Diehl fuses, cut-outs and boxes. Represented by J. M. Lorenz, Dan Woodhead, G. M. Cox, J. G. Boyd, C. D. Oldham, I. G. Martin.

Commercial Acetylene Company, New York.—Represented by H. C. Horan.

Consolidated Railway Electric Lighting & Equipment Company, New York.—Represented by L. J. Kennedy, T. L. Mount.

Cross-Links Company, Chicago.—Conduits, knife switches, hand lights, panel boards and mesholt junctions. Represented by F. F. Shack, A. C. Duba Key, George A. Gray, Marian S. Keel.

Diek, R. & L., Ltd.

Edison Storage Battery Company, New York.—Storage batteries for car lighting. Represented by H. G. Thompson.

Electric Storage Battery, Philadelphia, Pa.—Storage batteries for car lighting. Represented by G. H. Adams, H. E. Hunt, F. A. Cresson, R. E. Bopp, J. N. Rosdolt, P. G. Denton.

General Electric Company, Schenectady, N. Y.—Train lighting, incandescent lamps. Represented by E. M. Hawley, Henry Schofield.

Goold Storage Battery Company, New York.—Generator, generator lamp, regulator, model new pole changer, storage batteries and equipment in operation. Represented by G. G. Milne, Bonchie, Jepson, George Bever, W. M. Lawlor, G. R. Berger and Charles Knech.

Landis Electric Company, Cleveland, Ohio.—Battery fans and car roof lighting apparatus. Represented by R. A. Shaker, C. W. Beck, W. L. Dunsen, W. L. Dunsen.

Kaiser Insulated Wire & Cable Company, New York.—Company of electric insulated wires and cables, also accessories of power cables. See Art. 1, page 591.

Represented by P. W. Moore, and H. E. Richey.

Lea Electric Lamp Company, Cleveland, Ohio.—Standard of power lighting apparatus. Represented by E. V. Williams.

Lea Electric Lamp Association, Cleveland, Ohio.—

New York Leather Battery Company, New York.—Represented by J. L. Allen, W. H. Galt.

New York Electric Storage Battery Company, Cleveland, Ohio.—Dry cell batteries. Also special batteries, carbon buttons and specializers. Represented by W. H. Galt, and H. E. Richey.

Onondaga Steel Products Company, Onondaga, N. Y.—Sample of steel tubing for car lighting fixtures. Onondaga portable split taper steel lighting. Represented by N. G. Smith, and H. E. Richey.

Pyle National Electric Light Company, Chicago.—Ball-bearing lamp, also ball-bearing equipment and Rose special ball-bearing lamp. Represented by J. W. L. Johnson, and John E. Kille.

J. N. Pyle, National Electric Lamp Association, Cleveland, Ohio.—Complete line of Mazda multiple train lighting and street series lamps; incandescent lamps, also lamps and luminaires of all types. Represented by C. W. Bunker, J. L. Hunsinger, H. J. Raymond, and S. J. Bales.

Sears Car Heating & Lighting Company, New York.—Auto lighting apparatus and lamps for car illuminations. Represented by A. C. Moore, J. G. Van Wagon, George E. Huber, and H. H. Hulen.

Tysons Lamp Company, New York.—Tupless car lighting lamps. Represented by Ray P. Lee, and R. S. Carrick.

United States Light & Heating Company, New York.—Train lighting material and storage batteries. Represented by W. P. Hawley, L. S. Cunney, C. F. Mead and J. E. Sinclair.

Watson Insulating Wire Company, Chicago.—Represented by W. D. Dunsen, R. A. Patterson, B. L. Winchell, Jr.

Western Electric Company, Chicago.—Train lighting lamps of the mazda, tantum and carbon types; mazda lamps from 16 to 500 watts; Western Electric interphone railway shop and office type; Hawthorne magdalar fixtures. Represented by G. H. Porter and George Lounsbury.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.—Tungsten and metalized car lighting lamps. Represented by B. F. Fisher, Jr.; J. M. Schilling and A. N. Brown.

Willard Storage Battery Company, Cleveland, Ohio.—Willard standard train lighting battery. Represented by T. A. Willard, R. Norberg, W. E. Ballantine and L. Sears.

American Railway Bridge and Building Association.

C. A. Lichty, the secretary of this association, has just issued the program for the 20th annual convention to be held at the Albany hotel, Denver, Colo., October 18 to 20, inclusive. Committees will report on the following subjects:

"Method of Protection to Embankments Against Currents and of Restoring Them When Washed Out." E. L. Loftin, chairman, Queen & Crescent.

"How to Prevent Iron Pipe Culverts from Pulling Apart in Soft Ground and How Best to Repair Them When Pulled Apart." A. A. Page, chairman, Boston & Maine.

"Concrete in Railway Construction, Kind of Reinforcement and Waterproofing when Necessary." C. W. Richey, chairman, Pennsylvania.

"Arrangement of Buildings and Platforms, for Small Towns, as to Convenience and Appearance." C. H. Fake, chairman, Mississippi River & Bonne Terre.

"Best Method of Determining Proper Dimensions of Openings for Waterways." W. T. Main, chairman, Chicago & North Western.

"Best Method of Obtaining Elevation on Curves on Bridges and Trestles." J. P. Snow, chairman, Boston & Maine.

"Best Method of Numbering Bridges." I. F. Stern, chairman, Chicago & North Western.

"The Economy and Practicability of Wire Glass in Roundhouses, Shops and Station Buildings." E. E. Wilson, chairman, New York Central & Hudson River.

"The Best Style and Dimensions of Hoops for Water Tanks, From 50,000 to 100,000 Gallons Capacity." F. E. Weise, chairman, Chicago, Milwaukee & St. Paul.

"Plans of Fireproof Oil Houses for Storing Large Quantities of Oil at Principal Terminal Stations." G. W. Rear, chairman, Southern Pacific.

Besides the regular business and reports, A. D. Parker, vice-president, Colorado & Southern, will address the convention on Tuesday morning, and H. Rittinghouse will present a paper entitled "Regularity and Safety," at the evening session. On Wednesday a side trip will be arranged for the afternoon and some form of entertainment for the evening. The afternoon of Thursday will be occupied by a side trip on one of the railways and in the evening by a banquet, and an all-day trip will probably be arranged for Friday. There is at present a membership of 408 in this association.

MEETINGS AND CONVENTIONS.

The following list gives names of associations, dates of next or regular meetings, and places of meeting.

- A. B. BEST ASSOCIATION.—F. M. Nellis, 52 State St., Boston, Mass.
- AMERICAN ASSOCIATION OF DEMOCRATIC OFFICERS.—A. G. Hougham, Scranton, Pa., next meeting, June 22, 1911, Niagara Falls, N. Y.
- AMERICAN ASSOCIATION OF GENERAL MANAGERS AND TRUCK AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn.
- AMERICAN ASSOCIATION OF LOCAL FREIGHT AGENTS.—G. W. Deussen, Penn. Co., Lehigh, Pa.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—G. G. Palmer, Carew Bldg., Cincinnati, Ohio.
- AMERICAN RAILROAD ASSOCIATION.—W. F. Allen, 24 Park Place, New York, next meeting, Nov. 16, 1919, N. Y. C.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 18-20; Denver, Colo.
- AMERICAN RAILROAD ENGINEERS AND MAINT. OF WAY ASSN.—I. H. Frutch, Metropolitan Bldg., Chicago, March 21-23, 1911, Chicago.
- AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; May 6, 1911; Detroit, Mich.
- AMERICAN RAILWAY MASTER MECHANICS ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago.
- AM. RAILWAY TOOL PERMANENT ASSN.—O. T. Hartman, Bloomington, Ill.
- AM. SOC. FOR TESTING MATERIALS.—Prof. E. Marburg, Univ. of Penn., Phila.
- AM. SOC. OF CIVIL ENGRS.—C. W. Hunt, 220 W. 57th St., N. Y. C.; 1st and 3d Wed., except July and Aug.; annual, Jan. 18-19, New York.
- AM. SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Haner, 13 Park Row, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 30th St., New York, annual, Dec. 6-9, New York.
- AMERICAN STREET AND INTERURBAN RAILWAY ASSN.—H. C. Donecker, 29 W. 39th St., New York; Oct. 10-14; Atlantic City.
- ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; April 26, 1911; New Orleans, La.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; May, 1911; Montreal, Can.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Colegrove, I. C. R.R., Chicago; annual, Sept. 27-30; Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston.
- ASS. OF TRANS. AND CAR ACC. OFFICERS.—G. P. Conard, 24 Park Place, N. Y.; Dec. 18-14, Chicago; June 20-21, 1911, Cape May City, N. J.
- CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
- CANADIAN SOCIETY OF CIVIL ENGRS.—Clement H. McLeod, 418 Dorchester St., Montreal, Que.; Thursdays; Montreal; annual, last week January.
- CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month.
- CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
- ENGINEERS' SOCIETY OF PENN.—E. R. Dasher, Box 704, Harrisburg, Pa.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 808 Fulton Bldg., Pittsburgh; 1st and 3d Tues.; annual, Jan. 17, 1911, Pittsburgh.
- FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich. Fred & Pot. R.R., Richmond, Va.; 26th annual, June 21, 1911, St. Paul, Minn.
- GENERAL SUPERINTENDENTS' ASSN. OF CHICAGO.—H. D. Judson, 209 Adams St., Chicago; Wednesday preceding 3d Thursday; Chicago.
- INDIANAPOLIS RY. AND MECH. CLUB.—B. S. Downey, C. H. & D., Indianapolis, Ind.
- INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; next convention, Omaha, Neb.
- INTERNAT'L RY. EL. ASSN.—S. B. Sebastian, La Salle St. Station, Chicago.
- INTERNATIONAL RY. & GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.
- INT. RY. MASTER BLACKSMITHS' ASSN.—A. L. Woodworth, Lima, Ohio.
- INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.
- IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Ames, Ia.
- MASTER CAR BUILDERS' ASSN.—W. Taylor, Old Colony Bldg., Chicago.
- MASTER CAR AND LOCO. PAINTERS' ASSN. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass.
- NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, ex. June, July, Aug. and Sept.; Boston.
- NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except July and August; New York.
- NORTH-WEST RAILWAY CLUB.—T. W. Planagan, Soo Line, Minn.; 1st Tues. after 2d Mon. ex. June, July, August; St. Paul and Minn.
- NORTHERN RAILWAY CLUB.—C. L. Kennedy, C., M. & St. P., Duluth; 4th Saturday; Duluth, Minn.
- OMAHA RAILWAY CLUB.—A. H. Christensen, Barker Bk.; Second Wed. Railway Club of Kansas City, C. C. Manlove, 1008 Walnut St., Kansas City; 8d Friday in month; Kansas City.
- RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa., 4th Friday in month, except June, July and August; Pittsburgh.
- RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; annual, Oct. 11-13; Richmond, Va.
- RAILWAY S'KEEPERS' ASSN.—J. P. Murphy, Box C. Collinwood, O.; annual, May, 1911.
- RICHMOND RAILROAD CLUB.—F. O. Robinson; 2d Monday; Richmond.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSN.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Oct. 1911; St. Louis.
- ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago; Oct. 26 and 26; Hotel Chamberlin, Old Point Comfort, Va.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. R. Ry., Montgomery, Ala.; annual, Oct. 20; Atlanta.
- SOUTHERN & SOUTHWESTERN R.R. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., Mar., July, Sept. and Nov.; Atlanta.
- TOLEDO TRANSPORTATION CLUB.—L. G. Macomber, Woolson Spice Co., Toledo; 1st Sat.; annual, May 6, 1911, Toledo.
- TRANSPORTATION CLUB OF BUFFALO.—T. M. Sells, Buffalo; 1st Sat. after 1st Wed.; annual, Dec. 18; Buffalo.
- TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.
- TRAIN DISPATCHERS' ASSN. OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 20, 1911; Baltimore.
- TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo.
- WESTERN CANADA RAILWAY CLUB.—W. H. Rosevart, P. O. Box 1707, Winnipeg; 2d Monday, except June, July and August; Winnipeg.
- WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, Monadnock Bldg., Chicago; Wednesdays, except July and August; Chicago.

Traffic News.

The Interstate Commerce Commission has revoked its suspension, dated September 3, of "tap line" tariffs, which had been filed by the Chicago, Rock Island & Pacific.

Between Oroville, Cal., and San Francisco, according to a press dispatch, freight rates have been reduced 25 per cent.; this as a result of the opening of the Western Pacific.

The Morgan Line steamers have made important advances in freight rates on 100 or more commodities from New York City to points in Texas. These advances take effect October 1.

The Providence (R. I.) Board of Trade has held a special meeting and protested against the action of the railways in reducing from 96 hours to 48 hours the free time to be allowed for unloading cars.

The state railroad commissioners of Kansas have filed complaints with the Interstate Commerce Commission against the Missouri Pacific and 38 other roads, alleging unreasonable and discriminatory rates on flour shipped from the state of Kansas to New Orleans.

At New Orleans, according to a press dispatch of September 24, over 400 freight clerks of the New Orleans & Northeastern have struck and left their work because the railway had refused their demand for an increase of pay. Two freight houses had to be closed on account of the strike.

The Transatlantic Steamship Conference reports the following steamship passenger business for the year to September 23 in comparison with that of last year:

	Since January 1					
	Westbound	1909.	Incr.'se.	Eastbound	1909.	Incr.'se.
First class	1910.	1909.		1910.	1909.	
	75,051	67,411	7,640	93,369	82,469	10,900
Second class	192,119	148,146	33,973	92,954	79,067	13,887
Steage	821,907	712,207	109,700	280,753	191,624	89,129

The New York, New Haven & Hartford announces that the through night train between New York City and Portland, Me., which hitherto has been run only during the summer, will not be taken off this autumn. It will leave New York, however, at 10.40 p.m., 2 hours and 40 minutes later than now. The train leaving New York at 5.02 p.m. is to be run through to Springfield, 136 miles, in three hours. This is faster time than is made by any other train between New York and Springfield.

The Southern Pacific has issued a tariff, effective October 16, increasing the rates on green lumber from Portland and Willamette valley points to San Francisco bay points from \$3.40 and \$3.65 to \$5 flat. The company sought to make this increase three years ago, but was prevented by an order of the Interstate Commerce Commission. The road appealed the case, and it is now in the United States Supreme Court. The commission's order will expire at the time the Southern Pacific proposes to make the advance effective.

The Texas railway commission has given notice that it will give a hearing on September 30 regarding the switching rates of the Galveston Wharf Company. This company has given notice that after October 1 it will discontinue switching cars for \$1.75 a car and will expect a division of the through rate on the same basis that the Gulf, Colorado & Santa Fe has made with the Texas City Terminal Company. The railways claim that such a demand on the part of the Galveston Wharf Company would be unreasonable.

The Interstate Commerce Commission has suspended the tariffs which have been issued by the railways of New England reducing, on October 1, the free time to be allowed for unloading freight cars from 96 hours to 48 hours. From the action of the commissioners on demurrage questions in the past, it seems reasonable to conclude that they are strongly in favor of this reasonable change in the amount of free time; but the consignees have complained—as, of course, they will complain at every advance of any kind—and, of course, the commission must call upon the roads to present formal statements justifying their action.

Patrons and employees of the Atlanta & West Point recently

petitioned the state railway commission of Georgia to allow the road to increase its passenger fares from two cents a mile to two and a half cents; and this was followed in a short time by another petition from other patrons asking the commission to deny the request which had been made in behalf of the road. For assurance and simplicity, the argument of the later petitioners seems to surpass anything which has recently come to notice. It is declared that the reduction of the fares from three cents to two cents increased passenger revenue 25 per cent., and that if the rates are now put on the basis of 2½ cents, the total increase in earnings, as compared with the old three-cent rate, will be 62 per cent. Furthermore, it is declared that the property of the road is worth five times what the stockholders paid for it.

The Interstate Commerce Commission is to inquire into proposed advances of grain rates from points in North Dakota and South Dakota to St. Paul and Chicago; hearing to be held at Aberdeen, S. Dak., October 10. The tariffs were filed by the Chicago & North Western; the Chicago, Milwaukee & St. Paul; the Chicago, St. Paul, Minneapolis & Omaha; the Great Northern; the Minneapolis & St. Louis; the Minneapolis, St. Paul & Sault Ste. Marie and the Northern Pacific. Advances in rates on flaxseed and flaxseed products from St. Paul, Minneapolis and Missouri river transfer points to Duluth and Superior will be investigated at St. Paul October 13. At Kansas City, October 5, a hearing will be had as to the reasonableness of recent advances on cement made by the Atchison, Topeka & Santa Fe, the Missouri Pacific, the Missouri, Kansas & Texas, the St. Louis & San Francisco and the Union Pacific.

O. B. Colquitt, a member of the Texas Railway Commission and the Democratic candidate for Governor of Texas, has written a letter to Governor Stubbs, of Kansas, suggesting federal legislation to empower groups of states to regulate the traffic moving between them. Mr. Colquitt adds: "It may be well also to amend the interstate commerce commission act so as to provide for a division of the country into contiguous districts, composed of states which largely interchange or exchange products with each other, and provide for the appointment of an interstate commerce commission for each of these districts, who could frequently consult with the railway commissions of the different states comprising that district, with authority to promulgate orders affecting rates for said districts subject to revision by the full membership of the Interstate Commerce Commission at fixed intervals or on extraordinary occasions at called sessions."

New Boat Lines on the Mississippi River.

The Mississippi Valley Transportation Company of St. Louis has announced that on November 1 it will begin running packet boats between St. Louis and New Orleans, Galveston and other Texas points. It is also announced that the rates will be about half those now made by the rail lines. Two new type steel packet freight boats will be run between St. Louis and New Orleans, and a third boat will be run to Galveston. The *Dallas News* says: "The new packets are 550 feet in length, have 60 feet beam, with a width over guards of 95 feet. The depth of hold is 14 feet and with full load of 6,000 tons they draw only 7½ feet of water. It is claimed that the boats will carry 3,000 tons on 4½ feet draft. On the St. Louis-New Orleans run it is intended to make the round trip in ten days.

"The boats cost about \$300,000 each. The proposed rates are as follows (with comparison with rail rates):

	1	2	3	4	5	6	7	8	9	10
Water rates	35	30	45	42	40	41	38	35	30	30
Rail rates	115	129	112	102	80	83	75	62	50	50

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 79, giving a summary of car shortages and surpluses by groups from April 20, 1909, to September 14, 1910, says:

"The surplus reported totals 54,890 cars, a decrease of 5,132. The shortage totals 7,814, a decrease of 1,479. There were decreases in the surplus in all territories, excepting group 2 (East

ern), where an increase in coal and gondola cars offset the decrease in box, group 5 (Southern), which also reports an increase in coal and gondola, and group 8 (Middle Western), where both box and coal increased.

shortage is chiefly in group 4 (North Atlantic), where the box and coal car shortages that developed within the past four weeks have been considerably reduced.

The accompanying table gives the surpluses and shortages, by

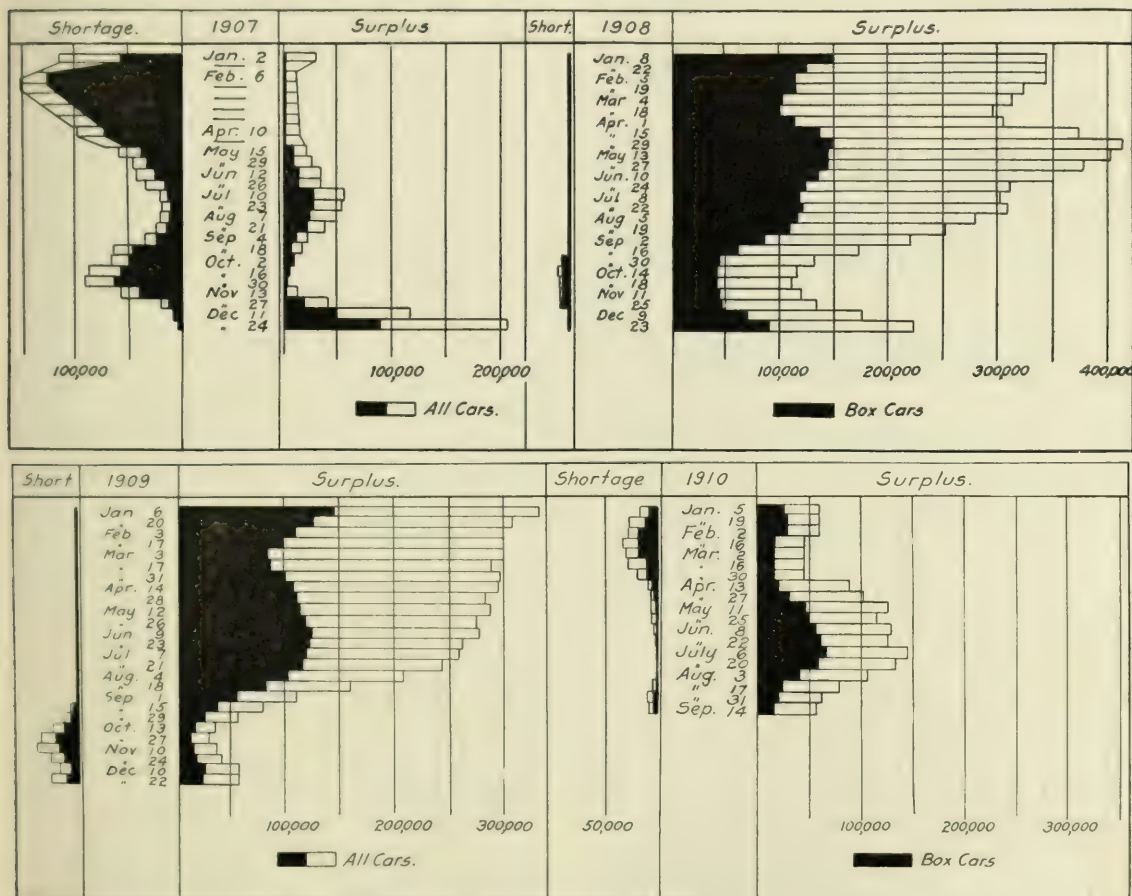
CAR SURPLUSES AND SHORTAGES

Group	Date	No. of cars	1919				1918				Total
			Box	Flat	Coal, gondola and hopper	Other	Box	Flat	Coal, gondola and hopper	Other	
1	September 14, 1919	8	6	486	200	189	120	96	505	9	721
2	" 14, 1919	21	1,393	112	5,201	7,186	145	2	47	83	297
3	" 14, 1919	22	3,800	100	300	2,385	76	216	127	36	454
4	" 14, 1919	19	298	4	257	470	336	379	1,159	229	2,406
5	" 14, 1919	17	139	104	369	775	145	199	223	9	759
6	" 14, 1919	19	6,726	680	1,000	2,453	1	0	0	2	14
7	" 14, 1919	5	81	17	0	179	24	0	22	157	208
8	" 14, 1919	13	1,699	145	2,454	1,946	0	10	6	4	20
9	" 14, 1919	9	441	389	717	1,774	192	5	43	0	240
10	" 14, 1919	18	1,064	326	2,100	4,080	1,124	105	16	255	1,830
11	" 14, 1919	5	1,019	237	15	863	694	175	0	91	870
Total		146	17,786	2,854	18,047	21,203	3,368	1,093	2,474	879	7,814

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia, and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.

"In groups 3 (Central) and 6 (Northwestern) there are material decreases in the coal car surplus, probably due in part to the resumption of mining in the Illinois field. The decrease in

groups for the latest period covered by the report, and the charts show total surpluses and shortages weekly in 1907, 1908, 1909 and 1910.



Car Surpluses and Shortages in 1907, 1908, 1909 and 1910.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF JULY, 1910.
(See also issues of September 7 and 21.)

Name of road and period.	Operating revenues.			Operating expenses.			Net operating revenues (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with year.
	Mileage operated.	Freight.	Passenger.	Total.	Way and structures.	Of equipment.					
Atlantic & N. E. Ry.	167	\$11,010	\$28,304	\$39,314	\$20,402	\$23,901	\$4,804	\$40,700	\$3,298	\$89,555	\$3,041
Atlantic & N. E. Ry.	167	11,443	321,962	333,405	21,560	11,914	3,023	110,361	2,755	158,643	10,008
Atlantic & N. E. Ry.	4,434	6,068,876	1,455,781	7,524,657	1,118,784	1,345,172	2,017,02	2,509,244	159,928	5,423,590	132,992
Atlantic & N. E. Ry.	21	236,732	31,392	268,124	24,463	31,392	556	80,799	6,094	143,314	17,260
Atlantic & N. E. Ry.	214	42,000	61,638	103,638	16,828	14,775	4,959	28,187	4,584	68,433	5,494
Atlantic & N. E. Ry.	300	121,496	57,699	179,195	16,151	15,440	6,895	74,415	4,138	115,179	3,172
Atlantic & N. E. Ry.	300	103,110	65,373	168,483	30,199	40,428	5,997	76,841	8,911	132,067	1,976
Atlantic & N. E. Ry.	336	109,194	196,148	305,342	34,615	71,001	19,956	175,804	12,015	313,592	42,889
Atlantic & N. E. Ry.	330	521,935	38,785	560,720	74,613	103,439	9,954	204,627	12,015	313,592	21,338
Atlantic & N. E. Ry.	4,500	2,903,368	1,093,984	4,000,352	1,012,757	1,612,757	130,565	2,871,022	201,896	3,534,327	560,665
Atlantic & N. E. Ry.	1,159	496,180	692,379	1,188,559	151,862	111,508	18,648	281,954	21,093	585,396	83,127
Atlantic & N. E. Ry.	175	225,870	31,409	257,279	40,500	47,273	3,938	75,931	6,134	173,776	7,411
Atlantic & N. E. Ry.	350	90,698	21,562	112,260	24,874	14,104	4,787	53,373	6,643	103,750	11,603
Atlantic & N. E. Ry.	1,438	374,861	302,831	677,692	146,392	78,151	24,337	349,332	31,292	630,927	4,277
Atlantic & N. E. Ry.	165	112,876	12,965	125,841	8,310	14,743	392	25,655	4,298	58,268	28,311
Atlantic & N. E. Ry.	560	682,943	173,859	856,802	115,970	99,321	49,778	351,659	14,300	631,088	1,920
Atlantic & N. E. Ry.	1,022	2,480,167	626,224	3,106,391	366,909	51,518	1,070,383	65,397	2,113,355	1,484,159	38,893
Atlantic & N. E. Ry.	373	176,362	90,427	266,789	48,643	41,614	4,798	100,853	8,620	213,536	63,822
Atlantic & N. E. Ry.	3,723	9,115	287,966	297,081	56,836	530,215	4,875	1,106,271	4,875	356,974	11,550
Atlantic & N. E. Ry.	1,284	74,284	10,843	85,127	229,397	38,355	83,355	803,558	63,213	1,765,838	5,065
Atlantic & N. E. Ry.	2,514	1,431,465	716,109	2,147,574	327,229	397,893	83,355	803,558	63,213	1,765,838	5,065
Atlantic & N. E. Ry.	443	482,703	125,018	607,721	78,450	65,080	12,319	198,015	12,430	367,203	87,020
Atlantic & N. E. Ry.	1,872	436,391	187,702	624,093	177,239	127,613	13,892	242,069	22,647	583,400	113,618

*From July 1, 1910, to July 31, 1910, previously reported separately. †Prior to July 1, 1910, included in returns of Missouri, Kansas & Texas Ry. Co. (See also issues of July 31, 1909, and July 31, 1908, 2,987 miles.)

Hearing in Western Rate Cases.

Commissioners Prouty, Clark and Lane continued to take testimony at Chicago last week in the cases involving advances in freight rates in the west. W. A. Gardner, vice-president of the Chicago & North Western, testified for that road. He stated frankly that the North Western is prosperous and that there is no danger that it will be bankrupt right away if it is not allowed to make the advances under consideration. He said, however, that it has reached the limit of reductions in operating expenses by grade revision and similar economies, and requires an advance in its rates to maintain a proper surplus and keep up its credit. In order to maintain its credit it must have a certain amount above its immediate needs for wages and the purchase of materials. "The exercise of the right of eminent domain," he said, "while it may give the power to regulate railways, does not render the North Western immune from the ordinary commercial rules when we undertake to borrow money, and if we are not allowed to earn a surplus we will become embarrassed and will cease to be the aggressive force in the communities we serve that we have been."

He was asked what would happen if the so-called weaker roads were permitted to earn revenues that would enable them to become as strong financially and physically as the North Western. He replied that the effect would be that the North Western would put the additional surplus back into its property and give the public the benefit of much better service. Asked if he thought that when the surplus is put back into the property the people should be expected to pay freight rates on the increased value due to this, he replied that if the value of the property be an element in rate-making, then the surplus will find expression in the valuation of the property.

"But it has not been the policy of the North Western and never will be to issue any bonds or stocks against its surplus. It has put almost \$30,000,000 of its surplus into the property during the last 10 years and never capitalized a dollar of it, and it is due to this fact and to the fact that it is still able to earn a surplus that it can borrow money at 4 per cent."

Commissioner Clark said to Mr. Gardner: "Suppose your property was inventoried at \$125,000 a mile and that alongside the North Western was another road that would be appraised at \$65,000 a mile. Could the rates be made on the value of the properties?" Mr. Gardner replied: "I think that is a conundrum that we are all seeking to answer, and I am glad that I do not have to do it. In such a case as you suggest, we could not get any higher or lower rates than the other road, and I admit that justice in rate-making to some lesser line might extravagantly increase our revenue, if you please, but I do not possess the wisdom to know how that problem should be solved."

He said he did not think that a road should be allowed to earn an extravagant surplus, or one that would encourage extravagant administration, but it should have a large enough one to protect it against loss due to a decline of traffic due to a failure of crops or other causes. "The surplus, Mr. Gardner continued, 'belongs to the stockholders. Now, it is beyond any man, I think, to say how much of that surplus is due to extraordinary remunerative rates and how much of it is due to extraordinary zealous administration. Both elements enter into the creation of the surplus.'

"We might have had a million and a half last year more than we did have, and who would be the wiser? I do not suppose you would have accused us of maladministration or an effort to throw the company's money away, so that the surplus does not in every instance express a higher rate. It expresses a remunerative rate as well as an efficient administration. If the position were swept away that efficient administration produces a surplus as well as high rates, there would be no incentive for efficient administration, because humanity on a railway is pretty near the same that it is in a lawyer's office, or anywhere else, I fancy."

Mr. Gardner, like preceding witnesses, gave detailed figures showing the causes of increases in the expenses of the railways. He showed that the increases in wages for different classes of employees had been from 10 to 40 per cent. prior to January 1, 1910, and since then had amounted on the North Western to \$71,900 a year. He stated that the locomotive engineers have already presented demands for an increase of \$800,000 a year and that he understood an increase for the trainmen is also to be asked for. He said that he had made no appraisal of the

North Western's property, but that in his judgment its reproduction would cost well over \$9,000 a mile, which exceeds its capitalization. Asked regarding increases in the cost of maintenance, he said it is the policy of the North Western constantly to improve the condition of its property and that the increase of \$7,757.62 in expenditures for maintenance of way and structures was due to the fact that last year there was a phenomenal outlook for business and the road made phenomenal preparation to meet it.

He was asked how the commission was to know that the road would not go on increasing the amount of the improvements which it regarded as maintenance. He replied: "The physical condition of a railway is like a case of typhoid fever. It never stands still, but gets better or worse. If prospective business demands great expenditures for up-keep we should make them."

Inquiries regarding the North Western's method of keeping its accounts brought the reply that they were kept in strict accordance with the spirit and the letter of the rules of the Interstate Commerce Commission, and that if there was any criticism of its methods it should be made to the commission.

William Ellis, commerce counsel for the St. Paul, after filing a large number of statistical exhibits, was cross-examined by attorneys for the shippers. Mr. Ellis brought out prominently the point that while the railway business is regarded as one of increasing returns, whether it is one or not depends on whether the unit costs for carrying it on increase. If unit costs did not increase returns would increase as traffic did, but, as a matter of fact, unit costs have been increasing, with the result that the lines of expense and earnings tend to converge. He said in order to put the St. Paul on a sound basis its earnings should be increased \$1,500,000 a year.

I. G. Scott, auditor, and W. G. Bied, general manager, of the Minneapolis & St. Louis and the Iowa Central, testified for these roads. Their testimony showed that while the net revenue of the Minneapolis & St. Louis increased from \$1,219,000 to \$1,372,000 in 1910, its surplus decreased from \$296,598 to \$22,062, in spite of the fact that its dividend had been reduced from 5 to 2½ per cent. It was shown that the Iowa Central had not paid dividends in 15 years.

S. B. Schuyler, general auditor of the Missouri Pacific, introduced a large amount of statistical evidence for this road. He showed that its average cost per mile has been \$38,418 and that the net return on the investment decreased from 2.89 per cent. in 1900 to 2.49 per cent. in 1910. He stated that the proposed increases in rates would increase the earnings of his road only \$94,863 per year. C. J. McPherson, assistant to the general manager of the Missouri Pacific, gave detailed statistics showing increases in the expenses of the road. A table which he filed showed that since 1900 the gross operating revenues of the Missouri Pacific have increased from 60.4 per cent., while wages have increased 101.8 per cent., other expenses 38.2 per cent., and total operating expenses 73.8 per cent. In 1900 the percentage of wages to total expenses was 56 per cent. and in 1900 it was 65 per cent.

E. B. Boyd, assistant to the vice-president of the Missouri Pacific, while on the witness stand, and J. C. Jeffery, commerce counsel for that road, told the commission they did not regard the advances in rates that had been made by the Western roads as the only ones they were entitled to make, and that it was the policy of the Missouri Pacific to make all of the advances that may be necessary in order to enable it to earn a proper return. Mr. Jeffery called attention to the fact that the Missouri Pacific is not paying dividends, and said that it feels that it ought to be able to earn both a reasonable dividend and a surplus.

Mr. Boyd told in detail of the various improvements in service that had been made by his line and others which tended to increase their operating expenses. He contended that the railways should be able to earn enough not only to maintain their operating and other charges but in addition enough to yield a return on the investment equal to the average return earned by other businesses in the territories through which they run. He declared that 20 per cent. would not be an unreasonable amount for a railway to earn if its rates were not extortionate per se. He contended that rates which do not put an undue burden on commerce are not excessive even if by charging them a railway earns a very large return.

After the completion of the testimony for the Missouri Pacific the Burlington opened its case. Before putting any witness on the stand Chester M. Dawes, its general counsel, made a state-

ment of the position it intended to take. He said that the net earnings of the Burlington for 1910 exceeded those for 1909, but that its operating ratio increased.

"The Burlington," Mr. Dawes continued, "will soon in the form of decisions of the supreme court of the United States, which we must regard as a guide to every administrative body and subordinate court, that it is entitled to a fair return on the value of its property, that is, the cost of reproducing it however that value may have been created, whether out of earnings from the receipts of securities, or from the natural increment in the value of the property. The governmental policy is to include all of these elements in determining the taxes which a railway must pay for the support of the government, and we insist, therefore, that we must be given the benefit of that value when the question of what rates may be charged is under determination. The Burlington believes that the only limit upon its right to a fair return upon the value of its property is that the rate which is used to produce that return shall at all times be just and reasonable and impose no undue burden upon the shipper. If counsel for the shippers assert the contrary and say that in rate making there should be an additional limit, it rests with them to overturn that legal proposition in the highest tribunal in the land. The casual opinions of traffic men and operating men as to whether or not we should be allowed to have the benefit of the increment of our value, or should be allowed to increase the value of our property out of earnings, is absolutely of no importance whatever. It is a question of law in which the burden to overcome the views I have contended for is on counsel for the shippers."

Commissioner Clark asked Mr. Dawes whether, in his opinion, as between several railways doing a competitive business, if the commission or courts should fix rates on which the railways having the largest investment could earn a reasonable return they would do full justice to all of the railways. Mr. Dawes replied that the question of what the rate on several competing roads should be was a practical question, and that he had been stating merely the Burlington's legal position.

C. I. Sturgis, general auditor of the Burlington, stated that its surplus for 1910 was \$1,113,000, but the estimated amount of the advance in wages already made and to come would be \$2,714,000. These advances in wages would, therefore, on present rates, wipe out the surplus and create a deficit of over \$1,600,000. He said that if the road's budget should be increased the way it ought to be in 1911 it, in connection with the wage advances, would wipe out the surplus for 1910 and create a deficit of \$8,085,048. Mr. Sturgis showed that 93.5 per cent. of the increase in gross earnings in 1910 was used up in increased operating expenses. He stated that the book cost of the road, less sinking fund, is \$432,076,500. Its total capitalization is \$320,695,100. The amount of gross corporate income available for sinking funds, betterments, improvements, interest and dividends in 1910 was \$22,481,636. Deducting from this the sinking fund and betterment items leaves a net income applicable to interest and dividends of \$18,485,755. This was 5.76 per cent. on the road's capitalization and 4.28 per cent. on its cost. The value of the property was estimated at \$450,000,000. The net return on this was 4.11 per cent. If the amount expended for betterments and charged to income were added to the amount available for interest and dividends the return on the capitalization would be 6.8 per cent.; on the cost of the property 5.05 per cent.; on the estimated present value, 4.85 per cent. Deducting from the capitalization of the Burlington the amount it has invested in the securities of other companies, etc., and from its earnings the amount of interest and dividends that it derives from its outside investments, leave it with a return on its net capitalization of 6.79 per cent. and on the investment in the property of 4.75 per cent. Mr. Sturgis gave figures which showed strikingly how much more rapidly operating expenses had increased than gross earnings in recent years. He said since 1901 gross earnings have increased 62.31 per cent. and operating expenses 62.4 per cent. per mile of road; since 1903 gross earnings have increased 32.24 per cent. and operating expenses 51.53 per cent.; since 1907 gross earnings have increased 6.68 and operating expenses 20.68. He estimated that the increase in earnings that would be caused by the advance in rates which had been suspended would be \$231,200 per year.

The question was raised as to whether the reasonableness of specific advances in rates was to be inquired into. Mr. Dawes said the understanding of the roads was that the commission

was merely going to inquire as to whether the roads needed more money. Commissioner Clark said that there is no purpose at present of going into the question of reasonableness of any specific rate.

F. E. Ward, general manager of the Burlington, testified that while his road's valuation as estimated by Mr. Sturgis was 450 millions, he believed the cost of reproduction would really be not less than 530 millions, and that the smaller figure was used by Mr. Sturgis to make sure of keeping within a reasonable limit. Mr. Ward's estimate amounts to \$60,000 a mile and includes: Lands used for terminals in cities, \$111,000,000; equipment, \$74,000,000; land for right of way in addition to terminals, \$45,000,000; such items as roadway, track, ties, terminal facilities, buildings, etc., \$300,000,000. He estimates that the Chicago terminals alone are worth \$48,000,000.

STATE COMMISSIONS.

Henry B. Seaman, chief engineer of the New York Public Service Commission, First district, has resigned, saying in his letter tendering his resignation that he did not wish to continue to take responsibility for plans for subway building when he was not given full authority in making these plans. George S. Rice, chief of the Bureau of Subway Construction, has also resigned. He says that his resignation was because the work on which he had been engaged has been finished.

The Railroad Commission of Louisiana, after having carefully considered applications filed by the various express companies for a postponement of the hearing on express rates assigned for September 29 at Baton Rouge, the commission has decided to grant the application, and the express cases assigned for that date will be postponed until further notice. In explanation of its action, the commission wishes it to be understood that its reasons for postponing this hearing are all in the interest of the public. It is certain that so important a case cannot be disposed of hurriedly, and the great amount of research and investigation necessary even to a preliminary hearing renders delay imperative. No changes will be made in any rates or classifications now in effect, except such reductions as may be voluntarily put into effect by the express companies.

COURT NEWS.

The supreme court of the state of Washington has ruled that when the state commission is defeated in litigation in one of the lower courts it may appeal. Counsel for the railways contended that the commission had no direct right of appeal.

The Missouri river rate cases have again come before the Supreme Court of the United States. The court's decision upholding the orders of the Interstate Commerce Commission reducing the rates was attacked as an illegal attempt of the commission to create zones of traffic. The supreme court could see no such attempt and a rehearing was demanded. Now the government has filed its reasons for objecting to a rehearing. It claims that unless the mandate of the court is issued shortly after October 10, when the term begins, the cases will become moot, as the orders of the commission will expire November 10. The railways now declare that if the final decision of the court is against them, shippers will present claims for reparation amounting to \$250,000.

The State Railways of Chile in 1909 had an extent of 1,703 miles, and 63 miles more than in 1908. Their gross earnings were \$47,169,802, which is at the rate of \$27,700 per mile; but the expenses (probably including interest on securities) were \$58,734,301, or \$34,490 per mile, or 124½ per cent. of the earnings. The very large earnings per mile are explained by the nature of the Chilean dollar, which is depreciated, and was more so in 1909 than the year before, when earnings were \$2,177,000 less, but expenditures \$7,983,000 more, being then 146 per cent. of the receipts. In 1909 it was reported that more than 100 new locomotives and 2,000 cars were required to make good the stock. Chilean works, for the most part, supply the rolling stock.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

C. A. Caldwell has been elected first vice-president of the Alton, Jacksonville & Peoria, with office at Alton, Ill., succeeding Robert Currie, resigned.

Timothy E. Byrnes, vice-president of the New York, New Haven & Hartford at Boston, Mass., has been elected vice-president also of the Boston & Maine. Mr. Byrnes was born at

Bellows Falls, Vt., in 1855. He lived there for nine years until 1864, when his parents went to Minnesota, where his father became a prosperous farmer. The son, after attending the public schools, entered the University of Minnesota. He graduated in 1879, taking the degree of Bachelor of Science. After passing two or three years in a law office he went to Columbia Law School, covering the course of two years in a single year, but, under the two years' requirement of the school, not receiving his degree. Returning to Minnesota, he was admitted to



T. E. Byrnes.

the bar of that state in 1882. Following several years of general practice, he took up railway law as a specialty and became counsel in various suits for a number of railway corporations of the state until 1897, when he went to the Northern Pacific as representative of President Mellen, having supervision not only of many legal matters but, to a considerable extent, of operation and traffic. Mr. Mellen went to the New York, New Haven & Hartford as president in November, 1903, and in March, 1905, called his former coadjutor from the Northern Pacific to the position of assistant to the president, with office in Boston—a position since raised to one of the vice-presidencies of the company. At Boston, Vice-President Byrnes has had for years a "diplomatic" position of high importance in solving not merely traffic problems but in dealing with the civic questions raised in the public and legislative resistance to the New Haven's control of the Boston & Maine. He also, for a time, represented his company at Washington while the federal suit against the New Haven under the Sherman anti-trust act of 1890 was pending—a suit which the federal department of justice withdrew in the spring of 1909.

Operating Officers.

W. E. Leonard, car accountant of the Gulf & Ship Island, at Gulfport, Miss., has been appointed superintendent of transportation, his former position having been abolished.

M. O. Gay has been appointed trainmaster of the Chicago, Rock Island & Gulf, with office at Ft. Worth, Tex., a position which was abolished some months ago and is now re-established.

H. W. McAbee has been appointed superintendent of dining cars of the Denver & Rio Grande, with office at Denver, Colo., succeeding T. A. Dempsey, resigned to enter the service of another company.

W. D. Dunning, trainmaster of the passenger terminal of the Illinois Central at Chicago, has been appointed superintendent of the passenger terminal at Chicago. W. H. Gerry succeeds Mr. Dunning.

R. F. Ledford, assistant transmitter of the Chicago, Burlington & Quincy at St. Joseph, Mo., has been appointed an assistant superintendent, with office at Brookfield, Mo., succeeding F. J. Warden, transferred.

F. W. Egan, having recovered his health, will resume his duties as superintendent of the Western division of the Grand Trunk, with office at Detroit, Mich., and J. Ehrke, acting superintendent, will resume his duties as assistant superintendent, 10th district (main line) and 26th district, with office at Battle Creek.

The new system of organization having been established on the Carolina & Eastern, the titles of general superintendent, superintendent of motive power and chief engineer have been abolished, and the following officers will hereafter be designated: assistant general manager, M. J. Buckles, formerly general superintendent; George W. Roschke, formerly chief engineer, and J. F. Graham, formerly superintendent of motive power, all with office at Portland; and J. D. Stark and C. G. Sutherland. In a previous issue we announced the appointment of the above to similar positions on the Oregon Railroad & Navigation Company.

Traffic Officers.

W. D. Cook has been appointed general freight and passenger agent of the Brinson Railway, with office at Sylvania, Ga.

C. W. Andrews has been appointed a commercial agent of the Missouri, Oklahoma & Gulf, with office at Dallas, Tex.

M. G. Buffington has been appointed a traveling freight agent of the St. Louis & San Francisco, with office at Oklahoma City, Okla.

G. A. Freeze, provincial agent of the Maine Central, has resigned, and G. W. Miller has been appointed a commercial agent, with headquarters at St. John, N. B.

Charles E. E. Ussher, whose appointment as passenger traffic manager of the Canadian Pacific at Montreal, Que., has already been announced in these columns, was born December 29, 1857, at Niagara Falls, Ont. He began railway work in 1874 as a clerk in the auditor's office of the Great Western. From May, 1876, to June, 1880, he was clerk in the general passenger department of the same road and then for about three years was chief ticket clerk of the Wabash, St. Louis & Pacific, now a part of the Wabash Railroad. He was then for about six months rate clerk of the Chicago & Atlantic, now a part of the Erie Railroad. For three years, from November, 1883, he was out of railway work engaged in commercial business at Hamilton, Ont. In November, 1886, he was appointed chief ticket clerk of the Canadian Pacific and was made assistant general passenger agent in May, 1889, remaining in that position until January, 1898, when he was appointed general passenger agent, eastern lines, of the same road. Mr. Ussher was appointed assistant passenger traffic manager, western lines, of the Canadian Pacific on January 1, 1907, with office at Winnipeg, Man., which position he held until his recent appointment as passenger traffic manager at Montreal.

H. H. Swearingen, general agent of the Chicago, Burlington & Quincy at Billings, Mont., has been appointed commercial agent of the Burlington, the Colorado & Southern and the Colorado Midland, with office at San Francisco, Cal.

W. H. Adew, traveling freight and passenger agent of the New Orleans, Mobile & Chicago, has been appointed a commercial agent, with office at Memphis, Tenn. J. O. Gaither has been appointed a traveling freight and passenger agent, with office at Laurel, Miss.

Samuel P. Collier, Jr., division freight agent of the Atlantic Coast Line at Jacksonville, Fla., has been appointed traffic manager of the Winston-Salem Southbound, a new line being built jointly by the Atlantic Coast Line and the Norfolk & Western, from Winston-Salem, N. C., to Wadesboro, 88 miles.

B. H. Stephens, general agent of the Trinity & Brazos Valley at Dallas, Tex., has been transferred to Corsicana, Tex., and E. E. Peacock, who resigned as commercial agent at Dallas a few months ago, has been reappointed to that position, succeeding to the duties of Mr. Stephens. Nat H. Hall, soliciting freight agent at Galveston, has been appointed a commercial agent, with office at Galveston. J. E. Murphy succeeds Mr. Hall.

Engineering and Rolling Stock Officers.

E. S. Heyser has been appointed roadmaster of the Third division and the Hidalgo branch of the St. Louis, Brownsville & Mexico, with office at Kingsville, Tex., succeeding W. J. Caronahan.

J. W. Storrs has been appointed consulting engineer of the Montpelier & Wells River, with office at Concord, N. H. Mr. Storrs will have full supervision of construction and maintenance of bridges.

J. J. Dewey, master mechanic of the New York division and branches of the Erie Railroad, at Jersey City, N. J., has resigned to become superintendent of machinery of the American Laundry Machinery Manufacturing Co., with headquarters at Rochester, N. Y.

M. A. Kinney, master mechanic of the Hocking Valley at Columbus, Ohio, has been appointed superintendent of motive power, with office at Columbus, succeeding G. J. De Vilbiss, deceased. P. G. Leonard has been appointed road foreman of engines, with office at Columbus, succeeding L. C. Engler, deceased.

C. L. McIlvaine, assistant engineer of motive power of the Buffalo division of the Pennsylvania Railroad, at Buffalo, N. Y., has been appointed assistant engineer of the Erie division of the Pennsylvania Railroad and the Northern Central, with office at Williamsport, Pa., succeeding J. L. Cunningham, promoted. Paul L. Grove, assistant master mechanic at the Altona shops, succeeds Mr. McIlvaine, with office at Buffalo.

Purchasing Officers.

E. E. Bashford, assistant secretary of the National Railways of Mexico at New York, has been appointed general purchasing agent, with office at Mexico City, Mexico, succeeding J. H. Guess, resigned.

OBITUARY.

Donald P. Stubbs, general agent of the Union Pacific at Cleveland, Ohio, a son of John C. Stubbs, vice-president and director of traffic of the Harriman Lines, died September 27 at Cleveland.

J. G. Parker, secretary of the New York, New Haven & Hartford, at New Haven, Conn., died September 27. Mr. Parker was in the service of the New York, New Haven & Hartford for many years, having been private secretary to former President Charles P. Clark, and was made secretary of the company after Mr. Mellen became president.

Samuel F. Parrott, receiver of the Atlanta, Birmingham & Atlantic and the Macon & Birmingham, also president of the Atlantic Compress Co., died September 26 in Atlanta, Ga., after a long illness. Mr. Parrott resigned as vice-president and general manager of the Georgia, Southern & Florida in July, 1908, to become president of the Atlantic Compress Co. He was appointed permanent receiver of the Atlanta, Birmingham & Atlantic in March, 1909.



C. E. E. Ussher.

Railway Construction.

New Incorporations, Surveys, Etc.

ATCHISON, TOPEKA & SANTA FE.—Grading is in progress on nearly all of the 310-mile cut-off which the Santa Fe is constructing between Texico, N. Mex., and Coleman, Tex. The plans for making Sweetwater the division point on the new line have been prepared and arrangements are being made for the commencement of construction work upon the large machine and car shops and other buildings that are to be built at Sweetwater. It is announced that the Santa Fe will spend approximately \$2,000,000 for improvements at Sweetwater.

ATLANTIC NORTHERN & SOUTHERN.—An officer writes that a grading contract has been let to Shugert & Barnes Bros., Des Moines, Iowa, and that other contracts are to be let by October 10. Work is now under way from Atlantic, Iowa, south via Grant to Villisca, 38 miles. There will be about 40 short trestles. The company now operates a line from Kimballton, south via Elkhorn to Atlantic, 17 miles. H. S. Rattenborg, president; C. B. Judd, chief engineer, Atlantic. (July 22, p. 173.)

BUFFALO, ROCHESTER & PITTSBURGH.—This company is planning to make a number of improvements along the line. The Silver Lake Railway, operating a line from Silver Spring, N. Y., to Perry, seven miles, has been acquired and is to be improved. The work on nine miles of double-track, including grade and line revision between Newton, Pa., and Mount Jewett, is nearing completion.

CANADIAN NORTHERN.—Work has been started by the C. J. Johnstone Co., Seattle, Wash., it is said, on a line between Vancouver, B. C., and Matsqui.

CANADIAN PACIFIC.—The report of this company for the year ended June 30, 1910, shows that the company has 471.4 miles of new line under construction on which work is now under way, as follows:

Ontario Division		Miles.
Tilsonburg, Lake Erie & Pacific: Code Junction, Ont., to Ingersoll...	4.8	
Georgian Bay & Seaboard: Cold Water, Ont., to Atherley.....	17.8	
Central Division.		
Storewall Branch: Komarno, Man., north to Icelandic river.....	38.4	
Virden Branch: Virden, Man., northwest to McAuley.....	14.0	
Souris Branch and Extension: Tilston, Man., westerly.....	24.0	
Western Division.		
Moose Jaw Branch: Outlook, Sask., to Macklin.....	147.7	
Bulyea Branch: Regina, Sask., to Bulyea.....	42.7	
Colonsay Branch: Craven, Sask., to Colonsay.....	112.0	
Weyburn Westerly: Forward, Sask., westerly.....	25.0	
Kimore Northeast: Irricana, Alb., easterly.....	15.0	
Crow's Nest Pass: Mile 28 to Mile 58 in Alberta.....	30.0	
Pacific Division: Vancouver, B.C., and Lulu Island, Eburne Exten.....	10.0	
Total	471.4	

A charter has been secured by the Kootenay Central to build from a point near Galloway, B. C., on the Crow's Nest Line, to Golden, on the main line, 175 miles. Arrangements have been made with this company for the construction of the railway in sections of such lengths and within such periods of time as may be determined hereafter, and when completed the new line is to be leased to the Canadian Pacific for 999 years.

CENTRAL RAILROAD OF NEW JERSEY.—The report of this company for the year ended June 30, 1910, shows that the sum of \$1,000,000 has been appropriated as a fund for additions and betterments to cover in part the cost of proposed reconstruction and elevation of drawbridges in New Jersey over the Hackensack and Passaic rivers and of the approaches; new piers at Jersey City, N. J., new equipment building at the company's shops and contracted for; installation of interlocking systems at various points; new engine terminals at Ashley, Pa., and Scranton; new signal bridges; grading and additional yard tracks at Jersey City, and other additions and betterments. The following improvements have been authorized to be carried out during the coming year: Improving the express and station facilities; a covered lighterage pier No. 11; new open front pier No. 12, and cattle pier No. 14, all at Jersey City; renewal of bridge No. 19 at Bayonne; renewal of bridge No. 136 at Hump-ton; change of alignment on the main track at Glen Onoko, Pa.,

and new engine terminal at Red Bank, N. J.; relocation of turnpike at Mauch Chunk, Pa.; extension of track No. 6 from Garwood, N. J., to Westfield; also extension of track from Lorraine to Cranford.

CHESAPEAKE & OHIO.—The report of this company for the year ended June 30, 1910, under date of September 15, shows that during the year the Coal River Railway added 5.8 miles and an extension of 0.7 mile was finished on the Paint Creek branch. Further extensions of 11.4 miles of the Coal River Railway and 14.1 miles of the Raleigh & Southwestern are now in progress; also, an extension of the Guyandot Valley branch, 21.4 miles. These extensions are for the purpose of further development of the timber and coal tonnage and it is expected will be finished and put in operation during the fiscal year 1911. This company completed second-track work, including revision of line and grade from Lee Hall, Va., to Grove, 4.5 miles; Greenway to Gladstone, five miles, and St. Albans, W. Va., to Barboursville, 27.8 miles. Second track work from Gladstone, Va., to Riverville, four miles; Walker to Providence Forge, six miles, has been finished since the close of the year. Second-track work from Providence Forge to Elko, 9.2 miles; Korah to Westham, 2.7 miles, and Fort Spring, W. Va., to Rockland, 2.1 miles, it is expected will be finished before the close of 1910. In addition, second-track work aggregating 67 miles, is in progress on the Cincinnati division. The greater part of this is expected to be put in operation during 1910. Upon the completion of second track now under construction the line from Newport News, Va., to Cincinnati, Ohio, will have two tracks, with the exception of nine miles in West Virginia and 48 miles in Kentucky. It may be necessary to double-track the 48 miles in Kentucky during 1911 if the present volume of traffic continues. See report of this company elsewhere in this issue.

CHICAGO & NORTH WESTERN.—The report of this company for the year ended June 30, 1910, shows that the following companies have been organized in the interest of the C. & N. W.:

Lee County Railway.—This company has completed a double-track line from Nachusa, Ill., to Nelson, 12.76 miles.

Bellefourche Valley.—Organized to build from a connection with the C. & N. W. at Bellefourche, S. Dak., thence through the counties of Butte and Meade for 88 miles; 23.52 miles have been finished.

James River Valley & Northwestern.—Organized in South Dakota to build from Gettysburg, S. Dak., to Blunt; also from Onida to Hitchcock, in all about 130 miles. The line from Gettysburg to Blunt, 39.55 miles, is about finished and about all the right-of-way for the line between Onida and Hitchcock has been secured.

Sioux City, Dakota & Northwestern.—Organized in Iowa to build from Sioux City, Iowa, to Hawarden. Work is well advanced from a connection with the Illinois Central near Hinton to the C. & N. W. near Hawarden, 28.17 miles, and an agreement has been entered into between the Illinois Central and the C. & N. W. providing for perpetual trackage rights over the main line of the Illinois Central between Sioux City and Hinton, 12.72 miles.

Des Plaines Valley.—Organized in Illinois and has secured about all the right-of-way for a double-track line from a point between Northfield, Ill., and Blodgett, on the Western division of the C. & N. W. to a connection with the Wisconsin division near Des Plaines, thence to the Galena division at Proviso, 21 miles. This line will directly connect the several divisions of the C. & N. W. entering Chicago with the proposed enlarged terminal yards at Proviso.

Milwaukee, Sparta & Northwestern.—Organized in Wisconsin to build from the C. & N. W. near Lindwurm, Wis., which is about eight miles north of Milwaukee, northwest to Sparta, on the Madison division, 169.52 miles; also to build from a connection with the above line at a point about six miles west of Lindwurm, southerly to a connection with the Milwaukee and Madison line near West Allis, 8.16 miles; from Lindwurm to Clyman, and from the junction west of Lindwurm to near West Allis, in all about 51.78 miles, and work is under way on a double-track line. From Clyman to Necodah, and from West Allis to Sparta most of the right-of-way has been secured and the construction of a single-track line has been started. Between Necodah and Wyeville an existing branch will be reconstructed and used as part of the main line. Provision is also

to be made for the future construction of an additional main track from Cleburn to Sparta. This line will extend a direct route with low grades from Milwaukee to connection with the Chicago, St. Paul, Minneapolis & Omaha at Waukegan and the C. & N. W. at Sparta. It will also provide a double-track belt line around the city of Milwaukee.

Satisfactory progress has been made on the company's new passenger terminal and approaches in Chicago. The company has undertaken the elevation to a maximum height of 17½ ft. of its roadway and main tracks in Chicago, from a connection with the Rockland street line, at Tyler street, to Lorain street, 0.81 mile. On the Milwaukee line satisfactory progress has been made on the elevation of the main tracks through the city of Evanston, Ill. This work is expected to be finished soon.

In the village of Oak Park, adjoining Chicago at its western limits, the four northerly tracks of the proposed six-track system have been elevated from Austin avenue to Clinton avenue, 1.26 miles. The bridge work has been erected for the subways and the street improvements are about finished, as well as the Harlem avenue freight yard, including the construction of a brick freight house. In the city of Milwaukee, Wis., the elevation of the main tracks from near Chicago avenue to Greenfield avenue, 1.62 miles, including the elevation of the Barclay street and Chase yards, containing 6.55 miles of track; the reconstruction of the Kinnickinnic river drawbridge and the construction of four subway bridges, also a brick freight station and team yard at Lincoln avenue, have been completed. The important additions and betterment work includes third track on the Mayfair cut-off, from Foster street, Evanston, to Weber station, 2.52 miles, which is about finished. The Fulton, Ill., cut-off consisting of third and fourth main tracks, from the main line of the Galena division, three miles east of Fulton, to the east end of the company's new bridge over the Mississippi river, between East Clinton and Clinton, Iowa, 4.69 miles, and the revision of the main line of the Nebraska and Wyoming division between Thatcher and Valentine, Neb., including the construction of a cut-off, 5.73 miles, south of the present main line between these places and the construction of a 1,300-ft. bridge over the Niobrara river, has been finished. Second main track has been constructed on the Galena division from near West Chicago to a point west of Wayne, Ill., 4.74 miles. A total of 60.57 miles of yard tracks, sidings and industrial spurs have been added during the year. A second main track is being constructed and the present main line is being revised between Hawarden, Iowa, and the junction with the Sioux City, Dakota & Northwestern, about two miles east of that station. Land has been bought for the extension and enlargement of the company's station and terminal facilities at Proviso, Ill., and Tracy, Minn. Near Fulton, Ill., the company has secured 201 additional acres of land and has commenced the construction of a large terminal yard. See report of this company elsewhere in these columns.

CHICAGO, MILWAUKEE & ST. PAUL.—The report of this company for the year ended June 30, 1910, shows that the company is carrying out improvements to include additional second-track on the following lines: La Crosse division, from Camp Douglas, Wis., west to West Salem, about 44 miles; on the River division, from Wabasha, Minn., southeast to Richmond, about 46 miles; on the Prairie du Chien division, from Elm Grove, Wis., to Blue Mound Junction, about seven miles. During the year work on the reduction of grades and improvement of alignment was carried out at various places.

CHICKASHA, ARDMORE & LAWTON.—According to press reports from Guthrie, Okla., financial arrangements have been made to build a line from Ardmore, Okla., northwest to Chickasha, with a branch to Lawton, in all about 150 miles. O. O. Ayers is president.

DENVER, LARAMIE & NORTHWESTERN.—A contract has been given to J. B. Orman & Co. to build a 42-mile extension, it is said, from Greeley, Colo., northwest via Severance to Scott. It is expected that the section to Severance, 12 miles, will be finished by December 1, and to Scott by April, 1911. The line is eventually to be extended further northwest. (Sept. 2, p. 440.)

GALVESTON-HOUSTON (ELECTRIC).—This company, building an electric line from Houston, Tex., southeast to Galveston, 50 miles, recently started track laying at Lamarque. It is said that 120,000 ties and 5,700 tons of rail are stored in the yards

near Texas City Junction, ready to be transported to the several portions of the line. On 3 ballast is being delivered at the rate of 200 cu yds. each day, 10,000 cu yds. being contracted for the entire right of way. Hardy & Ford, contractors, are grading the upper 19 miles, and will complete their work on contract time, October 1. It is expected that J. C. Rogers, grading the lower 16 miles, from Clear creek to a point within two miles of the causeway, will have the 16 miles section finished about the same time. The two miles of grading between the causeway and the first section and the two-mile stretch between the upper end of the work, being done by Hardy & Ford, and the Houston city limits, have not been let, and probably will not be until the completion of the main stretches. (April 15, p. 1015.)

HAMMOND, CHICAGO HEIGHTS & SOUTHERN TRAVEL.—An officer writes that work is expected to be started in the spring of 1911. The company was organized to build from a point near Hammond, Ind., southwest to Chicago Heights, thence to St. Anne, in Kankakee county, Ill., in all about 50 miles. W. S. Reed, president, First National Bank building, Chicago, and A. Van Steenburg, secretary, Lansing, Ill.

HUMBOLDT & EASTERN.—An officer writes that at the present time the company is locating a line from Good's Pass, Cal., to Humboldt bay, and it is the intention to keep a surveying party in the field as long as the weather will permit. The company was organized last year to build about 175 miles of line in California. E. E. Skinner, secretary, 318 Fifth avenue, Eureka.

INTERNATIONAL RAILWAY OF NEW BRUNSWICK.—According to press reports, the line under construction for the past two years from Campbellton, N. B., on the Baie des Chaleurs, southwest to St. Leonard, on the St. Johns river, 110 miles, is nearing completion and will be opened for traffic soon.

IOWA & SOUTHWESTERN.—This company is building 38 miles of line from Atlantic, Iowa, south to Villisca, and is also building 18 miles of line from Clarinda, via College Springs, to Blanchard. The contract for all the work has been let to the Engineering Construction & Securities Co., Chicago. The grading has been sublet to Shugart & Barnes Brothers, Des Moines. C. B. Judd, chief engineer, Clarinda. (Jan. 21, p. 164.)

KOOTENAY CENTRAL.—See Canadian Pacific.

LEHIGH & NEW ENGLAND.—Right-of-way is said to have been secured for an extension from Danielsville, Pa., near Slatington, west to Tamaqua, 31 miles. The cost of the extension will be about \$3,000,000.

LEXINGTON & EASTERN.—According to press reports, all the right-of-way has been secured and it is said contracts for building an extension will be let October 1. The plans call for a line from Jackson, Ky., up the north fork of the Kentucky river, through the Elkhorn and Boone's fork coal fields in Letcher county, thence to a connection with the Chesapeake & Ohio's Big Sandy branch near the Brakes, 115 miles. The entire line will traverse a coal and timber section. It is the intention to have the line finished and in operation within two years. (Sept. 9, p. 483.)

LONG ISLAND RAILROAD.—This company has accepted the proposition made to it by the city of New York with reference to the elimination of grade crossings, also for the improvement of the Jamaica station. This work includes the closing of certain streets and laying out other streets, as well as a change of the grades of streets. A part of the expense is to be paid by the city. In view of the acceptance by the Long Island of this proposition, it is expected that action will be taken soon by the Board of Estimate and Apportionment so that the work can be carried out. The agreement provides among other things for the elimination of all grade crossings on the existing line between Winfield and Jamaica avenues near Dunton; on the Montauk division through Richmond Hill; on the main line, Montauk and Atlantic divisions through a portion of Jamaica; the construction of a new line between Woodside and Winfield, to be known as the Woodside-Winfield cut-off, and putting in additional tracks. The facilities at Jamaica for handling passengers and freight are to be extended and some of the bridges on the main line are to be extended or lengthened and a number of new bridges put in. (April 15, p. 1016.)

LOUISVILLE, LINCOLN FARM & MAMMOTH CAVE TRACTION.—Bids are being asked, it is said, for building from Mammoth Cave, Ky., southeast to Glasgow, also to Lincoln Farm and Hodgenville. C. Van-den-Burgh, general manager, Glasgow, and H. H. Snyder, chief engineer. (July 22, p. 174.)

MEXICAN RAILS.—President Diaz, in a recent message to Congress, said that the railways under federal jurisdiction have added 148 miles of new line since April last and those railways now aggregate 12,225 miles. In addition, there are 3,000 miles of railway subject to the jurisdiction of the states, making a total of 15,225 miles of railway in Mexico.

MORGAN'S, LOUISIANA & TEXAS.—See Southern Pacific.

MISSOURI PACIFIC.—An extension of the Wichita-Kiowa branch, from Kiowa, Kan., west to Hardtner, 10.4 miles, has been opened for freight and passenger service. (Aug. 12, p. 294.)

An officer is quoted as saying that the company plans to make improvements and betterments during the next 10 years, if it can borrow the money at reasonable interest, to cost \$60,000,000.

NEW YORK CENTRAL & HUDSON RIVER.—Preliminary steps are being taken by this company to electrify the Auburn road from Syracuse, N. Y., west to Geneva, 51.45 miles.

See an item in General News regarding improvements to be carried out by this company.

NEW YORK, ONTARIO & WESTERN.—An officer writes that double-track work is being carried out on the Scranton division between Cadosia, N. Y., and Starlight, Pa., eight miles, and between Preston Park and Pleasant Mount, 13.5 miles. The McDonald Construction Co., Scranton, Pa., has a grading contract for work on 13 miles. The railway company will carry out the rest of the work with its own forces, including all the track laying and ballasting. Nothing has yet been determined regarding the bridges on this section. (Sept. 23, p. 559.)

NEZ PERCE & IDAHO.—Surveys are being made for an extension, it is said, from Vollmer, Idaho, to Forest, and it is expected to begin construction work as soon as surveys are finished. Capital has been secured to build the extension. Z. A. Johnson, president and general manager, Nez Perce. (Jan. 14, p. 114.)

READSTOWN & VIROQUA.—Under this name a company is being organized by capitalists of La Crosse, Wis., to build a line from Readstown north to Viroqua, 15 miles. It is expected that plans will be sufficiently advanced to begin construction work early in the spring.

SILVER LAKE RAILWAY.—See Buffalo, Rochester & Pittsburgh.

SOUTHERN PACIFIC.—According to press reports, a contract has been given to Ericson & Peterson, San Francisco, Cal., to build about 100 miles of line from Fernley, Nev., northwest through Washoe county, Nev., to a point in Lassen county, Cal., via Susanville. The line is eventually to be extended into Oregon. The same contractors are now at work on a line for the Southern Pacific in Placer county, Cal. (Aug. 26, p. 373.)

An officer of Morgan's Louisiana & Texas writes that all the road has been built and track laid but not entirely surfaced from the main line at Lafayette, La., which is 145 miles west of New Orleans, northeast to Port Allen, opposite Baton Rouge. The company will use the St. Louis & San Francisco car ferry across the Mississippi river to a point opposite the terminal, thence the Yazoo & Mississippi Valley tracks to Baton Rouge. This new line will be a connecting link from the Southern Pacific to the Illinois Central lines. (Sept. 23, p. 559.)

Preparations are being made to lay a second main track at a number of points between Suisun and Benicia, Cal., with a view to making the line double track throughout the distance from Sacramento to Benicia. From Port Costa (across the river from Benicia) to Oakland, the line is double track already. Fifty carloads of 90-lb. rails have arrived at Benicia. This division already has very long passing tracks at the stations. The capacity of this division is also to be increased by enlarging the ferry facilities. There will be new slips at the ferry terminals, and the big boat Solano is to be supplemented by a second boat, the plans and specifications for which have already been drawn.

TEXAS ROADS.—The Tyler Commercial Club has received a proposition from the J. L. Wortham Construction Co., Beaumont, Tex., to build from Tyler north to Paris, about 100 miles, for a cash bonus of \$300,000 when the road is completed. The question of building the line is now under consideration. J. L. McBride is secretary of the Tyler Commercial Club.

TOPEKA & NORTHWESTERN.—See Union Pacific.

UNION PACIFIC.—The Topeka & Northwestern, it is understood, will be opened for through traffic from Onaga, Kan., northwest to Marysville, 32.44 miles, about November 1.

WINSTON-SALEM SCUTHBOND.—It is expected that trains will begin operating over this line about December 1. The route is from Winston-Salem, N. C., south to Wadesboro, 88 miles. The line is being built jointly by the Atlantic Coast Line and the Norfolk & Western. O. H. P. Cornell, chief engineer, Winston-Salem. (July 8, p. 104.)

WISCONSIN & SOUTHWESTERN.—Incorporation has been asked for in Wisconsin, with \$200,000 capital, to build from Woodman, Wis., northeast to Bloomington, 23 miles. The incorporators include: W. H. Cash, New London; E. Hammer, J. A. Cash, Hillsboro; C. E. Coon, C. J. Chapman and W. D. Crist, Omaha, Neb.

ZINC BELT RAILWAY.—According to press reports, this company has been granted a charter in Oklahoma, with \$50,000 capital and office at Davis, Okla. The plans call for a line from Davis, west to Lawton, about 80 miles. G. Sober, R. C. Hope, T. H. Slaver, A. O. McCord and W. S. Lewis, all of Davis, are directors.

FOREIGN RAILWAY NOTES.

On the 15th of August the well-known establishment of Henschel & Son, in Cassel, completed its 10,000th locomotive. That day was also the 100th anniversary of the founding of the works. In the early days it did not build locomotives.

Referring to the construction of new railways in the Odessa district of Russia, the British vice-consul at Mariupol states that fair progress is being made with the Northern Donetz line, and that a portion—from Izum to Slaviansk—has been opened for freight traffic. Several other railways are projected, the most important of which is a line from Saratov to Millerowo on the southwestern line, thence to Schterovka on the Ekaterina line, and from there down to Mariupol. This would greatly reduce the distance between the Volga and the Azov, would open out immense tracts of fertile land, and much grain grown in Siberia would then also find its way to this port. To derive full benefit from this line, however, the port of Mariupol would have to be deepened, enlarged and brought up-to-date with necessary appliances for the rapid handling of cargo. Another project is a line from the Rozovka station, on the second Ekaterina line, to Taganrog, which would greatly reduce the distance between Taganrog and Mariupol.

The Yunnan Railway, extending from the port Haiphong in French Tongking northwestward 531 miles to Yunnan, the capital of one of the southernmost provinces of China, was opened through April 1 last. This line was begun in 1902, reached the Chinese border at Laokay, 141 miles, in 1906; and thence has met with great difficulties, partly in the nature of ground, and partly in the deadly climate of the Namti valley, though Yunnan itself is some 6,500 ft. above sea level. The cost, which had been estimated at about \$18,000,000, has mounted to \$32,000,000, or more than \$60,000 per mile for a meter-gage line. The country through which it passes is largely isolated from any navigable streams, but is not so productive as most parts of China. It has some coal, copper and tin mines, which English investigators have not thought to be particularly valuable. A large part of the country is wild and mountainous. What traffic it has, however, is pretty well assured to the new line. Surveys for an English line, from the southwest to Yunnan, have proved that it would be exceedingly costly, with little on the route to support it. Yunnan has been one of the leading producers of opium. This being now forbidden, Indian corn is taking its place, yielding a freight many times as heavy, but which cannot bear high rates.

Railway Financial News.

BALTIMORE & OHIO.—The property of the Berkeley Springs & Potomac was sold under foreclosure on September 21 and was bid in by the Baltimore & Ohio. The Berkeley Springs & Potomac runs from Hancock, Md., to Berkeley Springs, W. Va., 28 miles, and the entire stock of the old company was owned by the Baltimore & Ohio. The sale is a formality under a decree of the court in order to perfect the title.

BOSTON & MAINE.—See Vermont Valley Railroad.

BUFFALO, ROCHESTER & PITTSBURGH.—This company has bought the property of the Silver Lake Railway. The road runs from Silver Springs, New York, to Perry, seven miles.

CANADIAN NORTHERN.—The Canadian railway commission has been asked to grant permission to the Canadian Northern to take over the Edmonton & Slave Lake and to operate it as part of its road. The Edmonton & Slave Lake \$120,000 5 per cent. bonds were bought in 1907 and 1908 by the Canadian Northern and deposited as part of the collateral for Canadian Northern 4 per cent. perpetual consolidated debenture stock.

CENTRAL OF NEW JERSEY.—Henry Graves, Jr., and E. T. Stotesbury have been elected directors, succeeding H. McK. Twombly and Joseph S. Harris, both deceased.

CHESAPEAKE & OHIO.—A complaint has been filed in the circuit court of Indiana by the state prosecuting attorney asking the dissolution of the Chesapeake & Ohio of Indiana, on the ground that through the formation of this company by men interested in the Chesapeake & Ohio Railway, an attempt had been made to evade the Indiana state law, which it is claimed would have prevented the Chesapeake & Ohio Railway Co. itself from buying in at foreclosure sale the property of the Chicago, Cincinnati & Louisville, now owned by the Chesapeake & Ohio of Indiana. The suit was brought in connection with the filing by the Indiana company of a mortgage for \$40,000,000 under which there was to be issued about \$8,000,000 bonds. Apparently the suit was brought under a misapprehension as to the amount of bonds to be issued.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—Adrianse Iselin, Jr., president of the Buffalo, Rochester & Pittsburgh, has been elected a director of the Chicago, Indianapolis & Louisville, succeeding Ira G. Rawn, deceased.

CHICAGO, MILWAUKEE & ST. PAUL.—Stanley Field has been elected a director, succeeding Fredrick Layton, who refused re-election.

DELAWARE & HUDSON.—The New York Public Service Commission, Second district, has authorized the company to buy 500 shares of the Greenville & Johnsonville Railway, at not more than par. The D. & H. owned 1,750 shares of the stock of this electric railway before the passage of the Public Service Commission law and the 500 shares that are now to be bought are the total minority not owned by the D. & H.

DETROIT, TOLEDO & IRONTON.—Judge Swan, of the United States District Court, has confirmed the validity of \$5,000,000 bonds of the D., T. & I., which were issued in connection with the purchase of control of the Ann Arbor.

EDMONTON & SLAVE LAKE.—See Canadian Northern.

INTERNATIONAL & GREAT NORTHERN.—Governor Campbell, of Texas, is quoted as saying that Texas needs such a line as the International & Great Northern. The only thing, he said, standing in the way of the purchase of this property when it is sold at foreclosure sale on October 6 is the fact that the state would need about \$30,000,000 to make such a purchase.

MOBILE, JACKSON & KANSAS CITY.—The eighth and final installment of the assessment of \$2.50 per share on the stock of the Mobile, Jackson & Kansas City and the Gulf & Chicago has been called for payment on September 30 under the modified reorganization plan dated October 1, 1908.

PITTSBURGH, WHEELING & KENTUCKY.—A dividend of 3 per cent. has been declared payable October 1, and a special dividend

of 3 per cent. out of accumulated surplus, has also been declared. This company is a subsidiary of the Pittsburgh, Cincinnati, Chicago & St. Louis.

QUEBEC & LAKE ST. JOHN.—Over 90 per cent. of the 1911 mortgage and income bonds have been deposited with the bondholders' protective committee, and the time for the deposit of the remaining bonds has been extended to September 30.

TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION.—The directors have declared an initial collateral dividend of 1¼ per cent. on the preferred stock, payable October 1, 1910.

UNION PACIFIC.—The company has sold abroad through Kuhn, Loeb & Co., New York, and Baring Bros., London, £1,500,000 (\$7,500,000) first lien and refunding mortgage 4 per cent. bonds. These bonds are part of an issue of \$200,000,000, of which \$57,000,000 are outstanding.

VERMONT VALLEY RAILROAD.—Lee, Higginson & Co., Boston, are offering at 104½, to yield about 4¾ per cent., the unsold portion of the total authorized issue of \$1,500,000 first mortgage 4½ per cent. bonds of 1910-1940. The bonds are secured by a mortgage on the 24-mile road between Bel'ows Falls, Vt., and Brattleboro, and on the equipment; and in addition, by the deposit of \$700,000 stock of the Connecticut & Passumpic River Railroad and \$100,000 stock of the Massawippi Valley Railway, a total of \$800,000 stock, on which 6 per cent. dividends are guaranteed by the Boston & Maine. The road is operated by the Boston & Maine under an agreement providing for the payment of operating expenses, taxes, interest charges and 4 per cent. dividends on the \$1,000,000 stock by the Boston & Maine.

WABASH-PITTSBURGH TERMINAL.—In the suit brought by the Central Trust Co. of New York to foreclose the Wheeling & Lake Erie general mortgage, with its intervening petition of the New York Trust company to sell the collateral under the Wheeling \$8,000,000 notes, which consists of \$12,000,000 general mortgage bonds, a cross bill has been filed by the Wabash-Pittsburgh Terminal receivers attacking the validity of the Wheeling general mortgage.

WICHITA FALLS & WELLINGTON.—Application has been made to the Texas railway commission for permission to issue \$15,000 capital stock and \$285,000 first mortgage bonds, to be secured by a mortgage on the 15 miles of completed road running from Collingsworth to Wellington. This road is now ready to be put in operation.

FOREIGN RAILWAY NOTES.

The firm of Miani Silvestri, Comi & Grondona, of Milan, have taken an old locomotive and built on it a newly invented turbine steam engine, which is said to obviate those features of ordinary turbines which seem to make it impossible to use them for locomotives. If so, we shall soon hear more of it.

An agreement has been concluded between certain British banks and the Russian Minister of Finance, which provides for the construction of a network of railways in the Caucasus, according to a report by Consul Albert Halstead at Birmingham, England. The construction of these railways, it is said, includes the long-proposed line between Armivir and Touapse. It is understood that all the material used will be supplied by British concerns.

Three years ago the Prussian authorities recommended the organization of small gangs of track-hands, who should have special charge of keeping up joints and switches on the main tracks. The most intelligent and trustworthy men were selected for this purpose, and they are reported to have improved the condition of the track materially. Their duties are to see that every joint is properly drained, that no fastenings of joints or switches become loose; that the rails at a joint are always at the same level, and that there are no defects in joints and frogs. They also assist the larger gangs of ordinary trackmen in case of emergency. They receive a little higher pay than other trackmen.

Supply Trade Section.

The Westinghouse Air-Brake Company, Pittsburgh, Pa., has moved its Richmond, Va., and Cincinnati, Ohio, offices to Atlanta, Ga., the new address being Candler building.

The United States Metal & Manufacturing Company, Chicago, has moved its office from the Railway Exchange building to suite 1104-1105, McCormick building, Michigan avenue and Van Buren street.

The Strong, Carlisle & Hammond Company, Cleveland, Ohio, has received an order from the Bengal & Northwestern Railway of India for Randall graphite sheet lubricator for use on 200 cars.

A. R. Wight, assistant resident engineer of the South Australian Railways, Quorn, South Australia, wants catalogues of materials used in the engineering department of American railways.

Captain C. H. Smith, president of the Western Wheeled Scraper Company, Aurora, Ill., died at his home on Sunday last. Captain Smith was born in Hamilton county, New York, November 26, 1842, but spent his youth in Iowa. He was prominent in politics, being at one time an active gubernatorial candidate in his district.

The Isthmian Canal Commission will receive bids until October 17 for hose, packing, torpedoes, diaphragm pumps, hose strainers, valves, cocks, grease and oil cups, lubricators, engine gongs, flue ferrules, scales, machinists' clamps, flue cleaners, squilgees, headlight glass, carbide, drawing paper, cover paper, etc. (Cir. No. 607.)

Judge Landis, of the federal court, on September 21 appointed the Hibernian Banking Association receiver for the West Pullman Car Works, Chicago. Fears that the State Bank of West Pullman and the Browning Engineering Company, Cleveland, Ohio, would foreclose the property caused the petition for a receiver to be filed.

The Pittsburgh Testing Laboratory, Pittsburgh, Pa., has moved its New York office from No. 1 Liberty street to 50 Church street, and its interests in New York and in New England are now in the hands of Wm. F. Zimmermann, M.E., the second vice-president of the company. Mr. Zimmerman reassociated himself with the company last spring.

W. N. Matthews & Brother, St. Louis, Mo., have bought a controlling interest in the Davis Expansion Boring Tool Company, St. Louis. The stock bought formerly was held by Alexander Landau and A. E. Leusser. W. N. Matthews will be president and treasurer of the company; Emery E. Davis, vice-president, and Claude L. Matthews, secretary. The company's business will be increased and several new tools added to the line it handles, particularly an expansion reamer invented by Mr. Davis.

J. G. White & Company, Inc., New York, have been awarded a contract for the engineering and construction of a steam and electric power plant for the Power Transit & Light Company, Bakersfield, Cal. The building will be 82 ft. by 140 ft., with sub-structure of concrete, self-supporting steel frame and walls of metal lath and plaster, and designed to accommodate two 2,000-kw. horizontal turbines, with boilers, condensers, etc. A 750-kw. turbine will be temporarily installed at the earliest possible date. Water for condensing purposes will be obtained from an irrigation ditch near the plant, and the water for boiler purposes will be supplied from wells to be driven near the power house. As the boilers will be installed with oil burners, there will be no basement under the boiler room. The station will be designed electrically to deliver practically full load at either 60,000, 10,000 or 2,300 volts, and will operate at all the above pressures simultaneously. The estimated cost is approximately \$400,000. J. G. White & Company have also received a contract for erecting the railway shops of the New York, Ontario & Western at Mayfield, Pa.

RAILWAY STRUCTURES.

BURR OAK, ILL.—The Chicago, Rock Island & Pacific has let the contract to T. J. Leake & Co., Chicago, for building a new roundhouse.

BUTLER, PA.—The Butler Passenger Railway Co. may build a viaduct over the Baltimore & Ohio tracks on Center avenue, in Butler.

CHICAGO.—Reports that final arrangements for building the new union passenger station on Canal street have been made are denied by officers of the interested companies. Plans have been prepared and land secured, but the usual disagreements and obstacles to starting the work have prevented any definite announcement as to the date for beginning the work.

See Chicago & North Western under Railway Construction.

FT. WAYNE, IND.—The Pennsylvania has filed plans of a new passenger station to cost \$20,000. The plans for building a union station in Ft. Wayne, mentioned in the *Railway Age Gazette* of July 1, have been dropped.

JAMAICA, N. Y.—See Long Island Railroad under Railway Construction.

LENAPE, PA.—A contract has been given by the Philadelphia & Reading to D. W. Sperry, it is said, to put up a stone and frame passenger station at Lenape.

MARQUETTE, MICH.—The Duluth, South Shore & Atlantic has prepared plans for rebuilding the car shops recently destroyed by fire, and construction work will begin in a short time.

MAYFIELD, PA.—An officer of the New York, Ontario & Western writes that the company expects to carry out improvements at the Mayfield, Pa., yard, on the Scranton division, to include the following: A new 70-ft. turntable; 10-stall engine house; machine shop; carpenter shop; boiler house; store room and office; sand house and engine coal storage, together with an ash pit and additional tracks. J. G. White & Co., Inc., New York, have been awarded the contract for the erection of the railway shops. The buildings will be of brick and steel construction. The estimated cost is \$150,000.

NORTHEAST, PA.—The Buffalo & Lake Erie Traction will build a 90-ft. bridge, it is said, near Northeast.

OMAHA, NEB.—The Union Pacific has let the contract for the following buildings mentioned in the *Railway Age Gazette* of May 20: Mill, 90 ft. x 302 ft., brick and steel; five-stall brick engine house, 76 ft. 9 in. long; pony saw mill, brick, 24 ft. x 150 ft.; sub-store building, 16 ft. 6 in. x 40 ft. 8 in., brick; sub-store shed, 30 ft. x 115 ft., steel; two lumber sheds, 20 ft. x 248 ft., frame; sand blast and varnish remover building, 21 ft. x 40 ft., brick; dry kiln, 47 ft. x 58 ft., brick. Geo. B. Swift & Co., Chicago, is the contractor.

ROCHESTER, N. Y.—The Buffalo, Rochester & Pittsburgh contemplates improvements at its Rochester terminal, it is said, to cost more than \$300,000.

ST. LOUIS, MO.—The house of delegates has passed the bill submitted to it by the city council of St. Louis providing for the east side railway approach to the free bridge. The opposition to the bill was strong on the part of real estate men who argued that the approach suggested is a "plot" of the Terminal Association to "bottle up" the free bridge by locating the approach where no independent line can get to it. The bill received only 15 votes, the exact number required for its passage.

SWEETWATER, TEX.—See Atchison, Topeka & Santa Fe under Railway Construction. (Sept. 16, p. 523.)

SUNBURY, PA.—The York Bridge Co., who was recently given the contract for building the new county bridge over the Susquehanna river, to be used also by the Sunbury & Northumberland Electric Ry. Co., has given a contract for the reinforced concrete piers to W. H. Lyons, Sunbury. (Aug. 12, p. 297.)

WICHITA, KAN.—Local press reports quote railway officers as saying that the railways entering Wichita have agreed to build a union passenger station to cost \$200,000. No plans have been prepared.

Late News.

The items in this column were received after the classified departments were closed.

The Cleveland, Cincinnati, Chicago & St. Louis is said to have ordered 25 locomotives. This item is not confirmed.

The Wichita Falls & Northwestern has opened for operation an extension of the Panhandle division from Hollis, Okla., west to Wellington, Tex., about 25 miles.

L. F. Lorce, president of the Delaware & Hudson, has been elected a director of the New York, Ontario & Western, succeeding Grant H. Schley, resigned.

The Louisiana Railway & Navigation Co. will put up a brick warehouse, it is said. The structure is to be 50 ft. long x 250 ft., on Liberty street, in New Orleans, La.

F. J. Lisman & Co., New York, have purchased from the reorganization committee of the Southern Indiana-Chicago Southern \$2,000,000 first and refunding 5 per cent. bonds to be issued by the new company.

Complaint has been filed with the Pennsylvania State Railroad Commission complaining against the Philadelphia & Reading because it is collecting fares in excess of 2½ cents per mile on lines running to Reading, Pa.

Cable advices to Kuhn, Loeb & Co., New York, say that the public offering of £1,500,000 Union Pacific first and refunding mortgage bonds in London, noted elsewhere in this issue, has been completely successful and that the subscription has been closed.

The Northern Pacific has completed the grade for a new line from Dawson, N. Dak., northwest to McClusky, in Sheridan county, about 60 miles. A line is also being run northwest from Turtle lake, in McLean county, which it is expected will end near Berthold.

Henry C. Osterman, of the Osterman Manufacturing Company, testified Wednesday in the Illinois Central graft case. He gave the history of the connections of the company with the Illinois Central officers, and testified as to the number of shares of stock sold and given to officers.

Supreme Court Justice Brady, of New York, who heard the application of New York for a temporary injunction restraining the New York Central & Hudson River from using dummy engines or steam locomotives on the streets and avenues below 10th street, along Tenth avenue, has denied the application.

A press despatch from Windsor, Ont., says that a Michigan Central train ran the 112 miles between St. Thomas and Windsor, on the Canada Southern division, in 92 minutes. The train which made the run is known as "No. 3," is made up of eight coaches, and is drawn by one of the new Pacific type of locomotives.

The second track on the Atchison, Topeka & Santa Fe's Illinois division between Chicago and Fort Madison is to be put in operation for passenger traffic Oct. 15, and most of the new double track of the Missouri division Nov. 1. Second-tracking elsewhere is being rushed, especially between Winslow, Ariz., and Ashfork, which section will be ready next spring.

Judge McCormick, of the United States Circuit Court, has issued an order postponing the sale of the International & Great Northern until the third Tuesday in May, after the legislative convenes. The postponement was granted on the application of the second and third mortgage bondholders and Receiver T. J. Freeman, representing the railway. In his order Judge McCormick refers to the so-called International & Great Northern law passed at the recent special session of the legislature. The order concludes with the statement that it is granted solely because the court is of the opinion that under the circumstances

and in view of the lack of sale of the property at that time would be imprudent.

Secretary William H. Connolly has issued a call for the twenty-second annual convention of the National Association of Railway Commissioners to meet in the office of the Interstate Commerce Commission on Tuesday, November 15. The notice said that new committees are to report at the forthcoming convention. Some of the more important committees to report are those on shippers' claims on common carriers, simplification of railway tariffs, rate and rate-making, uniform classification, railway capitalization, railway taxes and plans for ascertaining the fair value of railway property, and amendment of the act to regulate commerce.

In the freight rate hearing the Atchison, Topeka & Santa Fe submitted its budget for 1911 and 1912, which calls for the expenditure of \$66,000,000, as follows: Rights of way and station grounds, \$2,424,225; grade revision and lessening curves, \$5,473,639; bank protection, \$625,792; terminal yards, \$4,317,937; ballast, \$5,914,088; tracks, \$2,252,405; second track, \$15,627,314; bridges, \$3,488,209; track elevation, \$3,364,435; station building, \$4,685,174; shops, \$2,597,014; water and fuel stations, \$2,379,819; signals, blocks, etc., \$2,064,051; machinery and tools, \$550,000; new rails, \$6,047,492; tie plates, \$905,000; telephones and telephone lines, \$382,000; docks and wharves, \$1,450,000; roadbed work, \$1,000,000; total, \$66,500,664.

Complexities of Prussian Molasses Freight Rate.

Some of the complexities incident to making freight rates are illustrated by the experience of Prussia with what seems to us the simple substance molasses. Germany, it must be remembered, is a great sugar-producing country. It makes about 2,200,000 tons a year, and competes with France and Austria for the export trade. Regarding this as an infant industry which needed encouraging, for many years these countries granted drawbacks on sugar exported, which in effect became premiums, and at last seemed likely to destroy the market for cane sugar. By the Brussels sugar convention of 1903, an end was put to this system, since which time the German production has fallen off about 15 per cent.

Now molasses makes from 2 to 3 per cent. of the beets manufactured, and in the last year reported amounted to about 500,000 tons in Germany, as it came from the sugar refineries. The question is, what to do with all this molasses. There are special establishments which by processes not practicable at most refineries get a considerable amount of sugar from it, and these take more than half of the molasses. But since the Brussels convention sugar has been cheaper on the continent, and it is desirable (for the beet-sugar industry) that the stock should not be so increased; and, moreover, this re-refining has not been profitable recently. Another small part of the molasses, about 7 per cent., is used in distilleries. But of late a large and increasing part has been sold for cattle-feed. This was looked on as a solution of the problem. Cattle-feed was needed. Immense quantities of coarse grains are imported every year for this purpose. To encourage this use of molasses a special rate was made for it. That is, molasses to be used as cattle-feed was carried at a lower rate than molasses to be distilled, or to be re-refined.

The molasses is not usually fed raw to stock, but mixed with bran or meal. Now there are in the German market various kinds of mixtures of meals, oil cake, etc., advertised as having peculiar fattening power, but usually sold for a good deal more than their components cost. Since the reduction in the rate on molasses to be used as feed, the producers of these mixtures have in many cases sweetened their stuff with molasses, and then claimed the low rate. The stuff has been submitted to Dr. Schulz, chemist of the Laboratory of Tests, and he reports: That nothing should go at the reduced rate which is not at least 50 per cent. in weight molasses. Almost any bran or meal will absorb more than that and remain dry enough to handle and not stick to the troughs. And thus there may be a great consumption of an article which otherwise would tend to oversupply the sugar market and threaten the prosperity of the sugar-beet industry.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The *Tata Iron & Steel Company* has ordered two six-wheel switching locomotives from the *American Locomotive Company*.

The *Chicago Junction* has ordered five 20-in. x 28-in. cylinder six-wheel switching locomotives from the *American Locomotive Co.* in addition to the order placed as reported in the *Railway Age Gazette* of May 27. Two of the engines will be used on the *Chicago River & Indiana*.

The *Spokane, Portland & Seattle*, reported in the *Railway Age Gazette* of July 15 as being in the market for three ten-wheel locomotives, is said to have ordered 10 oil-burning passenger locomotives from the *Baldwin Locomotive Works*. This item is not confirmed.

CAR BUILDING.

The *Grand Trunk* is in the market for 10 sleeping cars.

The *Richmond, Fredericksburg & Potomac* is in the market for 25 box cars.

The *Hudson & Manhattan* is understood to be figuring on 40 steel subway cars.

The *Brinson Railway* is in the market for 100 thirty-ton wooden frame box cars.

The *Indian Refining Company* has ordered 69 tank cars from the *American Car & Foundry Company*. This equipment is for immediate delivery.

The *Cold Blast Transportation Company*, reported in the *Railway Age Gazette* of March 25 as in the market for refrigerator cars, expects to place an order within a few days for 400 to 500 steel underframe beef cars.

The *Dairy Shipper's Despatch*, reported in the *Railway Age Gazette* of August 12 as figuring on refrigerator cars, advises that probably no action will be taken on this order until spring. It is the intention to eventually order 100 cars.

The *Duluth, Missabe & Northern* is having 25 refrigerator cars built by the *Peteler Car Company*. The cars are of the *Moore patent*, 36 ft. long, and of 30 tons capacity. This company is also in the market for two baggage-mail cars.

The *Pennsylvania Lines West*, mentioned in the *Railway Age Gazette* of September 23 as figuring on freight equipment, has inquiries with the car builders for 120 box, 20 hopper and 10 flat cars. It is understood that this equipment is for the *Cleveland, Akron & Columbus*.

IRON AND STEEL.

The *Michigan Central* is in the market for 500 tons of bridge steel.

The *Long Island* is in the market for 12,000 tons of structural steel.

The *Chicago & Western Indiana* is in the market for 2,000 tons of bridge steel.

The *Pennsylvania* has ordered 800 tons of bridge steel from the *Phoenix Bridge Company*.

The *Free* is in the market for 600 tons of bridge steel for use in a bridge at *Paterson, N. J.*

The *New York, New Haven & Hartford* has ordered 7,000 tons of bridge steel from the *Boston Bridge Company*.

The *Florida East Coast* has ordered 7,000 to 8,000 tons of shapes and plates from the *American Bridge Company*.

The *Chicago, Milwaukee & St. Paul* has ordered an additional 1,000 tons of rails from the *Illinois Steel Company*.

The *Lake Shore & Michigan Southern* has ordered 900 tons of bridge steel from the *Pennsylvania Steel Company* for use in a lift bridge at *Cleveland, Ohio*. See *Railway Age Gazette*, August 26.

General Conditions in Steel.—Notwithstanding the assurances of *Chairman Gary*, it is admitted that the steel trade is not in good shape, not from an inherent weakness in the industry itself nor general business conditions, but rather due to the policy of the railways, by whom little buying is being done. Reports say that prices are being shaded by the independent steel producers, at least in those cases where the business is to be secured by so doing, and that where prices are being maintained, it is because the amount of business to be secured is not sufficient to justify the effect of the cut. A large volume of prospective railway business is reported, but it is not expected to reach the markets before the latter part of November.

Blueprint Trimming Table.

A great deal of time is lost in drafting offices in the cutting of paper and tracing cloth into sheets, owing to the fact that this material comes in rolls. In an office employing a number of men a mechanical appliance for doing this cutting is indispensable. The *C. F. Pease Company, Chicago*, has lately placed on the market a table which is here illustrated. It is provided



Pease Blueprint Trimming Table.

with parallel clamp operated by a foot treadle which holds the paper or tracing cloth securely while the revolving cutting knife is used. The knife is driven by a motor and will cut five to ten sheets, being rotated mechanically and without friction against the plate or the material that is being cut. Both hands of the operator are free to handle the material as the knife once started in operation works independently. The top of the table is divided by lines into inch spaces and has figures along the edge so that any size sheet can be readily cut. A sizing diagram can also be provided for the top of the table so that any size sheet may be cut without a calculation being first performed. Baskets are furnished at the end when desired, instead of the light proof box shown in the illustration.

Western Air Dump Cars.

The *Atchison, Topeka & Santa Fe* recently purchased 100 20-yard air dump cars from the *Western Wheeled Scraper Company, Aurora, Ill.*, and about two-thirds of them are in use on the construction of a second track near *Chillicothe, Ill.* The air dump car has been in successful operation for contractors use for a number of years, and, to a greater or less extent, by railways directly. The satisfaction given by this type of dump car led to the demand for one of larger capacity than was heretofore thought practicable, and the 20 yard car was designed to meet the demand for railway use. It is of 30,000 lb. capacity and built to conform to *M. C. B.* requirements.

The dumping device consists of a cylinder and a set of levers, chains, shafts and cams for each side. The thrust of the cylinder rod acts on the lever which transmits the motion to a shaft through a chain operating over a cam. On the same shaft are two other cams to which the dumping chains are attached, the upper ends of the dumping chains being fastened to the outer angle sills of the bed. The action of the lever causes the shaft to rotate, drawing the bed down to the dumping angle. The return of the bed to carrying position is accomplished by a similar action of the device on the opposite side of the car.

The operation of the dumping and righting of the cars is con-

controlled by the engineer through a special four-way valve and requires but a few seconds of time. It will be seen that this method is a vast saving in both labor and time over the use of unloading plows or hand shovels. The amount of air required for dumping the car is very largely dependent on the

becoming a rail base extension, and in tests has shown great holding power against movement of the rail. The wedge, being made of malleable iron, will not nick the base of the rail, although binding the rail and plate together firmly. The continuous bottom rib, shown in the bottom view, excludes moisture and pre-



Western Air Dump Cars After Application of Air.

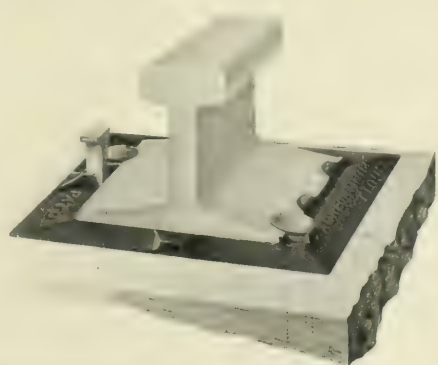
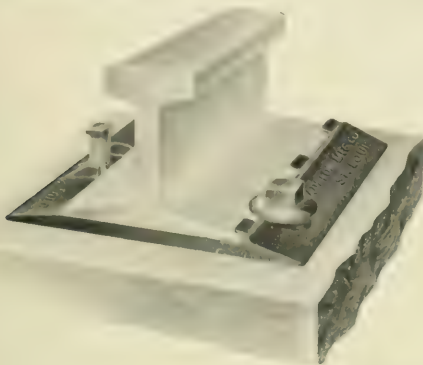
manner in which the cars are loaded. If they are loaded slightly heavier on the side on which they are to be dumped, they frequently dump automatically when released.

Clarke Tension Set Tie Plate.

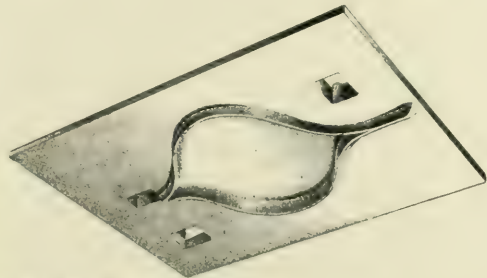
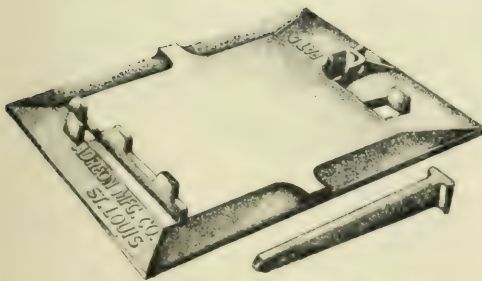
The accompanying illustrations of the Clarke tension set tie plate, sold by the Adreon Manufacturing Company, St. Louis and Chicago, show improved designs for both square and screw spike

vents the plate from skewing on the tie. The backing for the spikes prevents the heads from bending up and away from the rail. The projecting lugs can be bent over the base of the rail or, if left standing, are equivalent to a $\frac{3}{4}$ -in. shoulder.

As the mechanical abuse to which tie plates are subjected, due to lost motion between the rail and the plate, is eliminated, a $\frac{3}{8}$ -in. plate of this design will not break or bend. This design is said to eliminate worn spikes or shoulders on the Clarke plate.



Applications of Clarke Tension Set Tie Plate.



Top and Bottom Views of Tie Plate.

installations. Considerable interest has been directed to the working of the tie plate to the base of the rail. Actual service is said to have demonstrated that the tapered wedge, driven down firmly by an ordinary spike maul, puts the plate under heavy tension and that the wedge will not work loose. The plate thus

After the plate is properly set and the wedge driven it should remain exactly as set so far as gage and spacing of ties is concerned.

These plates in malleable iron and steel are now in use on upwards of 15 prominent railways.

ANNUAL REPORTS.

THE CHESAPEAKE AND OHIO RAILWAY CO.—THIRTY-SECOND ANNUAL REPORT.

RICHMOND, VA., September 15, 1910.

TO THE STOCKHOLDERS

The Thirty-second Annual Report of the Board of Directors, for the fiscal year ended June 30, 1910, is herewith submitted.

The average Main Track Mileage operated during the year was 1,936.9 miles, being an increase over the average mileage operated during the preceding year of 40.3 miles. The Main Track Mileage operated at the end of the year was 1,938.8 miles, an increase as compared with June 30, 1909, of 35.0 miles.

RESULTS FOR THE YEAR.

Operating Revenues were.....	\$31,237,169.30
(Increase \$4,606,451.52 or 17.29%.)	
Operating Expenses were.....	18,936,699.02
(Increase \$2,569,861.07 or 15.70%.)	
Net Operating Revenues were.....	12,300,470.28
(Increase \$2,036,590.45 or 19.84%.)	
Taxes were.....	873,744.12
(Increase \$72,144.12 or 9.00%.)	
Operating Income, Taxes deducted, was.....	\$11,426,726.16
(Increase \$1,964,446.33 or 20.76%.)	
Miscellaneous Income was.....	1,161,365.22
(Increase \$452,501.88 or 63.83%.)	
	\$12,588,091.38
Rentals and Other Payments were.....	727,453.98
(Decrease \$530.33 or 0.07%.)	
Income for the year available for interest was.....	\$11,860,637.40
(Increase \$2,417,478.54 or 25.60%.)	
Interest (46.96% of amount available) amounted to.....	5,570,151.10
(Increase \$139,119.41 or 2.56%.)	
Net Income for the year, equivalent to 10.02% on capital stock outstanding, amounted to.....	6,290,486.30
(Increase \$3,278,359.13 or 56.78%.)	
Dividends paid during the year: Three dividends of 1% each, and one dividend of 1 1/4%, aggregating.....	2,668,617.50
(Increase \$1,412,803.50, or 112.5%.)	
Balance devoted to improvement of physical or other assets....	3,621,868.80

ACQUISITIONS DURING THE YEAR.

In pursuance of authority given by the stockholders at the last annual meeting, held in Richmond, Virginia, October 19, 1909, your Company has acquired the properties of the following companies, whose stock it had previously owned: Coal River Railway Company, owning 69.3 miles of road; Raleigh and Southwestern Railway Company, owning 20.1 miles. The properties named having thus been made integral parts of The Chesapeake and Ohio Railway, their funded debt is now listed in the balance sheet as funded debt of your Company instead of being shown, as heretofore, below the balance sheet as bonds guaranteed by The Chesapeake and Ohio Railway Company. During the year, 5.8 miles were added to the Coal River line, and an extension of 0.7 mile of the Paint Creek branch was completed. Further extensions of 11.4 miles of the Coal River Railway and 14.1 miles of the Raleigh and Southwestern Railway are in progress, also an extension of the Guyandot Valley branch of 21.4 miles. These extensions are for the purpose of further development of timber and coal tonnage, and should be completed and in operation during the fiscal year 1911.

Other acquisitions mark a most important epoch in your Company's history, namely: 63,478 shares of stock of The Hocking Valley Railway Company and 40,271 shares of stock of The Kanawha and Michigan Railway Company; and payments amounting to \$8,919,190.99 were made on account of cost of the Chicago Line hereinafter referred to. Your Company owned at the beginning of the fiscal year 11,540 shares of common stock of The Hocking Valley Railway Company, so that its ownership of stock of that company at the close of the year was 75,018 shares. At the time of the purchase referred to, The Hocking Valley Railway Company had outstanding 110,000 shares of common stock and 150,000 shares of preferred stock, but that company, having received a large amount of cash on account of the sale of its interest in certain other lines, applied it to the retirement of its preferred stock. This retirement was at first enjoined on the petition of three stockholders holding in the aggregate only 155 shares of preferred stock, which appears to have been acquired by them a few months before the determination was made to retire the preferred stock, and only 90 shares of common stock apparently acquired after the retirement had commenced. The proceedings for the retirement were afterwards decreed by the United States Circuit Court to be valid and lawful in every respect, the injunction was dissolved, and your Company therefore owned on June 30, 1910, 75,018 shares of capital stock of The Hocking Valley Railway Company out of a total of 110,000 outstanding.

The total number of shares of The Kanawha and Michigan Railway Company capital stock outstanding is 90,000, of which, as above indicated, your Company owned 40,271 shares on June 30, 1910, an amount recognized by the United States and Michigan Southern Railway Company.

The balance sheet of results of operations, financial condition, etc. of The Hocking Valley Railway Company and of The Kanawha and Michigan Railway Company, reference is made to the annual reports of those companies.

For payments on account of cost of the Chicago Line above mentioned, together with payments made since the close of the fiscal year (all payments to date aggregating \$8,919,190.99), an amount of which your Company has received and now holds in its treasury as free assets securities of The Chesapeake and Ohio Railway Company of Indiana, a com-

pany organized on July 2, 1910, which acquired, from purchasers at fore closure sale, on July 5, 1910, the road formerly owned by the Chicago, Cincinnati and Louisville Railroad Company, operated by J. P. Goodrich, Receiver, since February 13, 1908. The results of operations of that line, the shortest between Cincinnati and Chicago, are included, from July 1, 1910, with those of The Chesapeake and Ohio Railway Company. As a trunk line between the Atlantic seaboard and Chicago, the Chesapeake and Ohio has taken a distinct forward step. The distance from tidewater at Newport News to Chicago via Chesapeake and Ohio Lines is 940 miles, comparing favorably with the length of lines of other systems from tidewater at New York to Chicago, ranging from 906 to 998 miles.

The number of miles operated by the three companies above mentioned is as follows:

The Hocking Valley Railway Company.....	350
The Kanawha and Michigan Railway Company.....	175.6
The Chesapeake and Ohio Railway Company of Indiana.....	284.6

Your Board considers this a conservative and much needed expansion of your Company's interests, amply warranted by the extraordinary growth during the past twenty years, as exhibited in the preceding section of this report, and has great satisfaction in the added belief that the Chesapeake and Ohio will become more useful and prosperous, not only in building up and fostering commerce between the States, but also locally within the States of Ohio, Indiana and Illinois, respectively, as well as within the States which it has heretofore served. In this connection reference is made to the new map accompanying this report (elsewhere in the *Railway Age Gazette*) by which it will be seen that the lines referred to reach Lake Erie and Lake Michigan and the important cities of Columbus, Toledo, and Chicago, as well as many other progressive communities.

FINANCIAL.

The outstanding capital stock was reduced during the year through the conversion of \$1,100 par value of first preferred stock into common stock and General Mortgage 4 1/2 per cent. bond.

The increases in your bonded debt shown by balance sheet of June 30, 1910, as compared with June 30, 1909, are as follows:

	Issued or Assumed During Year.	Held as Free Assets.	Held for Sale for Future Expenditures.
The Chesapeake & Ohio Railway Company 4 1/2 per cent. 20-year Convertible Bonds, maturing Feb. 1, 1930.....	\$31,390,000	.....	.....
Coal River Railway Company First Mortgage 4 per cent. Bonds, maturing June 1, 1945 (see preceding section).....	2,450,000	\$45,000	\$100,000
Raleigh & Southwestern Railway Company First Mortgage 4 per cent. Bonds, maturing July 1, 1936 (see preceding section).....	750,000	286,000	214,000
The Chesapeake & Ohio Railway Company 4 1/2 per cent. General Mortgage Bonds, maturing March 1, 1992, issued for expenditures for double track (\$741,000), and in exchange for preferred stock (\$1,000).....	742,000	741,000	
The Chesapeake & Ohio Railway Company, Paint Creek Branch, First Mortgage, 4 per cent. Bonds, maturing Feb. 1, 1945.....	14,000	14,000	

Through the operation of sinking funds, \$19,000 Greenbrier Railway Company First Mortgage 4 per cent. Bonds and \$59,000 Big Sandy Railway Company First Mortgage 4 per cent. Bonds were retired during the year.

The convertible bonds above mentioned were sold to bankers on May 2, 1910, subject to subscriptions made by stockholders pursuant to an offer made under date of March 25, 1910. This issue of bonds was approved at a special meeting of the stockholders held in Richmond, Virginia, April 26, 1910, at which the issuance of not exceeding \$37,200,000 of said convertible bonds and 10 per cent. for their conversion at par on or after May 1, 1911, an increase to 100% Company's common capital stock from \$33,200,000 to \$100,000,000 were respectively authorized.

The balance sheet makes a full exhibit of your Company's condition at June 30, 1910, and it will be observed that your Company had at that time:

Working assets.....	\$19,307,066.54
Material and supplies.....	2,472,000.00
Unpledged stocks and bonds worth.....	31,825,693.00
Payments on account of cost of Chicago Line on account of which securities of The Chesapeake & Ohio Railway Company of Indiana were advanced (received).....	3,010,190.92
Deferred or accrued assets.....	334,672.93
	\$10,001,113.39
Against which there were:	
Working liabilities.....	\$7,678,000.08
Deferred or accrued liabilities.....	2,138,833.50
	\$10,006,833.58

The acquisition of the property mentioned in the first paragraph of this report was made by the payment of \$1,112,129.00 and added to the cost of road, and the \$1,900,000.00 was added to the general account of the year.

GENERAL REMARKS.

The general condition of the property at the end of the year was as follows: The total length of the line was 1,112.13 miles, of which 1,000.00 miles were operated by the Company, and 112.13 miles were operated by the State of Virginia. The total length of the line was 1,112.13 miles, of which 1,000.00 miles were operated by the Company, and 112.13 miles were operated by the State of Virginia. The total length of the line was 1,112.13 miles, of which 1,000.00 miles were operated by the Company, and 112.13 miles were operated by the State of Virginia.

The second track was completed during the year at Barboursville, 27.8 miles, was completed during the year. The second track was completed during the year at Barboursville, 27.8 miles, was completed during the year. The second track was completed during the year at Barboursville, 27.8 miles, was completed during the year.

PERSPECTIVE TWO DECADES.

The past two decades, covering approximately the period since the reorganization of your Company, have witnessed such considerable achievement that it seems fitting to record in this report the following statistics indicating the growth in actual value of your company and in your general growth in public service.

	Year ended June 30, 1910.	Year ended June 30, 1900.	Year ended June 30, 1890.	1910 compared with 1900.	1910 compared with 1890.
Miles Operated	1,000.00	1,156.2	931.0	31.2%	108.0%
Revenue	\$ 1,357,169.30	\$13,162,970.97	\$7,161,919.37	133.1%	336.2%
FREIGHT					
Coal and Coke Tonnage	15,540,077	4,079,397	1,464,856	232.3%	961.5%
Freight Tonnage	7,343,397	5,067,443	2,205,721	44.0%	219.8%
Total	22,882,220	9,746,840	3,760,577	134.8%	508.7%
Revenue Ton Miles	6,123,134,875	2,946,894,104	1,006,323,855	107.7%	508.4%
Revenue per ton mile—mills	\$24.901,199.77	\$10,095,144.20	\$5,384,255.70	146.6%	462.5%
Revenue per ton mile—mills	4.07	3.43	5.35	18.6%	**23.9%
Revenue per freight train mile	8,739,022	6,044,579	4,475,114	44.5%	95.2%
Revenue per freight train mile	\$2.84.9	\$1.67.0	\$1.20.0	70.5%	137.4%
Revenue per freight train mile	701	488	225	43.6%	211.5%
Revenue per train—Inc. Company's Material	733	Not kept	Not kept	.....	.....
Revenue Car Miles	200,270,768	140,598,218	79,866,972	42.4%	150.7%
Average Tonnage per loaded car	30.6	21.0	12.6	45.7%	142.8%
Revenue freight carried one mile per car and car load tons	3,161,307	1,996,250	1,080,906	58.3%	192.4%
PASSENGER.					
Passengers Carried	4,969,612	2,536,529	1,470,642	95.9%	237.9%
Number of passengers carried one mile	226,715,956	135,852,014	71,560,114	66.9%	216.8%
Passenger Revenue	\$5,002,205.07	\$2,681,076.37	\$1,471,436.56	86.6%	240.0%
Revenue per Passenger Train Revenue	\$5,813,200.44	\$3,177,662.40	\$1,660,605.78	82.9%	248.2%
Revenue per passenger per mile	2.206 cents	1.973 cents	2.056 cents	11.9%	7.3%
Number of Passengers carried one mile per mile of road	117,051	92,028	77,530	27.1%	51.0%
Passenger Train Mileage	4,276,193	2,723,228	1,925,697	57.0%	122.1%
Passenger Revenue per train mile, not including Mail and Express	\$1.17	\$0.98	\$0.765	19.4%	52.9%
Passenger Revenue per train mile, including Mail and Express	\$1.36	\$1.16	\$0.868	17.2%	56.6%
EQUIPMENT.					
LOCOMOTIVES.					
Number of Passenger and Switching Locomotives	161	102	59	57.9%	172.9%
Tractive Power—pounds	4,135,874	1,703,266	445,778	142.7%	828.0%
Average Tractive Power—pounds	25,688	16,698	7,556	53.7%	240.0%
Number of Freight Locomotives	538	274	178	96.4%	202.2%
Tractive Power—pounds	18,597,274	7,452,800	3,767,370	149.5%	393.7%
Average Tractive Power—pounds	34,567	27,200	21,165	27.1%	63.4%
PASSENGER TRAIN CARS.					
Number of Cars	306	221	144	38.5%	112.5%
Seating capacity	11,793	7,541	4,641	56.4%	154.2%
REVENUE FREIGHT TRAIN CARS.					
Number of Cars	37,453	16,622	9,572	125.3%	291.3%
Tonnage Capacity:					
Box	250,598	222,394	93,740	12.7%	167.5%
Stock	12,425	9,495	7,040	30.8%	76.5%
Flat	37,940	14,287	19,430	165.5%	95.3%
Open	16,585	3,020	2,305	447.5%	617.3%
I. B. Gondolas	670,980	77,005	22,780	771.3%	2845.4%
II. B. Gondolas	636,967	155,424	68,994	309.8%	823.2%
Total tonnage capacity	1,625,445	481,625	214,280	237.5%	658.5%
Average Capacity—Tons	43.4	29.0	22.4	49.7%	93.8%

**Decrease.
The net income for twenty years after deducting operating and interest charges amounted to \$35,234,044.25
Amount paid in dividends during same period (26.02% of net income) 9,485,116.50
Remainder devoted to improvement of physical or other assets \$25,748,927.75

the double track the remaining 48 miles in Kentucky during the ensuing calendar year.

The coal and coke tonnage was 15,549,977, an increase of 21.5 per cent.; other freight tonnage was 7,342,252, an increase of 28.5 per cent. The total tonnage was 22,892,229 tons, an increase of 23.7 per cent. Freight train mileage was 8,739,022 miles, an increase of 15.8 per cent. Freight revenue was \$24,901,199.77, an increase of \$4,015,685.56 or 19.2 per cent. The revenue ton miles were 6,123,134,875, an increase of 20.2 per cent. The ton mile revenue was 4.07 mills, a decrease of 0.7 per cent. Revenue per freight train mile was \$2.849, an increase of 3.0 per cent. The revenue tonnage per train mile was 701 tons, an increase of 26 tons, or 3.9 per cent.; including Company's freight the tonnage per train mile was 733 tons, an increase of 3.7 per cent. The average tonnage per loaded car was 30.6 tons, an increase of 3.0 per cent. The number of tons revenue freight carried one mile per mile of road was 3,161,807, an increase of 17.7 per cent.

There were 4,969,612 passengers carried, a decrease of 2.5 per cent. The number carried one mile was 226,715,956, an increase of 4.1 per cent. Passenger revenue was \$5,002,205.07, an increase of 11.6 per cent. Total passenger train revenue was \$5,813,200.44, an increase of \$55,163.41, or 9.8 per cent. Revenue per passenger per mile was 2.206 cents, an increase of 7.0 per cent. Number of passengers carried one mile per mile of road was 117,051, an increase of 2.0 per cent. Passenger train mileage was 4,276,193, an increase of 12.0 per cent. Passenger revenue per train mile was \$1.17, a decrease of 0.3 per cent.; including mail and express it was \$1.36, a decrease of 1.7 per cent.

There were 12,412 tons of 100-lb., 7,254 tons of 90-lb., and 3,963 tons of 85-lb. steel rails used in renewals, a total of 23,629 tons, or 158.8 miles of track. There were on June 30, 1910, 686.9 miles of main track laid with rails weighing 100 lbs. per yard, 93.1 miles with 90-lb., 477.4 miles with 85-lb., 608.6 miles with 80-lb., 75-lb., and 70-lb., and 213.1 miles with

rails of lighter weight, a total of 2,079.1 miles of main track, including branch lines.

There were 951,881 ties used in maintaining existing tracks, and 277,290 in new construction, a total of 1,229,171. There were 838,959 yards of ballast used (principally stone), of which 276,873 yards were used in construction work.

Repairs were made to 813 locomotives, 287 passenger train cars and 108,015 freight train cars. The average amount expended per locomotive operated was \$2,338.78; per passenger car operated, \$792.54; per freight car operated, \$67.86. The average capacity of freight cars operated is 43.4 tons, and the average tractive power of freight locomotives 34,567 pounds.

On October 19, 1909, Mr. Theodore P. Shonts was elected a Director in your Company vice Mr. John W. Castles, deceased.

On June 5, 1910, your Company sustained a serious loss in the death of Mr. Charles E. Doyle, Vice-President in charge of operation. The Board of Directors, by suitably entry upon its minutes, promptly recorded its high appreciation of his character and service.

On May 1, Mr. E. W. Grice, the General Superintendent of the West Virginia General Division, was appointed General Manager; Mr. E. P. Goodwin was transferred from the Kentucky General Division to the West Virginia General Division as General Superintendent; Mr. J. P. Stevens was promoted to the General Superintendency of the Kentucky General Division, and Mr. T. J. Connors appointed Superintendent of the Cincinnati Division.

Acknowledgments are made with pleasure to officers and employees for faithful and efficient service during the year
By order of the Board of Directors

FRANK TRUMBULL,
Chairman.

GEO. W. STEVENS,
President.

THE FIFTY-FIRST ANNUAL REPORT OF THE CHICAGO AND NORTH WESTERN RAILWAY CO. FISCAL YEAR ENDING JUNE 30, 1910.

The results of the operations of the Chicago & North Western Railway Company for the fiscal year ending June 30, 1910, were as follows:

Average number of miles operated, 7,629.45.	
Operating revenues—	
Freight revenue	\$49,536,839.18
Passenger revenue	18,431,017.47
Other transportation revenue	5,768,314.63
Non-transportation revenue	439,483.41
Total operating revenue	\$74,175,684.69
Operating expenses (70.31 per cent. of operating revenues)	52,153,619.21
Net operating revenue	\$22,022,065.48
Outside operations—net deficit	56,941.06
Total net revenue	\$21,965,124.48
Taxes accrued (4.02 per cent. of operating revenues)	2,979,512.52
Operating income	\$18,985,611.96
Other income—	
Rents credits	\$84,180.43
Dividends on stocks owned	1,594,249.50
Interest on funded debt owned	1,900.00
Interest on other securities, loans and accounts	808,309.23
Miscellaneous income	51,120.29
Total other income	2,539,759.45
Gross income	\$21,525,371.41
Deductions from gross income—	
Rents—debts	\$1,397,277.94
Interest accrued on funded debt	7,532,514.99
Other interest	931.89
Sinking funds	225,000.00
Other deductions	20,649.23
Total deductions from gross income	9,226,874.05
Net income	\$12,298,497.36
Dividends (8 per cent. on preferred and 7 per cent. on common stock)	\$9,832,028.00
Balance income for the year	\$2,466,469.36

*This amount includes one-half year's dividend on the increase in common stock of the company issued during the current year.

The results as compared with the preceding fiscal year were as follows:

Freight revenue increased	\$5,917,747.91
Passenger revenue increased	1,555,340.04
Other transportation revenue increased	621,723.14
Non-transportation revenue increased	102,393.57
Increase in total operating revenues	\$8,197,213.66
Operating expense increased	\$8,300,379.80
Taxes accrued increased	264,880.73
Increase in operating expense and taxes	\$8,565,260.53
Net deficit from outside operations increased	41,941.10
Decrease in operating income	\$1,071,081.39

The operating expense for the current fiscal year include \$30,150,911.21 paid for labor in comparison with \$28,500,000 paid during the preceding fiscal year, being an increase of \$1,650,911.21 on account of labor of this amount \$1,380,000 was paid to the union of employees in compensation, and \$270,911.21 to the union on the basis of employees.

The taxes paid during the current fiscal year increased \$264,880.73 as compared with the preceding fiscal year, of which \$142,027.87 was due to the amount paid on account of the United States Government excise tax.

MILES OF RAILROAD.

The total number of miles of railroad owned June 30, 1910, was	7,506.47 miles
In addition to which the company operated—	
Through ownership of entire capital stock—	
Princeton & Western Railway (Wyeville to Necedah, Wis.)	16.06 miles
Wolf River Valley Railway (Junction east of Elton to Van Ostrand, Wis.)	1.98 "
Under lease—	
St. Paul Eastern Grand Trunk Railway (Clintonville to Oconto, Wis., and branches)....	60.02 "
De Pue, Ladd & Eastern Railroad (Ladd to Seatonville, Ill.)	3.25 "
Under trackage rights—	
Peoria & Pekin Union Railway (in the city of Peoria, Ill.)	2.02 "
Chicago, Indiana & South'n Railroad (Churchill to Ladd, Ill.)	2.80 "
Union Pacific Railroad (Broadway Station, Council Bluffs, Ia., to South Omaha, Neb.)	8.73 "
Chicago, St. Paul, Minneapolis & Omaha Railway (Blair to Omaha, Neb.)	24.70 "
Missouri Valley & Blair Railway & Bridge Company's track	3.36 "
	41.61 "

Total miles of railroad operated June 30, 1910	7,629.49
The above mileage is located as follows:	
In Illinois	685.02 miles
In Wisconsin	1,968.73 "
In Michigan	519.88 "
In Iowa	1,379.21 "
In Minnesota	650.30 "
In South Dakota	978.06 "
In North Dakota	14.28 "
In Nebraska	1,102.05 "
In Wyoming	130.16 "
Total	7,629.59 "

FREIGHT TRAFFIC.

The details of freight traffic for the year ending June 30, 1910, compared with the preceding year, were as follows:

	1909	1910	Increase Amount Per cent.
Freight revenue	\$43,619,091.27	\$49,536,839.18	\$5,917,747.91 13.57
			Percent at 100
	1909	1910	or Decrease
Tons of freight carried	32,793,118	39,379,739	19.06 100
Tons of freight carried one mile	1,803,880,004	2,362,887,119	14.37 100
Average revenue received per ton	\$1.33	\$1.26	6.26 100
Average revenue received per ton per mile	90.04 cent.	80.04 cent.	11.11 100
Average distance each ton was hauled	148.31 miles	141.01 miles	4.66 100
Mileage of revenue freight and mixed traffic	18,696,827	21,336,310	11.12 100
Average number of tons of revenue freight carried per train mile	260.13	260.71	22 100
Average number of tons of revenue freight carried per loaded car mile	14.60	15.61	6.23 100
Average freight revenue per train mile	\$2.11	\$2.32	48 100

The Bonds due from Trustee have been increased during the year as follows:

C. & N. W. Ry. General Mortgage Gold Bonds of 1987, due from Trustee in Exchange for Bonds Retired, viz.:	
M. L. S. & W. Ry. 20 Years Convertible Debentures of 1907, 5%.....	\$436,000.00
Cedar Rapids & Missouri River R. R. Mortgage of 1884, 7%.....	2,000,000.00
C. & N. W. Ry. 25 Years Debentures of 1909, 5 1/2%, 22,000 Northern Illinois Ry. First Mortgage, 5%.....	1,500,000.00
C. & N. W. Ry. Sinking Fund of 1879, 6%.....	112,000.00
C. & N. W. Ry. Sinking Fund of 1879, 5%.....	153,000.00
	\$8,870,000.00

C. & N. W. Ry. General Mortgage Gold Bonds of 1987, due from Trustee on Account of Construction Expenditures Made During the Year.....	1,000,000.00
Total Bonds in the Treasury and due from Trustee, June 30, 1910.....	\$20,263,000.00
Net Increase during the year in Bonds in the Treasury and due from Trustee.....	\$8,982,000.00

CONSTRUCTION.

The construction charges for the year ending June 30, 1910, were as follows:

On Account of Additional Main Tracks, viz.:	
Third Track, Mayfair Cut-Off, Ill.....	2.52 \$1,527.12
Second Track, West Chicago to Wayne, Ill.....	4.74 49,634.55
Third and Fourth Tracks, Fulton Cut-Off, Illinois.....	4.69 356,569.98
	\$497,731.65
On Account of Elevating Tracks, viz.:	
In the City of Evanston, Ill.....	\$767,001.31
North 46th Avenue to Austin Avenue, Chicago, Ill.....	86,424.69
Austin Avenue to Harlem Avenue, Oak Park, Ill.....	182,237.28
South Branch Track, from near Taylor Street to Canal St., Chicago, Ill.....	215,842.39
In the City of Milwaukee, Wis. (Madison Division).....	380,584.31
	1,632,089.98

Sundry Construction:

Right of Way and Additional Depot and Yard Grounds.....	\$347,668.04
Buildings, Furniture and Fixtures.....	915,515.17
Dock and Wharf Property.....	1,125,440.39
Shop Machinery and Tools.....	40,064.97
Permanent Bridges (cost of new over old).....	1,471,586.94
Interlocking and Signal Apparatus.....	24,163.30
New Sidings, Yard Tracks and Spurs to Industries (60.57 miles).....	310,641.34
Betterment of Roadway and Track.....	50,511.12
Fulton Terminal Improvements.....	154,177.76
Thatcher-Valentine Revision, Nebraska.....	407,297.53
Hawarden Revision, Iowa.....	42,105.13
Account New Chicago Passenger Terminal.....	16,939,515.48*
Miscellaneous Construction, including Road Crossings, Signs and other items.....	121,046.01
	22,403,173.68

Additional Equipment:

81 Locomotives, 5 Dining Cars, 48 Coaches, 8 Combined Mail and Baggage Cars, 10 Baggage Cars, 1,500 Automobile Cars, 2,000 Gondola Cars, 300 Flat Cars, 950 Ore Cars, 500 Box Cars, 250 Refrigerator Cars, 300 Stock Cars, 60 Caboose Cars, 3 Pile Drivers, 1 Track Seal Test Car.....	\$7,068,836.51
Less Equipment retired.....	1,117,428.89
	\$5,951,407.62
Total.....	\$30,394,422.93

*Note.—This item includes \$11,032,991.80 expended in previous years and carried in the account "Real Estate in Suspense and Advances on account of the New Chicago Passenger Terminal," which was transferred to Construction Account in the current year.

NEW PASSENGER TERMINAL IN THE CITY OF CHICAGO.

Substantial progress has been made during the year in the construction of the company's new passenger terminal and approaches in the city of Chicago. In the terminal section, extending from a connection with the west and north approaches to Jefferson street and Austin avenue to Madison street, all retaining walls, abutments, steel viaducts and sand filling are completed, the structural steel for the track floor and train shed is in place, and the track floor and train shed roof are being constructed; the enclosing walls are practically completed and the subdivision of the space beneath the track floor is well advanced. The walls, roof and interior partitions of the station building are completed and a large portion of the interior finish and decoration of this building is done. The power house, north of Lake street, is practically completed and the necessary machinery is being installed.

On the west approach, from near Ashland avenue to Jefferson street, and on the north approach from near Carpenter street to Jefferson street, all retaining walls, abutments, steel viaducts and sand filling are completed, the four main tracks are laid and ballasted, except at connections with the ground upon which, and the installation of signal and interlocking apparatus is in progress.

It is expected that the new terminal will be completed and opened to the public during the present calendar year.

TRACK ELEVATION IN THE CITY OF CHICAGO AND VICINITY.

Pursuant to an ordinance adopted by the Common Council of the city of Chicago, the company has undertaken the elevation to a maximum height of 17 ft. of its existing and main tracks in that city from a connection with its Rockwell street line at Taylor street to a connection with the Rockwell street line at 11th street, a distance of 31 miles. Subsequently, progress has been made during the year in the elevation of the main tracks of the company on its Milwaukee line through the city of Evanston, and it is expected that the work will be completed during the ensuing autumn. Three main tracks on this line are now elevated and in

operation from Chicago to a point north of the Davis street station in Evanston, a distance of 13 miles. In connection with this undertaking, four modern brick passenger stations have been completed in Evanston and one is under construction at North Evanston.

In the village of Oak Park, adjoining the city of Chicago at its western limits, the four northerly tracks of the proposed six-track system have been elevated from Austin avenue to Clinton avenue, a distance of 1.82 miles; the bridge work has been erected for the subways and the street improvements are substantially completed. The improvement of the Harlem avenue freight yard, including the construction of a brick freight house, has also been completed.

TRACK ELEVATION IN THE CITY OF MILWAUKEE.

The elevation of the main track of the company on its Madison division in the city of Milwaukee, from a point near Chicago avenue to Greenfield avenue, a distance of 1.82 miles, including the elevation of the Barclay street and Chase yards, containing 6.55 miles of track, the reconstruction of the Kinnickinnic river bridge and the construction of subway bridges across Kinnickinnic avenue, Becher street, Lincoln and Chicago avenues, and a brick freight station and team yard at Lincoln avenue, have been completed.

SUNDRY ADDITIONS AND BETTERMENTS.

Among the more important sundry additions and betterments to the property of the company during the fiscal year are the following:

The third track on the Mayfair cut-off from Foster street, Evanston, to Weber station, a distance of 2.58 miles, has been practically completed.

The Fulton (Ill.) cut-off, consisting of third and fourth main tracks from a connection with the main line of the Galena division, about three miles east of Fulton, Ill., to the east end of the company's new bridge across the Mississippi river between East Clinton, Ill., and Clinton, Ia., a distance of 4.69 miles, has been completed.

The revision of the main line of the Nebraska and Wyoming division between Thatcher and Valentine, Neb., including the construction of a cut-off 5.73 miles in length, located south of the present main line between these points, and the construction of a bridge 1,300 ft. in length across the Niobrara river, has been completed.

A second main track has been constructed on the Galena division from (near) West Chicago to a point west of Wayne, Ill., a distance of 4.74 miles.

An aggregate of 60.57 miles of yard tracks, sidings and industrial spurs has been added.

A second main track is being constructed and the present main line is being revised between Hawarden, Ia., and the junction with the Sioux City, Dakota & North Western Railway, about two miles east of that station.

To provide for the extension and enlargement of the company's station and terminal facilities, a considerable expenditure has been made during the year for additional real estate, the more important expenditures on this account having been at Proviso, Ill., and Tracy, Minn.

Modern brick passenger stations have been completed at McHenry, Ill., Blair, Neb., and Casper, Wyo.

Near Fulton, Ill., the company has acquired 201 additional acres of land and has commenced the construction of a large terminal yard. The improvement now undertaken consists of 22 yard tracks with capacity for 1,700 cars, 4 repair tracks with capacity of 100 cars, and the following structures:

Brick engine house, 58 stalls.
Turntable, 80 ft., electrically operated.
Mechanical coaling plant, 800-ton pocket capacity.
Double clinker pit, 100 ft. long.
Water station with five stand pipes.
Brick power houses and miscellaneous buildings.

At East Elgin, Ill., a brick freight house 160 ft. x 32 ft. has been constructed.

At the Chicago shops of the company a complete plant for washing out locomotive boilers has been constructed.

At Council Bluffs, Ia., extensive additions have been made to the company's shop and engine house plant. Among the more important structures completed during the year are the following:

Brick engine house, 24 stalls.
Brick machine and boiler shop, 100 ft. x 140 ft.
Brick heater house, 25 ft. x 25 ft.
Heating plant.
Brick oil house, 32 ft. x 84 ft.
Storehouse, office, 80 ft. x 24 ft.
Holman Coal Chute, 300 ton.
Turntable, 80 ft.

Under pit 15 panels—154 ft. long.
Clinker pit, 24 ft. long.
In connection with this improvement a system of yard, coach and repair tracks has also been constructed.

At Hawarden, Ia., a 16-stall 90-ft. engine house, an 80-ft. turntable, and a Holman mechanical coaling plant are being constructed, and the yard revised.

At LeGrand, Ia., two stone crushers of large capacity with the necessary appurtenances have been installed to provide ballast.

At Layton Park, Milwaukee, the company's storage yards have been enlarged.

At Lancaster, Wis., a 3-stall engine house has been constructed.

At South Oskosh, Wis., an ice house 160 ft. x 250 ft., of 30,000 tons capacity has been erected.

At Huron, S. D., a complete plant for the manufacture of Pintsch gas has been installed.

At Escanaba, Mich., iron ore dock No. 5 has been rebuilt and the yards enlarged. The rebuilt dock is 2,220 ft. long and 69 ft. 2 in. wide, with an approach 1,500 ft. in length. It contains 370 ore pockets each having a capacity of 325 tons and has a total working capacity of 120,350 tons.

To facilitate the despatching of trains, a complete telephone line with twenty station offices has been constructed along the company's right of way from Long Pine to Chadron, Neb., a distance of 192 miles.

The following new equipment has been purchased during the year:

Locomotives.....	81
Passenger equipment.....	
Dining cars.....	5
Coaches.....	48
Combined mail and baggage cars.....	8
Baggage cars.....	19

Equipment	1,000,000.00
Land	1,000,000.00
Buildings	1,000,000.00
Stock	1,000,000.00
Other	1,000,000.00
Total	5,000,000.00

Work done	1,000,000.00
Profit	1,000,000.00
Loss	1,000,000.00
Total	1,000,000.00

NEW RAILWAYS

The following railways have been organized under the laws of the State of Illinois:

CHICAGO AND NORTH WESTERN RAILWAY COMPANY. Organized under the laws of Illinois. This company has purchased a double-track railway from Nevada to Chicago, a distance of 120 miles, and has agreed to lease by the Chicago & North Western Railway Company after July 1, 1911, the right of way for the Chicago and North Western Railway Company from Chicago to St. Louis, a distance of 120 miles, and the Chicago and North Western Railway Company from Chicago to St. Louis, a distance of 120 miles, and the Chicago and North Western Railway Company from Chicago to St. Louis, a distance of 120 miles.

SOUTH DAKOTA VALLEY RAILWAY COMPANY. Organized under the laws of South Dakota to construct a railway eastward from a connection with the Chicago & North Western Railway at Belle Fourche, S. D., through the counties of Butte and Meade for a distance of 88 miles. This company has purchased a double-track railway from Belle Fourche to a point near the town site established in Butte county by the United States government in connection with its reclamation project, a distance of 23.52 miles, has been completed, and after July 1, 1910, will be operated under lease by the Chicago & North Western Railway Company.

JAMES RIVER VALLEY & NORTH WESTERN RAILWAY COMPANY. Organized under the laws of South Dakota to construct a railway in that State from Gettysburg, in Potter county, to Blunt, in Hughes county, and from Onida, in Sully county, to Hitchcock in Beadle county, in all about 130 miles. The construction of this railway from Gettysburg to Blunt, a distance of 39.55 miles, is nearly completed, and substantially all of the right of way for that portion of the railway between Onida and Hitchcock has been acquired.

SIOUX CITY, IOWA & NORTH WESTERN RAILWAY COMPANY. Organized under the laws of Iowa to construct a railway in that State from Sioux City to Hawarden. The construction of this railway from a connection with the Illinois Central Railroad near Hinton to a connection with the Chicago & North Western Railway near Hawarden, a distance of 28.17 miles, is well advanced. An agreement has been entered into between the Illinois Central Railroad Company and the Chicago & North Western Railway Company providing for perpetual trackage over the main line of the Illinois Central Railway Company between Sioux City and Hinton, a distance of 12.72 miles.

DES PLAINES VALLEY RAILWAY COMPANY. Organized under the laws of Illinois. Substantially all of the right of way has been acquired for this double-track railway, from a point between Northfield and Blount on the western division of the four-track system of the Chicago and North Western Railway between Chicago and Milwaukee to a connection with the Wisconsin Division near Des Plaines, and thence to a connection with the Galena Division at Proviso, a distance of about 21 miles.

This railway will directly connect the several divisions of the Chicago & North Western Railway entering the City of Chicago with the proposed enlarged terminal yards at Proviso and enable that company to effect important economies in the diversion and distribution of the large, and increasing, traffic now passing through the terminals within that city.

MILWAUKEE, SPARTA & NORTH WESTERN RAILWAY COMPANY. Organized under the laws of Wisconsin to construct a railway in that State from a connection with the Chicago & North Western Railway near Lindworm on the Wisconsin Division, about eight miles north of Milwaukee, northwesterly to Sparta on the Madison Division, a distance of 169.52 miles and from a connection with the above line at a point about six miles west of Lindworm southerly to a connection with the Milwaukee and Madison Line near West Allis, a distance of 8.16 miles. From Lindworm to Clyman and from the junction west of Lindworm to near West Allis, in all about 51.78 miles, the construction of a double-track railway is in progress. From Clyman to Necedah and from Weyville to Sparta a considerable portion of the right of way has been acquired and the construction of a single-track railway has been commenced. Between Necedah and Weyville, an existing branch railway will be reconstructed and used as a part of the main line. In the construction of this railway such provision as may be economical will be made for the future construction of an additional main track from Clyman to Sparta.

This railway will afford a direct route, with low grades, from Milwaukee to connections with the Chicago & St. Paul, Minneapolis & Omaha Railway at Weyville and with the Madison Division of the Chicago & North Western Railway at Sparta, to which may be economically diverted a large volume of traffic now passing over the existing routes and heavy

under the Madison and Illinois. It will also provide a double-track route from Chicago to the City of Milwaukee, and will afford great relief from congestion at the several points where the Chicago and North Western Railway crosses the line of the Illinois Central Railroad.

LANDS.

The sale of the timber lands in the Wisconsin & Milwaukee Land Grant, and the proceeds therefrom, for the purpose of reclamation and reforestation. The total number of acres remaining in the several grants is 1,000,000. The total number of acres sold is 1,000,000. The total number of acres under contract for sale, leaving unsold 372,320.20 acres.

Appended hereto may be found statements, accounts and statistics relating to the business of the fiscal year, and the condition of the company's affairs on June 30, 1910.

MARVIN HUGHITT, President.

COMPARATIVE STATEMENT OF INCOME ACCOUNT.

	Year Ending June 30, 1909.	Year Ending June 30, 1910.	
	Average mile- age operated	Average mile- age operated	Percentage Increase or Decrease
Operating Revenues:	ated 7,625.49.	ated 7,629.45.	Decrease --
Freight Revenue	\$43,619,091.27	\$49,536,839.18	+\$5,917,747.91
Passenger Revenue	16,875,608.43	18,431,017.47	+1,555,409.04
Other Transportation Revenue	5,146,621.49	5,768,344.63	+621,723.14
Non-transportation Revenue	337,089.84	439,483.41	+102,393.57
Total Operating Revenues	\$65,978,471.03	\$74,175,684.69	+\$8,197,213.66
Operating Expenses	43,191,239.41	52,153,619.21	+8,962,379.80
Net Operating Revenue	\$22,787,231.62	\$22,022,065.48	-\$765,166.14
Outside Operations:			
Net Deficit	15,906.54	56,941.00	+41,034.46
Total Net Revenue	\$22,771,325.08	\$21,965,124.48	-\$806,200.60
Taxes accrued	2,714,631.79	2,979,512.52	+264,880.73
Operating income	\$20,056,693.29	\$18,985,611.96	-\$1,071,081.33
Other Income:			
Rents—Credits	65,180.75	84,130.43	+18,999.68
Dividends on Stocks Owned	1,886,192.00	1,594,249.50	-291,942.50
Interest, Funded Debt Owned	2,837.50	1,900.00	-937.50
Interest on Other Securities,			
Loans and Accounts	549,421.42	808,309.23	+258,887.81
Miscellaneous Income	50,429.83	51,120.29	+690.46
Total Other Income	\$2,554,061.50	\$2,539,759.45	-\$14,302.05
Gross Income	\$22,610,754.79	\$21,525,371.41	-\$1,085,383.38
Deductions from Gross Income:			
Rents—Debits	\$818,848.13	\$1,397,277.94	+\$578,429.81
Int. Accrued on Funded Debt	7,603,025.00	7,582,514.99	-20,510.01
Other Interest	900.96	931.89	+30.93
Sinking Funds	224,500.00	225,500.00	+1,000.00
Other Deductions	28,187.15	20,649.23	-7,537.92
Total Deductions from Gross			
Income	\$8,675,461.24	\$9,226,874.05	+\$551,412.81
Net Income	\$13,935,293.55	\$12,298,497.36	-\$1,636,796.19
Dividends on Stock	8,764,503.00	9,832,038.00	+\$1,067,535.00
Balance Income for the year,			
carried to Profit and Loss	\$5,170,790.55	\$2,466,459.36	-\$2,704,331.19

*NOTE.—This increase is due to one-half year's dividend on the increase in Common Stock of the Company issued during the current year.

PROFIT AND LOSS ACCOUNT, JUNE 30, 1910.

PROFIT AND LOSS ACCOUNT, JUNE 30, 1910.				Cr.
Dr.	Balance from operations of Land Properties for year ending June 30, 1910.....	\$82,757.13	Balance, June 30, 1909.....	\$30,672,159.22
	Depreciation accrued prior to July 1, 1907, on equipment retired during the current fiscal year.....	709,158.55	Balance Income for Year Ending June 30, 1910, brought forward from Income Account.....	2,466,459.36
	Adjustments in sundry accounts due to operations of previous years (net).....	139,334.22	Balance of Accounts Written Off the Books.....	6,251.64
	Net loss on property sold or abandoned and not replaced and preliminary construction work abandoned.....	34,718.22		
	Balance Credit, June 30, 1910, carried to Balance Sheet.....	82,178,982.10		
		<u>\$33,144,900.22</u>		<u>\$33,144,900.22</u>

GENERAL BALANCE SHEET, JUNE 30, 1910.
(7,506.47 Miles.)

ASSETS.		LIABILITIES.	
Property Investment.		Capital Stock:	
Road and Equipment:		Common Stock and Scrip, C. & N. W. Ry.	
Balance to Debit of this Account, June 30, 1909	\$260,930.188 09	Co., held by the public	\$130,121,488.82
Add C. & N. W. Ry. Sinking Fund Bonds of 1879 retired and credited this account in the two preceding fiscal years	153,000.00	Preferred Stock and Scrip, C. & N. W. Ry.	
Add Sundry Construction and Equipment Expenditures for the year ending June 30, 1910, as see statement elsewhere herein	30,394,422.93	Co., held by the public	22,395,120.00
	\$291,597,611.02		\$152,516,608.82
Securities:		Common Stock and Scrip, C. & N. W. Ry.	
Securities of Proprietary, Affiliated and Controlled Companies—Unpledged	791,760.00	Co., owned by the Company	\$2,334,042.15
Other Investments:		Preferred Stock and Scrip, C. & N. W. Ry.	
Advances to Proprietary, Affiliated and Controlled Companies for Construction, Equipment and Betterments	\$15,877,949.09	Co., owned by the Company	3,834.56
Miscellaneous Investments	970,507.81		2,337,876.71
	16,848,456.90	Premium Realized on Capital Stock	29,657.75
	\$309,240,827.92		\$154,884,143.28
Working Assets:		Mortgage, Bonded and Secured Debt:	
Cash	\$18,503,988.19	Bonds in hands of the public	\$138,511,300.00
Common Stock and Scrip, C. & N. W. Ry. Co., in hands of Treasurer	2,334,042.15	Add C. & N. W. Ry. Sinking Fund Debentures of 1933, in hands of public, issued for purchase of Stock of C. St. Paul. M. & O. Ry. Co.	9,695,000.00
Preferred Stock and Scrip, C. & N. W. Ry. Co., in hands of Treasurer	3,834.56		\$148,206,300.00
\$40,000 M. L. S. & W. Ry. Ext. & Imp. Sinking Fund Bonds on hand	40,000.00	Bonds held by Trustee account Sinking Funds	4,989,500.00
\$1,835,000 C. & N. W. Ry. 3½% General Mortgage Gold Bonds of 1987 on hand	1,835,000.00	Bonds owned by the Company and due from Trustee	20,263,000.00
\$17,957,000 C. & N. W. Ry. General Mortgage Gold Bonds of 1987, due from Trustee in exchange for Bonds retired	17,957,000.00		173,459,000.00
\$431,000 Southern Iowa Ry. First Mortgage Bonds on hand	431,000.00	Working Liabilities:	
149,200 Shares of Capital Stock of the Chicago, St. Paul, Minneapolis & Omaha Ry. Co.	10,337,152.29	Traffic and Car-Service Balances Due to Other Companies	\$1,685,029.10
41,715 Shares of Preferred Stock of the Union Pacific Railroad Co.	3,910,575.93	Audited Vouchers and Wages Unpaid	5,650,593.14
Bills Receivable	1,685.35	Miscellaneous Accounts Payable	248,447.20
Traffic and Car-Service Balances Due from other Companies	40,721.28	Matured Interest, Dividends and Rents Unpaid	5,419,385.77
Net Balance Due from Agents and Conductors	3,782,095.15	Matured Mortgage, Bonded and Secured Debt Unpaid	36,000.00
Miscellaneous Accounts Receivable	1,296,155.86	Other Working Liabilities	921.96
Materials and Supplies	6,296,589.28		13,048,377.17
Other Working Assets	3,133.26	Accrued Liabilities Not Due:	
	66,773,573.30	Unmatured Interest Payable	1,590,973.35
Deferred Debit Items:		Deferred Credit Items:	
Advances	\$283,686.17	Reserve for Accrued Depreciation	\$1,398,702.01
Insurance Paid in Advance	25,918.31	Other Deferred Credit Items	172,002.84
Cash and Securities in Sinking and Redemption Funds	6,768,593.76		1,570,704.85
Other Deferred Debit Items	781,125.05	Appropriated Surplus:	
	7,849,323.29	Sinking Fund on Madison Extension Gold Bonds	\$1,862,015.92
	\$383,873,724.51	" " " Menominee Extension Gold Bonds	1,618,708.32
		" " " North Western Union Ry. Gold Bonds	1,303,348.27
		" " " W. & St. P. R. R. Extension Gold Bonds	1,947,516.64
		" " " C. & N. W. Ry. Sinking Fund Bonds of 1879	110,004.61
			7,141,593.76
		Profit and Loss	32,178,002.10
			\$383,873,724.51

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED WEEKLY BY THE RAILROAD GAZETTE (TRUST), 30 FIFTH ST., NEW YORK

CHICAGO: Published by The Railway Age Co., 30 FIFTH ST., CHICAGO, ILL.
LONDON: Printed and Published by The Railway Age Co., 30 FIFTH ST., NEW YORK

W. H. RAGAN, Editor

J. A. SAMMONS, Editor of The Railway Age, 30 FIFTH ST., CHICAGO, ILL.
For all other communications, address the office.

EDITORS

W. H. RAGAN, Editor	R. V. WILSON, Editor	B. B. ADAMS, Editor
SAFETY OF TRAINS	EDWARD M. CROSBY, Editor	W. H. H. H. Editor
Engineering and Maintenance	G. E. TUCKER, Editor	E. L. LUTHER, Editor
Business and Economics	WILLIAM F. KELLEY, Editor	F. W. RAGAN, Editor
Engineering and Maintenance	S. W. THOMAS, Editor	H. H. SIMMONS, Editor
	CLARENCE J. DUNN, Editor	

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free.

United States and Mexico.....	\$5.00 a year.
Canada.....	\$6.00 a year.
Foreign (including postage).....	\$11.00 (\$8.00 a year).
Single Copies.....	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49 FRIDAY, OCTOBER 7, 1910 NUMBER 15.

CONTENTS

EDITORIAL:

Editorial Notes.....	613
Abolish the Unfair Discriminations.....	614
The Safety Appliance Conference.....	615
Illinois Central.....	616
Atchison, Topeka & Santa Fe.....	616
Chicago, St. Paul, Minneapolis & Omaha.....	618
New Books.....	619

ILLUSTRATED:

Signaling at the New Grand Central Terminal.....	620
--	-----

GENERAL NEWS SECTION.....

661

SUPPLY TRADE SECTION.....

678

SHOP SECTION.

EDITORIAL:	
Editorial Notes.....	625
Scientific Car Wheel Foundry Methods.....	626
Future Competitions.....	626
Mechanical Articles During September.....	626

ILLUSTRATED:

Engine House Kinks.....	629
Car Wheel Foundry Practice—Canadian Pacific.....	645
Shop Kinks.....	656

MISCELLANEOUS:

Increasing Shop Output.....	627
Unscientific Methods of Coach Cleaning.....	628
Master Car and Locomotive Painters' Convention.....	636
Notes on the Electric Driving of Machine Tools in Railway Shops.....	643
Apprentice Notes.....	649

TO see the pages of the journal of a national association of railway officers occupied by descriptions of proprietary devices written by the proprietors or their agents, and the time at the association taken up with the reading and discussion of such subjects, to the exclusion of really valuable matter, produces disgust. If such devices are thus treated in connection with reports by regularly appointed committees of the association, or by active members who have used them and wish to give others the benefit of their experience, that is another matter. So handled, no exception can be taken and there is

nothing to detract from the dignity of the proceedings. The Railway Signal Association has been a conspicuous offender against good taste in this respect during the past year. We do not accuse the secretary of the executive committee of the offense of using the body of the journal for the material profit of the association; such a proceeding in the case of the men concerned would be beyond belief. Nevertheless, the time of the association at the March meeting in Chicago was in large part devoted to descriptions of proprietary devices which, it so may judge by the paucity of debate, added little or nothing to the knowledge of those present. What discussion there was consisted largely of an exchange of personal opinions between representatives of different makers of similar devices. Again, at New York, in June, the discussion of the report of committee No. 4, on automatic block signals, than which nothing more important has come before the association during the year, was postponed to the end of the meeting when all those who had not gone home were exhausted and anxious to get away, with the result that scant attention was paid to this subject. Meanwhile three-fourths of the afternoon session had been devoted to proprietary devices described by the agents of the makers. The Railway Signal Association has done splendid work in the past and is doing it now (in committee), as a glance at the advance notices of the annual convention will show. It is recognized as the authority on signaling and is striving for a place in the railway world comparable to that of the Maintenance of Way Association. Before, however, it can attain to any such dignity as attaches to this body, the Railway Signal association will have to model its conduct more after that of the larger organization.

THE members of the Interstate Commerce Commission held a general conference at Washington on Monday last and discussed at considerable length the principal problems now before them. They have decided to give a hearing on October 8 on the question of the proper administration of the long and short haul clause of the law, as amended last June. It is deemed important that, in order to comply with the spirit of the law, the question of the administration of this clause shall be settled by December 18, when the six months' period allowed by the statute for adjustment will expire. It was decided to hear additional testimony concerning trunk line freight rates on October 12. On that date it is expected that the presidents of the New York Central, the Pennsylvania and the Baltimore & Ohio will give testimony concerning the financial condition of their companies. The commission will, on October 17, hold a hearing in Boston to consider the complaint of New England consignees against the new demurrage rules of the railways, by which the free time allowed for unloading cars shall be reduced from four days to two. We referred recently to the task of prescribing equitable freight rates by governmental procedure as impossible; this because the indeterminate or variable factors in the problem are so numerous and so elusive. We might have added that the commission's task as a whole is physically impossible, even if there were no other obstacles. The three subjects here mentioned are enough to keep a half dozen men busy a month; and shippers in all parts of the country are presenting new complaints or remonstrances as fast as their typewriters can turn them out. As questions concerning proposed increases must take precedence on the commission's docket over all other matters, it looks as though ordinary complaints would stand a poor show for the next six months. In the meantime passengers are being killed by the score, in Indiana and Illinois, and the commission apparently lacks the time or the money to exercise its power, granted by the last Congress, to investigate and expose those railway practices which result in such distressing disasters. Even the preferred questions—proposed increases—get in each other's way. That New England demurrage question ought to be settled at once, for it is a comparatively simple one; but while the commissioners are attending to that subject, the immensely important trunk line rates must wait.

OUR editorial last week on the Bluffton collision might with propriety be reprinted this week, in almost the same form, as a commentary on a collision which occurred two miles north of Staunton, Ill., on Tuesday of this week, in which 37 persons were killed; that is to say, the article might profitably be reprinted provided there is any profit in printing editorials on this subject—which sometimes seems doubtful. Looking at the subject from a cold statistical standpoint, and having in mind the slaughters which in the past have led to reforms in railway practice that apparently could not be accomplished except by slaughter, one could wish that these last three trolley-car disasters could all have occurred in the same state, so as to be more effective in burning the lesson into the minds of the people. The only difference in the circumstances of the Staunton collision, as distinguished from the two in Indiana, which may in any way affect the question of what to do about them is that in the Staunton disaster four of the persons killed were officers of the company on whose line the collision occurred—the assistant superintendent of motive power, the assistant trainmaster, the land commissioner and the auditor of disbursements. As we write there comes to hand an Indiana newspaper which says that the railway commission of that state, since the Bluffton collision, has held several conferences with block signal experts and “the commissioners have concluded that it is practicable to have block signals on electric railways.” It seems to us that to have this solemn declaration, in the year 1910, of a simple fact which was equally well-known 20 years ago, and which was easily susceptible of proof, both by theory and experience, 50 years ago, should be looked upon as the flower of the American system of regulating railways through the instrumentality of a political railway commission. The Indiana paper adds that probably the commission will issue an order for block signals on all electric lines in Indiana; but what such an order would amount to, when the legislature has explicitly exempted electric roads from the block system law, is not explained.

ABOLISH THE UNFAIR DISCRIMINATIONS.

LAST week the *Railway Age Gazette* published the facts about some unfair discriminations in the form of published rates which are given certain members of the Illinois Manufacturers' Association. The facts, as we stated them, have not yet been denied; they are undeniable. The only answer which has been made is that the rates referred to are all right, because, being published, they are legal. Any unfair discrimination under heaven could be made equally “right” and equally “legal” in the same way. What is the difference in the effect whether a railway publishes a rate of 26 cents and secretly rebates 3 cents of it to certain favored concerns, or makes a rate of 23 cents, in such a way that it can be enjoyed only by those concerns? If a discrimination is unfair, immoral and harmful, it is not made fair, virtuous and beneficent by a small application of printer's ink.

Many big shippers and big cities are getting published rates that are unfairly low as compared with the rates charged other shippers and to other points. They know it and railway men know it. The public also will soon know all about it. Many magazine articles have been published in recent months attacking railways for numerous things. Most of these attacks have been unfair. For an attack which is fair, and which is written by a man who evidently knows what he is talking about, we commend our readers to the article in the October *World's Work* by C. M. Keys, entitled “The Shipper's Fight for Life.” Some of the specific cases Mr. Keys cites are not apropos, but he seems to have grasped the vitally important fact that the present great evil in American railway rate-making is not the making of lower rates for longer than for shorter hauls, which is often justifiable; nor the charging of rates excessive *per se*, which seldom or never happens; but that the real evil consists in unfair discriminations in favor of the big shippers and big cities, simply because, being big, they control enough traffic to bribe or bully the railways into giving them that to which they are not entitled. It is only a matter of time unless this condition of affairs is remedied, until other writers having no friendly feeling toward railways will be making similar attacks, and presently we shall have—and justly—

an agitation comparable in violence to that which was provoked by secret rebating. One of the great dangers from rates that are unfairly low always is that they will be effectively used as arguments to show that other rates are too high, when, in fact, the other rates are not too high absolutely, but only seem too high when compared with the rates that are unfairly low.

How did these discriminatory rates get into the tariffs? As the *Railway Age Gazette* recently said, the Hepburn act was hardly in effect before the big shippers all over the country began begging and demanding that the railways give them in the form of published rates the same advantages they formerly had in the form of secret rebates. The result was reflected in an interview given to the press about January 1, 1907, by one of the new members of the Interstate Commerce Commission, in which he said that more rates had been reduced since the Hepburn act went into effect than in any equal period in the country's history! That tells the story of how some of these unfair published rates originated. Our shipper friends talk much about the “interests of the consumer.” Did anyone ever hear of the consumer getting rate reduction benefits? They went almost entirely into the same pockets into which the rebates formerly had gone.

The railways have said to the Interstate Commerce Commission that they need more revenue. The best way to make a start toward getting it is to abolish the unfair discriminations that are being given to the big industrial corporations and the big commercial centers. Some of the advances in rates that are now pending before the Interstate Commerce Commission would be in the right direction, but they would leave undone many things that ought to be done. What is needed in the interest of the railways, in the interest of the public—in the interest of everybody except the present recipients of the benefits of unfair discrimination—is that every excessive tap line allowance be reduced to a proper basis; that every commodity rate which has been made excessively low for the special benefit of the smelting trust, the beef trust, the steel trust, the harvester trust, the sugar trust, the oil trust, or any other big industrial concern, shall be raised to a place where it will bear a fair relation to other rates; that every vicious transit arrangement shall be abolished—in short, that every one of the unjustly low rates and unfair traffic arrangements, which every traffic man knows exist, shall be eliminated. By this means fair relations will be established between rates in general. The effect will be to increase railway revenues. If it does not increase earnings enough, then the time will have come for truly general advances in rates.

The needed reforms can be accomplished only by a concerted action by competing railways. The big industrial corporations will resist them violently. They are apt to try, as those belonging to the Illinois Manufacturers' Association are now trying, to get the railways prosecuted for alleged violation of the Sherman anti-trust act. But if the railways will fully and candidly present their case to the public and the commission and loyally stand together in fighting for what they know is right, they ultimately will win. One of the main obstacles to needed reform in railway traffic matters has been that railway men often have not loyally stood together. Each traffic manager has been loath to suggest and insist that unfair advantages be withdrawn from large industrial corporations for fear that officers of other roads would let the shippers affected know where the suggestion originated, and that his road would then be punished by the withdrawal of business. Needed readjustments of rates have also been prevented by attempts of individual traffic managers to protect pet industries on their respective lines. These narrow and selfish efforts of individual lines to protect their own interests at the expense of those of other lines have cost the railways as a whole vastly more than they have benefited their individuals; they have moved mainly to the benefit of the big traffic.

The time has come when railways must give an accounting to the public for everything they do. In order to prevent the constant scrutiny of the facts regarding their business from muzzling them, they must make the facts such that they will bear the most rigorous inspection. They cannot make a more salutary, more important, or more needed move toward that goal than to cut out unfair rate and traffic discriminations, root and branch.

THE SAFETY APPLIANCE CONFERENCE

WHEN it was suggested to put on record that a law standardizing the so-called safety appliances on railroads would be enacted, it was thought that the past experience of the country's Congresses concerning public law would result from the history of the standards that had been adopted by the Master Car Builders' Association. This was deplored on the ground that it would present a substantial obstacle to an advance that might be desired in the future. But when it was learned that the new regulations were to set aside, as a makeshift measure, what had been done by the association, one would expect some details of construction that were more massive than the association ever thought of attempting, and that these details were to be forced on all the equipment of the country, the railways took real alarm and began a campaign of protest. The result is a hearing before the commission, for receiving the protests against and the arguments for these changes. At the present writing this hearing is still on and the final result uncertain.

At the hearing of last week it was shown that the M. C. B. standards were not enforced with the rigidity that would follow their enactment into a law and the penalization of every variation from them. There is a certain flexibility of application due to local conditions, the preferences of the trainmen, the details of the car construction and the personal equation of the designer; a flexibility that makes for economy of construction and maintenance and does not, in any way, reduce the safety and efficiency of the apparatus. This was acknowledged, with the possible mistake that not enough emphasis was put on the real importance and value of the M. C. B. standards. If it was an oversight, it was quite natural, because people who think are not apt to over-emphasize self-evident truths, and it was quite natural to assume that everyone must recognize this value without the necessity of driving it home with a sledge hammer. But as soon as it was admitted that these variations from rigid adherence to the standard existed, the supporters of the measure took advantage of it and urged the necessity of strict regulations whose slightest disregard would be penalized. In this it appeared that there was an exceedingly narrow range of vision in some quarters. When the lines were drawn so closely that a brake ratchet with 14 teeth was considered to be the proper thing and one with 12 teeth deserving of a fine of \$100, and when the height of a grab iron had to be so nicely adjusted that the variation of an inch was sufficient to throw the car out of service (a distance less than the variation of car height in loaded and empty conditions) even the commission took breath and one of them remarked that it would be inadvisable to adopt anything that would make them look foolish. This ray of light is encouraging.

The testimony of railway representatives showed that not one of them had the slightest objection to anything that would make for the safety of the men. That was recognized as being of paramount importance, and sufficient to warrant any expense. But when it came to tying up cars and locomotives on every American railway, because of the number of teeth in brake ratchets, or the location of a brake staff, or because the end clearance was $\frac{1}{4}$ in. scant, or because of the thousand and one details that are shifted from their proper location by the commercial exigencies of construction, it seemed time to call a halt; the commission did not quite feel that the country would back them up in such a move. The cost to the railways was a matter of minor importance in the eyes of the advocates of the regulation. The fact that it would cost about \$56,000,000 to apply these new details to present equipment was slurred over as of no moment.

It is doubtful if the leaders, who seem possessed to get some legislation enacted that will demonstrate to their clientele that they are doing something, regardless of its real value, realized the magnitude of the task that they have undertaken. It is small wonder that with the multiplicity of irresponsible coun-

slors, there should have been built up this detailed regulation that is almost appalling in what it proposes, compared with the paucity of the good it really promises to effect.

However, the hearing has had some good effect. It has shown the danger of the radical suggestions proposed, and while the commission listened with *empressement* to its own inspectors and to the representatives of the labor organizations, the illustrations and the statements of the railway representatives were of such a character that they enforced respectful attention. It is probable that the commission will give careful consideration to the report of the special committee that is to present its case this week, and may thus be steered along a sane course. It is probable, too, from present indications, that the law will not be made retroactive, and thus the new regulations will not be made applicable to old equipment.

The strange part of the whole agitation is that advice was not taken earlier from the men who put real safety paramount to everything else and who have been in the habit of looking at these points with a broad and liberal perspective; in short, the men who have been in the habit of doing some real thinking before they leap. But, as Lord Dundreary says: "There are some things no fellow can find out."

ILLINOIS CENTRAL.

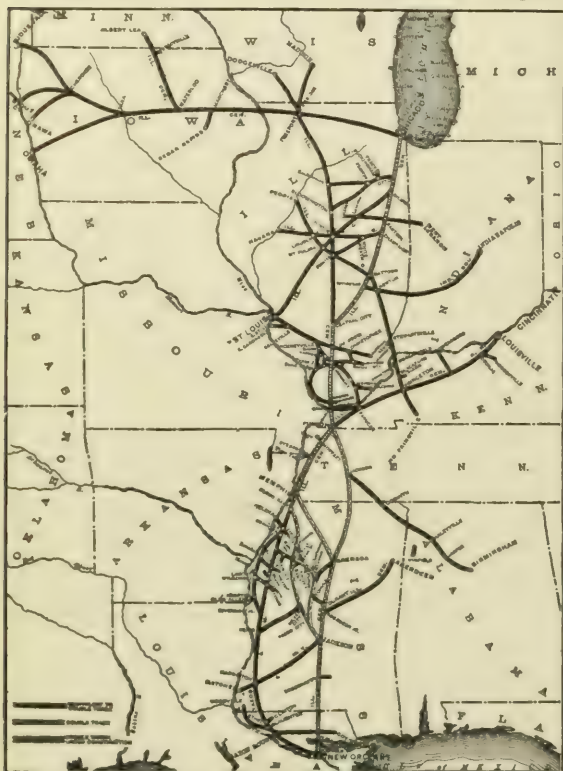
WHEN, in 1907, Stuyvesant Fish was making his fight to retain control of the Illinois Central, he prophesied loss to the stockholders of the I. C. if the Union Pacific interests became dominant. He pointed out the strong, strategic position of the Illinois Central as a north and south line, running through a fertile and highly productive territory and originating a great part of the traffic carried, and he laid stress on the advantages that such a line had in bargaining for traffic with transcontinental lines. He predicted that an alliance with other lines would result in loss of business. This prophecy has not been justified.

In the fiscal year ended June 30, 1910, gross operating revenue amounted to \$57,900,000, an increase of \$4,200,000 over 1909. This would hardly indicate that the alliance between the Union Pacific-Southern Pacific and the Illinois Central was a disadvantage to the north and south line. Moreover, the Illinois Central has not apparently suffered in division on through rates. In 1907 its average ton-mile receipts were 5.7 mills and in 1910 they were 5.89 mills.

What has happened, however, is a steady mounting expense account, which has more than kept pace with the increase in gross earnings, so that in 1910, with an increase of \$4,200,000 in gross over 1909, there is a decrease in net, after the payment of taxes, of \$700,000, making the total net in 1910 \$12,800,000. Operating expenses last year amounted to \$43,300,000, an increase of \$4,900,000 over 1909, and by far the greater part of this increase came in maintenance expenses. The fact that the company was able to show transportation expenses of \$19,700,000 in 1910 compared with \$18,600,000, or an increase of 6 per cent., while the total tons of revenue freight carried one mile increased 8.88 per cent. and the number of passengers carried one mile increased 9.91 per cent., speaks well for the efficiency of the operation of the property. But the company spent \$3,600,000 more on maintenance in 1910 than in 1909, and \$4,600,000 more in 1910 than in 1907, a year when the ton mileage was greater than in 1910.

In maintenance of equipment the facts that are being brought out in the investigation of the car repair scandals account for a good part of the increase in these accounts. The annual report for 1910 states frankly that the company has been defrauded of between \$1,000,000 and \$1,500,000, but says that part of this sum has been recovered through civil suits and that the money recovered has been credited to freight train car repairs during the current year. If there has been any considerable sum credited on this account in the expenses of the fiscal year ended June 30, 1910, the cost of repairs and renewals of freight

cars must have been even more expensive than appears from the total figures given in the company's report. The table showing operating expenses gives the total maintenance of equipment expenses as \$13,500,000, an increase of \$2,200,000 over 1909; and the cost of maintenance of freight train cars is given as \$7,800,000, an increase of \$1,600,000 over 1909. The following table gives the unit costs of maintenance as figured



Illinois Central.

by the company, but these costs are not comparable to the unit costs usually given in studies of maintenance in these columns because the figures given in the Illinois Central report do not conform to the classification for operating expenses prescribed by the Interstate Commerce Commission:

	1910.	1909.
*Maintenance of way, per mile	\$1,426	\$1,162
†Repairs and renewals, per locomotive	3,527	3,095
car	1,107	952
†Repairs and renewals per freight-train car	128	100

*Per mile of first and other main track.

†Presumably includes depreciation.

It is particularly to be regretted in the case of the Illinois Central that the management did not see fit to make the annual report in the form prescribed by the Interstate Commerce Commission, especially in regard to details of operating expenses. At a time when certain ex-officers of the road are on trial for their connections with car repair companies, it would seem that the management should have taken special pains to make their returns of operating expenses as full and comprehensive as possible. If it were thought desirable to continue to give the details of operating expenses in the same form as was used in previous reports, so that comparisons with former years could be made, the figures which the company will have to report in any case to the Interstate Commerce Commission should have been included in the annual report to the stockholders, so that they could themselves make a comparison with the expense accounts of other railways.

Maintenance of way cost \$7,600,000 last year, an increase of

\$1,400,000, and this increase is due partly to the higher cost of labor and also to a higher standard of upkeep of the property. For instance, there were 2,300,000 ties put in track in 1910 as against 1,400,000 in 1909; there were 18,300,000 tons of new rails laid in 1910 as against 12,300,000 tons laid in 1909.

Besides these increases in maintenance of way costs, the company spent \$1,560,000 on additions and improvements to road and equipment during the year and charged this amount to capital account. After the payment of rents and fixed charges the company had net corporate income of \$7,800,000 last year; and after paying 7 per cent. on the outstanding capital stock there was only the nominal sum of \$180,000 surplus.

A road with the natural advantages in location, the operating efficiency and the standard of service to the public which the Illinois Central has should, if its credit is to be maintained, earn a very much greater sum than this surplus above its dividend requirements. This is true even making all allowance for the extraordinary cost of maintenance of equipment and the high cost of maintenance of way. The annual report of the Illinois Central is a strong argument in favor of the fairness of permitting railways to increase their freight rates. At the hearing in Chicago some of the officers in their testimony rather bungled the railway's case; but an unprejudiced study of the figures given in this year's report show, it seems to us, conclusively that one of the principal reasons why the Illinois Central is now able to carry freight at an average rate of less than 6 mills per ton per mile is because its policy in the past has been to spend large sums for additions and improvements to its property, as well as ample sums for upkeep; and it has been enabled to do this without excessively increasing its capitalization, primarily because its credit has been unusually high, permitting it to obtain money at low rates.

The following table shows the results of operation in 1910 compared with 1909:

	1910.	1909.
Average mileage operated	4,551	4,547
Freight revenue	\$38,777,758	\$36,003,897
Passenger revenue	11,881,014	10,865,359
Total operating revenue	57,884,721	53,672,336
Maintenance of way	7,607,891	6,196,287
Maintenance of equipment	13,502,350	11,265,627
Traffic	1,246,382	1,177,356
Transportation	19,734,911	18,817,942
Total operating expenses	43,320,730	38,415,639
Taxes	2,524,899	2,276,969
Operating income	12,787,921	13,464,230
Gross corporate income	16,680,664	17,289,238
Net corporate income	7,833,198	8,134,186
Dividends	7,650,720	7,650,720
Replacement of equipment	332,367	332,367
Surplus	182,478	351,140

ATCHISON, TOPEKA & SANTA FE.

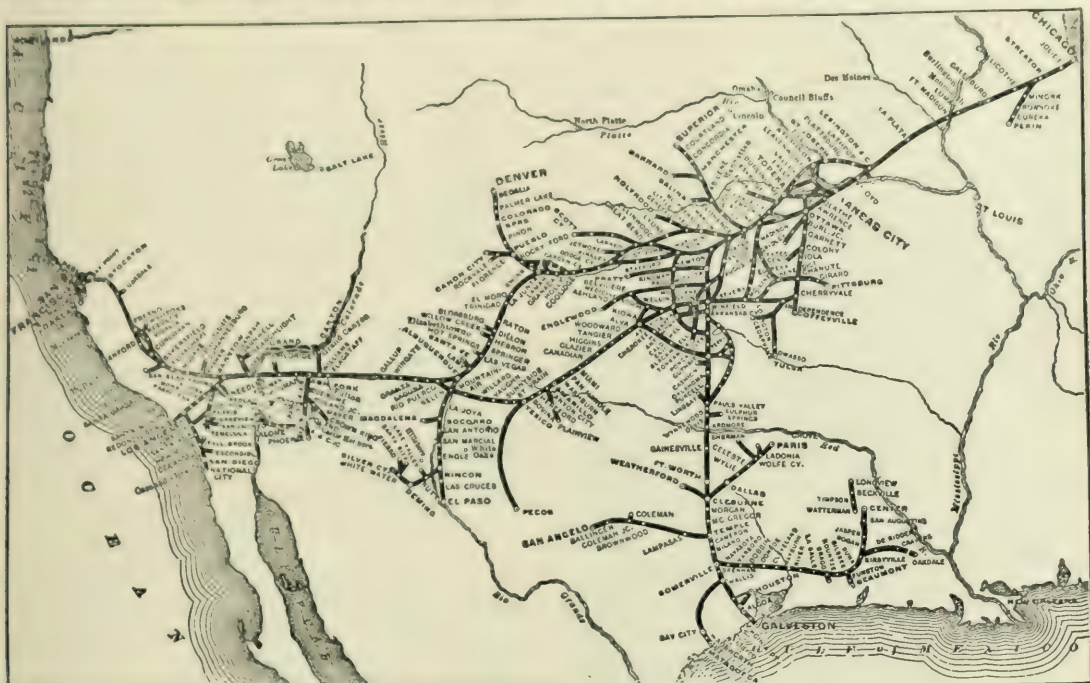
THE work of bringing the main lines of the Atchison, Topeka & Santa Fe up to a high standard has been steadily continued. The standard to which the company is working includes 85 or 90-lb. rail, tie plates and treated ties. Untreated pile trestles are being replaced with either treated pile trestles or concrete or steel bridges. Maximum grade of .6 per cent. and curvature of 2 deg. is standard, and this is adhered to in the greater part of all new construction and grade revision; for example, on the Texico-Belen cut-off the maximum grade opposing westbound traffic is .6 per cent., but there is a short stretch eastbound from Belen where the maximum is 1.25, with some curvature sharper than 2 deg. Since June 30, 1907, the company has spent, in addition to liberal sums for maintenance, \$47,226,278 on improvements of its equipments and lines. This does not include expenditures for the acquisition of new lines or securities of other companies. Of this amount, \$18,268,881 has been spent for equipment, leaving \$28,957,397 spent on the improvement of permanent way and structures. At present the entire main line of the Atchison is either laid with 85-lb. or 90-lb. rail or the work of laying this heavier rail is under way. Of the \$29,000,000 spent since 1907 on improvement of the line, \$1,031,790 has been spent on grade revision. With the end of the calendar year 1910 the greater part of the work of bringing the road up to modern standards

will have been completed. In the fiscal year ended June 30, 1910, \$741,000 was spent for new equipment for its line and equipment.

Second track on the eastern part of the system has been needed most between Chicago and the line in Kansas. The work most needed was (shown in detail under Railway Construction in this issue) is in Illinois and Missouri. Comparatively little double track is needed on the central part of the system, since the congestion of through traffic has been relieved by the opening of the northern line from eastern Kansas to a connection with the old main line at Indian, near Albuquerque. West of Albuquerque, however, there is but one route to the coast, and it is expected that double-tracking work on this part of the system will proceed at the rate of about 100 miles a year.

The extension of the Arizona & California from the Colorado river southward to a connection with the main line gives a direct outlet into southern California for the products of the rich Gila river country. The line from Texico southeast to Coleman is the latest step following the completion of the El Paso-Texico line. This line will serve an entirely new territory which has

by 1910 was the net heavy increase in operating expenses, which resulted, in spite of much larger gross earnings, in a turning of smaller net income in 1910 than in 1909. Total operating revenue amounted to \$10,000,000 in 1910 and to \$94,200,000 in 1909. Operating expenses amounted to \$6,500,000 last year and to \$7,000,000 the year before. That is an increase of \$500,000 in gross and \$12,000,000 in expense, leaving net operating income of \$3,500,000 in 1910 and of \$1,000,000 in 1909. United differently, the operating ratio in 1910 was 65.44, as compared with 68.9 in 1909. Details of operating expenses show that the increase came largely in maintenance of way and in transportation expenses. In transportation expenses it is of interests to see whether the increased cost of labor was disproportionate to the increase in cost of supplies. Taking the sums spent for station employees, yard conductors and brakemen, yard men, road men and road trainmen we have a total expense of \$14,040,675 in 1910 and \$12,014,271 in 1909. This is an increase of 17 per cent. Fuel and water for yard locomotives and fuel and water for road locomotives cost \$3,900,675 in



Atchison, Topeka & Santa Fe.

heretofore raised only cattle but into which agriculture is rapidly spreading. This line should prove immediately profitable to the Santa Fe. It plans to bring cattle up to the new packing plants at Amarillo. Heretofore, cattle from this region have been taken to Fort Worth or up into Kansas for slaughter. The town of Plainview has been the distributing center for this country, but much of its business will now be taken by Lubbock, on the new line. The probable traffic which the Santa Fe will get out of that town alone may be estimated by comparing it with Plainview, which last year, with a population of 2,500, was worth \$60,000 a month to the Santa Fe. Plainview is now about three years old. The progressive character of the country served by the Santa Fe is well illustrated by the rapid growth of distributing centers like Amarillo, Wichita and Oklahoma City. Amarillo, for example, has grown in a few years to a population of some 15,000. Its success is indicated by its real estate values, which run up to \$1,200 and \$1,500 for a 50-ft. lot in the residence, and \$12,000 for a corner lot in the business district.

The most interesting point about the operations of the Santa

1910 and \$7,009,927 in 1909, an increase of 27 per cent. Fuel not only cost more because the engine mileage was greater, but was more expensive per ton. In 1910 the average cost per ton of coal was \$1.64, as compared with \$1.61 in 1909, and the average costs per ton of fuel was \$4.21 and \$3.77. The fuel cost was 12 cents per mile on coal-burning locomotives and 19.71 cents per mile on oil-burning locomotives.

In maintenance of way the increased cost is due both to an increase in the wages paid and to a higher class of maintenance. For instance, in the total sums charged for ballast the cost of labor forms only a comparatively small percentage, and in 1910 the Santa Fe spent \$323,456 for ballast, as compared with \$149,646 in 1909. On the other hand, it should be pointed out that rails cost \$453,722 in 1910, as against \$1,125,524 in 1909, but this is probably due to the large amount of 85-lb. rail that has been put in track in the last three years; the cost of which over and above what it would have cost to relay with 70-lb. rail has been presumably charged to capital account and not to operating expenses. Other track material cost \$1,570,608 in 1910, as against

\$664,418 in 1909, and roadway tools and supplies, into the cost of which the price of labor hardly enters at all, cost \$341,316 in 1910 and \$153,451 in 1909. These larger sums spent on accounts which are not greatly affected by labor cost show the effects of the higher cost of materials, but unquestionably show also a higher standard of maintenance. This higher standard of maintenance is demanded by the more exacting conditions of passenger service, and also to more exacting conditions of freight service, due in part to more keen competition on transcontinental and long-distance traffic.

The following table shows the unit costs of maintenance:

	1910.	1909.
*Maintenance of way, per mile	\$1,469	\$1,091
†Repairs, per locomotive	3,201	2,541
" " passenger car	1,035	903
" " freight car	81	91

*Per mile of first, second, third, etc., track, the cost of two miles of siding and switch tracks being taken as equal to the cost of maintenance of one mile of main track.

†This is for repairs only and does not include renewals, depreciation or superintendence charges.

In 1910 the total revenue tonnage carried amounted to 19,448,590 tons and in 1909 to 17,220,597 tons. In 1910 products of mines furnished 29.28 per cent. of the total tonnage; products of agriculture, 20.68 per cent.; manufactures, 18.31 per cent.; products of forests, 12.16 per cent.; products of animals, 7.11 per cent.; L. C. L. tonnage, 6.94 per cent., and the remaining tonnage being miscellaneous and intersystem revenue tonnage. The tonnage of products of agriculture amounted in 1910 to 4,022,464 tons, which is only a very slight increase over 1909. This was due to a very much smaller movement of wheat last year than in 1909. Fruit and vegetables, on the other hand, show an encouragingly heavier movement in 1910 than in 1909, and the tonnage of these products amounted to 1,117,955 tons in 1910, as against 912,290 tons in 1909.

The total number of revenue tons carried one mile in 1910 was 7,012,896,589; in 1909 it was 6,260,172,676. The average revenue per ton was 1.015 cents last year and 1.026 cents the year before. The train load, including company freight, was 389 tons in 1910 and 366 tons in 1909. The average haul per ton of freight has been steadily increasing for nearly all roads over the country, but this is especially noticeable on roads like the Atchison that are building up the territory through which they run, and where the industry is changing from cattle raising to agriculture. Local distributing centers have been established, and a short-haul business between these centers has grown up. In 1907 the average haul on the Atchison was 403 miles; in 1908 it had decreased to 392 miles; in 1909 to 364 miles, and in 1910 it was 361 miles.

The number of passengers carried one mile totaled 1,236,975,839 in 1910 and 1,108,004,215 in 1909. The average trip per passenger was 90 miles in 1910 and 88 miles in 1909; the average revenue per passenger per mile was 2.056 cents in 1910 and 2.052 cents in 1909.

The following table shows the results of operation in 1910, compared with 1909:

	1910.	1909.
Average mileage operated	9,946	9,295
Freight revenue	\$1,191,096	\$64,212,638
Passenger revenue	5,177,182	32,351,405
Total operating revenue	104,993,195	94,265,747
Maintenance of way	15,807,136	12,884,107
Maintenance of equipment	15,969,947	13,968,897
Traffic	2,114,260	1,901,822
Transportation	31,871,824	26,674,864
Total operating expenses	69,953,870	57,475,193
Taxes	4,006,119	3,015,719
Operating income	31,033,206	33,785,305
Gross corporate income	35,755,011	34,913,678
Net corporate income	30,135,384	29,417,991
Dividends	15,336,720	10,861,410
Additions and betterments*	4,303,518	9,138,230
Surplus	365,846	398,351

*Includes \$1,012,118 in 1910 and \$1,855,020 in 1909, for fuel resource.

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.

THE Chicago, St. Paul, Minneapolis & Omaha is the Chicago & North Western's most important subsidiary, and its lines are an integral part of the North Western system. It has three main lines, one running from Omaha, via Sioux City, to Minneapolis; one running from Elroy to Minneapolis, and one running from Minneapolis to Duluth and to Ashland. The road is almost entirely dependent for its freight traffic on the products of agriculture and the supplies and household goods that are consumed by farmers. Elroy is about half way between Chicago and St. Paul, and the fast passenger traffic and freight traffic between Chicago and St. Paul uses the Omaha line from St. Paul to Elroy and the North Western line from Elroy to Chicago. The line of the Omaha from Duluth and Ashland to Omaha serves to connect up the western ends of a number of North Western lines that spread fanwise out from Chicago and serves as a valuable feeder to the North Western line. Serving as it does an agricultural territory, the business of the Omaha does not fluctuate with changing business conditions, and notwithstanding fluctuation in crop conditions its growth has been remarkably steady.

In the fiscal year ended June 30, 1910, freight revenue amounted to \$9,700,000, an increase of 12.67 per cent. over 1909, and passenger revenue amounted to \$4,300,000, an increase of 7.97 per cent. over 1909. These increases are not unusual when compared with the increase in revenue reported by other roads in the same territory for 1910, but are notable in the case of the Omaha, because in 1909 the road had a very prosperous year, showing considerable increases in gross and net over 1908. The Omaha road has not added any new mileage to its property in the past year. An obvious reason why the road has not expanded is that there is little to be gained by extensions. New branch lines would add new business, but not business of a different character or of an amount large enough to unquestionably offset the added charges entailed by increased investment. Another consideration which tends to deter the company from building or acquiring new lines is the fact that it has a consolidated mortgage, the terms of which do not easily permit the financing under this mortgage of new acquisitions or extensions of the road, and it has not been the policy of the company to make divisional mortgages. Due to this past policy, present interest charges are low.

Expenses in 1910 show a considerable increase over 1909, but have not increased as much in proportion to the increase in gross as was the case on the North Western. Total operating expenses amounted to \$9,900,000 in 1910 and \$8,800,000 in 1909. Reduced to a mileage basis, operating revenues last year amounted to \$8,681 per mile operated and operating expenses to \$5,687. This is an increase of a little over 11 per cent. in gross per mile and a little over 11½ per cent. in expenses per mile. Net operating income last year amounted to \$5,200,000, or \$3,991 per mile, an increase of 10.63 per cent. over the previous year. The principal increases in expenses came in maintenance of way, which, as a whole, cost \$1,960,000 in 1910, or \$300,000 more than in 1909; and in transportation expenses, which were \$5,550,000 in 1910, or \$550,000 more than 1909. The following table shows the unit costs of maintenance:

	1910	1909
*Maintenance of way, per mile	\$1,961	\$846
†Repairs, per locomotive	1,875	1,295
" " passenger car	509	450
" " freight car	41	32

*Per mile of first and second track. Since the mileage of switch tracks and sidings are not given, no account is taken of them.

†This is for repairs only and does not include renewals, depreciation or superintendence charges.

As in the case of the North Western these unit costs, especially of repairs of equipment, are low; this is due not to neglect of necessary repairs, but to a high standard of efficiency and economy in the mechanical department.

The tons of revenue freight carried one mile totaled 1,979,987,529 in 1910, comparing with 954,358,150 in 1909, and the average distance each ton was carried was 148.10 miles in 1910

and 144.7 miles in 1909. The average train load was 251 tons last year and 245 tons the year before; the average revenue per ton per mile was 9.98 mills in 1910 and 9.93 mills in 1909.

The passenger carried one mile totaled 221,061,301 in 1910 and 205,184,190 in 1909; the average rate per passenger per mile was 1.206 cents in 1910 and 1.245 cents in 1909.

The principal interest in the balance sheet of a subsidiary company is the information that it gives as to the possible needs of the subsidiary calling on the parent company for advances. In the case of the Omaha and the North Western such a need is out of the question. The working assets of the subsidiary company amounted to \$8,700,893 on June 30, 1910, of which \$684,848 was cash and \$7,811,790 common stock of the Omaha and \$1,356,000 of preferred stock held in the treasury. Working liabilities amounted to \$3,158,983. The Omaha road is very lightly capitalized, even compared with the North Western. It has total assets and bonds outstanding of \$37,000 per mile. There is \$3,618,988 stock, common and preferred, of the Omaha outstanding, on which it is paying 7 per cent. dividends.

The following table shows the operations in 1910 compared with 1909.

	1910	1909
Average mileage operated	1,739	1,734
Freight revenue	\$9,290,912	\$8,602,866
Passenger revenue	4,339,023	3,999,915
Total operating revenue	13,629,935	12,602,781
Maintenance of way	1,956,500	1,643,784
Maintenance of equipment	1,588,143	1,577,781
Traffic	288,187	296,402
Transportation	5,592,145	5,000,766
Total operating expenses	9,888,479	8,831,229
Taxes	682,892	641,167
Operating income	4,329,966	4,069,542
Gross operating income	1,956,660	4,173,406
Net corporate income	2,614,286	2,262,240
Dividends	2,086,910	2,086,910
Surplus	528,375	175,330

NEW BOOKS.

Twentieth Century Sheet Metal Worker. By H. E. Osborne. *The American Artisan*, Chicago. 86 pages; 5 in. x 7 1/2 in. Price, Cloth, \$1.00; flexible cover, 60 cents.

The author of this little book, being a practical sheet metal worker of many years' experience, realized the value, to a tinner, of a pocket reference book, one containing short cuts, jump-rules and quick methods, combined with accurate information of the tinner's art. Long explanations and scientific rules have purposely been omitted. The book is easily understood by the apprentice and also sufficiently scientific for the journeyman's use.

Why Rates are Not Higher Rates. By E. P. Ripley, president of the Atchafalaya, Topeka & Santa Fe.

This pamphlet contains a verbatim report of the testimony given by Mr. Ripley in the hearing at Chicago on the proposed advances in western freight rates. Some comments by the press on Mr. Ripley's testimony are included. Mr. Ripley was one of the greatest traffic experts in the United States before he became president of the Santa Fe. In his testimony, therefore, he spoke with the authority and knowledge of a traffic man as well as of a railway executive of long experience. He has, besides, a mind that naturally takes a keen interest in economic matters, and a temperament which causes him to express his opinions with more frank bluntness, perhaps, than any other railway president in the country. All these things make the statements of fact and the reasoning regarding present railway rates in this pamphlet of great value. The book will repay reading by every person, whether railway man, economist or publicist, who is interested in railway economics.

Transportation in Europe. By Logan G. McPherson, lecturer on transportation at Johns Hopkins University and author of "The Working of the Railroads," "Railroad Freight Rates," etc. Henry Holt & Co., New York. 285 pages; 5 1/2 x 7 1/2 in.; cloth. Price, \$1.50 net; \$1.62 postpaid.

Mr. McPherson needs no introduction to the readers of the *Railway Age Gazette*, to whose columns he has been a frequent and valued contributor. In 1909 he spent six months in Europe

under the auspices of the National Waterways Commission, investigating the subject which furnished the title for the present volume. The reader who desires to familiarize himself with transportation in Europe and has only a limited time to give to the subject can devote it more profitably to the perusal of this book than to any other now available. Mr. McPherson began his investigation in Europe with a very thorough knowledge of transportation and the conditions under which it is carried on in the United States. His connection with the National Waterways Commission and the special courtesies accorded to him by officers of European railways and government officials intimately connected with the transportation systems gave him an especially good chance to get a comprehensive knowledge of European transportation systems in a very short time. While it has been said by high authority that comparisons are odious, they often afford the best vehicle for imparting information, and Mr. McPherson has made his picture of foreign transportation systems much more instructive than it otherwise could have been made, by constantly comparing their rates, their service, etc., with those of American railways. While no one can doubt after reading the book that he thinks that, considering all conditions, the service rendered by American railways is greatly superior in proportion to the rates charged by them to that of European transportation systems, his tone is never that of an advocate, but is always judicial.

In his earlier chapters Mr. McPherson reviews the development of the highways, the waterways and the railways of Europe. He then describes their freight tariffs and their methods of handling freight, both national and international. He shows that in almost every continental country efforts have been made to establish rates on a distance basis, but that commercial conditions have always compelled the abandonment of these attempts to a greater or less degree. The rates are much less elastic than they are in the United States, and this has been one of the main reasons why commerce on the waterways, the rates on which are not subjected to any kind of regulation whatever, has grown so much greater in proportion than in the United States. Mr. McPherson's general conclusion is that the rates of European waterways are not as low in proportion as those of American railways.

He shows that government ownership has not worked so satisfactorily everywhere as many advocates of this policy attempt to make American readers believe. The financial results of the state railways of Austria have been so bad that considerable sentiment has developed in that country in favor of a return to private ownership. In Switzerland the passage of the railways into the hands of the government was followed by considerable reductions in both freight and passenger rates. "It was estimated," says Mr. McPherson, "that these reductions would bring more than compensation in the increase of traffic. The results for the first year or two seemed to accord with this expectation, but during the succeeding period the net revenues have fallen off. This is in accord with the experience of other countries where experiment has demonstrated that while reductions in rates sometimes lead to a permanent increase in traffic, in other cases they do not." The Swiss railways were doing well under corporate management, but show a deficit after ten years of government administration. Regarding the financial results of state ownership elsewhere, Mr. McPherson says, "The strong central government of Prussia operates the railways with severe economy in order to obtain the greatest net revenues for utilization in the general budget. In France, Belgium and Italy, where socialistic influences are strong in the government, the number of employees in the government railways has been increased beyond all reason, to make places for political henchmen, with the result that expenses are going up, revenues going down, and the quality of the service, from all accounts, is sadly deteriorating."

Mr. McPherson devotes a separate chapter to transportation in England, which is one of the most interesting and instructive in the book.

SIGNALING AT THE NEW GRAND CENTRAL TERMINAL.

WITH TWO INSETS.

The construction of the tracks of the new terminal of the New York Central & Hudson River and New York, New Haven & Hartford roads at 42d street, New York City, may now be said, roughly, to be one-third completed, and the arrangement of the tracks and the scheme of the signaling are so far advanced that we are enabled to give at this time the plans of the tracks, upper and lower levels; plans and elevations of the principal signal cabin and some information about the arrangements for the interlocking.

The plan of the tracks on the upper or express level, which is about 20 ft. below the level of the old yard, is shown on the upper inset. These tracks rest on a concrete floor supported by steel columns, and the location of these columns is indicated on the drawing, where possible, by small crosses. That part of the yard in which the structure is finished and on which tracks are now in use is on the east, or Lexington avenue side; but the tracks now in use are not, in all cases, in their final locations. It will be observed that at the south end there is a loop on this level, as well as one on the lower level; this is a recent modification of the plan, which at first provided only for stub tracks on the upper level. The tracks descending from the main line to the lower level, as shown between 53d and 54th streets, are those numbered A, B, F and J. For those readers who may have the patience to read the track figures on the plan, it may be noted that the curves are 599.607 radius, except in the "East yard," which consists of storage tracks, where the radius is 400.782. The frogs are No. 8, unless otherwise indicated.

The area of the lower level is not so great as that of the upper, and, looking at the drawing at 45th street, 14 of the tracks at the east or Lexington avenue side are laid on the surface; that is to say, there is no excavation beneath for the lower level, except for the single track of the lower-level loop. The columns shown in this part of the drawing are the supports for the buildings above the tracks.

The tracks of the lower or suburban level are shown on the second inset. As noted above, the excavation for this level does not extend all of the way to Lexington avenue. Its boundaries are indicated by a heavy black line. On the west, or Madison avenue side, a part of this excavation (not occupied by tracks) is left out of the drawing for lack of space. In this diagram may be seen the outline of the baggage subway, which runs beneath the tracks. This baggageway, some 50 ft. below the former surface of the ground, is connected with the tracks above it by stairways and elevators at suitable locations, and it affords a means of access for men on foot to all parts of the yard with the least possible crossing of tracks. The entrance to the signal cabin at 49th street will be by a stairway down from the street (Park avenue) which will run above the yard on the line of tracks, D, E, F, G and H. Entering the cabin and passing out by the stairway at its south end, one has easy access to the baggage subway and thus may reach all parts of the yard readily from the street.

There are five interlocking plants; stations A, B, C, F and U.

The main signal cabin, which is called a "station" and not a "tower," as it is named in the drawing, is near 49th street. Station A for the upper level is immediately above station B for the lower level. This combination is called a four-story cabin, but in reality it consists of two buildings of two stories each, the upper building resting on the upper track-floor structure. Referring to the diagram of the upper level, station A controls the switches of what may be called the full speed, or passenger, routes from the terminus northward to the irregular line drawn across the tracks between 52d and 54th streets, except the switches leading to and from the loop, which are controlled from station F, which is shown at the extreme left of the drawing of the lower level. Station F controls the switches and signals of the loops of both levels. The limits of signaling for the

East yard, which is controlled from station C, are indicated by a line drawn across the diagram diagonally from 45th street to a point near sub-interlocking station V, thence northward to a point near the power sub-station at 50th street.

The connections from station A to those switches, signals and track circuits which are a considerable distance away, are run through sub-interlocking stations V, W, X, Y and Z, which are indicated on the drawing by solid black rectangles. The arrangement and functions of these sub-stations are explained below.

Station U at 57th street is an independent station. Sub-station T at 53d street is connected with station U. In the diagram of the lower level the sub-interlocking stations, connected with station B, are shown at N, P, R and S. Station F is independent, as before noted.

The buildings which house main signal stations, A and B, are used not only for the control of the switches and signals but for other purposes also, as will be seen from the drawings; namely, trainmaster's office; yardmaster's office; office of the foremen of car cleaning and car repairs; foremen of electrical equipment; rest room for enginemen and their assistants; rest room for conductors and trainmen; rooms for track repair men.

The floor plans of the main cabin (stations A and B) are shown in Figs. 1, 2, 3 and 4. Fig. 1 is the upper or fourth floor; Fig. 2, the floor next beneath this; Fig. 3, the second floor of the building on the lower level, and Fig. 4 is the lowest floor.

Fig. 5 is the east elevation of these buildings and Fig. 6 is the north elevation.

Fig. 7 shows the three-position dwarf semaphore which is standard in the terminal. The signaling on the main routes in these yards is arranged strictly on the plan of giving home and distant indications, however short may be the distances from one signal to another; that is to say, a signal in the vertical position indicates that the next signal is in the proceed position. It will be observed that the roundels for the different colors, green, yellow and red, are of three different sizes, thus making it impossible to put the wrong color into any one of the spectacles. The signal here shown is in a temporary location, and the tall iron box for holding the resistances and relays, which stands just beyond the signal, is a feature which in the permanent signaling will be conspicuous by its absence, all this class of apparatus being placed either in the block signal station or one of the sub-stations.

The two principal interlocking machines, aggregating a total of 750 levers, will be fixed in the second and fourth floors of the "four story" building. The signal maintainers' quarters, together with certain relays, switchboards, etc., will be in the first and third floors directly under the machine floors. This four-story building is about 200 ft. long and 20 ft. wide, only the northern half being used for signal purposes.

Station F will be a two-story building. It will be in the suburban level at the south end, and will contain the two machines required for the express and suburban level loops, respectively.

By consolidating into five interlocking stations the control of the functions which it was originally proposed to operate by 13 stations, it has been possible to eliminate approximately 100 levers which would have been required for interlocking between towers. Every switch in the terminal will be interlocked and protected by signals, and all of them except storage tracks will have alternating current track circuits throughout their entire length.

Power for the operation of the terminal interlocking will be supplied from a station situated on the south side of 50th street at Park avenue, where are located static transformers delivering alternating current at 300 volts, 25 cycles. The 300-volt lines will be carried around the terminal with cross connections at various points which will give duplicate 300-volt connections to every part of the yards, so that in case of a break in the 300-volt line at any point the duplicate connection can be used. Thus

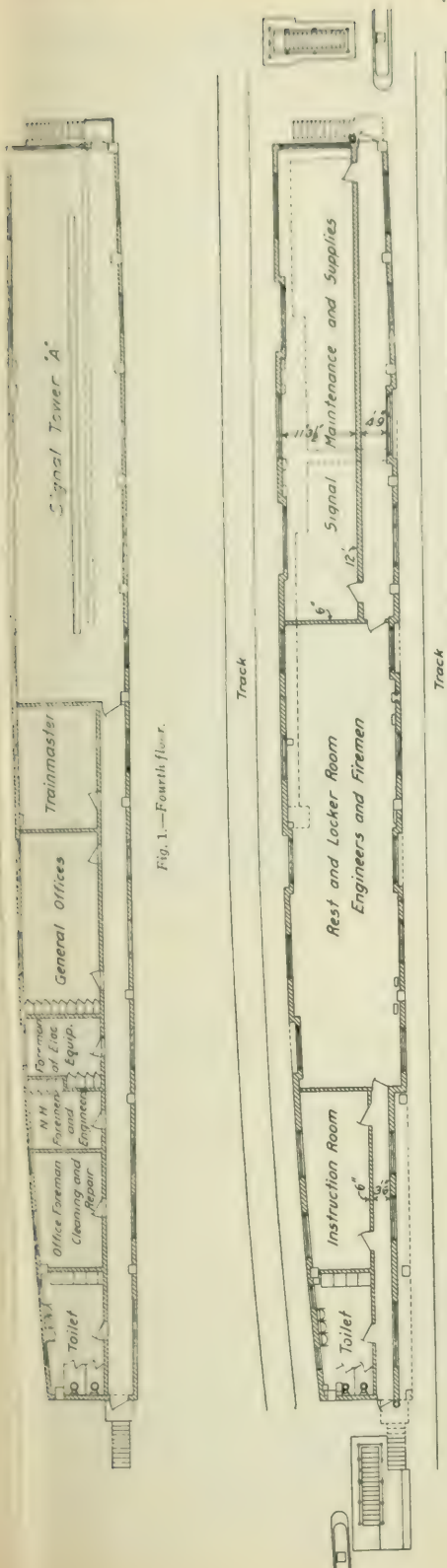


Fig. 1.—Fourth floor.

Fig. 2.—Third floor.

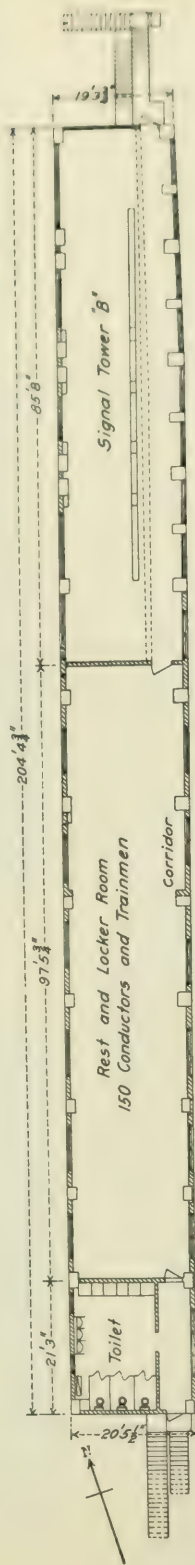


Fig. 3.—Second floor.

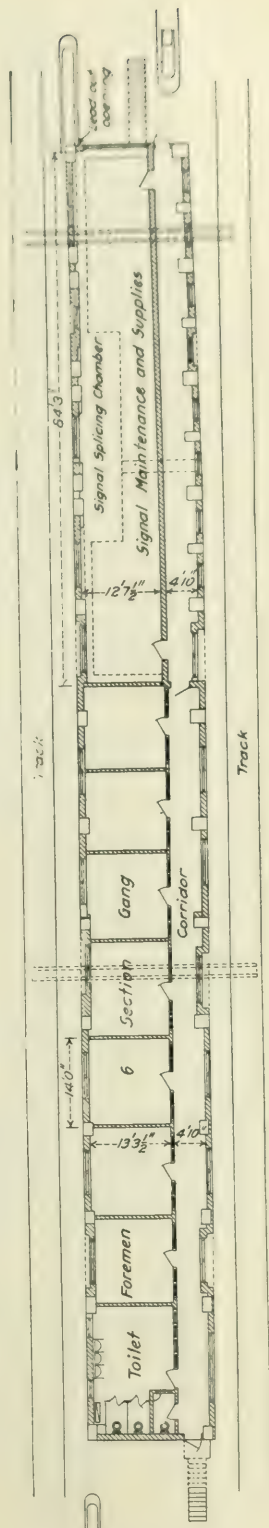


Fig. 4.—First floor.

Figs. 1, 2, 3 and 4.—Floor Plans of Signal Stations A and B; Grand Central Terminal, New York City; New York Central & Hudson River Railroad.

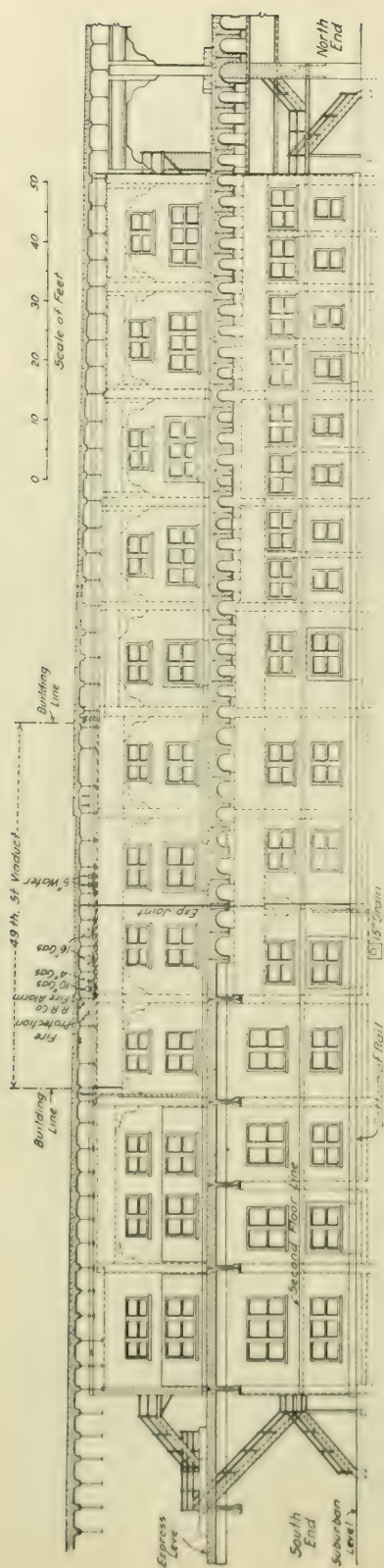


Fig. 5—East Elevation of Signal Stations A and B; Grand Central Terminal.

is shown on Fig. 9. The main storage battery and motor generator which will supply 110 volt direct current for the switches and signals in the terminal will be located in the power house.

The sub-interlocking stations were introduced in order to dispose conveniently the great number of wires which will lead from the large interlocking machines in cabins "A" and "B" to the very numerous operated units. Each level has been divided into sections or groups, each of which will have one of these central distributing points. There are six of these in the express level and four in the suburban level. These will be small one-story buildings housing the transformers, switchboards, terminal boards, relays and resistances. All control wires for switches, signals and locks will be carried from the main interlocking station to the sub-interlocking stations in large cables which will be run in ducts. From the sub-interlocking station to the operated units single wires or two or three-conductor cables, as required, will be used, and these will be carried in trunking. Duplicate transformers feeding the signal lamps, the track circuits and the lever lights are provided in each sub-interlocking station with throw-over switches to be used in the case of a breakdown of either transformer.

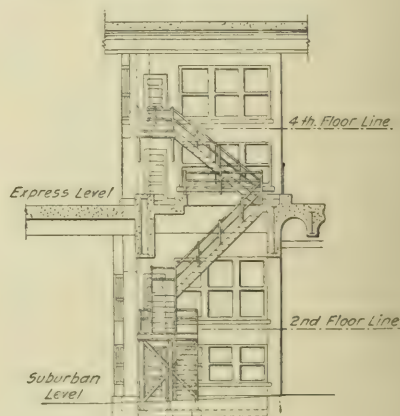


Fig. 6—North Elevation of Signal Stations A and B.

All track circuits in one group are fed by the transformers in the sub-interlocking station for that group, and there will be no track transformers on the ground. As all wires run to or through a sub-interlocking station no track or relay boxes are necessary outside of the station. Variable resistances of the tubular type are used in the leads to the track. These are placed on slate boards in the sub-interlocking station. A set of transformers, switchboards, etc., similar to that used in sub-interlocking stations is provided in each main interlocking station for the control of the units adjacent thereto.

A typical arrangement of the circuits between the terminal board of the interlocking machine and the operated units is shown in Fig. 10.

The interlocking machine is the General Railway Signal Co.'s type Model No. 2. To increase the efficiency of the machine and to facilitate inspection and maintenance, the lever proper has been placed in a re-designed guide which permits a lever to be removed without disturbing any other levers in the machine; in other words, the unit lever idea has been adopted. Alternating-current locks are used on all switch levers, the circuit for which is cut through a normally open controller on the latch of the lever. Thus this circuit is open at all times except when the lever is in use. The unit lever and the lever lock have been worked up from designs suggested by the Signal Department of the Electric division.

Lever lights controlled by the track circuits will be provided over all levers, as shown in Fig. 11. These will indicate, in the case of switch levers, whether the electric lever lock is en-



Fig. 7—Three-Position Dwarf Signal.

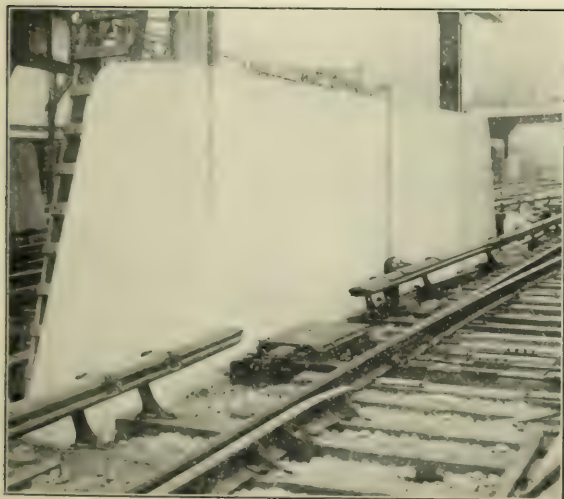


Fig. 8—Switch and Switch Movement; Grand Central Terminal.

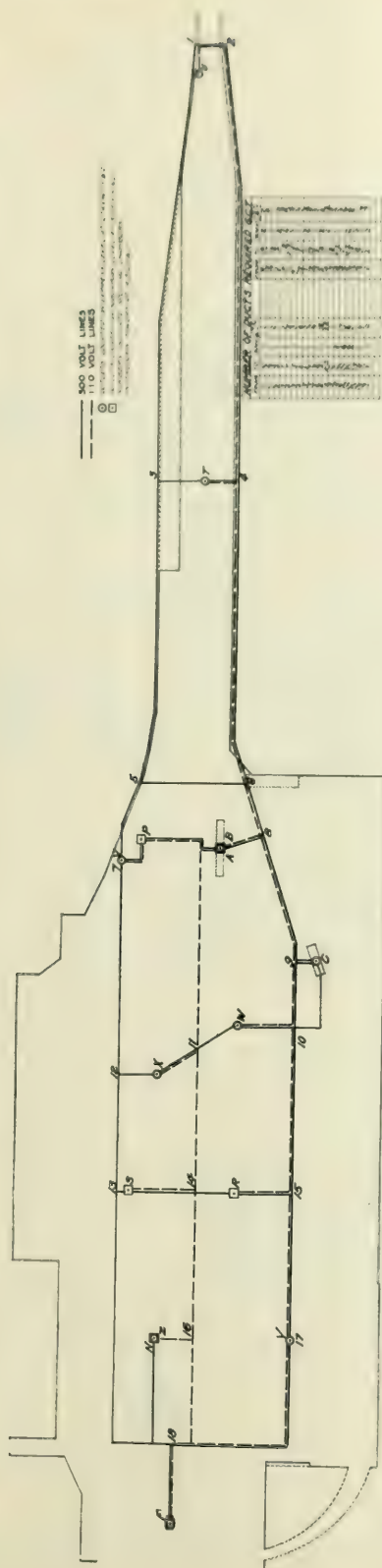
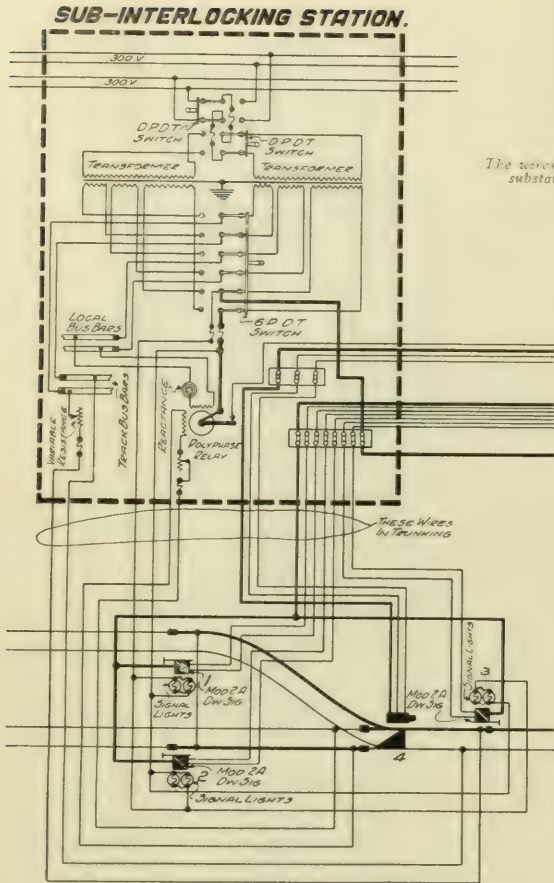


Fig. 9—Arrangement of Ducts for Control, Indication and Power Lines for Electric Switch and Signal Movements; Grand Central Terminal, New York City.

The Power-house is at 6.



The wires to and from the main interlocking station are in a cable.

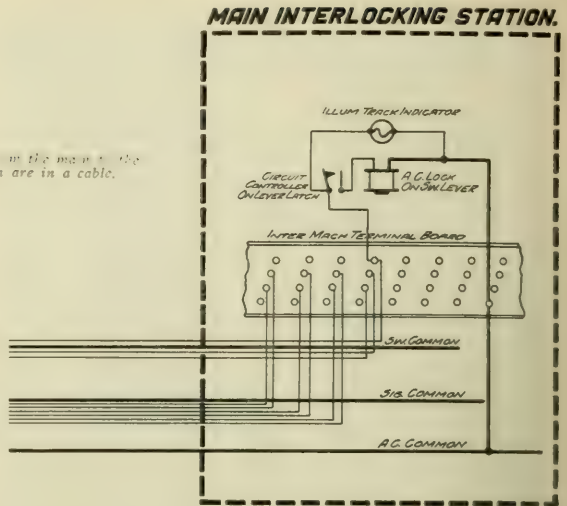


Fig. 10—Typical Arrangement of Circuits for Electric Interlocking; Grand Central Terminal.

gized (thus permitting the lever to be operated), and in the case of the signal levers, whether the signal is indicating "stop" or "proceed."

The train director in each cabin will have a track indicator in addition to the lever lights. These track indicators will consist, first, of a plan (not illuminated) of the tracks, switches and signals controlled from that machine, the track circuits

being shown in distinctive colors and designated by numbers. On the desk with this plan will be a series of lights, similar to the lever lights on the machines, which will be numbered to correspond with the track circuits on the plan. These will indicate whether the track circuits are occupied or not. These lights will be arranged close together, in rows, and not graphically (to show the relative locations of the track circuits which control them) as is done in illuminated track plans. By this method a very much smaller indicator can be used than would be possible with the illuminated plan. This indicator will be placed directly over the director's table.

The switch movement is the General Railway Signal Co.'s Model No. 4 type, which has been used in the Grand Central Terminal and Electric Zone heretofore.

The signal mechanism is the General Railway Signal Co.'s Model 2-A, three-position, upper quadrant direct-current dwarf signal. There will be no high signals. The design is shown in Fig. 7. The design of the semaphore spectacle was decided upon as the only one which could be used in the very scant clearances available in the Grand Central Terminal.

For the information here given we are indebted to George W. Kittredge, chief engineer, and H. S. Balliet, signal engineer.

FOREIGN RAILWAY NOTES.

Plans are being made for a direct line of railway between Genoa, Italy, and Piacenza, to be extended as far as Cremona, passing through the valley of the Bisagno and Trebbia. Such line would place the rich agricultural region of the Department of Emilia in much closer communication with the most important seaport of Italy than at present. Committees composed of members of the leading commercial bodies of Genoa and Piacenza are urging the government to provide, without delay, for the construction of the line.

The Russian government has decided to build a railway direct from Odessa to Moscow, by way of Bakhmach, the latter place being now connected by rail with Odessa. This road, as planned, would undoubtedly bring many additional cargoes to Odessa. However, a short distance from Bakhmach is the village of Vosnesensk, located upon the Bug river. In order to divert from the railway cargoes intended for Odessa, public menaces of Nicolait are arranging to dig a small canal from Vosnesensk to Bakhmach. The Russian government, it is understood, in view of the new development of affairs, has under consideration the matter of rearranging the plan of the new line.

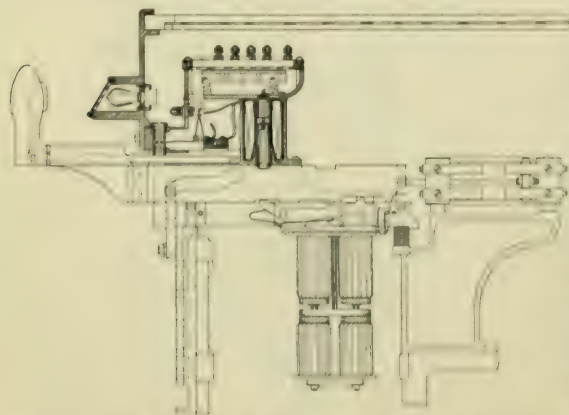
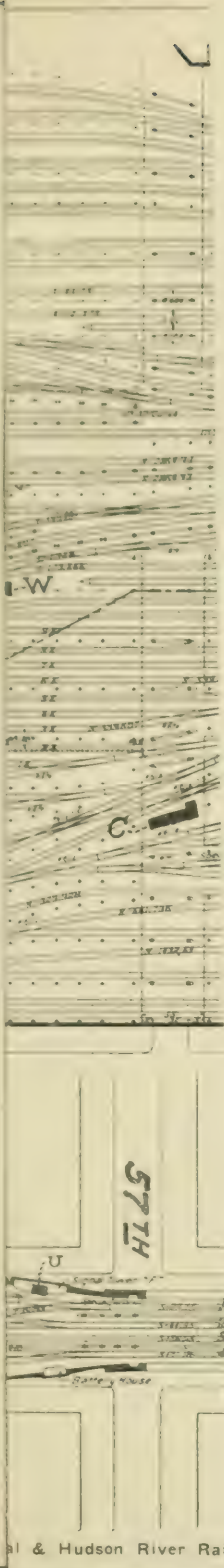


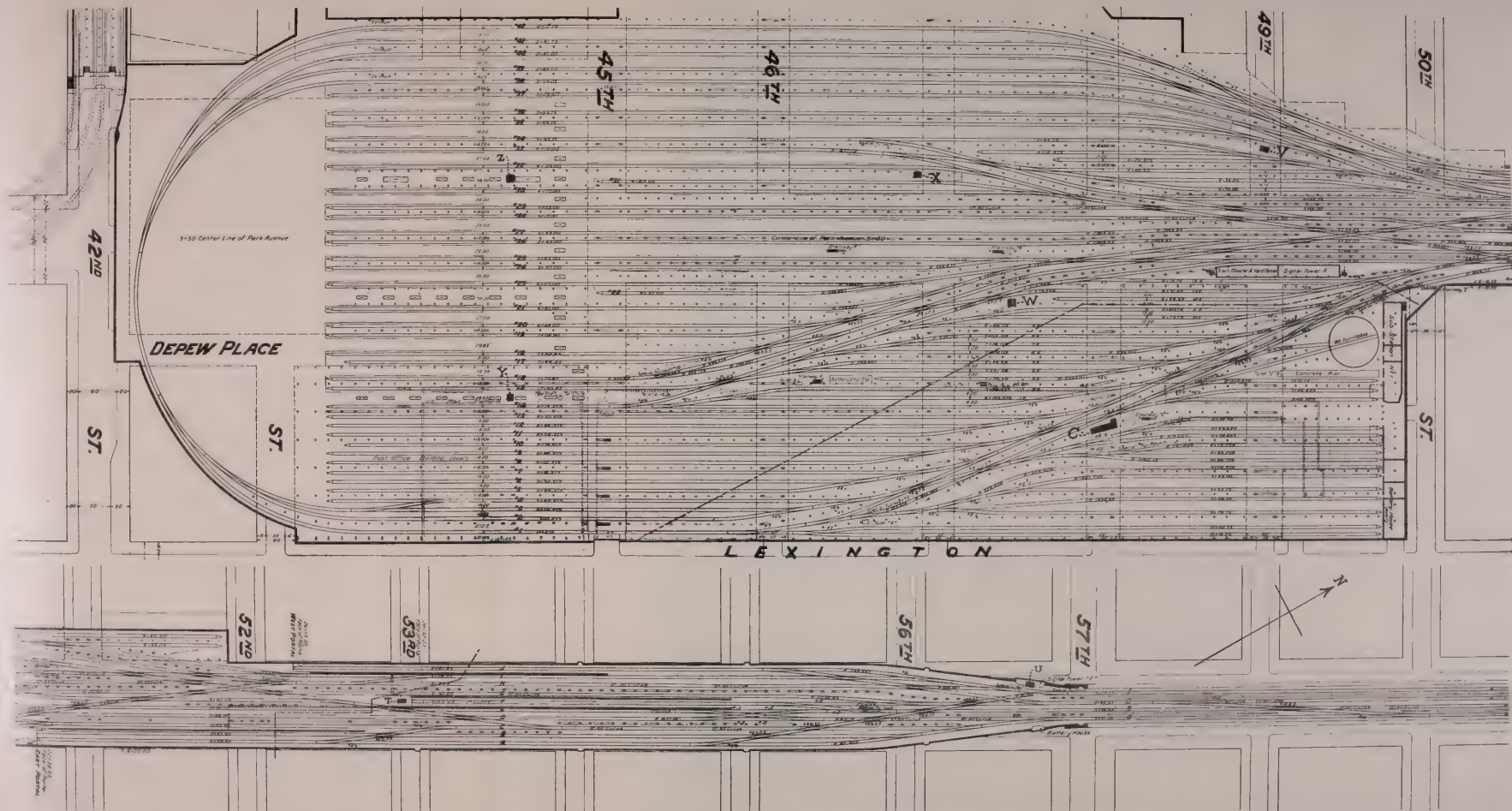
Fig. 11—Unit Lever for Electric Interlocking Machine; Grand Central Terminal, New York City.



from Peck, Pa.,
remained at
at Antioch, Ill.
d creditable ad-
were E. K. Hall,
Ont., Cas. J. C. P.
gan Central, Jack-
reman, Nashville,
Theodore Rowe,
at Northern, St.
a who does not
have been advised
but could not be

A glance at the
fact. All of
nd west of Pitts-
t any from New
1, or at least the
er Reyer and his
rs. And, by the
ho has previously
ition. In former
d throughout the
from Canada to
e house problems
on, if we except
as in other parts
, much better, so
are not forced to
that they are in
s of the far west
efore, that these
rom. It may be
uses represented
so that in several
shop draftsman's
ecessary sketches.
made their own
have been up to
all the necessary
f they had been

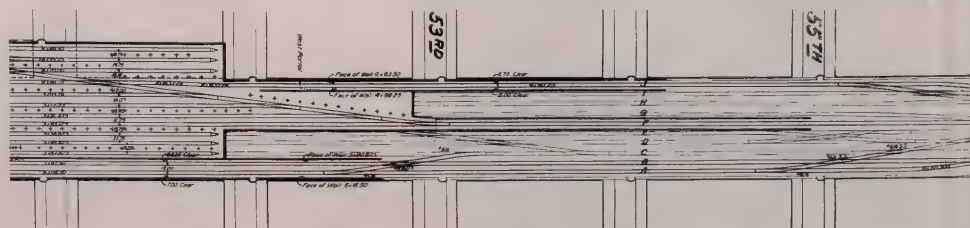
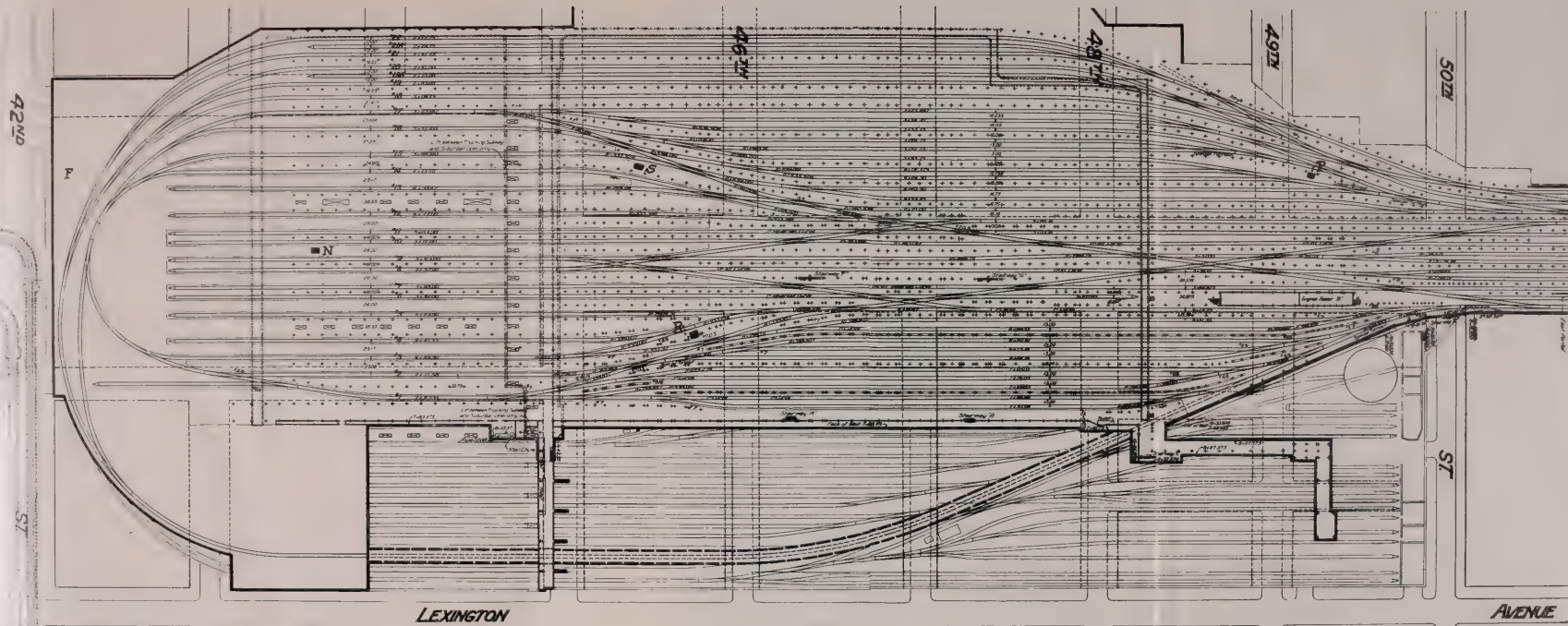
Output was pre-
of an important
essful experience
qual force to any
y with the prob-
pment and labor-
higher efficiency,
ts which may be
the men to put
good equipment
lack of proper
art of the fore-
." The foreman
should therefore
tudying the men.
y for doing this,
e; he will prob-
rd and studying
f his own short-
velop a broader
overcome their
ot realize it, his
i stronger. Too
due so much to
at the man over
get the most out



Arrangement of Tracks on the Upper or Express Level of the New Grand Central Terminal, New York City; New York Central & Hudson River Railroad.

For B. L. Pl.
and H. L. Pl.
at Aurora, Ill.
d. (reliable - 10)
were J. (reliable)
Ont., Can.; C. P.
gan Central, Jack-
reman, Nashville,
Theodore House,
at Northern, St.
a who does not
have been advised
but could not be
A glance at the
liar fact. All of
ind west of Pitts-
t any from New
h, or at least the
ier Reyer and his
ers. And, by the
who has previously
ition. In former
ed throughout the
from Canada to
ie house problems
ion, if we except
as in other parts
s much better, so
l are not forced to
t that they are in
es of the far west
efore, that these
from. It may be
ouses represented
so that in several
shop draftsman's
necessary sketches.
made their own
have been up to
all the necessary
if they had been

Output was pre-
of an important
cessful experience
qual force to any
ly with the prob-
ipment and labor-
higher efficiency,
alts which may be
the men to put
t, good equipment
ie lack of proper
part of the fore-
p." The foreman
should therefore
studying the men.
ity for doing this,
nge; he will prob-
vard and studying
of his own short-
develop a broader
to overcome their
not realize it, his
nd stronger. Too
t due so much to
that the man over
d get the most out



Arrangement of Tracks on the Lower or Suburban Level of the new Grand Central Terminal, New York City; New York Central & Hudson River Railroad.

Shop Section.

It is not too late, if you have not yet started to work on your contribution to the competition on The Care and Selection of Machine Tools and Shop Equipment, to do so, that is, if you finish, for it will close October 15. The conditions of this contest were fully outlined in the issue of September 2, page 394. Briefly, the article submitted may cover any phase of the general subject suggested, and should contain from two hundred to fifteen hundred words. Prizes of \$35 and \$20 will be given for the best two articles, such of the others as are used for publication will be paid for at our regular space rates.

CAR department readers are reminded that the competition on car repair kinks will close on November 15. Kinks used in car repair shops or yards on either freight or passenger car work, or at terminals in connection with the cleaning or repair of car equipment are included in this competition. We have been asked whether it takes in the car shop wood or planing mill. Certainly it does, and we hope to receive a number of good kinks from that source. The volume of car repair work is so great, and the number of times a given operation is performed in a day or a week, in an average size yard or shop, is so large, that the field is an especially attractive one for the development and use of labor-saving devices. Then again the advent of the all-steel and steel underframe cars has called for new equipment and new methods of handling repair work. Most of the tools and devices for this work had to be devised and constructed by the foremen, for the field was a new one and the requirements were so little understood that outside concerns and supply companies were not in a position to supply the need, except in a few cases. Our readers want to know just how you go about splicing a center or side sill, reinforcing a cracked or distorted bolster or end sill, or patching up a cracked side sheet, or any of the various repair jobs on steel or steel underframe cars, for all of them require special tools or methods. It is true that most of the devices used on steel car work, as well as on wooden equipment, are quite simple and that their value is often overlooked for that reason. Nevertheless they are as valuable, and in many cases much more so, than the more complicated apparatus and machinery often used in other departments. For the same reason it should be much easier for our car department readers to prepare the necessary sketches, etc., to make a good showing in the competition. Only two kinks are required to enter it; if more are submitted the judges will base their decision on what they consider to be the best two in each collection. Please make your descriptions as clear and as complete as possible. The conditions under which the work is done and the operation of the devices are so familiar to you that you may forget that the editor or the judges sitting at their desks, a thousand or more miles away, may have some difficulty in following the drawings or descriptions, even though they may be equipped with practical experience and good imaginations. A few additional words of explanation will not take much of your time, and they may mean a big saving at this end. The best collection of kinks will be awarded a prize of \$35 and the second best a prize of \$20. Others which are accepted for publication will be paid for at our regular space rates.

SEVEN collections of engine house kinks were received in the competition which closed September 15. Heretofore the shop kink competitions have been of a general nature, covering the entire locomotive and car repair departments. The results from this, the first kink competition covering a special field, have been so gratifying as to encourage us in the attempt to bring out more fully the labor-saving devices and shop kinks used in each of the different departments, such as the engine house, car repair department, smith shop, boiler shop, etc. The first prize of \$35 has been awarded to Richard Beeson, roundhouse

foreman of the Pittsburgh & Lake Erie, McKees Rocks, Pa., and the second prize of \$20 to C. I. Lindgren, roundhouse foreman of the Chicago, Burlington & Quincy, at Aurora, Ill. The other competitors, all of whom submitted creditable collections, which are reproduced in this number, were: F. Nowell, locomotive foreman, Canadian Pacific, Ottawa, Ont., Can.; C. P. Wilkinson, apprentice school instructor, Michigan Central, Jackson, Mich.; William G. Reyer, general foreman, Nashville, Chattanooga & St. Louis, Nashville, Tenn.; Theodore Rowe, general foreman, Jackson street shops, Great Northern, St. Paul, Minn., and a contributor from Indiana who does not wish to have his name used. In addition we have been advised of other collections which are in preparation but could not be completed in time to enter the competition. A glance at the list of competitors brings out a rather peculiar fact. All of them are located east of the Mississippi river and west of Pittsburgh, Pa., and Ottawa, Ont. There are not any from New England, the east, the far west and the south, or at least the extreme south, for no one who has met Brother Reyer and his good wife would mistake them for northerners. And, by the way, Mr. Reyer is the only one of the number who has previously participated in a *Railway Age Gazette* competition. In former competitions the contestants have been scattered throughout the country from the Atlantic to the Pacific, and from Canada to the far south. It has been said that the engine house problems in the territory covered by this last competition, if we except St. Paul and Ottawa, are not nearly as severe as in other parts of the country, and also that the equipment is much better, so that the foremen need not be as resourceful and are not forced to devise special kinks and methods to the extent that they are in the smaller and less well equipped engine houses of the far west and the south. It is rather surprising, therefore, that these latter districts and the east were not heard from. It may be due to the fact that nearly all of the engine houses represented in the competition are near large shop plants, so that in several cases it was possible to secure help from the shop draftsman's force or the apprentice school in making the necessary sketches. On the other hand, three of the contestants made their own sketches, and while some of them might not have been up to the standard of the drafting room they gave all the necessary information and were just as satisfactory as if they had been presented in a more elaborate form.

ALTHOUGH the article on increasing Shop Output was prepared by the freight car shop foreman of an important eastern road, and is based on a long and successful experience in the car repair department, it applies with equal force to any other department, since it deals almost entirely with the problem of handling men. Much as first-class equipment and labor-saving devices mean in increased output and higher efficiency, their value is small as compared with the results which may be obtained by properly handling and inspiring the men to put forth their best efforts. As a matter of fact, good equipment often seems to lose its value because of the lack of proper organization and good management on the part of the foreman, shop superintendent, or those "higher up." The foreman who is ambitious to make a better record should therefore realize the importance of getting close to and studying the men. The moment that he understands the necessity for doing this, his whole attitude towards his work will change; he will probably be surprised to find himself looking inward and studying himself, and will undoubtedly awake to some of his own shortcomings, and in striving to overcome them will develop a broader sympathy with his men in assisting them to overcome their faults. At the same time, although he may not realize it, his influence over the men will grow stronger and stronger. Too often the failure of men to make good is not due so much to the lack of proper qualities as to the fact that the man over them does not understand how to develop and get the most out

of them. This is not so surprising, for the human being is a complex piece of machinery, the working of which is little understood, and also because no two men are exactly alike, each requiring different treatment. The successful foremen are those who understand this, and by observation and study, combined with certain natural gifts, learn how to best encourage and inspire the different men under their charge. This is a far more difficult problem to solve than any mechanical proposition with which they may be confronted. The unfortunate part of it all is that so many foremen fail to realize that this, the most important of their duties, exists at all.

SCIENTIFIC CAR WHEEL FOUNDRY METHODS.

THE article on the Car Wheel Foundry Practice of the Canadian Pacific deserves more than a passing notice for the lesson that it teaches of the value of an application of scientific principles to shop work. It is not so many years since the refinements that are in use in the Montreal shops were absolutely unknown in any wheel foundry in the country, and a proposal to introduce them would have been laughed to scorn. The value of the chemistry of iron was not appreciated and the practical men in charge were disposed to flout it as of no value whatever. It must not be understood, however, from the strong emphasis that has been placed on the new method that a novice with a bundle of chemical analyses in his pocket could take charge of a wheel foundry and turn out a satisfactory wheel. There is still much that can and must be learned from the close personal contact of the foreman with the cupola; he must have the touch of the molder to know that the sand work is right; his judgment as to iron temperatures must be almost infallible, and he must be up to all the tricks of a trade that is certainly possessed of its full quota of them.

But there are some things that mere eyesight cannot detect. We know, for example, that the presence of silicon in even the minute quantities that a chemical analysis of pig and cast metal reveals, has an important influence on the chill. It would be an astute practical man, indeed, who could look at a fracture of pig metal and tell, with the certainty that is necessary, as to whether the silicon percentage was .50, 1.00 or 1.50. It is here that the chemist steps in and supplements what was formerly guesswork and trust in good furnace practice with definite information as to the composition of the iron that is to be used. The analysis places in his hands a material the constitution and peculiarities of which are definitely known and thus relieves him of the necessity of acting on what has heretofore been mostly guess. It is small wonder that with this burden removed from his shoulders the foundryman should, at once, show results like those given between the 1907 and 1908 wheels on the Canadian Pacific.

As to how far this method of working on scientific principles is used in private foundries we have no means of knowing, but the probability is that it is pretty broadly extended, and that it will be used, before long, in all of the railway foundries there is but little doubt.

Occasion has been taken repeatedly in the columns of this journal to urge the necessity of further investigation into the characteristics of cast iron wheels. We know nothing of what is going on in the interior of a wheel, except to be certain that there are stresses in existence of no mean intensity, and which, if they could be relieved, would probably add much to the strength of the wheel. But it is useless to attempt to relieve them until their character and amount is known. The matter has been agitated of making an investigation into these stresses, and it is hoped that it will be done in the near future.

There is still another point to be considered in this change from the old to the new system that reaches out and affects all shop practice, and that is that this laboratory work, this "theory," as it is sometimes contemptuously called, has a practical value that cannot be overestimated. When a single road, with an output of but from 10,000 to 15,000 wheels can, by the mere handing to its foundry foremen of the analyses of its pig irons and a study of the chemical composition of its wheels, divide its

wheel failures by five, it is certainly time for others to take notice and cause everybody to emphasize the value of that laboratory work which has now become such an important factor in the routine work of every well-organized and well-equipped railway.

FUTURE COMPETITIONS.

COMPETITIONS which have been decided on in addition to the one on The Care and Selection of Machine Tools and Shop Equipment, to close October 15, and the one on Car Repair Kinks, to close November 15, announcements of which appear elsewhere, are as follows:

A competition on "Increasing Shop Output" will close December 15. We want to know how you increased the output of your shop, or department, by improving the organization, rearranging the equipment, or handling it to better advantage. The competition should bring out such articles as a good shop schedule and the result of its installation, a successful shop despatching system, the arrangement and operation of a first-class bolt manufacturing plant, the best flue handling plant, how a car repair yard increased its output by better methods, how a better system of organization and operation was instrumental in improving the conditions at an engine house, or how the same results were secured with the same equipment, but smaller labor costs. These few subjects are presented merely as suggestions. There are at least a hundred more equally as good. The article should contain from five hundred to fifteen hundred words. Prizes of \$35 and \$20 will be awarded for the best two. Others which are used for publication will be paid for at our regular space rates.

The competition to close January 15 will be on shop kinks and will include any kink used in connection with the repair and maintenance of locomotive or car equipment. The prizes will be \$50 and \$25 for the best two collections of three kinks. More may be submitted, but the award will be based on what the judges consider to be the best three kinks in each collection. Kinks or articles which do not win a prize, but are accepted for publication, will be paid for at our regular rates. Contributions may be entered in these competitions any time between this and the closing date.

MECHANICAL ARTICLES DURING SEPTEMBER.

SHOP NUMBER readers may be interested in some of the mechanical articles which have appeared in the *Railway Age Gazette* since the issue of September 2. They are as follows:

Combination Buffet, Luggage and Mail Car. An illustrated article, briefly describing a car recently rebuilt by the New York Central & Hudson River for use on the Twentieth Century Limited trains.—September 9, page 100.

Converted Automobile Motor Car. W. B. Chenoweth, roundhouse foreman at the Atchison, Topeka & Santa Fe, at Lawrence, Kan., converted an old 24-hp. Rambler automobile into a motor car. It is used for a messenger purposes. As an example, in July a passenger train was derailed 47 miles from Longview; four men and four 35-ton jacks were loaded on the car and arrived at the wreck in but four and a half hours.—September 9, page 168.

Mallet and Pacific Type Locomotives for the Carolina, Clinchfield & Ohio. Ten of the former and three of the latter type have recently been placed in service. Illustrated description.—September 9, page 169.

The Rules of Interchange. A communication of about 1,300 words on the subject of "Run, and Transfer."—September 16, page 493.

Life of Fireboxes and Tubes. Extract from a report on improvements in locomotive boilers, presented before the International Railway Congress by H. H. Vaughan, assistant to the vice-president of the Canadian Pacific.—September 16, page 496.

Composite Gondola Car for the Gilmore & Pittsburgh. The car is of the general service type. The most interesting feature is an all cast-steel truck which when assembled contains only four bolts; a special journal box is used.—September 16, page 499.

Drop Flange Lost. A communication calling attention to a new method of testing wheel flanges and the advantages of nickelized cast iron car wheels.—September 23, page 536.

The Testing Department. Abstract of a paper on this subject presented at the September meeting at the New York Railroad Club by R. S. Hirsch, engineer-in-charge of tests at the New Haven & Hartford.—September 23, page 537. A communication commenting on this paper and entitled "The Content of the Testing Department," appeared in the same issue. Page 538.

Heavy Pacific Type Locomotives for the Vandalia. These locomotives have been in service for a sufficient time to thoroughly try them out and obtain some data as to their capacity. Illustrated description.—September 23, page 509.

American Ingot Iron: Its Development and Production. By George L. Foulkes. A study of the development of this metal, which is 99.94 per cent pure, and its properties.—September 30, page 574.

Development of Articulated Locomotives. By C. H. Caruthers. The first articulated locomotive was built in 1831. Mr. Caruthers has briefly and interestingly sketched the progress of this type of locomotive to the present time.—September 30, page 582.

INCREASING SHOP OUTPUT.

BY A FREIGHT CAR SHOP FOREMAN.*

The shop output can be increased more readily by having the right kind of man in charge than by any shop kindly or labor-saving device, if he is "The right man in the right place." I believe in shop kinks, and we have any number of them in our shop, but they were developed to suit our conditions and would be of little use to any shop not arranged as this one is.

The foreman should hold the interest of his men second only to that of the company he serves. He is one man against many, and if he can get the good will of the men and keep it by maintaining an interest in their welfare he has gained a great advantage. I also believe in promoting men to any higher rate made vacant by a man leaving the shop. This should be understood by the men, the oldest man being advanced to the higher rate. If he does not show that he has the welfare of the company at heart, by the amount of work he or his gang turns out, he should be told of the fact and a younger man in the service should be advanced over him. By doing this the foreman either loses the man or rouses in him an ambition to do better, or the man drops into the third section. The system of promotion should be explained to the men and be thoroughly understood by all of them.

A great evil, if not the greatest, is a foreman having pet men; this can do more harm to a shop than any labor-saving device can overcome in years. All men should receive the same treatment from the foreman, and the easy jobs, or "snaps," as the men term them, should be given to the men who have earned them by faithful service. This is another thing that all the men should understand. A foreman should always maintain his dignity and be ready at the right time with a kind word or a little joke, but never to lower himself from his position as a foreman. He should be possessed of magnetism to the degree of making his men feel the necessity for rushing a piece of work; this from his own manner and bearing and not from the fact that he tells them to "hurry up" or "get a move on." "I want that piece of work," is sufficient if spoken in the right tone of voice. He should never forget that men have feelings, and a foreman should never use profanity at or in the presence of his men. There is nothing that will lower him in the eyes of his men so quickly as the continued use of profane language. He should be able to administer a severe reprimand and do it without using profane or vulgar words.

Care should be used in grouping the men or making up the gangs, if this system is in force. The writer has six gangs that are used on new work, and they are made up as follows: Two French gangs, one Swede gang, one Irish gang, and two Yankee or American gangs. Men dislike to be defeated at anything, and so I arranged (with a little planning at first) to start all the gangs at the same time and with the same surroundings. The natural rivalry did the rest; during the first two or three hours all were watching each other to see how far along the other gangs had their cars. In a short time no time was lost in this way and as pretty a race was on as any foreman with the interest of his employer at heart could wish to see.

There is very little inducement held out for men to attempt to rise on some railways, and the roads that hold out the best inducements are sure to get and to keep the best men. The foreman should always be ready to tell his men when a good piece of work has been well and quickly completed. Also to put in a little praise at any time he sees it is deserved; a word of this kind and a hand laid on a man's shoulder at the right time often change a careless man to a good servant of the road and one who is always ready to respond to the call for a special effort. Men have rights as well as feelings, and these should always be respected by the foreman; a man should never be held up to ridicule unless he is about to be discharged from the service.

The writer has found in his experience that the men in most of the large shops can be divided into three sections; the first section, or those a third of the men will under all and any circumstances do a little more than a good day's work; the second and third will do just as near an honest day's work as they can, but not any more if they can help it, and the remaining third will do as much under a good day's work as the first section does over it. This leaves the foreman with about one man in three that he will have to drive and the way to do it is to put a third section man between first and second section men. The natural desire of the first class man keeps him going, the second class man keeps up because he does not like to be behind and the third class man does not dare to fall behind for fear he will lose his place by the others not wanting him in the gang. I believe some inducement should be offered by the railways to men who devise such labor saving device and schemes.

So much for the foreman and the men of the shop. No attempt has been made to outline the entire duties of either, but to point out where in some cases the output of the shop may be increased by the proper handling of the men by the foreman. The output may be further increased by taking pains to group like kinds of work near together, that comparisons can be drawn readily. The natural rivalry of men will make them try to outdo each other.

Many times a foreman can increase the output and at the same time save money by visiting the scrap pile frequently. Just now, as many railways are changing from wooden to steel construction, there are many parts that may be saved to repair a car that is not as far gone as one that is to be destroyed. These parts should be saved and used again as fast as possible, but must not be allowed to accumulate, as they will take up room and will have to be handled over. Care should be exercised in placing the material as near where it is to be worked as possible so that it need not be handled twice. Material costs about as much for one railway as another; the important savings must be in the labor, and here the good will of the men again comes in. Many a man can see a saving in some little thing that the foreman may not have noticed, and if he has the good will of the men his attention is at once called to it.

All old bolts should be collected. An old man, in some out of the way corner of the shop, with an anvil and hammer can straighten these, after which they should be carefully sorted and used again; if the threads are rusted or broken, cut off the end and re-thread. Old truss rods work over into guide irons for brake rigging, brake hangers and various other parts. Nuts, washers and lag screws should be carefully collected, sorted and replaced in the racks.

A large item of loss in all shops is occasioned by changing men from one piece of work to another before the first job is completed. This should never be done when it can be avoided. Another item that should be carefully looked after by the foreman and one that will greatly increase the output of the shop is to have on hand, assembling and ready for use, truck parts such as bolsters, truck side frames, sandplanks, etc.; also, parts of bodies of cars should be kept on hand and ready for use. Long sills should be kept on hand in the mill room and also templates for all standard parts. These should be so arranged that the piece of timber may be laid out by a man of very little experience. Draft timbers, should always be kept on hand. These should not be cut to length until the exact distance is taken from the car on which they are to be used.

One good thing for any foreman who is located near a large yard from which he daily receives loaded cars for repairs, is to have on hand spare trucks of the various kinds in use under cars on his road. These he can arrange so that they may be gotten at without requiring much help and when a rush load comes in with arch bars broken, a broken bolster or truck girts, or any other defect, and it is almost time for the whistle to blow at the end of the day, he simply details two men to jack up the car and two others to get the spare truck; by the time the truck

*The writer of this article is the foreman of the freight car repair shop of an important eastern road.

has been pushed up to the switch, the car been raised and the broken truck run out. All that needs to be done is to open the switch, run under the spare truck, lower the car, connect the brake rigging and car is ready for service. In most shops there are orders limiting the repairs to be made on certain classes of cars; when the repairs will exceed a certain sum the damaged car is destroyed; therefore, spare trucks for the above purpose are readily obtained.

If a foreman is interested in increasing the output he will be continually finding ways to do it, but if he is not he will not succeed in increasing it very much, no matter how much advice he may be given or how many shop kinks he may have.

UNSCIENTIFIC METHODS OF COACH CLEANING.

BY WILBUR F. LEACH

Former Master Car Painter, Minneapolis & St. Louis.

While other departments of railway economy have been sifted down to almost a mathematical certainty, the art of cleaning coaches effectively, economically and without serious losses, direct or indirect, seems to have been entirely overlooked. Very few of the higher railway officers have any conception of the tremendous losses sustained annually in this department. Various methods have been in use, but all may be classified under four heads, i. e., dopes, soaps, oxalic acid and solvents.

Dopes.—The various dopes usually consist of some kind of soap mixed with paraffin oil. The latter, a non-drying hydrocarbon, penetrates paint and varnish, and saturates the wood beneath. Its application requires much labor; it rots the paint and varnish and new paint will not adhere to the wood when the time comes for re-painting the coach, due to its being saturated with this non-drying oil. The operation is so extremely impractical, expensive and unscientific that it is surprising that any one should even attempt its use.

Soaps.—These, properly speaking, are neutrals, the action of alkalies upon the acids found in grease or oil. These soaps are solvents so far as ordinary dirt, such as dried mud or other similar substances, is concerned, but all are inert when applied to the removal of vapor tar and tar oils which are thrown from the firebox of a locomotive along with the smoke, striking and adhering to the sides of the coach, a condition that cannot be avoided as long as coal is used for fuel. If an alkali, a lye so called, is added in any form it combines with the linoleic acid in linseed oil, the base of all paints and varnishes, forming soap. That is to say, if a lye is used, paint and varnish are destroyed through a process known as saponification. Soaps, therefore, as applied to exterior coach cleaning are unscientific, expensive and impractical.

Oxalic Acid.—The chemical formula when obtained by sublimation is $H_2C_2O_4$. It is referred to in chemical records as the most active acid known. Oxygen is the builder and destroyer in nature. It erodes the rock into sand and the sand into soil and assists in the growth of animal and vegetable life, and when life becomes extinct it is oxygen that again converts the remains into soil. It is the oxygen in oxalic acid that gives to it its activity and corrosive properties. It penetrates brass, uniting with the zinc and forming an oxide, weakening the compound until a slight blow of a hammer will shatter the metal. The brass cover of a cuspidor submerged over night in a moderate solution of oxalic acid will be ruined.

Used in coach cleaning oxalic acid destroys the vitreous coating of varnish, penetrating the porous paint beneath, forming an oxide and causing the paint to chip, first in small spots and finally in flakes, until eventually when the car reaches the shop for repairs it often necessitates the removal of all the paint by a burning process before reliable repairs can be made. Sulphuric, hydrochloric and nitric acids all act instantly, when applied to a surface where chemical action follows, until their power is exhausted, while oxalic acid penetrates slowly and works through a process of oxidation; because of its slow action but few of

those using it realize the work of destruction going on. As it corrodes a varnished surface the smoke and tar deposits find lodgment, increasing from time to time until a coach, originally an olive green or Tuscan red, gradually assumes the hue and somber aspect of a funeral car.

If oxalic acid alone is used, unless great care is taken, a few hours after washing a car will be streaked with a white oxide, particularly about the windows and bed work. If soap is used in addition to prevent this, it means additional labor and expense.

To remove the smoke and tar deposits mentioned, I saw four car washers use a hot solution of oxalic acid, followed with a hot solution of soap. It worked all right and did the work quickly, but with what result? The varnish on the car was absolutely destroyed, the vitreous coating being broken up until the surface had the appearance of sandpaper. It cannot be denied that this process of cleaning, so unscientific and illogical, is being used in varied forms all over the country.

Solvents.—The tar which adheres to the side of the coach may be classified among the non-drying oils. It does not crystallize into a vitreous hard gum like linseed oil, but at all times becomes liquid in the presence of heat. Tar is largely carbon, and carbon resists oxygen, hence tar resists the oxidizing effects of oxalic acid to remove it, and its removal is secured when oxalic acid is used, only by removing the paint and varnish to which it adheres. As tar is a non-drying oil, it yields quickly to a solvent and it is peculiar that the solvent that readily dissolves and removes tar has little affinity for the gum formed from the oxidation of linseed oil, as found in paint and varnish. It is a question, therefore, of chemical affinity. For instance, alcohol readily penetrates and softens paint and varnish, but has little affinity for tar, and can only with difficulty be made to unite with it, while with a good solvent just the reverse is found, as it softens and removes tar and has no preceptible effect upon paint and varnish.

Economy of Labor.—When dopes, soaps or oxalic acid are used, they require additional labor. Soap must be entirely removed, especially from the windows, else the mushy deposit catches dust and upon drying is difficult to remove at a subsequent cleaning. Oxalic acid also requires extra care and labor, or the destructive and forbidding effects of the oxide follow. When a solvent is used, work can be rushed on the hop, skip and jump with no evil effects in case some part is neglected. Car foremen are often limited in their time for cleaning. They hail with delight a method that can be rushed and their cars sent out on time and clean.

Expense.—A test was recently made in one of the St. Paul coach yards. Two old-time washers were set at a dirty 70-ft. coach with a liquid cleaner—a solvent. The labor was less than by any other known process. The material used cost only twenty cents. At the finish the coach was absolutely clean, so clean that at the next washing only water was required. It was estimated that the car could be kept clean the year around by washing with the solvent every fifth washing and at other times only with water.

Ill-advised Methods of Cleaning.—It is the practice of many roads to clean coaches only twice a year, usually spring and fall, using only water in washing at other times. The result of this policy is that a train of coaches looks like a funeral train of hearses. This is due to the fact that during the six months intervening the smoke and tar deposits referred to become so deeply seated that their removal can be effected only through injury to the varnish, if methods heretofore used are applied. The best policy is to treat each coach separately, according to its needs. First get it clean, and then keep it clean. Use only water until the car shows signs of requiring a solvent cleaner, say every fifth or even tenth washing, and repeat the operation according to conditions found from day to day. This method would keep coaches clean and of a uniform color the year around and the saving in expense over present unscientific methods will be enormous.

Engine House Kinks.

FIRST PRIZE.

BY ROBERT MEEHAN,

Rosenbloom, L. Nathan, Pittsburgh & Erie, McKees Rocks, Pa.

REPAIRING, AND ETC.

The problem of repairing sand boxes in the engine house is complicated by the need of having some means of emptying the sand from the box and replacing it after the repairs have been made. The usual practice, when it is known in advance that repairs must be made to the sand box, is not to take sand before going into the house. Such sand as remains in the box at the end of the trip is run out on the engine house floor or in the pit and is carted to the sandhouse or the refuse dump by a laborer. It is then necessary for the engine to take sand on its way from the house, which is not always a convenient operation, particularly if special provision has not been made for sanding on the

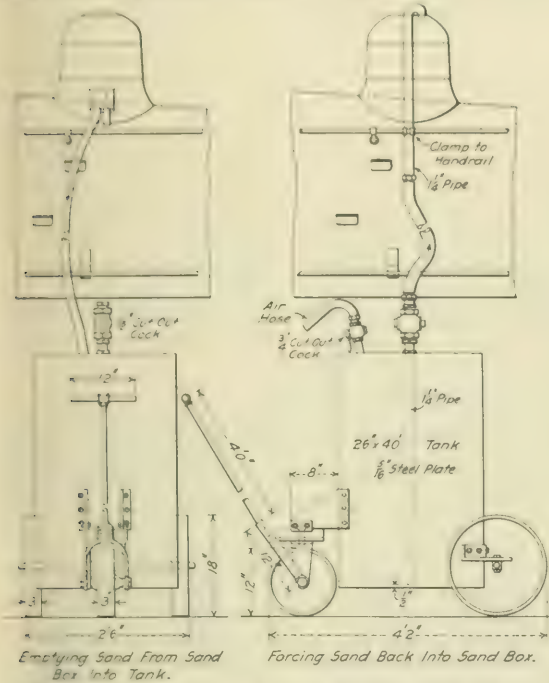


Fig. 1—A Handy Device Used in Connection With the Repairing of Sand Boxes.

outgoing track and the operating department is in a hurry to get the engine.

To overcome this the portable tank shown in Fig. 1 has been constructed. It is wheeled alongside the engine, the sand pipe is disconnected, and the sand is run into the tank through the rubber hose, connected as shown in the left-hand view in the illustration. When repairs have been completed, the portable tank is connected to the sand box, as shown in the right-hand view, and air is admitted to the tank by connecting the air hose to the air line and opening the $\frac{3}{4}$ -in. cut-out cock. The $1\frac{1}{2}$ -in. cut-out cock is opened and the air pressure forces the sand back into the sand box. This method makes it possible to fill defective sand boxes before they come into the house and thus prevents any delay on leaving the house. The portable sand tank is 26 in. x 40 in. and is constructed of $\frac{3}{16}$ -in. steel.

BABBITTING CROSSHEAD SHOES.

With the device shown in Fig. 2, the crosshead shoe, after

being removed from the cross-head, is clamped to the mold. It is then stood on one end and the babbitt is poured. The shoe is ready to be replaced on the engine without any machine work, from 15 to 20 minutes being required for the entire

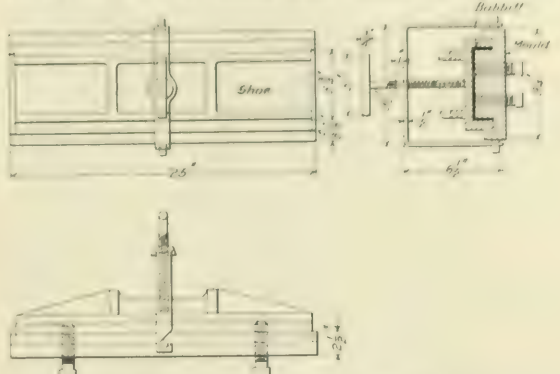


Fig. 2—Mold for Babbitting Crosshead Shoes.

operation. This is much more satisfactory than the former practice, which was to fill the shoes with babbitt over blocks slightly smaller than the guide and plane them to size. At the smaller engine houses, which were not equipped with planers, it was necessary to replace the shoe with one which had already been babbitted and was carried in stock. This arrangement was not entirely satisfactory, for the reason that the shoes usually required some fitting of the bolts because of the holes not lining up properly. All of our engine houses are equipped with these molds.

VALVE SETTING APPARATUS.

A simple but efficient machine for turning the drivers in set-

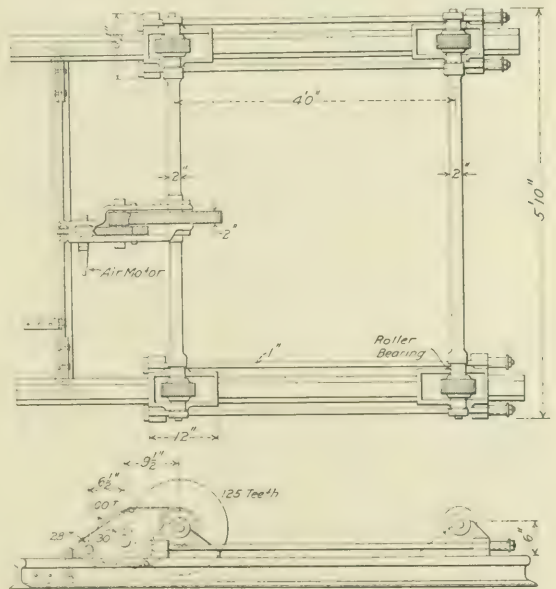


Fig. 3—Valve Setting Machine.

ting valves is shown in Fig. 3. It is driven by an air motor, and the reducing gears are similar to those used on a portable cylinder boring machine. The efficiency of the valve setting apparatus

can be very greatly increased by taking proper care of it. In many engine houses the practice is to toss it to one side after it has been used. The result is that when it is necessary to place it under another engine, more or less time is lost in

scribed by C. J. Drury on page 409 of the September 2 issue. It can be used without taking these members down, and does not require the use of heavy or unwieldy bars such as are so often used for this work. It is only necessary to slip the strap

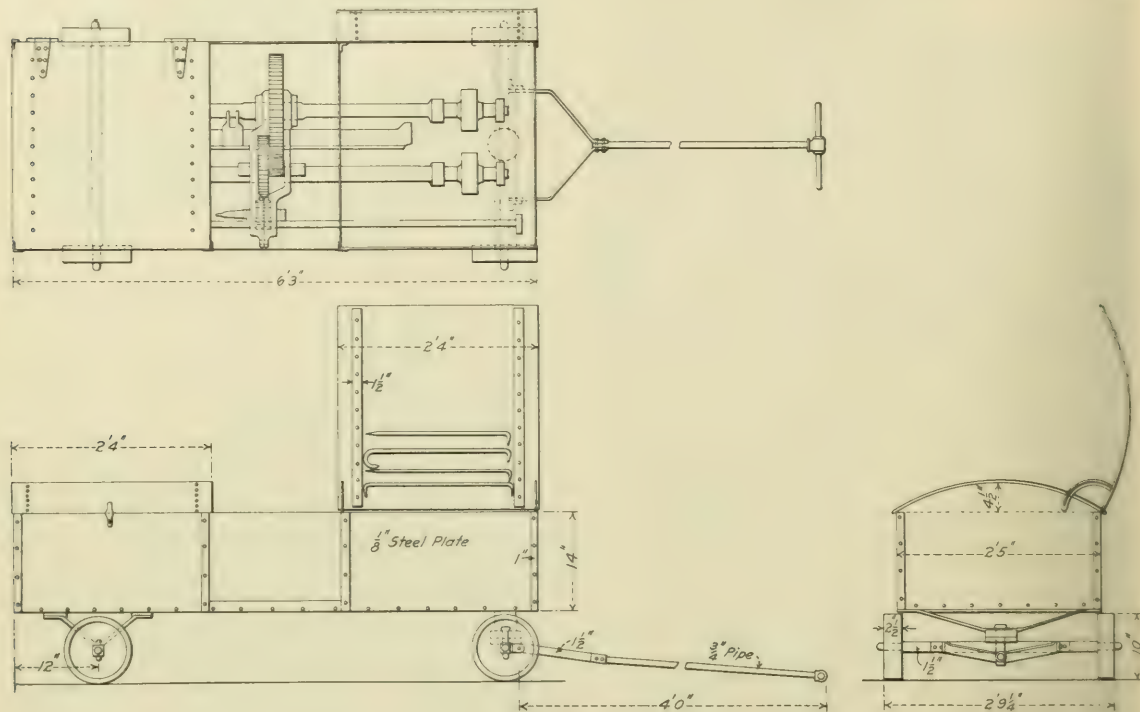


Fig. 4—Portable Steel Box for Valve Setting Machine and Tools.

locating it. Then again, the different parts of the apparatus may have become separated and the trams and other tools may have been misplaced or lost. To overcome this a portable double steel box has been built, as shown in Fig. 4. This is arranged so that the apparatus can be quickly packed away, and provision has been made for placing all of the tools and instruments used in connection with valve setting in it. When this has been done the boxes are locked and the portable truck is returned to the tool room. The box is constructed of $\frac{1}{8}$ -in. steel plate, reinforced by wrought iron bands, as shown. The wheels are 10 in. in diameter, with a 2 $\frac{1}{2}$ in. tread.

GASKET CUTTER.

A portable pneumatic machine for cutting gaskets from old hose is shown in Fig. 5. The former practice was to cut such gaskets with a knife, but this took considerable time and the gaskets did not prove satisfactory. With the new device, it is possible to keep a good stock of different sizes on hand by having the machine placed in the tool room so that the man in charge can cut them out during his spare time. The $\frac{1}{4}$ in. copper plate against which the hose is held prevents the tool steel cutter from being injured. Although a rather large air cylinder is used (12 in. x 14 in.), the stroke is limited by a bar, which passes through the slot in the piston rod, to about 3 $\frac{1}{2}$ in., so that only a comparatively small amount of air is used. This bar also assists in driving out the gasket after it has been cut, for as the piston rod drops downward two pins which pass through the cutter come in contact with the cross bar and force the gaskets upward. No trouble is experienced with the breakage of cutters, as is the case when a hammer is used.

DEVICE FOR BENDING ECCENTRIC BLADES AND LEVERS.

The device for bending or straightening eccentric blades, brake levers, etc., shown in Fig. 6, is similar to the one which was de-

over the bar, adjust it, and drive the key into place. The $1\frac{1}{8}$ -in. screw can then be turned by the use of an ordinary wrench. The key can be backed off slightly and the strap slipped along the blade or lever, if more than one operation is required to

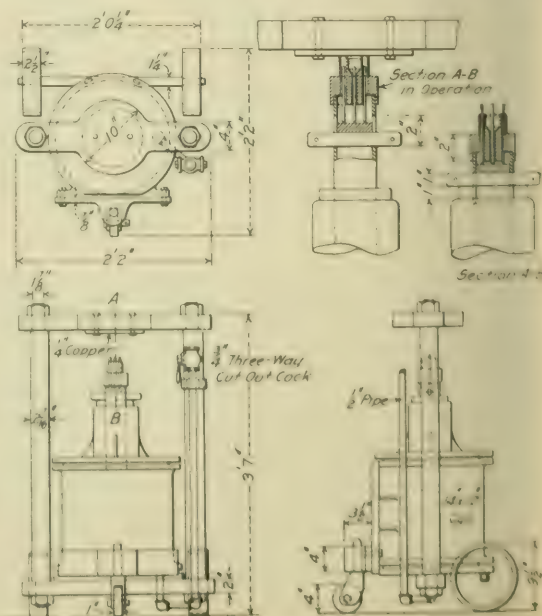


Fig. 5—Portable Pneumatic Gasket Cutter.

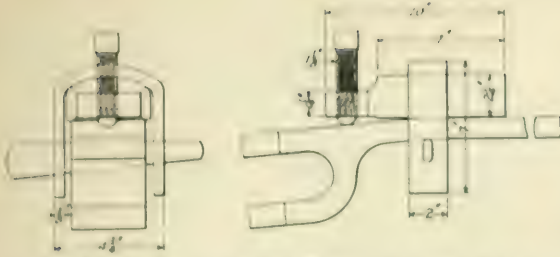


Fig. 6—Device for Bending Eccentric Blades, Brake Levers, Etc.

properly bend or straighten it. With this arrangement it is possible to make short bends and to operate in restricted spaces.

AIR HAMMER FOR DRIVING OF T BOLTS

The air hammer for driving out bolts, Fig. 7, is of much simpler construction than the one which was submitted by A. S.

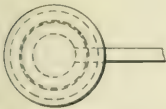
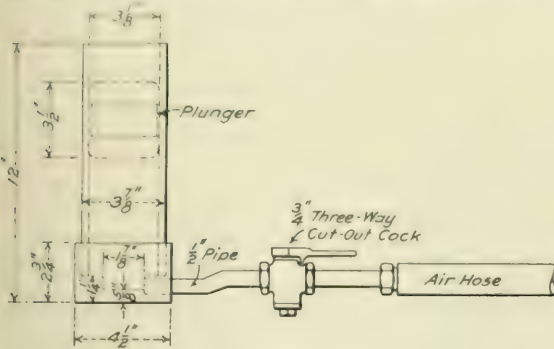


Fig. 7—Pneumatic Hammer for Driving Out Bolts.

Willard in your issue of September 2, page 408, and is giving good satisfaction at our engine houses. It consists of a piece of pipe, 3 1/4 in. inside diameter, with a cap at its lower end. The plunger can be projected with considerable force by properly manipulating the 3/4-in. three-way cut-out cock. As may be seen, it is shorter than the pneumatic hammer mentioned above, and can therefore be used in more restricted places. It also has the advantage of being safer than guns using powder.

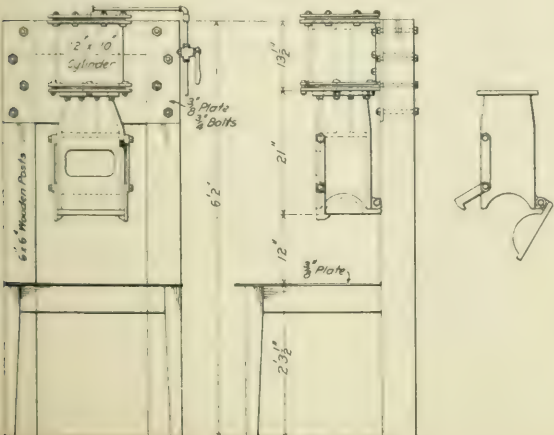


Fig. 8—Press for Forming Grease for Driving Box Cellars.

MOLDING GREASE FOR DRIVING BOX CELLARS

The press for forming Ekam grease package for use in driving box cellars, Fig. 8, is installed in the oil house. The 12 in. x 16 in. cylinder is bolted to a 3/4 in. steel plate, which is fastened on the two 6 in. x 6 in. wooden posts. The bottom of the press is closed and held in place by the two latches. Grease is then put through the hole just below the plate on the lower end of the piston rod, after which air is allowed to enter the cylinder and the grease is pressed to shape. Before this press was placed in commission the grease was pounded to shape by hand, which was a slow and expensive process.

PORTABLE HACK SAW

The portable air motor-driven hack saw, shown in Fig. 9, is used principally for cutting out sections of broken frames which

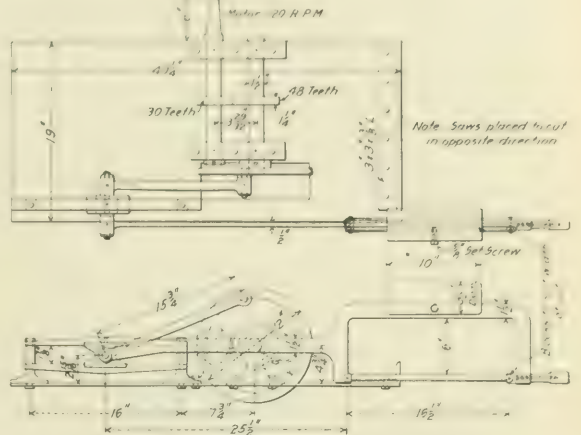


Fig. 9—Portable Hack Saw Driven by an Air Motor.

it is desired to weld without removing from the engine. The angle iron is clamped to the engine frame and the rear end of the saw frame is supported on blocking. The two saw blades are placed to cut in opposite directions and are spaced apart by blocking, to suit the thickness of the piece which it is desired to remove.

DIES FOR PISTON SWAB HOLDERS.

Dies for making piston swab holders are illustrated in Fig. 10; similar ones are used for the swab holder for valve stems. The 1/8-in. sheet steel has a hole punched in its center and is slipped over the 7/8-in. stud in the lower die. The upper die is then placed over it and the swab holder is formed to shape under a steam hammer.

PORTABLE STEEL TOOL BOXES.

Portable tool boxes for the machinists are made of steel. This construction, while more expensive than wood, is practically

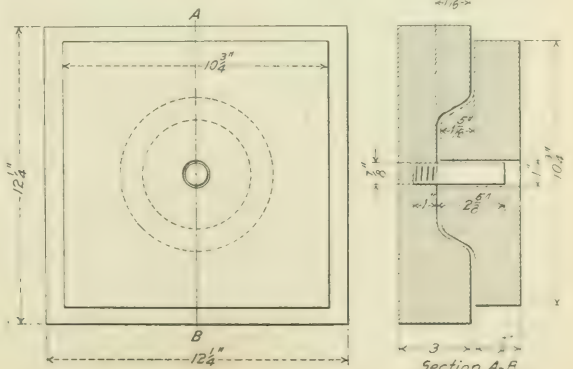


Fig. 10—Dies for Making Piston Swab Holder.

indestructible, and the boxes cannot be broken open. One-sixteenth-inch steel is used and the boxes are 39 x 18 x 10½ in.

SECOND PRIZE.

BY C. J. LINIGREN,

Roundhouse Foreman, Chicago, Burlington & Quincy, Aurora, Ill.
AIR PUMP HOIST.

A simple hoist for removing and applying air pumps is shown in Fig. 11. It consists of the strut B of 1-in. round iron, a ¼-in. chain C with a hook at each end, and a ½-ton differential block. To remove an air pump, the strut B is placed on top of the pump bracket, as shown, and its upper end is connected to the handrail by means of the ¼-in. chain C. The length of this chain may be adjusted to the proper position by means of the hooks at each end. The ½-ton differential block is then attached to the upper end of the strut; the reverse valve chamber cap is replaced by the lifting eye A, and the hoist is ready for use. While the parts are of sufficient strength, the weight is a minimum, and one man can carry the apparatus from the tool room to the engine in one trip, which takes on an average about four minutes; after arriving at the engine he can set it up in half a minute, making a total of 4½ minutes to have it ready for use after leaving the tool room. The same amount of time is required for removing and returning it. Where a hoist of this kind is not used, the ordinary method is to remove the pumps by means of a timber

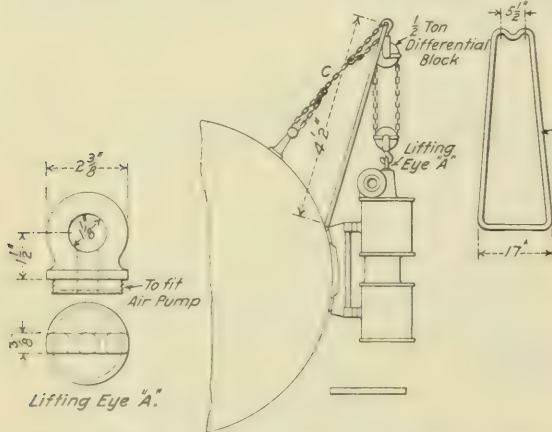


Fig. 11—Hoist for Removing and Applying Air Pumps.

about 20 ft. long, clamped to the back edge of the roof of the cab. Two men are required to handle the timber, and it usually requires about 38 minutes to transport it to the engine and apply it, and 20 minutes to remove and return it. The new device is, therefore, about ten times as efficient as the ordinary method.

REMOVING AND APPLYING DRIVING SPRINGS.

The lever and the clamp, shown in Fig. 12, afford a most convenient means for removing and applying driving springs in the engine house. With the driving wheels in place, the springs are usually quite inaccessible and ordinarily four or five men are required to move a spring by the obstructions, and in so doing often crush their fingers. The clamp of the new device, by which the spring is lifted, consists of two hooks which engage the ends of the spring. These are connected by a turnbuckle, so that adjustment can readily be made for different lengths of springs. By means of the I-bolt attached to one side of the turnbuckle, connection is made to the clevis on the end of the iron lever. This lever is suspended from the running board by means of a ¾-in. chain, which engages one of the six notches in the lever to prevent its slipping. In removing a spring, two men press down on the handle of the lever and lift the spring; then by pushing it sideways it may be lowered on to one of the side rods, from which point it is handled in the usual manner. It takes half as many men and half the time to

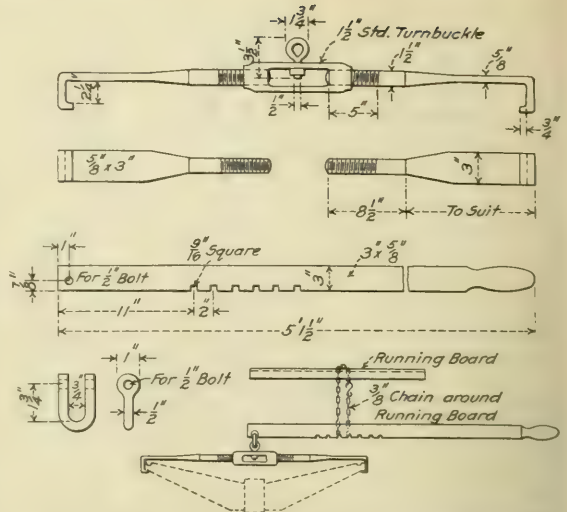


Fig. 12—Lever and Clamp for Removing or Applying Driving Springs.

do the work in this way as compared to the old method; it is also much safer.

SETTING TIRES IN THE ENGINE HOUSE.

In setting tires in the engine house, a pair of iron wedges, 5 in. wide, 2½ in. high and 28 in. long, are placed on the track and the engine is moved over them by means of a shop locomotive. The spring saddles are then blocked from the frame by the use of old rod keys, after which the engine is moved off of the wedges. The wheels and axle, which now carry only their own weight, are jacked up. The brake shoes are removed, and a gas burner, which is made of 1-in. pipe in two sections, is slipped over the tire and heat is applied. By this method one tire can be set in one hour, whereas by the old method of jacking up the engine and taking down the rods it required three hours.

BY F. NOWELL,

Locomotive Foreman, Canadian Pacific, Ottawa, Ont., Can.

CHANGING PISTON ROD AND VALVE STEM PACKING.

A time and labor-saving device for use in connection with the changing of piston rod and valve stem packing is shown in Fig. 13. Unless a special device of this kind is used for holding the gland in place while the nuts are being removed or put on, the machinist doing the work must have a helper to assist him. In that case the helper would hold the gland in place with a bar, but when the nuts are removed and he starts to ease up

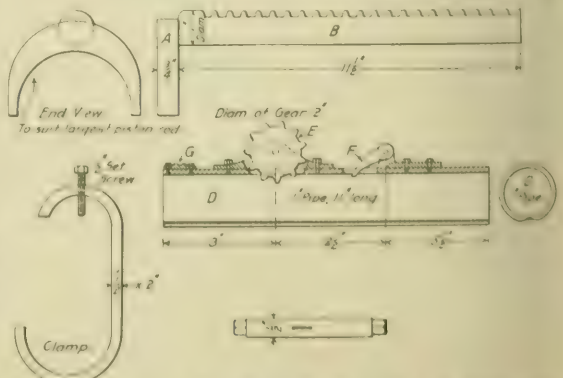


Fig. 13—Device to Facilitate the Changing of Piston Rod Packing.

on the pressure on the gland in order to allow it to back off, the bar is liable to slip and allow the gland to be thrown back against the crosshead, often knocking off the copper ring that forms the joint. It then becomes necessary to draw the piston rod from the crosshead in order to put in a new joint. With the use of the device illustrated one man can change the packing, and there is no possibility of the copper ring being injured or of the workman bruising his hand, due to the slipping of the gland.

The ram or pusher B is 1 in. in diameter, the end A butting against the gland. D is made of a piece of 1-in. pipe and forms a brace for B to work in. To remove a gland, the pipe D is clamped to the rod. As may be seen from the illustration, the bottom of the pipe is trimmed for its full length so as to fit snugly on the rod. D is adjusted so that the pusher B is extended as far outward as it will go and still mesh with the teeth on part E. The clutch F is then dropped down, engaging the teeth in B. The nuts on the gland are removed, after which a wrench is placed on the end of the $\frac{1}{2}$ -in. shaft to which E is keyed, the clutch F is thrown backward, and the gland is backed off slowly. New packing is put on the rod, after which the gland is forced back into position and held there by the clutch F while the nuts are being replaced.

DRIVING OUT BROKEN BOLTS.

The gun, shown in Fig. 14, is convenient for driving out broken frame bolts, or bolts in any other part of the locomotive which cannot be driven out with a hammer and would otherwise

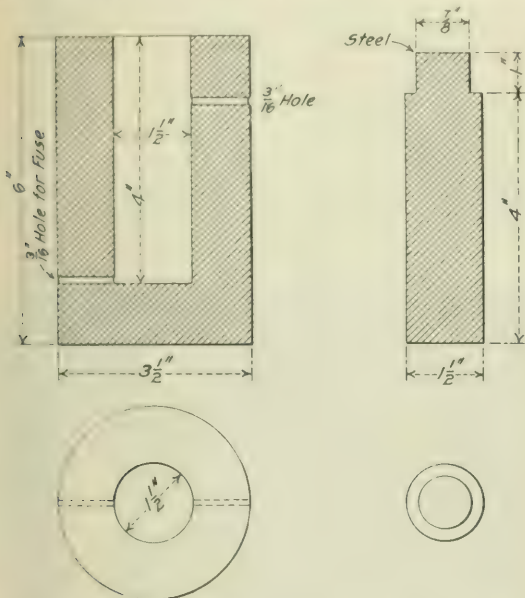


Fig. 14—Gun for Shooting Out Frame and Equalizer Bolts.

have to be drilled out. For instance, consider the taking out of broken equalizer bolts. These are often broken; they carry the weight of the engine and are so located that it is impossible to get at them with a hammer. On some classes of locomotives the brackets which support the driving brakes are so placed that it is impossible to drill the bolts out without removing the driving brakes and bracket. If the gun is given a small charge of powder, and is placed fairly under the broken bolt, it can easily be driven out. The gun is loaded much the same as one of the old muzzle-loading shotguns, the fuse being placed in the $\frac{1}{8}$ -in. hole near the bottom. It is advisable to get out of the way while it is exploding. It saves more time than any device I know of, as engines often arrive with broken equalizer bolts which can be knocked out with the gun and put back into service inside of two hours, whereas from 15 to 20 hours would be required to take down the driver brake and drill out the hole.

FROM AN ENGINE HOUSE TO A LOCOMOTIVE

LOCKING VALVE

It is often desirable to have valves outside of buildings, locked. This is particularly true where it is necessary to store large quantities of oil, gasoline or other inflammable material outside and away from the building for safety. In such cases the

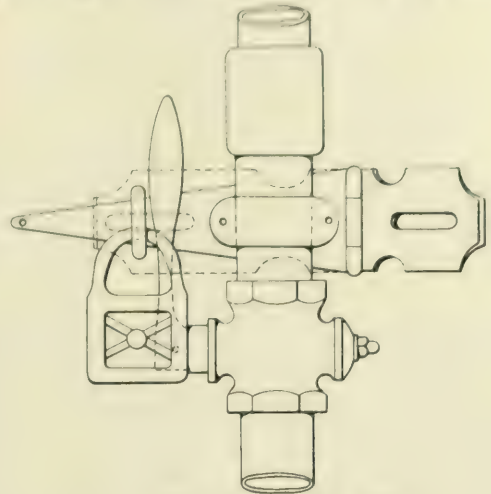


Fig. 15—Device for Locking Valves.

usual practice is to build a housing about the valve and provide a lock for the door, or opening, in the housing. A much simpler arrangement, and one which has proved satisfactory, is illustrated in Fig. 15. The full lines in the sketch show the hasp in an open position, while the dotted lines show it closed.

CART FOR TRANSPORTING LONG MATERIAL.

Those who are familiar with the work in an engine house will at once realize the advantage of having at the disposal of the workmen a steel cart adapted for carrying long material such as tubes, pipes, rods, etc. The body of the cart, shown in Fig. 16, is made of $\frac{1}{2}$ -in. steel, reinforced at the top of the

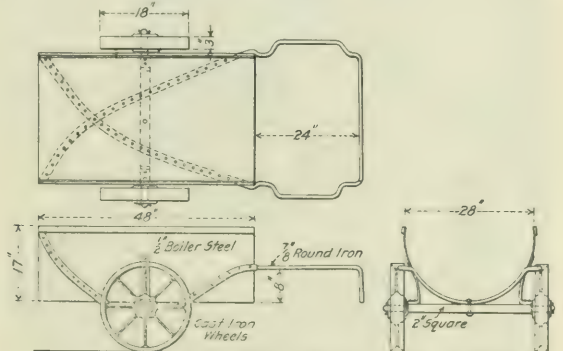


Fig. 6—Steel Cart for Transporting Long Material.

sides by pieces of bar iron. The handle is constructed of $\frac{1}{2}$ -in. round iron and is formed so that long material can extend out over it and at the same time leave a portion at the sides unobstructed. The material from which the handle is made is flattened out and riveted to the body of the cart as shown, in order to add to its stiffness and strength. The cast iron wheels are 18 in. in diameter and have a tread 3 in. wide, thus making the cart easy to move over rough floors, or on the ground outside the building.

PORTABLE WORK BENCH.

A portable work bench is a necessity in a roundhouse. Two or three benches of this kind, such as shown in Fig. 17, will take care of this class of work nicely in a 20 to 25-stall round-

CENTER CAR.

A cart for cinders and rubbish is shown in Fig. 20. The box is constructed of No. 10 tank steel and $1\frac{1}{4}$ by $1\frac{1}{4}$ by 3-in. angles with $\frac{1}{4}$ in. half round at the top on the outside. The frame and the handles are of wood. The box is 54 in. long, 30 in. high, and 22 in. wide at the bottom and 32 in. at the top. The door at the front facilitates unloading. The wheels are 24 in. in diameter.

VISE BENCH.

A small bench for a vise is shown in Fig. 21. One of these is attached to the posts between every other pit. The top is 24 by

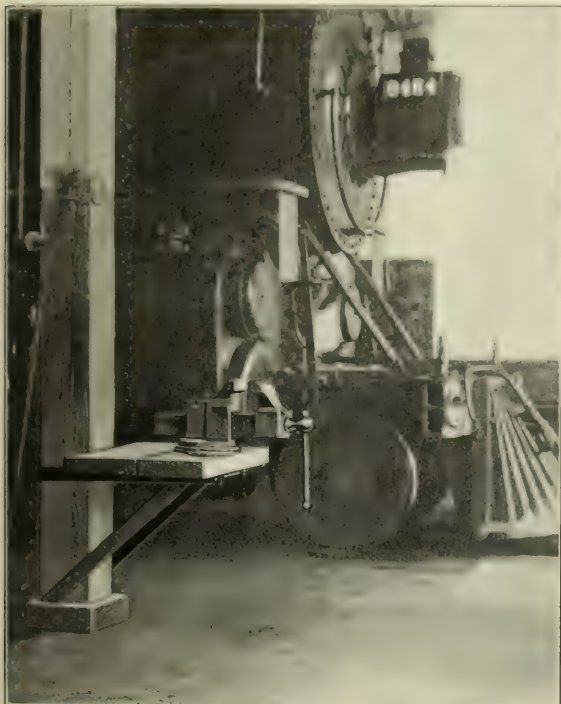


Fig. 21—Convenient Vise Bench; Placed Between Every Other Pit.

32 in. in size and is made of 3-in. oak resting on $1\frac{3}{4}$ -in. angle irons and braced by $2 \times \frac{1}{2}$ -in. iron, as shown. The bench takes up very little room, is rigid, and is conveniently placed.

BY WM. G. REYER,

General Foreman, Nashville, Chattanooga & St. Louis, Nashville, Tenn.

PORTABLE WORK BENCH.

Much time is saved by the portable work bench shown in Fig. 22, as the workman can move it near the engine and does not

have to carry material back and forth, as is necessary where a wall bench is used. The wheels are of large diameter and the bench can readily be moved from one engine to another. It is 28×36 in. at the top and stands 30 in. high. The construction is substantial, and the drawer is large enough to hold the necessary tools.

WASHING OUT LOCOMOTIVE BOILER.

We use the Miller boiler washing system. The steam and hot water are blown into a heater and the boiler is washed out with water at about 130 deg. Fahr., after which it is refilled with

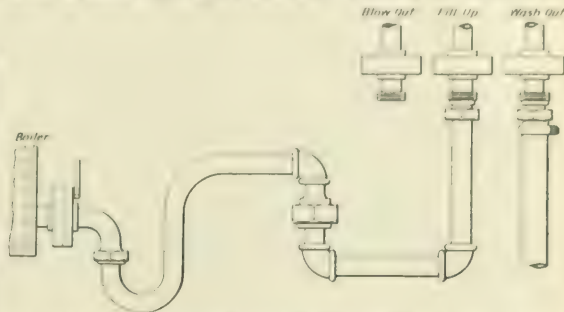


Fig. 23—Ball Joint Pipe to Connect Blow Out and Filling Up Lines of Boiler Changing System.

water at 180 deg. Fahr. The washout hose remains connected to the washout line at all times, unless it is desirable to change it from one pit to another. Formerly we used a hose for connecting the blow-off and the filling up lines to the boiler, but we had so much trouble in maintaining it that we applied the ball joint pipe, shown in Fig. 23. This has given good satisfaction; in changing it is only necessary to loosen up the nut and change the connection from one pipe to another. We have several of these connections to suit the blow-off cocks on the different classes of engines. It takes 14 minutes to blow out a wide firebox boiler of a locomotive having 21×28 -in. cylinders, through the 2-in. blow-off cock, and about seven minutes to refill it. We blow off the boiler, wash, refill, start the fire and have up 40 lbs. of steam in about one hour and 10 minutes.

BY THEOPHORE ROWE,

General Foreman, Great Northern, Jackson Street Shops, St. Paul, Minn.

BOILER TESTING.

When transferred from the main shops at Dale street, I found little machinery and, in general, a crude way of doing things. It was the intention to increase the output of the Jackson street shops from 4 or 5 to 10 locomotives per month, using 26 machinists; an alteration in the method of testing boilers was one of the early improvements. This work had been done by using a Philadelphia Rue injector, coupled to the branch pipe, making the test through the boiler check, and using a strong hose to supply the steam. The results were not satisfactory, however, as it was not possible to get more than 100 lbs. pressure, and the inconvenience and loss of time in moving the apparatus.

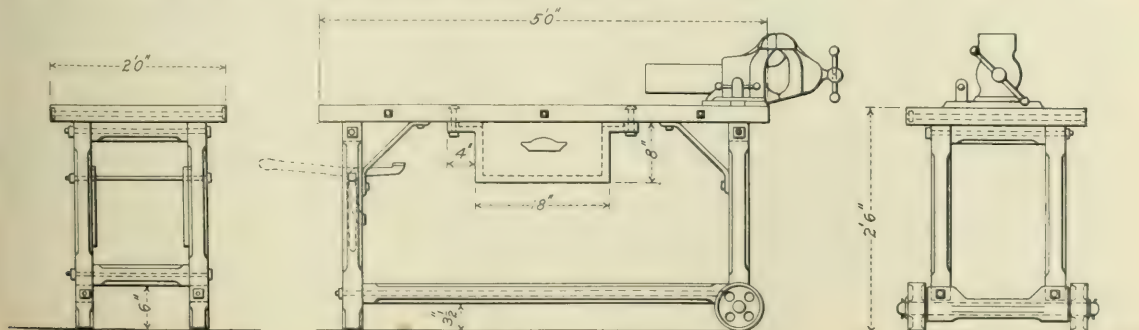


Fig. 22—Portable Work Bench.

from one engine to another were considerable. There was also the ever present danger of a man being scalded by a bursting of the steam line.

The sketch, Fig. 24, shows the Rue injector and piping as rearranged for boiler testing. The injector was secured to the wall of the machine shop, on the pit side. The 2-in. service pipe extends to the shop water main. The steam pipe is $1\frac{1}{4}$ in. From this steam line a 1-in. pipe is run into the enlargement of the main piping to the boiler, for use only when filling the boiler. It is used in conjunction with the by-pass from the service pipe to heat the water for testing. The enlargement of the pressure line pipe where the 1-in. pipe enters allows the cold water and the steam an opportunity to mix before entering the boiler. After the boiler is filled the valves in the by-pass and in the 1-in. steam line are closed, and the injector is operated to force water and steam into the boiler, by which the pressure can be increased to 200 or 300 lbs. An ordinary pump could be used instead of an injector, although not so conveniently. A 2-in. pipe, to which the pressure line of the injector is connected, was then run along the ends of the pits, with short branches and 2-in. foot cocks into the end of each pit. Nine-ply, wire-woven, 300-lb.-pressure hose is used between the foot cock and the blow-off valve of the engine to be tested. The water used

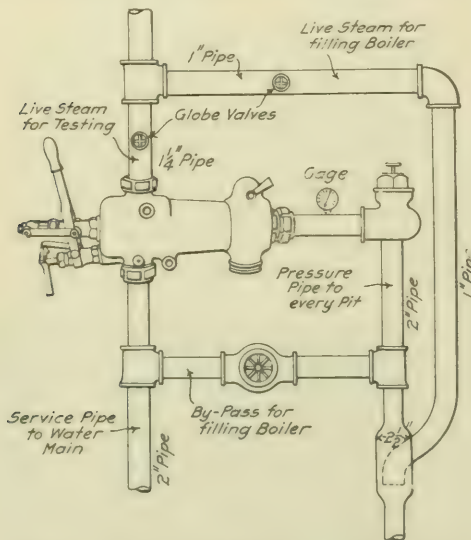


Fig. 24—Piping Arrangement for Testing Boilers.

for testing may later be used for another test by connecting the blow-off valve of the second engine back to the 2-in. line running along the ends of the pits, thus filling up another engine. By this method it is possible to test a boiler, after it is filled, in 15 minutes, one man doing the work; formerly it required at least two men for the work and three hours' time.

BOILER WASHING.

It was customary to run engines into the roundhouse for washing, but as the regular running work had the first call upon the pump and apparatus, it usually required two days' time to get an extra boiler washed. But 25 or 30 lbs. pressure was available in the shop, and it requires 90 to 100 lbs. pressure and warm water to obtain the best results. A No. 10 Ohio injector was fastened to the wall at the opposite end of the shop from the testing apparatus shown above. A $1\frac{1}{4}$ -in. hose was run from the pressure pipe of the injector to the $\frac{3}{8}$ -in. nozzle which is used for washing. By this method it was possible to get excellent results, removing all scale and performing the work in four to five hours as against the two days previously required when the locomotive had to be sent to the engine house. The required 90 to 100 lbs. pressure can be obtained by the use of the injector.

MASTER CAR AND LOCOMOTIVE PAINTERS' CONVENTION.

The 41st annual convention of the Master Car and Locomotive Painters' Association was held in the Southern Hotel, St. Louis, September 13 to 16, John D. Wright, Baltimore & Ohio, presiding. An account of the opening session appeared in the *Railway Age Gazette* of September 16, page 513. The following subjects were discussed:

OIL OR EMULSION CAR CLEANERS.

H. M. Butts (N. Y. C. & H. R.):—The shopping period for exterior varnish on passenger cars is usually about 12 months. Varnish loses its luster in six months; at eight or nine months it is near the end of its usefulness, and at 12 months it no longer furnishes sufficient protection to the undercoatings. An oil or emulsion cleaner is the best method of removing dirt without injuring the varnish. It has been used on the New York Central for eight years on an equipment of 1,700 cars. Prior to its use cars were shopped once in 12 months for re-varnishing and many needed it in nine months. At present the average shopping period is 19 months. The varnish on all of the 1,071 cars shopped during the last shopping period was in remarkably good condition considering that they had been in service from 14 to 26 months. One dining-car was kept in continuous service for 24 months running 300 miles every 24 hours and being cleaned with waste and an oil cleaner and then wiped dry at the end of each trip. The varnish was firm and solid, retaining considerable gloss. The best results with an oil or emulsion cleaner will only be obtained when a rigid cleaning system is adopted and enforced. A newly varnished car should be wiped with dry waste after every trip until that method no longer cleans, then with waste dipped in a very thin moisture of oil emulsion, the surface being wiped dry after the cleaning. No brush or tool should be used until other methods fail. Thick emulsion can be substituted when the thin solution fails to clean. A brush should only be used at intervals, but after a careful cleaning with the brush, wiping should suffice for some time.

J. W. Houser (Cumberland Valley):—Use of an oil or emulsion cleaner should increase the shopping period for the exterior varnish at least 25 per cent. Care must be taken, however, to select good cleaning material. The oil cleaner must not contain too much alkali, acid or grit. The cleaning must be done by careful men at least once in two months, once a month being better, as with a shorter period the surface need not be rubbed so hard. We have increased the shopping period of coaches by the use of oil emulsion cleaner from 12 to 15 months to 15 to 18 months.

John R. Ayres (Utica & Mohawk):—The Utica & Mohawk Valley and the Oneida Railway, of Utica, N. Y., use an oil and emulsion cleaner on both light yellow city and Pullman-colored interurban cars. The Syracuse Rapid Transit Railway, Syracuse, N. Y., had used up to November 1, 1908, an oil cleaner which proved unsatisfactory, as it seemed to decompose the varnish and the management discontinued the use of oil cleaners altogether. The same materials, colors and varnish are used on the city cars of both the Syracuse and Utica systems so that a fair comparison can be made as to the value of an oil or emulsion cleaner. At a recent inspection of the cars on both systems the varnish on the Syracuse cars was found to be in no better state of preservation at the end of 12 months service than the varnish of those shopped in Utica after 16 months' service. All cleaning should be under the supervision of the painting department and a definite schedule should be maintained, the frequency of cleaning depending on the climatic conditions under which cars operate. The cleaner itself should be composed of emulsion and a thinner of a non-drying neutral nature.

Mr. Cubbs (Southern Pacific) asked what fuel was used on the roads represented by the men that had spoken, and stated that the use of oil as a fuel on his road seemed to leave a thin

over the varnish which was especially hard to clean. Replies by former speakers showed that in the different houses, oil, sand and hard coal and electricity were used with the results already mentioned.

Mr. Gohen (Cleveland, O.):—An emulsion cleaner may contain an alkali or acid which is as injurious to varnish as soap and water. An oil cleaner does not affect the varnish nor will a strictly neutral emulsion cleaner. If the emulsion cleaner is strictly neutral it is to be preferred to the oil cleaner. Water should be entirely eliminated from the emulsion as varnish gets too much water naturally, but the definition of an emulsion implies water and an acid or alkali.

B. E. Miller (Lackawanna):—I do not believe water, if mixed with the oil, without the co-agency of an alkali or acid, would be injurious to the varnish. It would make easier the wiping dry of the oily surface.

Mr. Hartman (Western Maryland):—An oil cleaner leaves a surface which collects dirt. It is better practice to use even soap and water, followed by a good renovator, rather than have the dirty interiors, which are the result of using an oil cleaner. Another objection to the oil cleaner is the fact that you cannot re-varnish a car within a short time after cleaning with oil or emulsion.

Mr. Butts:—It is true that the car cannot be re-varnished a short time after cleaning and it is our practice to let a car run three months before re-varnishing. It will cost 15 per cent. more to clean equipment with an acid or soap and follow with a renovator and the results are much less satisfactory. If the surface was wiped as dry after using an oil cleaner as it would have to be when using a renovator, there should be no trouble with collecting dust.

Mr. Gohen:—The use of an acid cleaner will bleach the color badly.

Mr. Bruning (Louisville & Nashville):—We have used an acid cleaner for many years, but find we cannot get a pure acid. It bleaches the color badly and injures the varnish. Emulsion cleaner also injures the varnish, for no matter how good the varnish, it will open up small surface cracks after a time and the emulsion gets in these cracks. We have now changed to an oil cleaner.

Mr. Hartman:—We use muriatic acid. It does not bleach, costs a little more, but looks much better.

Mr. Gohen:—In 1891 the Chesapeake & Ohio put out its first orange-colored trains and after being in service four months, all of this equipment had to be shopped for painting, as the varnish had been actually scrubbed off. I inaugurated the use of an oil cleaner, thereby increasing the shopping period to 12 months.

Mr. Watts (N. C. & St. L.):—Will an oil or emulsion cleaner work as well on locomotive as passenger equipment?

Mr. Whittington (C. & A.), and Mr. Butts told of good results which they had obtained by the use of oil cleaners on locomotives. The following resolution, introduced by Mr. Copp, was carried:

Resolved, That it is the sense of this association that the use of an oil cleaner materially extends the shopping period of passenger and locomotive equipment, besides presenting a better appearance, and that the best results are obtained when this work is done under the supervision of a practical car painter.

KEEPING A PRACTICAL PAINTER IN ROUNDOUSES.

A. J. Bush (D. & H.):—A practical painter should be kept in every roundhouse. Much painting is done there, such as finishing engines painted in the shop, washing engines for varnishing and seeing that grease is removed. Carelessness or poor judgment may cause much unnecessary work. A careless man will use any convenient material for renovating rather than walk to the storehouse for proper supplies, and good painting is often spoiled in that way.

Mr. Miller:—It depends on local facilities and requirements as to whether a practical painter is needed in a roundhouse.

In some of our large houses we have corners set aside for house repairs where we do some painting, sometimes even varnishing; at smaller houses we only keep a general man to touch up, repair pilots and steampipes.

Mr. Butts:—When a roundhouse is large enough to employ ten or twelve experts, we have one man who is carefully instructed in painting.

Other members discussed the practicability of placing the daily cleaning of locomotives in charge of a practical painter, and the sense of the meeting was summed up in the following resolution:

Resolved, That where conditions are favorable, it is desirable to have a practical painter at roundhouses, the class of men and wages allowed to be governed by the kind of work done.

QUALITY VS. QUANTITY IN SHOP OUTPUT.

Chas. A. Cook, of the Philadelphia, Baltimore & Washington, read an excellent essay on this subject. He touched on the importance of the paint-shop as limiting the total output of a shop, and brought out the conflicting requirements of hurrying equipment through and of securing the finished product that every master painter desires. He showed that the painter is better serving the interests of his company when he returns to service in the minimum time a coach with a cracked, though firm and adhesive paint surface, than in detaining it in an effort to cover a defect palpable to a painter, but unnoticeable to a layman. The painter's general policy should be to follow the methods which will most fully meet the particular requirements of his road.

TREATING VENEER.

Chas. E. Copp (B. & M.):—We have had considerable trouble with veneered car interiors, the greatest difficulty being with dining equipment, which had been shopped but once before and was in for repairs and varnish. The glue holding the veneer had protruded through, bringing the filling, shellac and varnish with it, and making pustules over each pore, which, when sand-papered, left holes which were very hard to fill and refinish. We tried many ways of treating these, but without much success. Some of the trouble seemed to be due to the proximity of Pintsch gas lights to the ceiling. Many coaches have since been in the shop, having the same rough surface. This condition leads me to believe that solid wood should be substituted for veneer in interior car finish, for when the heat is shut off at night and turned on in the morning the interior will invariably be reeking with moisture, which must have an injurious effect on the veneer. If solid mahogany is too expensive for car interiors, I would suggest using a cheaper wood. Veneers and graining are shams which might well be discarded for the solid and the real. I confess I have no solution for the question as to how a painter can overcome the difficulties caused by steam heat in passenger coaches on the glue holding the veneer. I would use a close-grained wood finished by the best known methods. The use of an outside car body finishing varnish might help if it were possible to allow it time enough to dry before rubbing or polishing. The filler and subsequent coats of shellac might also account for some lack of stability in the glue. A vegetable filler would not be so permanent as a mineral filler, but if nothing but varnish were used to produce a finish on a veneered surface, it would probably be hermetically sealed and so waterproofed that heat and moisture would have little effect on it.

Mr. Miller:—The painter can do little to prevent the failure of glue unless the glue is of a good quality, properly prepared and carefully applied, and the timber well seasoned and sound. If this work is all good, the painter can aid by the following methods: First, protect the surface from moisture by not less than three coats of varnish after filling, if the wood requires this latter operation. Shellac should be avoided. A slow-drying elastic varnish is to be preferred to the quick-drying kind. Filling should be done immediately upon completion of the work, to avoid any absorption of moisture. Second, paint or

protect the rear side to keep out moisture. Third, avoid excessive use of water in scrubbing for re-varnishing or terminal cleanings. Fourth, watch roofs to prevent water getting to the rear of the wooden veneered headlinings, side finish and bulkhead partitions. Canvas roofs should be painted if necessary.

A. S. Baldwin (Barney & Smith):—Two causes may be assigned to the loosening of the veneer; one, too much heat; the other, too sudden a change of temperature. Glue softens or melts at a comparatively low temperature when preparing for use, viz.: 110 degrees. Notwithstanding the fact that when the inside finish and ceilings are placed in the car the glue under the veneer is perfectly hard, dry and set, yet by subjecting the veneered finish to a greater heat than 100 degrees in a closed, unventilated car the glue is in danger of losing its sticking qualities. The writer has, on numerous occasions in the winter, seen strings of passenger cars in railway coach yards, connected to the yard steam line and upon entering the cars has found them to be stifling hot, without a deck ventilator open and being subjected to a much greater temperature than they should be. This condition is largely responsible for the difficulty under discussion and is one that is capable of remedy. If it were practical to ventilate the back of all ceilings and side finish, veneer troubles could be largely eliminated, as any excessive accumulation of heat and the resultant moisture would be carried away by the current of ventilation.

The most satisfactory method is to paint the back of all side finish panels, wainscoting and ceilings with linseed oil, before placing these parts in position in the car. This closes the avenues for the absorption of moisture and dampness in the process of scrubbing the car for re-varnishing and painting in the repair shop. There is another important feature to which attention should be given by the painter in the repair shop; that is, to see that the veneer is kept in a perfect state of preservation. When a car is shopped for repairs and is turned over to the paint department, the painter should inspect it carefully to see if there are any places where the veneer has become loose. If there are such places, they should be carefully re-glued before the scrubbing process; then clean them thoroughly with benzine, fill and varnish to seal up the pores, and scrub the car. In this way the veneered surfaces can be kept in good condition for an indefinite number of years with very little expense.

Mr. Mann (C. C. & St. L.):—We have had troubles in replacing headlinings when they were put up before being completely dry. The veneer was forced away from the wood and my explanation of it is that a gas or steam was formed in the space behind the headlining due to the moist paint, which forced its way through the pores of the wood.

Mr. Miller:—The peeling of veneered headlinings is due to moisture in the space behind them and it may be that this moisture comes from the condensation on the metal carlines which are used on most passenger cars.

Mr. Glass (Yazoo & Mississippi Valley):—I do not think oil paint in the backing of veneer has any effect on the headlinings because of a lot of cars we treated in the same way—some were satisfactory and some were not. I think the trouble must be with the veneer work.

Other members described various cases of trouble with veneered work, not only on headlinings but on panels, showing that the moisture confined behind the headlining was not the only cause of trouble. Among the suggestions as to possible causes of the trouble were poor filler, too great hurry in the preparation of the work, and the use of too thin a veneer. Mr. Butts told of a number of panels that had never been touched by a painter which showed the same blistering of the veneer and raising of the grain, proving that it was the glue rather than anything the painter applied. Another member suggested that the glue was often insufficiently cooked, when cooked from two to three hours the results were entirely satisfactory. The following resolution, introduced by Mr. Cripp, was adopted.

Resolved, That it is the sense of this association that many, if not all, of the troubles caused by protruding glue are

attributable to the use of very thin veneers and to unseasoned lumber to which they are applied, also to improperly prepared glue, and we recommend greater care in performing this work, as well as to discourage the use of veneers as far as consistent with the construction of up-to-date coach equipment.

INERT PIGMENTS.

Anderson Polk, of the Lowe Brothers Co., read a lengthy and well prepared paper on "Inert Pigments—Their Use and Abuse."

SUBSTITUTE FOR WHITE LEAD IN INTERIORS.

J. H. Pitard (Mobile & Ohio):—The use of white lead is recognized, and its poisonous nature is unquestioned, although the exact extent of its injurious effects probably never will be known. Its deleterious effect may be largely mitigated by personal cleanliness and the addition of a little iodide of potassium to the drinking water. Some substitutes for white lead are zinc, lead sulphate, standard zinc lead white, zinc oxide, lithophone and sublimed white lead. The comparative merits and adaptability of these substitutes are still an open question.

TESTS.

The test committee reported that the principal test made during the past year was the climatic varnish test in which three glass test plates were covered with varnish by pouring, and sent to each of 14 members of the association for exposure in widely different climates all over the United States and Canada, with the object of determining the actual effect of climatic conditions on the luster of the varnish. The samples were exhibited, but as the test is not yet completed no comparisons were drawn or conclusions reached. Two test roof canvases were also exhibited, one having been painted with three coats of carbon black pigment mixed in a drying retarded linseed oil, the other with three coats of a special gum-charged oil made into pure carbon black paint. Paint stains removed from steel hopper cars that have been under inspection for a number of years were also exhibited, but no conclusions were reported in any of these tests.

ORGANIZATION OF A PAINT SHOP ON A PIECEWORK BASIS.

H. H. Heffelfinger (P. R. R.):—In order to obtain the greatest output of passenger equipment cars, the men should be placed in gangs according to the class of work they will handle, so that calculations can be made to average so many cars per day. Assuming a shop having a capacity of five cars per day, there should be a gang to do all the cleaning, removing of varnish, burning off and rubbing of rough stuff; coating gang; a gang to do striping and lettering; a gang to do cutting in, touching up and striping; a varnish gang for exteriors; a gang to paint roofs and decks; a gang to paint trucks, platforms and all iron work; two gangs to do all work pertaining to the interior of cars; and a varnish room gang to take care of the sash, blinds, doors, seats, etc. Each of these gangs should have a leader, who is held responsible for the jobs assigned to the gang. He should have supervision of all material used by his gang, seeing that no change is made in the original mixing and that each man gets his share of material and his own brushes or tools, which should be numbered or marked. For example: The gang that does the outside varnishing should have cars marked "rubbing varnish" and "finishing varnish," and if the varnishes are mixed they should be so marked on the can. If a car is to have varnish applied, the can is placed on the end platform by the gang leader, that it may be handy for the men he selects to do the job. If a car is to be lettered and striped, the gang leader procures enough gold size or necessary material for the whole car, so that it will be of the same consistency throughout. This method is carried out with the other gangs according to the material they use; thus making it almost impossible to get the wrong material on the car, as sometimes happens when furnished in small amounts. The gang leader should also see that the tools and all material left over are returned to the storeroom when the job is completed, so that paints, brushes or empty vessels are not left in shop over night. The number of men allotted to each gang depends on the

amount of work they are expected to turn out each day. With a shop capacity of twenty-eight or thirty cars a week, running at different lengths and classified repairs, a daily output of at least five cars should be expected. This will necessitate having a force of one hundred and fifty men, including foremen, workmen, apprentices, laborers and men to do inside and outside of car work, or one hundred and thirty men working twenty-six days per month, for a staff of an average of one car per man per month.

Owing to the time cars remain in the shop through the turning of seasons of paint and varnish, it is evident that the same shop contains the output per day. Yet a given output of cars cannot be relied upon unless each day's supply of classified repairs is in keeping with the force employed to do the work. The repairs should consist of four classes outside, designated by numbers, and inside repairs of three classes, designated by letters. It is easily seen that to determine on a certain number day, system should govern the handling of the cars from the time they are classified until they are finished for service.

There should be a generous supply of cars classified before they are sent to the shop and they should be gone over after cleaning, so that no misunderstanding will occur as to the condition of paint, gold or varnish. After the class of repairs a car is to receive has been decided, it is marked accordingly. The foreman of the erecting shop should work in harmony with the foreman painter, so that in finishing cars for the paint shop, there will not be too much of any one class of repairs sent in each day.

In getting cars ready for the paint shop it naturally devolves on the foreman of the erecting shop to approximate the dates the cars will be finished. The foreman of each department at the time they will require to do their work, to the foreman of the erecting shop. The painter reserves the right to necessary priming and other operations on cars while in the painting shop, so long as it will not interfere with the other workmen. In this way cars that are burned off can often receive several coats of rough stuff while the cabinet makers are finishing heavy repairs to the interior. This advancement of the exterior of the cars lessens the time required in the paint shop at least one-third and equals about the time it takes to do the interior finishing when newly brought up.

In conducting a paint shop force on a piecework basis, with a view of turning out five cars per day, and with the gangs itemized to do certain classes of work and guaranteeing all a proper share of the money paid for each job, the gang leader who may have twenty or more men, can divide them into smaller gangs, placing them where they are most needed, and he may concentrate them, as he sees fit. This rule works to advantage in having only two inside gangs and simplifies the giving out of the work, as each gang will receive its share of classified repairs as they come in the shop and will also have an equal number of cars with heavy repairs.

When the gang leader looks after the cleaning, burning off or turning off of rough stuff, he selects men to clean the interior and exterior of the cars and to do the burning off or rubbing; dividing them into gangs and confining them to one particular class of work and section of the car, as far as practicable. This practice enables the men to become more proficient and helps the foreman to calculate on just what his force can do in one day.

After the shop has been fully organized on this basis it is important that no operations, or days for drying are overlaid on any cars while in the shop.

In starting to slate cars with the intention of getting out five cars per day and allow ample time for them to stand for drying, no cars should be slated until enough have been gotten out to make several panels, advanced so they can be dated, starting on the first five as being finished for a given day. It is desired to have each panel of cars stand one or two days for drying. They are then slated ahead accordingly. This means that the shop in the beginning will be held back the days the cars are kept in for drying of the last coat of finishing varnish and floor paint. It is advisable to do all touching up in the

evening of the day the trimmers complete their work and hold the cars over until the following day for final cleaning and thorough inspection before they are put in service, each inside gang cleaning up its own cars.

In giving out work on a piecework basis, each person should have a day rate, or rate per hour, set in accordance with the class of work he will usually be occupied on, so that by prorating he will receive a proper share of the money the gang he is in earns; based on the rate and hours he works on the job. The gang leader is rated higher than the men. The manner in which the work is given out consists in having a price for each separate operation, whether in bulk or itemized. On the outside of a passenger coach there should be a price for each operation on the car body proper, governed by its class and length, whether it be for cleaning, burning off, priming, second coating, puttying, glazing, sand-papering, coats of rough stuff, rubbing of rough stuff, coats of color, lettering, striping or varnishing. These operations not to include the roof, deck, sash, doors, vestibule, platforms, hand rails, air brakes, truck, etc., as they should be priced separately.

The car body proper can then be divided or subdivided into parts, say each side, upper half and lower half of side and each end; the rates set for each operation on all these parts to equal the cost of each operation on the whole car, departure being made from this rule in dividing the car body into smaller fractional parts, such as the fascia boards, letter boards, panels according to width, belt rails, corner posts, door posts and so on. As the time consumed in getting ready to do these parts separately, far overbalances the time if done in bulk, the rate should be proportionately higher on itemized repairs and should be paid for under the head of minor repairs.

On the inside of the car the same method is followed, starting with the largest portion or seating capacity between bulkheads of the car. There should be a price for each separate operation on the headlining, moldings, deck, work between side headlining and window heads, panels between windows, window sills and the base. Each saloon inside, each saloon or waiting room outside including one-half of bulkhead. The rate for each operation on all these parts when added is to be the rate of the work when done in bulk. The headlining and floor are rated separately, as are the curtain facings, covers, sash, blinds, seats, etc., all of which have rates set for each operation by the piece or in sets. There are also itemized rates for doing this work when portions are renewed or scraped, such as the bottom rails of sash, blind slats and frames, seat fronts, arm rests and rails.

To simplify the giving out of a set of sash or blinds when they are partly renewed or scraped, the foreman of the varnish room takes account of the repairs, and out of a set of say 34 sash or 68 blinds he will allow for so many whole sash or blinds up to a point where the full set will require the same operation. This method is followed on the doors, seats and car furniture generally when sent to the varnish room.

As to the clerical part of conducting the shop; commencing with the cars when received for classification, there are accounts kept of each car by first taking a record of the repairs it last received, both inside and outside; the record is stenciled on the inside of the saloon, showing the shop marks and different classes of repairs it received from time to time. There is also a record of class repairs the car last received stenciled on the truck side.

A careful examination is made as to the condition of the paint and the varnish, before giving them class repairs, and so recorded; also dates recorded when cleaned, when put in shop and when put in service, designating the classification to the inside and outside and the kind of material used. While a record is kept of class one, two, three and four repairs to the outside, each class of which represents its own operations, a more complete record is kept of class A, B and C repairs to the inside, owing to the difference in the size of the cars and the variation of the work to be done. This work is written up for each car, a copy of which is given to the gang leader,

the price of which he must be familiar with, so that no misunderstanding will occur as to the correct cost of the whole job when finished for service.

This practice is used only on work done to the interior of cars, as it would necessitate too much clerical work to present an account of the many operations and parts gone over each day and would not guarantee any better results. All other gang leaders are required to present a bill each day, as their work is mostly done in bulk and can be more readily accounted for. After these bills have been gone over by the foreman and found to be correct, they are signed and turned over to the piece work clerk, who separates all charges, prorates the money by the hours made and enters it in a book provided with a column for each person's account. A time sheet is also sent to the shop clerk's office each day, showing the names of all employees, whether on day rate or piecework, the charges, hours made and absentees.

In handling the paint storehouse, where a stockman, a color mixer and two attendants compose the force, the stockman in charge looks after the stock, and in ordering material is required to interview the foreman, who, of course, is familiar with the number of cars to receive class repairs and, therefore, regulates the amount of material to be ordered according to the work on hand. The amount of material to be ordered is placed in the order book, according to the different account numbers to which the material is chargeable, and is taken to the general foreman for approval, after which the order is sent to the storekeeper, who makes out the requisitions on the standard form, a copy being sent back to the paint storehouse, bearing the same requisition numbers as are forwarded to the requisition and purchasing departments, respectively.

This copy of the material ordered is placed in a binder, known as a requisition book, and when the standard bill, which is sent to the different firms with the order, is received, it is checked up in the requisition book; a copy of it is then placed in a standard book ruled for the purpose, showing the firms from whom the material is received and the price. We are governed by these prices when charging out the material. The bill is then sent to the shop clerk's office for correct disposal, and is forwarded through the regular channel.

A ledger is also kept for the daily receipts of material, and the bill referred to must correspond with the amount of material received before it is passed for payment. All departments are compelled to furnish orders specifying the amount of material and charge for any material given out from the paint storehouse. These orders are priced; the inventory account numbers chargeable are placed on them and they are then forwarded to the shop clerk's office for the proper charge. On the first day of each month the stock on hand is taken to balance the accounts.

The ultimate success of a shop depends on the co-operation of all departments and with this in view the general foreman has a staff meeting each morning promptly at eight o'clock, comprising the foreman of each department and the storekeeper. General subjects, such as material, receipt of cars and output are discussed and any department retarding the progress must clearly explain the reason.

W. H. Estabrook (Lackawanna).—Following is an outline of our methods: First I make a schedule, with number and price, giving the operation on each part of a car or locomotive, arranging it in alphabetical order. Take a coach, for instance; I subdivide it as follows:

Body, exterior	Deck
	Plantings
	Defender
	Roofs
	Ironwork
	Trucks
	Wheels
	Car tank
	Headlining (lower)
	Headlining (upper)
Interior of car	Side finish (including alcove)
	Deck
	Seats
	Seat straps and foot rests
	Floor planks
	Floor
	Pipes

Varnish room trimmings	Doors
	Sash
	Deck sash
	Deck screens
	Blinds
Brass trimmings	Stops
	Water coolers
	Lamps
	Flat racks
	Seats
	Sash and door trimmings

The operations on a coach are scheduled as follows:

Exterior Body.

Burning off.
Cutting in.
Enameling.
Lettering, per letter.
Oiling and wiping.
Painting per coat, car color.
Painting per coat, guide.
Painting per coat, lead.
Painting per coat, priming.
Painting per coat, rough stuff and scraping beads.
Puttying and plastering, burned off or new surface.
Puttying and plastering, old surface.
Rubbing down letters or figures with stone, each.
Rubbing rough stuff.
Sandpapering and touching up putty spots.
Sandpapering lead or car color.
Sandpapering rubbed surface, touching up and repainting.
Sandpapering varnished surface.
Varnishing, per coat.
Washing.

All other parts of the car have each operation scheduled in a like manner. We make a separate schedule for baggage, baggage and mail, baggage and express, composite cars and dining cars, referring back to the coach schedule for any parts which are identical.

For convenience I work my men in gangs of from two to five men in the following order, making one man in each gang a leader; four strippers, four outside body men, four inside finishers, two men doing roofs, trucks, floors, etc., five washers. Varnish room men work in pairs; all apprentices work day work.

I have one assistant foreman whose duty it is to look after the varnish room in detail; one piece work inspector whose duty it is to follow each operation, except in the varnish room, seeing that it is properly done, and he also looks after and instructs the apprentice boys; one man tracking or touching up after cars have been trimmed before sending away, and one piecework clerk who writes all piecework slips from memoranda given him by the men doing the work, and which have been O. K'd by myself or assistant, who in turn delivers them to the timekeeper for checking and entering in the time book.

I go through my shop every afternoon writing down each car and every possible operation for the next day's work, my assistant doing the same in the varnish room. When we give out the work the leader's check number is marked opposite, thereby giving us a record as to when and by whom the operation was performed.

EFFECT OF CUTTING-IN ON BURNING OFF PERIOD

R. J. Kelly (Long Island).—Without doubt the practice of repeatedly cutting-in with body color affects the burning off period. Every coat, no matter how carefully prepared and applied, will affect and shorten the life of any painted surface. But it is absolutely necessary to cut-in when shopping cars, as cleaning and one coat of varnish does not make a satisfactory job. The cut-in color should be applied as thin as practicable with sufficient elasticity added in the way of wearing body varnish to allow of finishing with one coat of finishing varnish. To extend the burning off period, apply at the beginning few but exceedingly fine coats having in mind, at primer time, the numerous paint and varnish coats the car or engine will get before passing to the line, usually at about seven and one-half years. This average life of burning period can be materially increased by the application of earlier coats and keeping later coats as thin as possible.

O. P. Wilkins (N. & W.).—The practice on the Norfolk & Western is as follows: After the preliminary work such as scrubbing, repairing, touching up, puttying, sandpapering, etc., has been done we touch up with the cut-in color where necessary. By introducing considerable varnish in the cut-in color we avoid the condition of having an elastic coat between two elastic coats. We use on the average about one pint of finishing body varnish to a gallon of flat color which we have found through experience

to be about right for local conditions on cars that have been in service from twelve to eighteen months. We do not, however, mean to advise this as an absolute rule to follow in making up that color for cutting-in purposes, for special cases require special treatment. As a general proposition, the flat color should contain enough varnish to form the proper connecting link between the old surface and the new varnish to be applied. All body colors are more or less fugitive, and this alone forms a reason for both for renewing the color every twelve to eighteen months, particularly where the color is dark and one coat will be sufficient to secure proper results. It might be well to consider practices that cause early failures on cut-in cars. Extremely flat color should never be applied to a varnished surface, as it will only tend to hasten the checking of the surface. The whole paint structure should be a gradual increase of elastic qualities from the foundation up, and when this has been secured in the correct position it should be maintained in all subsequent operations. A surface should not be cut-in under twelve months since the varnishing, as there would be too much of a difference between the varnish on the car and the cut-in color, which would cause premature checking. In such cases we recommend varnishing in the usual way.

The sense of the meeting was embodied in the following:

Resolved, That cutting in of cars with body color when required is generally a necessity to produce a satisfactory job, and when properly done does not hasten the burning off period.

AVOIDING DAMAGE CLAIMS DUE TO WET PAINT AND VARNISH.

J. T. McCracken (Interborough Rapid Transit).—The only remedy for damage suits by passengers for soiled clothing and shoes due to wet paint and varnish is not to put the cars in service until the paint and varnish are dry, and also to use good materials. We must rush our cars through the shop, as we only keep a car out of service six days for general repairs. When the elevated cars come in we first put a quick drying enamel on the gates and fences, which are sources of trouble, so it will be sure to dry before the cars go out. We have an inspector in the paint shop whose duty it is to go over each car after it is turned out, and watch for little runs and spots of paint that might be broken and soil clothes. If it is necessary to hurry the car, he uses a little turpentine or shellac to dry up bad places. Another inspector in the car barn goes over each car before it returns to service.

Mr. Copp.—We have had a great deal of trouble with cast iron seats painted with enamel or varnish, on account of the irregular surface holding small drops of paint. We have changed our practice and now use steel blue bronze. We can bronze the seats in the morning and put the car in service in the afternoon without any danger. We did use a slow drying floor paint on plates and foot rests with the result that we had many claims for damage to shoes. We now use a very fast drying paint, and I see no reason why all interior paints should not be of the fast drying variety.

Mr. Wilkins offered the following resolution, which was adopted:

Resolved, That it is the sense of this association that in rushing cars through the shop for paint and varnish it is good practice to have all interior paints dry with sufficient rapidity, and be applied at the proper time to insure their drying before placing in service, which will minimize our companies from damages.

IDEAL RAILWAY CAR PAINT SHOP.

W. O. Quest (P. & L. E.).—If permitted to have a voice in the planning of a new car paint shop, we would have a roomy shop, at least twenty feet between track centers. It would be large enough to accommodate ten per cent. of company's passenger equipment, as this size shop would permit the entire car outfit to remain in service during the busy passenger traffic season of midsummer. During those months we would employ the time and force in rushing the rapidly increasing caboose and freight work through the paint shops and yards, as such systematizing of freight paint repairs would result in having much of the now

almost characteristically neglected freight cars of solid wood and steel construction put in good paint condition for the fall and winter freight traffic. Viewed from the car painter's standpoint, the chief advantage of having such a shipping system would be that the best results could be expected and secured from both color and paint applied out of doors in the good drying weather.

The ideal paint shop building would call for the transverse shopping of equipment, as the longitudinal shop without the advantage of the transfer approach is always a source of annoyance in getting cars in and out of the shop. The shop should have cement floors; also shallow cemented track pits. The pits are labor savers in all under car work operations. The sash shop and wash room should adjoin, but be partitioned off to exclude all possible dampness from the sash room.

The ideal shop light essentials would be a steady volume of natural light radiated into the shop from the north, if possible, the amount to be equal, if not greater, than any kindred shop in the group. The light should be so distributed as to cast as little reflection as possible; also to shed a uniform light over the entire interior, regardless of the number of cars standing in the shop. We would also have shade controlled sunshine in the building through an ample skylight; also at least sixty per cent. of glass openings in side and end walls. In order to shed a low floor line light, all shop window sills should not exceed thirty-six inches above the floor line. Our electrical light conveniences would include all the fixed and portable lights we could get. As a mechanical help to both natural and electric light radiation, the paint shop interior should be white coated. The ceiling should be coated with a good honest white paint to insure against the falling and flaking off trouble, which will invariably occur where the water mixed gypsum or common carbonate of lime are used on the dressed lumber shop ceiling.

The ideal shop ventilation should be secured through a series of easily manipulated openings in the roof sections, so mechanically wind muffled and screened as to insure cleanliness, and discharge at a low floor line, in order that the entire shop would be benefited by the supply.

For heating we favor steam heat radiation as being the least liable to drive the presiding painter into fits of profanity. All heat should be discharged at a low floor line, in order that moisture resulting from the use of water in the shop would quickly dry up. Regardless of whether piped dry steam, hot water or the mechanical recirculating of hot air is used, we would have our heating plant so constructed that it would in conjunction with our pure air supply, insure us a fifty to sixty per cent. foul air displacement in an hour. It is a well established fact that the constant reurning of foul air in a paint shop will be productive of bad results in the form of both humidity and poisonous gaseous air, which are both extremely injurious to fresh applied paint and the health of the men. Since heat ascends it should be generated as near the floor line as possible.

The color shop should be safely fire walled either at one end or in an outside center adjoining connection to the main shop. This department should be of ample dimensions with up-to-date labor saving conveniences; also have 'phone connection from foreman's office and the several paint shops.

Light, strongly built, stationary, or let down adjustable scaffolding should be provided.

In the tool equipment, we would have both stationary and portable sand blast machines operated by compressed air, which are fully two hundred per cent. labor saving investments when compared with hand labor cost in cleaning the structural sheet iron and steel parts of the locomotive, steel passenger or freight car. The tool equipment should also include an up-to-date pneumatic paint atomizing machine, which on class work, regardless of all craft prejudice and most strenuous opposition is one of the greatest labor, time and material saving devices where shop and labor are handled right, that ever was introduced into a car and locomotive paint shop.

An ideal shop plant should also include a fully equipped mod-

ern glass etching, bevel cutting, mirroring and embossing departments.

The shop should be so located as to obviate all unnecessary handling of unfinished work, from the fact that the practice of transferring passenger cars undergoing paint repairs about a shop yard can be attended with bad results caused by the partially dried coatings coming in contact with falling smokestack water, soot, coal and cinder dust; also the greasy dirty hands of yard help, or knocks of the careless or the touch of the inquisitive fellow always in evidence about large shop plants.

The car building and paint departments should be as close together as possible, for there is a great deal of priming and surfacing work that can be brought up in the building shop, which, if located at a distance involves the expense of much time in having the men travel back and forth for the many coating operations. The location should also be such as to avoid all unnecessary vibratory motion, such as the running of heavy machinery or the nearby heavy train service, or other concussive elements calculated to keep the finer particles of shop dust in circulation to the detriment of clean work.

PAINTING AND MAINTENANCE OF CANVAS ROOFS.

John F. Lanfersick (P. R. R.).—Every fiber in the canvas should be thoroughly charged with oil, raw linseed oil preferred, if time can be had for its drying, in order that it may be made elastic. A number of passenger cars were built at the Columbus, Ohio, shops of the Pennsylvania lines in the year 1897. The wood roof proper of each of those cars was given a good heavy coat of oil paint which was allowed to dry. The canvas with which the roof was to be covered was thoroughly painted on the under side and immediately applied on the wood roof by means of a windlass, which stretched it very tight; after it was properly tacked down the whole outer surface of the canvas was pretty well covered with paint by oozing through the canvas. This was allowed ample time to dry. The outer side of the canvas was then given three coats of oil paint, allowing each coat to dry before the succeeding coat was applied. After the roofs were finished they were ideal in appearance. I have watched them at every opportunity since that time and I can truthfully say they are still in good condition. I see no reason why they should not be good for the next ten years. There were six cars in the lot and there has not been a single failure among them. We have, however, changed our method somewhat in later years, and now paint them as follows: The wood roof proper is given a coat of oil paint, which is allowed to dry. It is then given a coat of slush, or heavy freight car paint, and the dry canvas is immediately applied to the wet paint, properly stretched and tacked down, and given time to dry. The outer side of the canvas is then given three coats of oil paint, allowing time for each coat to dry before the succeeding coat is applied. This method has also given good satisfaction. The maintenance of canvas roof is a simple matter. All that is necessary is to touch up any repaired parts and give the whole roof one coat of thin oil paint during each shopping. You will notice that while we have changed our method somewhat, the idea of getting the under side as well as the outer side charged with paint is the same. We have, therefore, really not made much improvement in the painting or maintaining of canvas roofs on passenger equipment cars. Our experience with canvas covering for the roofs of box cars and engine cabs has been such that we do not think it is the proper thing for them. On box cars, for the reason that they receive such hard usage that the nails are forced out, leaving the superstructure shaky and thereby loosening and tearing the canvas, thus allowing the wind to get under it and tear it off. Also for the reason that they are easily cut off and stolen. On engine cabs, for the reason that the heat from the boiler chars the canvas, making its renewal in whole, or in part, necessary in a short time. Our experience with canvas as a covering for cabin car roofs has so far been satisfactory.

George R. Kinney (P. R. R.).—The old method of laying the canvas down in a heavy coating of white lead and sticking it

to the roofing boards, the heavy coating of lead being almost sufficient to make the roof practically water tight without canvas, is, in my opinion, a mistake for passenger cars. While this method might work on cars that are rigid and operate on railway lines that are straight, it has been found that there is a tendency to split the canvas when the boards get loose and work, as they frequently do on the older cars while running around curves and over switches, frogs, etc. It is a mistake to apply too heavy a coating on top of the canvas, or paints that dry hard and brittle, for when cracks appear in the paint it has been found that the canvas will not stop the water from seeping through. Of course, the cracking of the paint is due to various causes; it may be due to the receptacle in which the pigment is ground; too much japan or quick drying varnishes; or it may be from using a non-elastic pigment. The car roofs get very hot, especially when they run through tunnels or are stored for days at terminals. This causes the paint to dry out more rapidly than it might on a vertical surface and it then becomes brittle. Linseed oil in its natural state is not a good canvas preserver. It is necessary to have a treated oil and an elastic pigment for a canvas preserver and also as a coating, in order to avoid deteriorating the canvas and prevent cracking. Ochres and oxide of iron paints are unsuitable for canvas and we prefer graphites because of their non-drying qualities. Both of these pigments are so fine that they enter the fabric of the canvas and in subsequent coatings they can be used so as not to pile up a heavy layer of material on the surface. The greatest improvements that have been made are in the grades of canvas now being used in place of the ordinary duck. We are now able to get a waterproof canvas that does not depend upon paint to prevent it from leaking, and we hope that in the course of time, if the paint applied on top of it should crack, that the canvas will still remain non-porous and prevent the dampness from getting through to the headlining. By covering the roof boards with a prepared paper before the canvas is applied we hope to prolong the life of the canvas and make the surface smooth so that in the swinging and rolling of the cars the canvas will slip and not tear should the boards become loose. To sum it up, a waterproof canvas is more desirable than the ordinary duck for roofs; that a treated linseed oil should be used in the canvas preserver and all paint that comes in contact with the fabric; that subsequent coatings should be thin and elastic and it is not good practice to coat them too frequently. Wiping them off occasionally with an elastic oil to renew their color and freshness is better than repeated coatings of paint. This subject has during the past few years been given considerable attention by paint manufacturers, and there are now several canvas preservatives and canvas roof paints which on account of their preservative qualities and elasticity appear to have considerably more merit than the ordinary paint mixtures made from linseed oil which has not been treated.

Mr. Butts.—It is good to have canvas painted both on the bottom and top with oil paint. Those who have made exhaustive tests of using paper underneath the canvas, such as the Pullman Company, have abandoned its use. It does make the canvas lie smooth. That was the object of it in the first place, to avoid the wearing of the canvas where the joints were uneven; but it was found that wherever there was a leak, the moisture was absorbed by the paper, and remained there to do mischief to the headlinings below. We investigated that subject very thoroughly, and found that the Pullman people had had much trouble with the headlinings where the roof was coated with paper underneath, and they told us they had abandoned it entirely because of that.

Mr. Houser.—For canvas roofs on engine cabs I think it would be a good idea to use tar paper between the sheathing and canvas. Our experience has been that when the roof is deteriorating it goes in slits right at the cracks of the boards, due to the smoke and fumes of the gases. I believe that could be taken care of by the use of the paper, but as to passenger

car roofs, I don't think it would be necessary to treat them in that way.

Mr. Miller.—I agree with Mr. Botts that a layer of paper between the roof boards and the roof canvas is not necessary. We found that it caused the veneered boarding, causing it to warp, swell and blister. I don't say that a thoroughly water-proof paper, if used, might not be of some benefit, but the benefit derived from its use would be so small that it would not pay to use it.

In regard to holding the canvas in place we tried it on a number of cars, but it proved a failure. In almost every instance the canvas would crack, even within a year, along the joints of the boards. I am also in favor of going on record against the bedding of canvas in lead, or other material, in fact, fastening it to the roof-boards at all.

Mr. Hoxsey (Ill.)—I have here a sample of a canvas that has been on a car eight years, and I dare say it is as pliable today as when the final coat was put on. There is no sign of break anywhere.

Mr. Quest.—I sent in the canvas referred to. The priming coat was 30 lbs. to the gallon of lead and lampblack. That was 11 of lead, 2 of lampblack and 4 of oil. It fixed it so that there wasn't a great deal of oil to be taken up. I wanted to avoid the rotting process by not having too much oil permeate the canvas.

Mr. Miller.—Between 10 and 11 years ago the Lackawanna began applying canvas roofs, and we painted them by applying a very thin primer composed of raw linseed oil with a little carbon and graphite as a pigment; increased the pigment with the succeeding coats. We gave the priming coat a good opportunity to thoroughly permeate the canvas. I do not know what the condition of the canvas is to-day, because we haven't had a chance to examine it. The roofs are in perfect condition so far as outward appearances go. Some canvas has been on eight, nine or ten years and longer. We require two weeks in painting a canvas roof, never less than a week. The priming coat we give at least four days, the second coat perhaps three, and we hold off with the third and final coat as long as we can, and have never had a failure.

Mr. Coleman (B. & O.)—If you are going to paint a roof to stand you have to paint the sheathing. You must get the oil there. I don't use any lead. I use an oxide on my canvas, top and bottom. We paint the sheathing, paint the canvas, and let the carpenters put it on wet.

Mr. Pitard.—In replacing leaky roofs we used tar paper, which won't absorb water, if properly treated, and we got rid of the moisture trouble. We replaced the roofs with a little heavier grade of canvas, as it was rather light and didn't stand the strain. In painting the roofs we coated the under side with a wax preparation that is on the market, the top side with a roofing paint specially prepared, and I think it also contains wax. We gave it one coat underneath and three on top, and have had no trouble. To expedite roof painting, we have tried a prepared canvas sized by those who make it. The sizing seems to consist of linseed oil and wax. It is of yellowish color and penetrates entirely through the canvas. When put on the roof, two coats of paint complete the job. So far we have had very good results, although we haven't used it long.

Mr. McCracken.—We have had a great deal of success by wetting the canvas with water and then painting it. I do not bed canvas in lead nor paint the boards. We put the canvas on the car, wet it and paint it, and we do not have any trouble. It is inexpensive, for it requires less paint, and after the paint is incorporated with the water and dries out, you have a canvas roof as tight as the head of a drum. We haven't the least trouble with leaky roofs.

Mr. Quest.—So far as using that method as a matter of speed we do wet them. We do not have time to bed them on our roofs, and we do use water. We pay the same price for priming that way as for all after coats; otherwise, we would have to pay twice the money for the application.

Mr. Russell (C. & E. Ind.)—The water that Mr. McCracken speaks of is the same as the soap and glue which we use. It keeps the paint from going through the canvas.

Mr. Miller.—About four years ago a special committee submitted a report on canvas roofs, and the opinions were about evenly divided between the canvas-bedded-in-lead process and the canvas-applied-loosely process. I think we recommended at that time a lead paint about 26 lbs. to the gallon and 1 lb. of lampblack to the gallon. I would recommend modifying our opinion to the extent of the following resolution:

Resolved, That it is the sense of this meeting that experience of the last few years have proven that canvas laid on roofs of cars and properly painted with carbon or graphite paint gives better results than if bedded in lead, this on account of the torsion of the car having a tendency to crack both paint and canvas.

The resolution was duly adopted.

The convention closed with the installation of the following newly elected officers, as reported in the *Railway Age Gazette* of September 16: President, J. H. Pitard, Mobile & Ohio, Mobile, Ala.; first vice-president, J. T. McCracken, Interborough Rapid Transit, New York; second vice-president, John Hartley, Atchison, Topeka & Santa Fe, Topeka, Kan.; secretary-treasurer, A. P. Dane, Boston & Maine, Boston, Mass.

The ballot for the location of next year's convention resulted in a choice of Atlantic City, with Denver and Boston as second and third choice, respectively.

NOTES ON THE ELECTRIC DRIVING OF MACHINE TOOLS IN RAILWAY SHOPS.*

BY L. R. POMEROY.

The variable-speed alternating-current motor, possessing series characteristics, is not adapted to general machine tool driving, but it can be used to more or less advantage in performing operations to which a series motor is adapted, such as driving bending rolls, cranes, etc. In a number of tools it is advantageous to vary the speed, to stop, start and reverse quickly in order to facilitate lining up the work, to take a trial cut, to adjust counterbore, etc. After such adjustment the open or synchronous speed can be used for cutting and the tool then becomes, through its working cycle, essentially a constant-speed machine.

The speed-changing mechanism in geared-head machines or tools equipped with mechanical speed variation is as available and handy as if obtained electrically and, therefore, removes the necessity for individual drive for a tool located in a group. There is no question that, from a commercial viewpoint, the alternating-current motor is preferable for constant speed work, on account of economy of transmission, the ease of obtaining proper voltage for lighting, and the general upkeep of motors. As an example of this latter point, the case of a large manufacturing concern in the middle west is pertinent. The shop is provided with both direct and alternating-current motors, and the cost of upkeep is \$2 per month more for the 600 h.p. in direct-current than for the 4,000 h.p. in alternating-current.

For railway shop conditions 75 per cent. of all requirements can be fully met by constant-speed motors, and as the necessary 25 per cent. of direct-current motors for the variable speed machines can be obtained by the use of a motor-generator, it would seem that this is the most desirable combination to use. By providing a synchronous motor for driving the motor generator, an excellent opportunity is given to adjust or to increase the power factor, thereby eliminating the low power factor and its consequent disadvantages. The synchronous motor, besides delivering leading current and neutralizing a low power factor, has 70 per cent. of its capacity available for

*From a discussion on electric driving in machine shops before the American Society of Mechanical Engineers. Mr. Pomeroy is chief engineer of the railway and industrial department of J. G. White & Co., Inc., New York.

mechanical load, and as this part of the load can be utilized to supply the necessary direct-current for variable speed tools, the combination becomes an efficient one. Alternating-current motors are especially economical and advantageous in wood-working shops on account of the presence of dust and flying particles. If direct-current motors are used, the fire hazard necessitates the use of enclosed motors, which are much larger for a given output, on account of the restricted ventilation due to enclosing.

As an illustration of the advantage of reckoning with the intermittent duty of a given machine in determining the size of motor to select for a given service, suppose the requirements are 50 h.p. for five minutes, 10 h.p. for ten minutes, the cycle to be repeated every 15 minutes with speed constant. The speed characteristics of the motor require a shunt excitation, i.e., a definite exciting current in the fields regardless of the load on the armature. The average motor load is

$$\begin{aligned} 50 \text{ h.p.} \times 5 \text{ min.} &= 250 \text{ h.p. min.} \\ 10 \text{ h.p.} \times 10 \text{ min.} &= 100 \text{ h.p. min.} \\ \text{Total} &= 350 \text{ h.p. min.} \\ \text{or, } \frac{350}{15} &= 23.3 \text{ h.p. average.} \end{aligned}$$

The average load will not produce the heating that the cycle will, for the reason that the copper loss varies as the square of the current. The root mean square or equivalent heating will be produced by the following:

$$\begin{aligned} (50)^2 \times 5 \text{ min.} &= 12,500 \text{ h.p. sq. min.} \\ (10)^2 \times 10 \text{ min.} &= 1,500 \text{ h.p. sq. min.} \\ \text{Total} &= 14,000 \text{ h.p. sq. min.} \end{aligned}$$

Dividing this power by 15 min. gives the average square as 933, which is equal to 30 h.p.

This is the root mean square load, or a load which will produce the same heating if applied continuously as would the intermittent work.

Group driving, employing relatively short main and counter-shafting is not an unmixed evil for the reason that the aggregate stored energy of pulleys, due to flywheel action, is advantageous where slotters, shapers, drills, planers, etc., are present, counteracting in a large measure the shaft friction losses. Very often a better load factor is obtained from the group motors than from the aggregate intermittent service of the individual drive motors. The repairs on individual drive motors are heavier than for the same number of group drive motors. As an illustration, a certain shop has the same number of motors as one of 70 per cent. greater capacity located in another city, both shops producing the same kind of output. In the former case individual drive is the rule; in the latter group driving prevails. The repairs per unit of output is larger in the former than in the latter.

It is also quite necessary to consider the work to be performed by a given tool in a given department, rather than the range of the tool. For example, a 72-in. boring mill has an ultimate range of work from 72 to 3 in., and with various materials a cutting speed range of 15 to 25 ft. per min. The total speed range therefore becomes

$$\begin{aligned} 72 \times 25 &= 1800 \\ 3 \times 15 &= 45 \end{aligned}$$

Where the variety of work a tool will perform is the determining factor a wide range of speed quickly obtained is desirable, but under ordinary machine shop conditions, volume of output is the standard governing the selection of a tool, requiring in many cases constant speed.

The ideal condition is when the work is so classified and arranged that the machine is practically performing the same work all the time, i.e., duplication of parts. This condition requires the minimum amount of speed manipulation, at least that

which is electrically obtained. The more variable speed is sought for, the further we are getting from ideal conditions. This should promote judicious conservatism and careful analysis to make sure of definite reasons for departure from the ideal standard. A careful study of each tool, with reference to the work to be performed, will establish definite ranges of speed, which will be found quite narrow, and which automatically determine the power requirements. The selection of the driving motor would be governed by the foregoing conditions, and might not apply to the same kind of machine in another shop or even in another department of the same shop, where a different output prevailed.

Mechanical changes of a simple character, not covering a very wide range but grouped about the zone of work which the tool is generally intended or selected to perform, giving changes within comparatively narrow limits, provide variations that are useful and advantageous. This avoids the necessity of using motors with large speed ranges and very often admits the application of a constant-speed motor, where otherwise a variable-speed motor might be required, all of which tends toward economy in first cost and repairs.

The results of comparison vary, depending upon whether the tool output is based on performing stunts or ordinary commercial shop operations. In forge shops at steel plants, where no attempt is made to forge close to size and the machine tools are relied on quickly to reduce the forgings to rough-finished sizes, or where motor shafts are rough forged and then finished on machines, the question of high-speed cutting tools and powerful machines is of the greatest importance. But in railway shops where the companies purchase driving axles, crank pins, piston rods, etc., rough-turned with a flat-nosed tool to within $\frac{1}{8}$ in. or $\frac{1}{4}$ in. of finished dimensions, an entirely different standard necessarily governs the rating of tools, both as to power and speed requirements. For instance, in a list of parts, 23 in number, scheduled for manufacture at the central or main shop of a large railway, the arrangement is such that the minimum amount of machine work has to be performed at the local or division shop where the repairs are to be made. Piston rods are finished except piston and crosshead fits, crank pins are finished complete except for wheel fit, etc., all of which goes to show that a large quantity of work, at least in railway shops, requires minimum rather than maximum machine tool duty.

The heavy type of so-called high-speed lathe is practically built for forging lathe conditions and under these conditions requires high power to drive, but when, as is frequently the case, this same tool is installed in a railway shop where much smaller cuts are the rule, it is not necessary to provide for such great power, as the full capacity of the tool is never utilized. In order to utilize the full power of such a machine it is necessary to raise the cutting speed in the same proportion as the area of the cut is reduced, but this is not always possible. For example, a $\frac{1}{2}$ in. \times $\frac{1}{2}$ in. cut was taken at 38 ft. per min., while with a cut of $\frac{1}{4}$ in. \times $\frac{1}{4}$ in. only 52 ft. per min. could be obtained. With one-half the area of the cut the cutting speed could be increased only one-third, resulting in the removal of only 57 per cent. as much metal. If the full capacity of the machine is not possible, why pay the price for a high-power motor when a saving in first cost is possible by the selection of a motor more suitable and a better efficiency can be obtained by running the motor more nearly up to its normal capacity? A 10 per cent. loss in efficiency on a 15-h.p. motor capitalized at 10 per cent. per annum would amount to \$750. The same policy carried out among a large number of machines would result in a considerable saving.

The Leopoldina Railway, the line of which is to be completed within two years to Victoria, Brazil, is to establish a sleeping and dining car service. Its contract provides for the establishment of immigrant colonies, the founding of experimental farms, and the developing of meat packing and similar establishments.

CAR WHEEL FOUNDRY PRACTICE; CANADIAN PACIFIC.

BY GEO. L. FOWLER,
Associate Editor, *Railway Age Gazette*.

About twenty-seven years ago, or shortly after the opening of the road, the Canadian Pacific commenced the manufacture of car wheels. The foundry was small and only an insignificant proportion of the wheels needed were made in it. But when the great Angus shops were built in 1905 it was decided to incorporate car wheel making on a comparatively large scale, and the present foundry was built.

EQUIPMENT.

It is a brick building, 187 ft. by 134 ft. 4 in., and is equipped with two Whitney cupolas each having a 90-in. shell measuring 2 in. inside the lining. They are rather shallow, being but 15 ft. 8 in. from the bottom to the charging door and 12 ft. 9 in. from the tuyeres to the same point.

on whose shaft there is a worm engaging a gear attached to the reservoir. The controllers for the two reservoirs are placed on a sheltered platform on one side, from which the operator has a clear view of the reservoir and the ladle that is being filled.

There are fifteen floors each with a capacity of 22 wheels, though in the ordinary working only 20 are molded for a heat. This gives a total capacity of 330 wheels a day, with 300 as the usual output. The floors are of the longitudinal type, as in the case of the Altoona and Milwaukee foundries described in the *Railway Age Gazette* in the issues of December 3, 1909, and April 1, 1910, respectively. The floors are spaced 9 ft. from center to center and each is served by an overhead lorrey carried on channel rails suspended from the roof. The operations of hoisting and traversing are controlled from the floor by two lines running across the building a little more than 6 ft. from the floor, but within easy reach of the operator. This hoist and

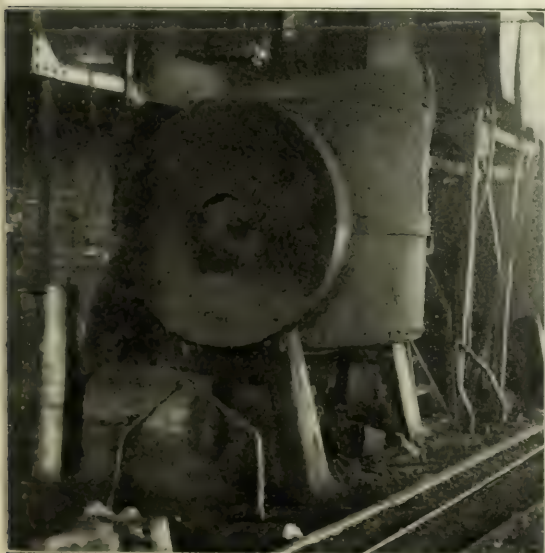


Canadian Pacific Car Wheel Foundry.

The cupolas each discharge into a tilting reservoir of about 10 tons capacity. They are operated by means of electric motors, a pinion on the motor armature shaft meshing with a large gear

traveler serve for the lifting of flasks and chills, the turning of the molds, the carrying of the ladles of hot metal to the molds and the removal of the wheels after they have been cast. The speed is about 200 ft. per minute and, as they can be operated from any point on the floor, it is not necessary that the men should follow either the metal or the wheel.

Along each side of the building there is an industrial track of 21 in. gage. That in front of the cupolas serves to carry the hot metal to the ends of the molding floors. On it there is a train



Tilting Reservoir and Motor.



Molding Floors in Car Wheel Foundry.

of 5 cars coupled together with bars that space them at about the same distance apart as the floors. This train is hauled to and fro by a cable passing around and over a drum at one end of the building, driven by an electric motor. The cars have a simple platform between the axles on which the ladle is placed. In loading, one car after another is run in front of the cupola, and as soon as all of the ladles are filled the train is hauled to the

contains two hoists spaced 4 ft. 6 in. from center to center to correspond to the distance between centers of the wheel pits. The wheels are picked up from the train by ordinary pitting tongs. They are closed by the falling of a toggle joint, as indicated on the skeleton illustration. The tongs are lowered into



Hot Metal Train.

floors that it is to serve. The ladles are transferred to the molds to be poured by the overhead lorries, and the train stands until all of the ladles are returned, when it is run back to the cupola for refilling.

The track on the other side of the building is used for carrying the hot wheels from the floors to the annealing pits. Each car has a rack upon which the wheel rests, and upon which it is placed by the overhead lorry. The train runs down to the end of the nest of annealing pits where the wheels are lifted off by an overhead crane and put in the pits. It is operated by a con-



Annealing Pits.

the hole in the hub and the toggle is raised, then as the stress is applied to the lifting cable the toggle closes and the lower arms of the lever open out into the wheel and grip it. When the wheel is lowered into the pit and the hoisting cable is slackened the toggle straightens by dropping and as its joint passes a little below the center line the upper arms are held apart and the lower drawn together so that they can be withdrawn from the wheel.

In handling the wheel from the floor to the pits, the sprues are knocked off and the cores driven out by hand. This is done after the wheels are placed on the industrial cars.

As the pitting crane has but two hoists, it follows that but two



Wheel Truck.

trolley on the side wall and a distance from the floor, while the hot metal line is controlled from the same elevated platform as the storage reservoir. There are 4 cars in the wheel train whose general construction is shown by the illustration. They are spaced the same distance apart as the floors, though the car is smaller and the connecting rail longer than for the hot train cars. The pitting crane is one of 3,000 lbs. capacity, whose car sage



Hot Wheel Train.

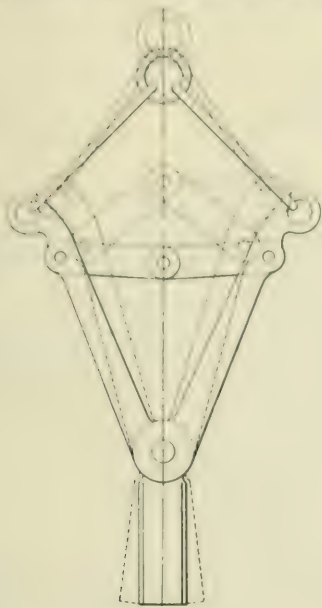
lines of pits can be served at once. Of course, the crane spins the whole. There are 6 rows of pits, with ten pits in each of two rows and eleven in each of the other four, making 64 in all. As each pit will hold 25 wheels the total capacity is 1,600 wheels.

When the wheels are removed from the pits they are laid on a four-wheeled truck similar to the one illustrated. They rest on

the back of the handle, which can be raised so as to stand the wheel up in its row. The wheel is then cleaned and rolled out on the shipping floor at the end of the building. This covers the mechanical features of the foundry.

FORMER FOUNDRY PRACTICE

At the time of the starting of the work, very little regard was paid in any quality to the scientific aspects of wheel making.



Pitting Tongs.

The results such as they were, were obtained by the use of purely empirical methods. The charges were made up of certain proportions of selected brands of pig iron and car wheel scrap, sole reliance being placed upon the reputation of the brand and the appearance of its fracture. This gave satisfactory results for a number of years, so long as the capacities of the cars under which the wheels were placed were comparatively low and the work demanded was not severe. But, when the car capacities were increased to those of the present day construction, and speeds were also raised, the wheel showed that it was too weak for the requirements and considerable trouble ensued. It was then that attention was turned to the improvement of the quality of the wheel and the present foundry practice was evolved.

PRESENT PRACTICE.

Pig Iron.—Car wheels cannot be made from any grade of pig, and that used at present is the Deseronto and Hamilton bessemer and Midland. The Deseronto is a charcoal iron made at Deseronto, Ontario, from Lake Superior ores. An average analysis of this pig may be taken to be about as follows:

Silicon	1.50 per cent.
Manganese	.61 "
Sulphur	.02 "
Phosphorus	.32 "

In it the range of content of these elements is that the silicon runs from 1.00 to 1.73 per cent.; the manganese from .40 to .80 per cent.; the sulphur from .01 to .03 per cent., and the phosphorus from .165 to .34 per cent.

The Hamilton bessemer pig is made at Hamilton, Ontario, from hematite ores from the Mesabi range and is a coke iron. An average analysis of this iron is about

Silicon	1.78 per cent.
Manganese	.68 "
Sulphur	.025 "
Phosphorus	.185 "

The range of these impurities is from 1.19 to 2.06 per cent. for silicon; from .49 to .77 per cent. for manganese; from .017 to

.031 per cent. for sulphur, and from .163 to .229 per cent. for phosphorus.

The Midland iron, which is used in such quantities as are obtainable, analyzes about as follows:

Silicon	.94 per cent.
Manganese	.80 "
Sulphur	.02 "
Phosphorus	.32 "

The range being from 1.45 to 1.82 per cent., for silicon, from .35 to .50 per cent. for manganese, from .02 to .06 per cent. for sulphur, and from .07 to .11 per cent. for phosphorus.

Silicon and Manganese.—The points that are especially watched in making up the charges are the silicon and manganese content. This varies from practice at other places where it is the silicon and combined carbon that are given attention. The reason assigned for disregarding the carbon and directing attention to the other two impurities is that the combined carbon is a rather difficult element to control, that it is influenced by the sulphur, and that it will take care of itself. The softening effect of silicon makes it necessary that it should be watched very carefully, while the hardening effect of an excess of manganese, or even of its absence, in the extreme, make it necessary that it should be confined to rather narrow limits. It is well known, too, that both the manganese and the silicon helps to cut into the sulphur, while the former also has an important influence in steadying the shrinkage and keeping up the strength to the proper point. That it may do this to the best advantage it should be held at from .45 to .50 per cent. in the finished wheel. If it varies much from this in either direction the metal will become hard and brittle. This will occur if it goes up to from .65 to .70 per cent. or drops below .40 per cent. But between .45 and .50 per cent. there is no bad effect. To hold it there, then, with pigs whose content varies from .30 to 1.50 per cent. requires care and watchfulness in the selection of the metals that go to make up the bed and subsequent charges.

Phosphorus.—Then in the matter of phosphorus it has been found that it varies but little if any in going through the cupola, so that if the irons are properly proportioned in the charges it is tolerably certain that a uniform result will be obtained. At the Canadian Pacific foundry it has been found best to keep the phosphorus at about .30 per cent. The upper limit has been placed at .35 per cent., which, in reality .33 per cent., is as high as it should go. The reason for this is the influence of phosphorus on the shrinkage as well as the strength of the wheel. This latter varies inversely as the phosphorus content. An excessive amount of phosphorus in a mixture whose other elements are normal, has a tendency not only to decrease the shrinkage, but the strength of the mixture as well, while with a very low amount of phosphorus under the same conditions the shrinkage is excessive without noticeably effecting the strength.

Sulphur.—The sulphur not only weakens the wheel when it is in excess, but also has a tendency to raise the combined carbon. At Montreal great watchfulness has to be exercised in this matter because of the high sulphur content of the coke that is used. After trying several brands the Vinton coke, made by the Vinton Colliery Co. of New York, was adopted. It is made from Cambria Co., Penna., coal, mined at the Vintondale colliery, and an average analysis would be about as follows:

Fixed carbon	91.19 per cent.
Volatile matter	.75 "
Sulphur	1.04 "
Ash	6.62 "
Moisture	.40 "

100.00 per cent.

It is generally expected that the sulphur in the iron will raise about .03 per cent. by the use of this coke, although this may increase to .08 per cent., depending upon the amount in the coke. As a fuel it is a good melter and burden bearer as the results obtained will show.

Desired Analysis.—When all of these things are taken into

consideration, the analysis that it is desired to obtain in the wheel is that the limits should be

Silicon	From .55 to .70 per cent.
Manganese	43 " 32 " "
Phosphorus	28 " 33 " "
Sulphur, not above	17 " "

To do this the composition of all irons used should be known. Of course this is out of the question with the scrap, but for the pig metal it is possible. For that reason an analysis is made of a sample taken from each carload and that carload is piled by itself to be used as directed by the superintendent. In this

is desired for the wheel is that already given. As to how closely this result is attained is shown by an average of light wheels taken at random. These analyses averaged:

Silicon .....	.68 per cent.
Manganese .....	.49 " "
Phosphorus .....	.396 " "
Sulphur .....	.162 " "

The reason for cutting down the sulphur is that an excess weakens the wheel, and also cuts down the manganese because of its affinity for it, forming sulphide of manganese, a part of which passes off in the slag.

CANADIAN PACIFIC RAILWAY COMPANY																
ANGUS SHOPS.																
Montreal, <i>Sept. 2</i> 19 <i>10</i> .																
MIXTURE FOR CUPOLA CASTINGS																
Car Number.	Brand.	Pounds per Charge.	Per cent.	% Silicon.	Pounds of Silicon.	% Manganese.	Pounds of Manganese.	% Sulphur.	Pounds of Sulphur.	% Phosphorus.	Pounds of Phosphorus.	Grade.	Grade Units.	Cost 100 Lbs.	Total Cost.	
83113	Deseronto	300		1 70	5 10	86	2 58									
77530	"	400		1 24	4 96	40	1 60									
554085	Hamilton	350		2 00	7 00	63	2 20									
33234	"	200		2 42	4 84	60	1 20									
145656	"	300		1 92	5 76	72	2 16									
25318	Silicon	35		9 48	3 32	1 81	63									
	Old Wheels	5600		60	33 60	50	28 00									
	Scrap Metal	465		65	3 02	30	1 40									
	" Steel	350		10	35	40	1 40									
	Manganese	20				80	16 00									
TOTAL POUNDS		8020			67 45		57 17									
Gross Per Centage					847		712									
Loss by Oxidation (Estimated)					20%		30%									
Net Per Centage (Estimated)					677		448									
Net Per Centage (by Analysis)																

Record of Cupola Charges.

analysis only the manganese, silicon, sulphur and phosphorus are taken, the carbon both combined and graphite being neglected.

Ratio of Coke to Iron.—In making up the charges the ratio of coke to iron in the bed is about as 1 to 1.9, while for the subsequent charges it is as 1 to 10. In case the total melt is 120 tons, made up of 4-ton charges, the total ratio of coke to iron for the whole would be about 1 to 8.7, a figure that denotes careful melting.

Method of Making Charges.—The method of making these charges and keeping a record of them is shown in the two report blanks. It will be noticed that the gross percentage of silicon in the first two charges is markedly lower than in the following ones. This because it has been ascertained that the impurities of the first two do not vary much in their passage through the cupola, so that a different mixture is used at first than for the later charges. These records are kept for every heat as shown; although the blank has space for a similar estimate of the sulphur and the phosphorus, they are disregarded in detail though taken very carefully into consideration in the general make-up of the charge. In this, care is taken that the phosphorus does not run above 29 or 30 per cent and the sulphur above 13 or 14 per cent, thus to permit the latter element to rise in the cupola to not above .17. The analysis that

As an indication of the probability that this has to do with the quality of the wheel, the analyses of two rejected wheels are given, wherein it will be seen that the sulphur alone was the only abnormal element.

Silicon .....	.69 per cent.	.59 per cent.
Manganese .....	.40 " "	.48 " "
Sulphur .....	.20 " "	.319 " "
Phosphorus .....	.327 " "	.305 " "
Combined carbon		1.13 " "
Graphitic carbon		2.40 " "

Such results as these show that the cupola practice is exceedingly good.

Blast.—In this cupola practice, the coke stands about 67 in. deep over the tuyeres, and the blast cannot be varied. It is kept at from 8 oz. to 9 oz. per sq. in. for the whole heat. Under ordinary working conditions the blast is put on at 9.15 in the morning, and the first wheel is cast at about 10 o'clock and by 3.45 p. m., at the latest, everything has been poured. This gives a rate of about 55 wheels per hour from the time of the first casting.

Pouring.—The pouring is conducted very systematically. The reservoir ladle has a capacity sufficient to hold the metal for 30 wheels. After it has been filled, metal for 15 wheels is taken out and used, leaving enough in the reservoir for five more. It is then refilled, and again 15 wheels are poured, and thus

routine is continued without variation until the end of the heat. The object of this is to make it possible to treat any tapping in the ladle and be sure that the wheels poured subsequent to that treatment shall be of the same character.

Depth of Chill.—Whether the ladle shall be treated or no depends upon the character of the chill in a test piece that is poured immediately after the tapping. These test pieces are a little smaller than those used in other places, and measure $1\frac{1}{2}$ in. by 2 in. by $6\frac{1}{2}$ in. The chill is made along the $1\frac{1}{2}$ in. by 6 in.

being considered that as good results are obtained, both as to roundness and uniformity of chill, as where contracting chills are used, regardless of the type.

Annealing Pits.—When cast and shaken out the wheel is taken to the annealing pits as already described. These pits differ somewhat from those usually employed. In the first place they are deeper, having a capacity of 25 wheels each. After they had been in service for some time it was found that the wheels did not cool rapidly enough and so ventilating pipes were

CANADIAN PACIFIC RAILWAY COMPANY															
ANGUS SHOPS.															
MIXTURE FOR CUPOLA CASTINGS															
Car Number	Brand	Pounds per Charge	Per cent.	% Silicon	Pounds of Silicon	% Manganese	Pounds of Manganese	% Sulphur	Pounds of Sulphur	% Phosphorus	Pounds of Phosphorus	Grade.	Grade Units.	Cost 100 Lbs.	Total Cost.
327	Hamilton Cast	400		1.79	7.16	.69	2.76								
3219	"	300		1.82	5.46	.73	2.19								
36324	"	500		1.51	7.55	.71	3.75								
	all wheels	5800		.60	34.80	.50	29.00								
	Scrap Metal	700		.65	4.55	.30	2.10								
	" Steel	300		.10	3.0	.40	1.20								
	Manganese	19				.80	15.20								
TOTAL POUNDS		8019			59.82		56.20								
Gross Per Centage					.745		.70								
Loss by Oxidation (Estimated)					28%		30%								
Net Per Centage (Estimated)					.596		.49								
Net Per Centage (by Analysis)															

Record of Cupola Changes.

side and it has been found that the chill of the wheel averages about .8 of that on the test piece. Of course the depth of chill in a wheel varies, even with the same iron, with the weight of the wheel and the shape of the pattern. Even the addition of so small a detail as a single bracket will have its effect on the chill. The allowable variations for the several weights of wheels on the Canadian Pacific are

8-lb. wheel	.25 in. to .75 in.
6-lb. "	.25 " .875 "
7-lb. "	.375 " .875 "

Ladle Treatment.—The ladle treatment consists in the addition of ferro-silicon or steel punchings, according to whether the chill is to be lowered or raised. Each of these ingredients are added in definite quantities and a record kept of what is done, and after a treatment has been added to the reservoir, a chill test is made from the metal to be used in the next wheel to be cast and is taken from the small ladle from which it is to be poured. A record of this is also kept.

Wheel Cores and Chill.—The method of conveying the metal from the cupola to the floor has already been described. The pouring is, of course, done by the molder himself. The wheel cores are of the ordinary character in which flour and clay wash are used as binders. The chill is the simple cast iron ring with no attempt to introduce a contracting feature; it

added, as it was undesirable to cut down the capacity. These pipes, which may be seen projecting above the ground in the illustration of the pit floor, are about 7 in. in diameter. They are located in the space between each group of four pits and extend down and are connected to the bottoms of the pits, giving an opportunity for the hot air to escape. This was probably rendered necessary, not so much because of the depth and capacity of the pits, as because the lower ends are embedded in a clay that bakes hard and retains the heat.

The opening of this ventilating duct into the bottom of the pit and its probable admission of cold air against the lower wheels of the pile, produces no bad effects that careful inspection and watchfulness have been able to detect. Whether from this cause or no is not known, but the period of cooling is somewhat shorter than that used elsewhere, as it is but four days. The wheels, when removed from the pit, are quite hot and are allowed to stand for 24 hours before cleaning, as they are too warm to handle. After cleaning they are rolled out on the shipping platform.

RECORDS AND CHECKS.

This, then, is a brief outline of the methods employed at Montreal in the making of a car wheel. It is based upon the assumption that the chemical composition of a wheel has much

to do with its physical qualities, and is a most important factor to be considered. The system was introduced after a long period of practice under the empirical method of working by brands and the general appearance of the fractures of the pig metals. The immediate cause of the abandonment of this old method was the making of a bad lot of wheels from the regular brand mixtures, wherein several car loads had been dumped

MOULDERS CARD

FLOOR NO. 3DATE CAST July 7/1910MOULDER BoyleHELPER Amara

NO. CAST	DIAM.	WEIGHT	CENTER CORE	PAN CORE	CLASS OF WHEEL				
20"	33"	690 [*]	6"	9"	Standard Int				
ORDER POURED LADLE NUMBER TAP	WHEEL NUMBER				ORDER POURED LADLE NUMBER TAP	WHEEL NUMBER			
20 12 S	X 1 4 2 4 0 0				10 14 I	X 1 4 2 4 1 0			
19 7 S	01				9 9 I	11			
18 2 S	02				8 4 I	12			
17 12 R	03				7 14 H	13			
16 10 O	04				6 11 D	14			
15 5 O	05				5 6 D	15			
14 4 N	06				4 1 D	16			
13 10 N	07				3 11 C	17			
12 5 N	08				2 6 C	18			
11 4 J	09				1 2 C	19			

Card Kept by Molder.

together, samples from which were found to contain from .50 per cent. to 2.50 per cent. of silicon, due solely to furnace variations. This change of method was made in 1908, and it is considered that the records already prove the move to have been a wise one, as will be shown directly.

As car wheel making has not yet been resolved into an exact science where every step has been proven to be correct, but is still susceptible of improvement, it is necessary that the proper data should be kept for future reference so as to show whether or no any general practice or any detail of that practice is faulty, or what it should be.

Acting on this principle the records of the Canadian Pacific foundry and of the wheels in service afterwards are probably the most complete and comprehensive of any road on this continent. Every wheel is watched from the cradle to the grave; from the time the metal of which it is composed is thrown into the charging door, until at the end it becomes scrap to start the cycle afresh.

We have seen how carefully the composition of the charges is regulated, how the metal is tapped from the cupola in quantities sufficient to make 15 wheels, and how the chill test pieces serve to indicate the ladle treatment that the metal should receive. The charges are known and recorded on the forms already alluded to, and when they are melted and ready for pouring another series of records are started.

Molder's Card.—In the first place, at the commencement of the day's work, each molder is handed a card form on which are written the numbers of the wheels that he is to set upon his floor. There are usually 30 of them, and, in the case shown, they run from 112490 to 112419 inclusive. In the small column to the left he writes down the order in which he pours the

wheels; which, in this case, shows the one with the highest number to have been poured first. At the head of the card are written the date of pouring, the names of the molder and his helper, the floor number, the wheel's class and the main dimensions. Then, there are two other columns headed Ladle Number and Tap, the use of which will shortly appear.

In order to retain these records and avoid the bulk that they would occupy as well as the trouble that a search for any particular wheel would involve, they are copied into a regular book of forms as shown in the engraving.

Tap Card.—The other record that is kept in the foundry is the tap card, which is made out by a clerk who is stationed at the cupola during the whole of the pouring. It will be remembered that there are 15 floors in the foundry, which are numbered from 1 to 15. Columns on the form are headed with these numbers respectively. These are cross divided by horizontal rows, with a letter at the left to signify the tap. Letters are used because of the great demand for figures in the records and for the sake of clearness. These tap symbols run from A to Z though they are not all used. Next to the Tap column are two for the chill tests that are made from the reservoir or large ladle and the small ladle respectively. The former is from the metal as it comes from the cupola and the latter from the small ladle after the metal in the large one has been treated, and is in this instance usually a little lower. The fourth column,

(5-509-15172)

CANADIAN PACIFIC RAILWAY ANGUS WHEEL FOUNDRY

MONTREAL,

WHEEL RECORD

July 7, 1910
690[#]

WHEEL Nos.	Tap Letter	Tap Size	WHEEL Nos.	Tap Letter	Tap Size
X14240	12S	2	X14241	14I	1
1. 7S	2		1. 9I	2	
2. 2S	2		2. 4I	3	
3. 12R	2		3. 14H	3	
4. 10O	2		4. 11D	3	
5. 5O	1		5. 6D	3	
6. 4N	1		6. 1D	4	
7. 10N	2		7. 11C	3	
8. 5N	3		8. 6C	4	
9. 4J	2		9. 2C	3	
0			0		

Part of a Sheet from the Book Showing Molders' Record.

Temperature of Iron, is an observational record by the man in charge and is not a pyrometric measurement.

Then follows the main detailed record of the wheels as they are cast. As there are 15 wheels cast from each tap they are numbered from 1 to 15 respectively, according to the order in which the metal composing them is drawn from the main reservoir. But as there are but 10 digits in our system of numeration, five extra symbols have been adopted as indicated on the engraving, to represent the ladies numbered from 11 to 15 inclusive. This is to avoid the possible confusion that might arise from the repetition of a digit. For example, according to the symbols, 13 and 14 represent the first and third and the 13th ladle from a tap. There can be no mistake, whereas it might easily occur if both were written 13.

Starting then with the first ladle drawn from any tapping, its

number is placed at the left of the floor column, to which it is delivered. And this is followed by others in order. For example, it will be seen that Floor 5 received the 1st, 8th and 13th ladle from tap C, and the 3rd, 8th and 13th from tap D, and so on. Those taken from left to right and from top to bottom will evidently give the order in which the several ladles were delivered to the floors. Then by taking the form already described on which the order of pouring on each floor is given, it is a simple matter to determine from what particular ladle and from what tapping any wheel number has been poured. In the case of Floor 5, the first wheel poured was from the second ladle of tap C.

This is determined by following down the column under Floor No. 5, on the Tap Card and taking the first figure to the left, which is 3 on the 2nd of tap C. Then follow the other wheels in succession in their order of pouring. This definitely settles the ladle from which each wheel is poured.

The details of its composition and chill depth are also written on the card. It will be seen that above a large number of the ladle figures, small horizontal lines are drawn. Each of these indicate that 2 lbs. of steel punchings were added to the ladle. Had silicon been added, there would have been an x for each $\frac{1}{4}$ lb. As it was, for this particular heat the silicon was evidently high and the steel was added to cut it down.

In the columns at the right there are given the total number of wheels cast from each tapping, and the amount of silicon, manganese and steel punchings in pounds that were added to both the large and the small ladles. And, when fully filled out, the consumption of iron and coke, as well as the record of the cupola work, also appears.

Daily Record.—When the wheels are on the shipping platform they are taped for circumference and the tape number recorded for each number. These three records are then combined on the Daily Record. The order sheet gives the weight of wheel for each number. Then, on the Daily Record we have the ladle and tap number for the wheel, its weight, and the ladle treatment to which its metal was subjected.

For example, take wheel 142415 from the molder's record. It was the sixth wheel poured from the D tapping; it had 8 lbs. of steel punchings added to its ladle; it weighed 690 lbs.; its tape number was 3, while the depth of chill for the two test pieces was 1.15 in. and 1.10 in. respectively.

If then anything ever happens to that wheel, whereby it becomes desirable to know its record, there it is.

Utility of These Records.—It may be urged that the keeping of such a record involves an unnecessary amount of labor, and that so few of these records will be required that the bulk of the whole becomes useless. To this contention the reply is that the record is not made for to-day. The cast iron wheel is conceded not all that could be desired, but the possibility of improving it is also conceded. If, then, it is desired to make a study of failures, and it is found that, in a large number of similar defects, the foundry treatment was the same and yet

differed slightly from the average, it will be a fair presumption that that particular method of treatment should be avoided for the good of the wheel and may indicate the path along which a method for a general improvement should be sought.

Daily Record.—In order to keep track and show clearly the run of the practice in the foundry, a daily record is compiled from those already indicated, supplemented by further examinations and tests of wheels selected for the purpose. At the head of the sheet there are brought together into compact form the treatments, for each tapping, that have been given to the large (B) and small (S) ladles in the additions of silicon, man-

TAP CARD

July 7, 1919

CHILL TESTS			FLOOR NUMBERS															SILICON		MANGAN.		STEEL		REMARKS
TAP	Large	Small	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Large	Small	ESB	ESB	ESB	ESB	
			30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	
A	1.25	1.20	448														15						48	
B	1.20	1.05															15						86	
C	1.10	1.05	318	334	334	334	334	334	334	334	334	334	334	334	334	334	15						88	
D	1.15	1.10	334	334	334	334	334	334	334	334	334	334	334	334	334	334	15						92	
E	1.35	1.30															15						120	
F	1.20	1.15															15	25					80	
G	1.10	1.05															15	20					64	
H	1.10	1.10															15	15					92	
I	1.20	1.15															15						100	
J	1.20	1.15															15	10					96	
K	1.20	1.15															15	10					120	
L	1.15	1.15															15	10					100	
M	1.25	1.20															15	10					72	
N	1.30	1.25															14	15					92	
O	1.20	1.15															15	25					76	
P	1.20	1.15															15	20					96	
Q	1.15	1.15															15	25					64	
R	1.10	1.15															15	20					40	
S	1.25	1.20															15	25					80	
T	1.25	1.20															11						48	
U																								
V																								
W																								
X																								
Y																								
Z																								
TOTAL																								
			X - 1/2 LB. POWDERED SILICON - 2" STEEL PUNCHINGS O - 10TH. LADLE L - 11TH. "															L - 12TH. LADLE E - 13TH. " b - 14TH. " B - 15TH. "		NO. TONS IRON " " COKE BLAST ON 9.20 A.M. FIRST IRON 10.17 A.M. BLAST OFF 4.12 P.M. LAST WHEEL POURED 4.32 P.M.				

Tap Card Showing Ladle Treatment.

ganese and steel punchings. Then follows statements as to the chills and test bars. The mixtures used in the cupola are recorded, with an analysis of the mixture. Analyses of the wheels that are withdrawn for the purpose are placed in the proper column, as well as the number of wheels tapped under the proper shrinkage number, and with reference to their weights. This is a most important feature, in that it shows at a glance the relations that exist between the mixtures, analyses, ladle treatments and shrinkages, as well as the physical character of the wheels as shown by the thermal and drop tests, a record of which is placed at the bottom of the page. The advantage of having all of this information upon a single sheet so that the eye can take it all in at once is self-evident, and needs no comment.

Rejected Wheel Record.—Finally there is a bad wheel report of wheels rejected from each floor with the name of the molder

STATEMENT OF WHEELS REMOVED DUE TO OPERATING DEFECTS.

650-690 lb., 33-in. wheels.

Year cast.	No. of wheels cast.	1st year.		2d year.		3d year.		4th year.		5th year.		6th year.		7th year.		8th year.		9th year.		10th year.		11th year.		12th year.	
		% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.
1900.	455	....	....	....	....	....	....	....	....	....	....	1.10	1.10	0.88	1.98	0.88	2.86	0.88	3.74	....	3.74	....	....	....	....
1901.	7,608	0.10	0.10	0.83	0.93	1.59	2.52	2.25	4.77	4.15	8.92	5.22	14.14	4.02	18.16	3.35	21.51	3.06	24.57	....	....	....	....	....	....
1902.	14,056	0.36	0.36	1.60	1.96	3.56	5.52	6.83	12.35	7.28	19.63	5.63	25.26	3.37	28.63	3.31	31.94	....	....	....	....	....	....	....	....
1903.	5,240	0.80	0.80	4.22	5.02	7.21	12.23	8.34	20.57	6.66	27.23	4.39	31.62	3.47	35.09	....	....	....	....	....	....	....	....	....	....
1904.	4,070	0.05	0.05	2.06	2.11	5.63	7.74	7.86	13.6	6.07	21.66	5.48	27.15	....	....	....	....	....	....	....	....	....	....	....	....
1905.	18,446	0.47	0.47	2.27	2.74	4.34	7.08	5.78	12.86	7.63	20.49	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1906.	15,770	0.71	0.71	2.67	3.38	3.97	7.35	5.75	13.10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1907.	15,288	0.61	0.61	2.40	3.01	5.10	8.11	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1908.	11,463	0.15	0.15	2.58	2.73	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1909.	67,826	0.50	0.50	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

Service Record of Wheels, Operating Defects.

the 7,378 wheels made, 3.25 per cent. were rejected for molding and foundry defects. The number of wheels tested also shows the thoroughness with which the inspection is carried out.

Wheels Made at Angus Wheel Foundry, August, 1910.

Date.	Accepted.	Tested.	Bad mold- ing.	Rejected (cupola).	Total made.
Aug. 1	272	5	17	1	295
" 2	273	5	13	3	294
" 3	276	4	10	...	290
" 4	281	3	3	...	292
" 5	278	3	14	...	295
" 8	279	5	8	8	295
" 9	271	3	10	11	295
" 10	283	5	6	1	295
" 11	284	4	5	2	295
" 12	266	12	7	10	295
" 13	282	6	3	...	296
" 15	284	6	6	...	296
" 17	265	16	6	9	296
" 18	284	6	1	5	296
" 19	275	13	...	3	296
" 20	284	5	4	3	296
" 22	285	5	5	...	295
" 23	281	4	11	...	296
" 24	264	11	13	3	296
" 25	286	6	4	...	296
" 26	295	4	7	...	296
" 27	277	8	10	1	296
" 29	286	4	5	...	295
" 30	283	7	5	...	295
" 31	291	3	2	...	296
Total	6,975	153	180	70	7,378
Average per day...	279	6	7	8	295

Wherever there is a suspicion that anything is wrong, the number of wheels withdrawn for testing is increased, and it is the intention to do this even more elaborately in the future, the object being to increase the safety and life of the wheels that

are put into service, rather than to make a good showing for the foundry.

Record of Wheel Failures.—So far these reports are of value to the men responsible for the technical details of the foundry work. But what of the management? These men cannot go into the details of the work. They want to know the results and the results only, and it is desirable to have them at the earliest possible moment. For purposes of simplification, all wheel failures are charged to manufacturers' defects and operation, regardless of the classifications of the M. C. B. Association. The manufacturers' defects are charged with all wheel failures and removals, except slid flat spots, worn and broken flanges, burst hub and brake burns. Broken flanges, cracked brackets and the like are charged to manufacturing defects, and the ratios are shown on the form illustrated.

At the upper left-hand part of the page there are the several manufacturers' defects shown for both the Canadian Pacific and miscellaneous wheels, in which the number of wheels removed with their average life is given. The same data appears at the right for the operating defects. This same information is given at the bottom as applied to the several divisions of the road so that it is possible to compare the work that the wheels are doing in different sections and determine the effect of local conditions.

Then there are two more reports of wheels removed for manufacturers' and operating defects that are considered to show at least as early as the end of the first year the effect of any change in the general run of the foundry practice. They show

STATEMENT OF WHEELS REMOVED DUE TO MANUFACTURERS' DEFECTS.

650-690 lb., 33-in. wheels

Year cast.	No. of wheels cast.	1st year.		2d year.		3d year.		4th year.		5th year.		6th year.		7th year.		8th year.		9th year.		10th year.		11th year.		12th year.	
		% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.	% Def.	Tot'l %.
1900.	455	....	....	....	....	....	....	1.37	1.37	0.49	1.86	....	....	1.86	....	1.86	1.47	3.33	1.47	4.8	0.6	5.3	....	....	....
1901.	7,608	....	....	0.98	0.98	3.12	4.1	4.75	8.85	4.9	13.7	4.35	18.0	2.7	20.7	2.25	23.0	2.2	25.2	....	....	....	....	....	....
1902.	14,056	0.26	0.26	3.56	3.82	5.18	9.0	5.2	14.2	4.75	18.9	3.55	22.5	2.6	25.1	2.25	27.3	....	....	....	....	....	....	....	....
1903.	5,240	0.19	0.19	2.5	2.69	3.46	6.15	3.9	10.2	2.8	12.8	2.8	15.6	2.08	17.7	....	....	....	....	....	....	....	....	....	....
1904.	4,070	....	....	0.7	0.7	0.95	1.66	2.0	3.66	3.94	6.6	2.2	8.8	....	....	....	....	....	....	....	....	....	....	....	....
1905.	18,446	0.12	0.12	1.43	1.55	2.3	3.85	3.7	7.55	3.76	11.3	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1906.	15,770	0.14	0.14	1.56	1.7	2.6	4.3	3.3	7.6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1907.	15,288	0.35	0.35	2.35	2.70	4.1	7.1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1908.	11,463	0.66	0.66	0.88	0.64	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1909.	14,436	0.10	0.10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....

Service Record of Wheels, Manufacturers' Defects.

the percentage of wheels removed of each year's cast at the end of each year. If, then, any year's cast shows a lower percentage of removals in any year relatively to another, it is argued that the wheels were better in the year of the lower percentage.

this new standard. When it is considered that, at the end of two years, the wheel removals for manufacturers' defects were less than 25 per cent of what they were of the output of the year before, the road has every reason to be satisfied with the

[illegible]

Daily Record of Wheels Cast, Mixtures, Analyses and Tests.

This record has now been kept for ten years, and by referring to the report on manufacturers' defects it will be seen, at once, that the wheels cast in 1904 were evidently superior to those cast immediately before or after.

THE RESULTS OF SCIENTIFIC METHODS.

Applying this test let us see what the change from the rule-of-thumb to the scientific method has produced, the change from mixtures by brands to mixtures based on chemical analysis.

The advanced method was introduced in 1908, and the drop in removals for the first and second year of life is almost startling, and the wheels for 1909 promise to maintain the record of

new method and is equipped with a strong argument for its continuance.

It will be seen, then, that these reports cover the whole range of information that it is necessary to have for an intelligent prosecution of the work. They keep the foundryman posted from day to day as to the effect of his practices and the results that are obtained, while the management, upon whom the final responsibility rests, can see the warrant for a continuation of the force and the authorization of the expense that is involved in truly scientific wheel making, which in this case, at least, is returning a manifold profit.

Shop Hints.

BY JOHN HOWE,

Draftsman, Chicago, Burlington & Quincy, St. Joseph (Mo.) Shops.

LONG STROKE AIR HAMMER.

A staybolt breaker made of 5-in. pipe was illustrated in the *Railway Age Gazette* of January 7, 1910, page 33. The smaller air hammer here shown (Fig. 1) is made of 2½-in. pipe, and was designed by E. C. Schoen, Chicago, Burlington & Quincy

inlet *E* and through the ⅝ in. space at the top of the piston valve and the outlet *F* to the front end of the hammer. The exhaust air passes through the outlet *G* into the atmosphere at *M*; the coil spring holding the valve in this position. For the driving stroke the operator pushes down the piston valve and live air enters the inlet *E* and passes through the outlet *G* into the back end of the hammer, driving the piston forward. The ex-

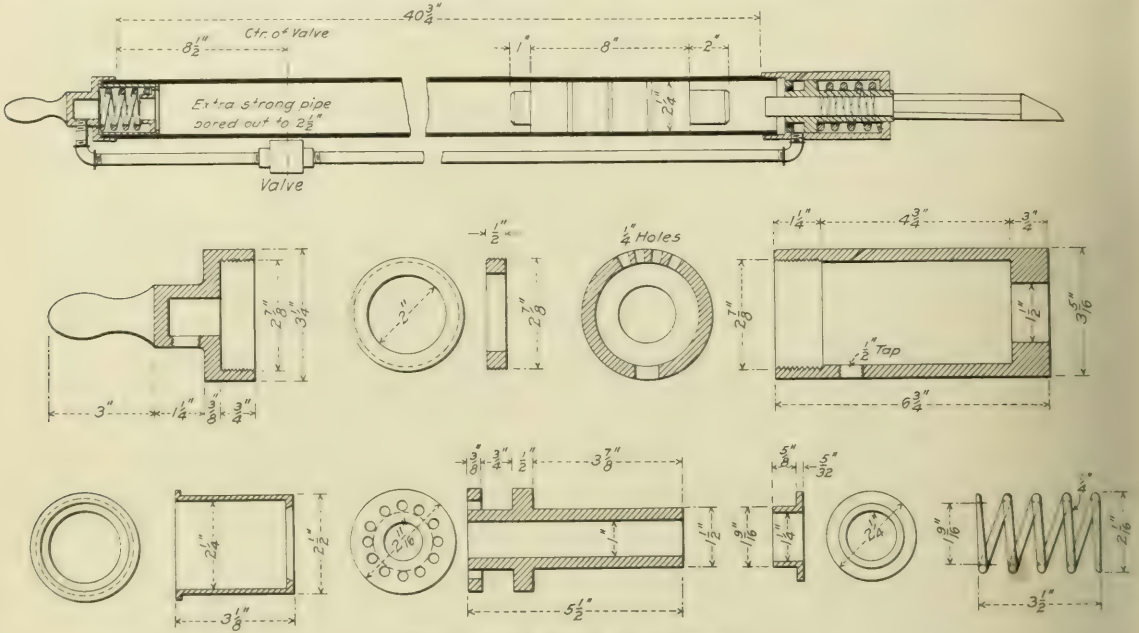


Fig. 1—Long Stroke Air Hammer.

shops, St. Joseph, Mo. It is intended for cutting rivets up to ¾ in. in diameter. By actual test it will cut ¾-in. rivets with six strokes and ½-in. rivets with one or two strokes. It is operated by a push button valve which controls the delivery of the blow; the piston returns automatically. Section AB (Fig. 2) shows the valve in the position for returning the piston to the back end of the hammer; the live air passes in the

haust passes through the outlet *F*, into the valve and to the atmosphere through the exhaust holes *H*.

COCKFIELD & HOWE RADIUS LINK PLANER AND GRINDER.

This machine (Fig. 3) is especially adapted for planing and

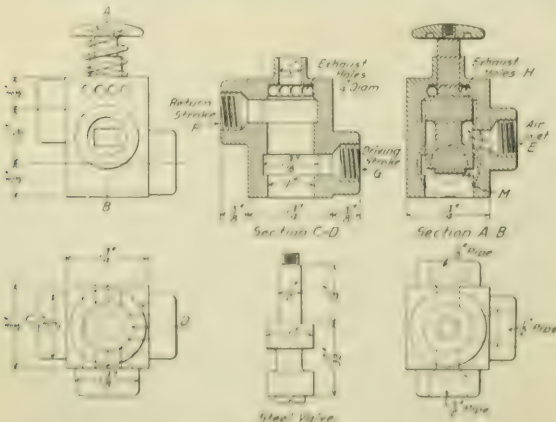


Fig. 2—Automatic Valve for Long Stroke Air Hammer.

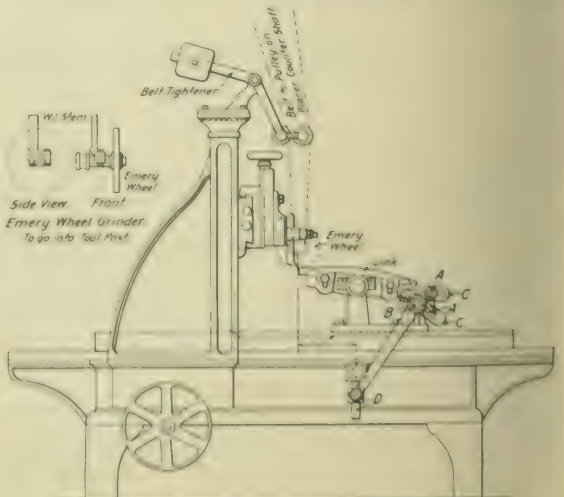


Fig. 3—Radius Link Planer and Grinder.

grinding locomotive bolts and blocks. It feeds both straight and curved surfaces of any rod from 34 in. to 3 straight line. When continuing rod A is turned in the center of B by moving it at the end C, it will plane or grind straight. Move the rod A at both ends and turning on the right in the slot C, and it will plane or grind curves. Move the rod to the left and it will plane corners. The further the rod is from the center where was the handle the radius becomes. The bottom end of A is roller up and drives on post D. The machine is mounted at the end of an ordinary planer and moves with the table.

BY E. J. COOK.

Locomotive Car Department, South Shop, St. Louis, Mo.; Western, Post Office, Ark.

ROLL-UP BENDING DIE.

In the photographs, Figs. 4 and 5 are shown two views of a roll-up die used on an Atax bull-dozzer for forming sill steps.

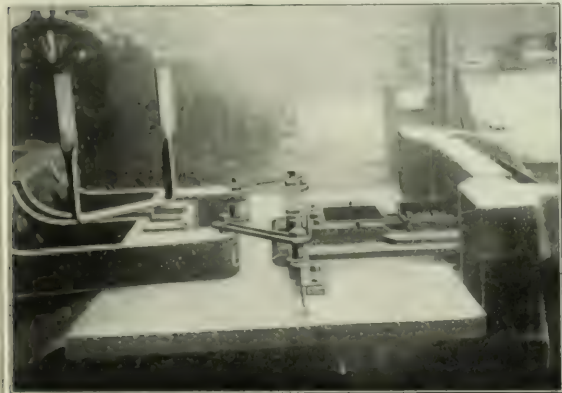


Fig. 4—Dies in an Open Position.

Fig. 4 shows the dies open after having formed the step. By reference to Fig. 5 it may be seen that the jaws of the female die are much wider than the male die—plus twice the thickness of the metal, as is usually the case. The female die bends the

iron by carrying the two arms from their position in Fig. 4 to that shown in Fig. 5. The point at the end of rods at the same time. The two metal loops serve to bring the bending arms back to position for another stroke. This machine will bend from 20 to 30 sill steps per hour, making one at each revolution of the machine.

IRON ROLL-HOOK MACHINE.

A bending machine for forming coal gate hooks is shown in Figs. 6 and 7. The female die is carried by the power rod of the 12 x 14-in. cylinder, and the two dies which form the hook the pin on which these formers revolve is another pin in the bed plate. Fig. 6 shows the dies open and the piece of round iron, pointed on one end and slightly bent on the other, in position. Fig. 7 shows the dies opened slightly after the hook revolve about the heavy pin in the table. A few inches from is bent. The metal loops serve to draw the dies open again as the female die recedes. This machine is a great labor saver, turning out from 30 to 40 hooks per hour.

JACK BUGGY.

An iron buggy, used for handling a 290-lb. jack, is illustrated in Figs. 8 and 9. The ends of the fork or claws are turned up slightly to prevent the jack from slipping. The wheels have

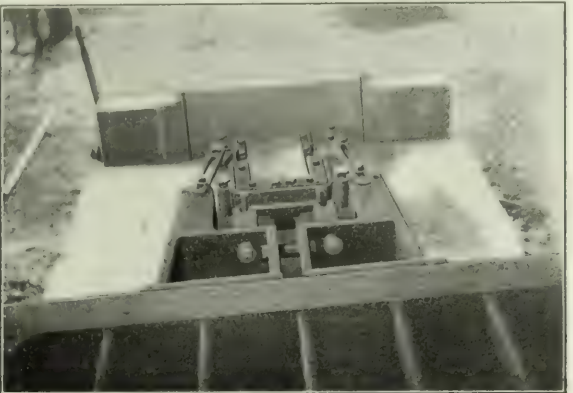


Fig. 5—Dies Opening Up After the Step Has Been Formed.

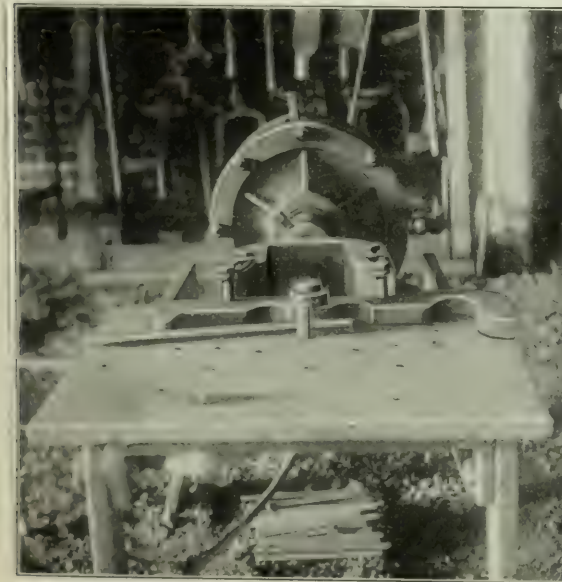


Fig. 6—Material in Position Ready to Bend Coal Gate Hook.

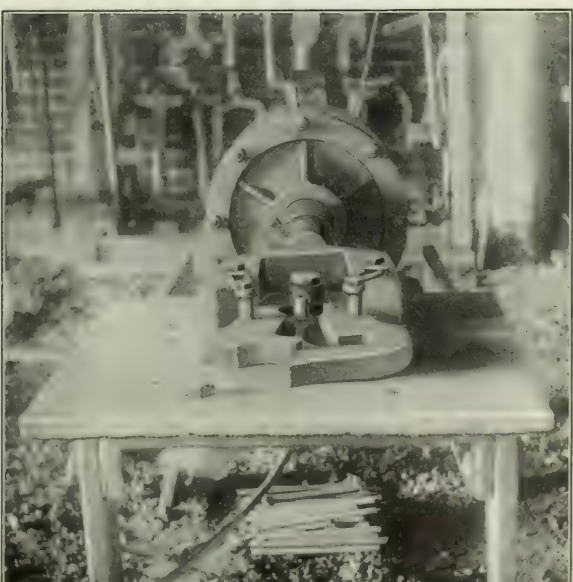


Fig. 7—Dies After Coal Gate Hook Has Been Formed.



Fig. 8—Lifting the Jack on the Buggy.



Fig. 9—The Jack in Position on the Buggy.

wide treads, but are not heavy. One man can easily handle a jack with this buggy. It is made high to permit placing the jack upon a 16-in. block direct from the buggy.

BY FRED BENTZ.

Tool Room Foreman, Southern Pacific, Bakersfield, Cal.

HYDRAULIC JACK VALVE FACER.

A tool for refacing worn valves of hydraulic jacks is shown in Fig. 10. It consists of two steel blocks, held between the jaws of a vise and guided by the dowel pins. The cutting edges, indicated on the plan view, extend along the conical surface of

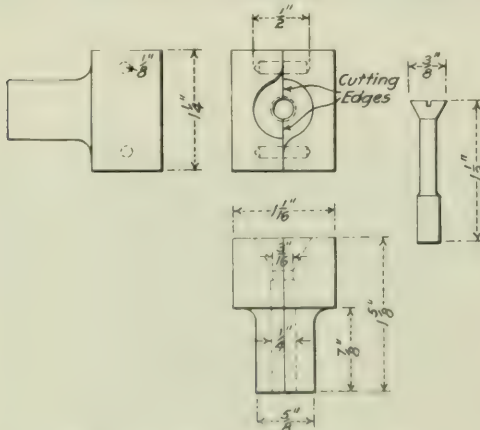


Fig. 10—Hydraulic Jack Valve Facer.

the bore through the block, clearance being provided by filing a radius on each block, as shown. For facing, the valve is placed in the bore of the blocks and revolved by a screw driver attachment in a breast drill. Only a few seconds are required to face a valve, which operation may be repeated four or five times before it is worn out.

BOILER CHECK REAMER.

A hand reamer for refacing worn seats of boiler check valves is shown in Fig. 11. The check, outlined in the illustration, for which this reamer was designed, has a flat seat, the outside diameter size of which is the same as the diameter of the hole in the check body through which the cutter must be inserted. It is necessary, therefore, to have an offset cutter so

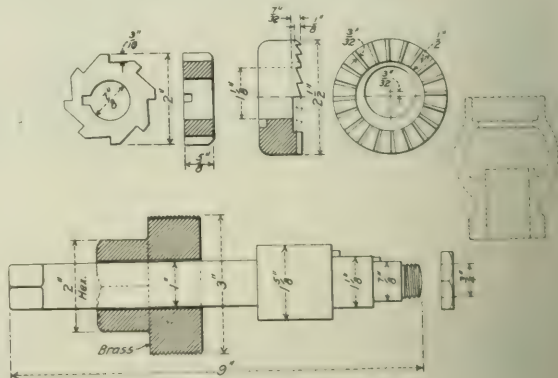


Fig. 11—Boiler Check Reamer.

spindle. There are two cutting tools, both of which are used at the same time. The $2\frac{1}{2}$ -in., or main seat cutter, is offset $3\frac{1}{32}$ -in. The 2-in. cutter, which removes scale from the bore of the valve below the seat, also acts as a guide for the spindle. The reamer is operated with a ratchet or single end wrench.

BACK FACING TOOL.

It is often advantageous to have a tool for truing up the bearing surfaces for the nuts which secure two-bar guide blocks on the cylinder head. These surfaces, being on the inside of

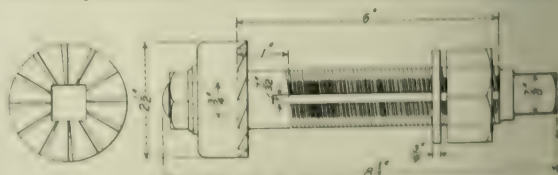


Fig. 12—Back Facing Tool.

the disc, which is cast integral with the back head, are inaccessible, save with a tool designed along the lines of the one shown in Fig. 12. In using, the cutter is removed from the spindle of the tool and replaced after the spindle is inserted

through the bolt hole. The nut and washer shown are then run up against the face of the disc in the head, the feed of the cutter is regulated by this nut. A single cutter tool is often used for this work, but not so successfully as the cutter shown.

DETACHABLE REAMER.

The detachable reamer (Fig. 13) was especially designed to eliminate a prevalent trouble with ordinary shell reamers, that of bending and warping when the finished tool is tempered. A change in tool feed can also be effected, as one shank may be used for a large number of reamers. The small block shown

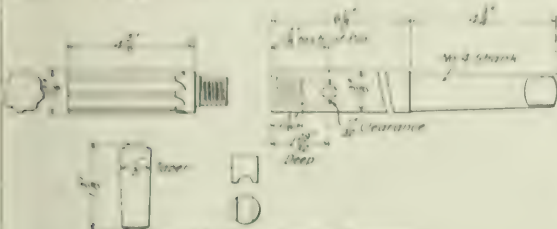


Fig. 13—Detachable Reamer.

in the illustration acts as a lock in holding the reamer in the block, as it is driven against the threaded end of the reamer by the taper key. A clearance of $\frac{1}{8}$ in. is provided between the end of the block and the shank.

MISCELLANEOUS KINKS.

PUTTING CLAMPS ON AIR BRAKE HOSE.

A simple device for tightening the clamps on air brake hose while they are being bolted or locked, as the case may be, is shown in Fig. 14. This is in use at the East Buffalo car shops at the New York Central & Hudson River. An 8-in. air brake

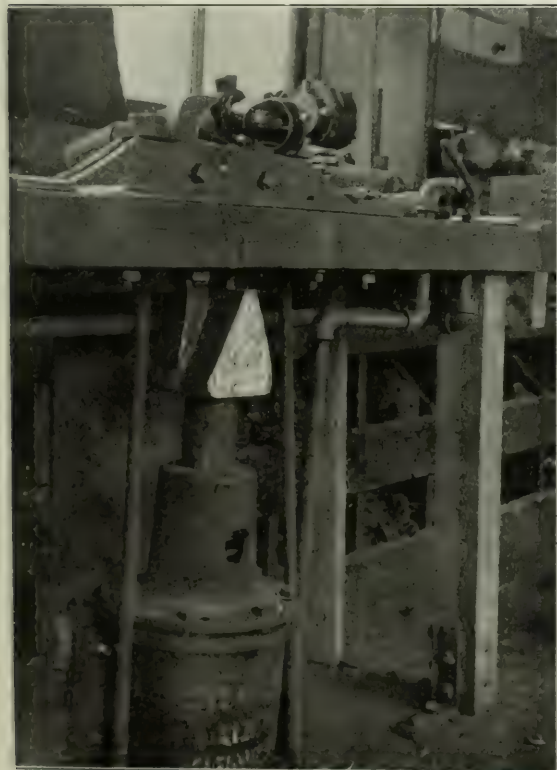


Fig. 14—Device for Tightening Clamps on Air Brake Hose.

cylinder furnishes the power. A spring is to be applied near the lower ends of the two levers to force the clamp open when the wedge is withdrawn.

APPRENTICE NOTES.

Early in the year the apprentice shop instructors on the Atchison, Topeka & Santa Fe held a three-day conference at Topeka, Kan., this occasion marking the close of the first two and a half years' work of the new apprentice system. While this system is based on the same general principles as that of the New York Central lines it differs considerably in detail. For instance, the New York Central has one school instructor and one shop instructor at each shop while the Santa Fe has a school and a shop instructor at each point and at the larger shops several shop instructors, thus placing special emphasis on the importance of thorough shop training. The following notes are abstracted from the report of the shop instructors' conference at Topeka.

Handling First Year Apprentices. The discussion emphasized the importance of a careful selection of apprentices and of starting a boy out right. The instructor should study each one carefully, for all cannot be handled in the same way. He should give the boy a chance to show his individuality and to use his head, and should change him about as much as possible during the first six months to ascertain his ability and to keep his interest up to the highest point. No new boy should be kept on one class of work longer than 30 days, and he should have six or eight different classes of work during his first six months. When the apprentice is started he should be given work that will in a way familiarize him with the shop. At Topeka the boy is usually first assigned to the blue print room. At some shops he is put on the floor for a few days, but it was agreed by all that in general new apprentices should not be assigned to floor work but to machine work. The instructor can usually give the boy more individual attention and instruction while on machine work. The importance of doing his work right from the very start and of cleanliness was also emphasized. The apprentice should be taught from the first to keep his machine or the bench around which he is working clean and tidy. Apprentices should be required, as far as possible, to wash up before leaving the shop to go to their homes or to the street. This will instill in them a greater personal pride and will be instrumental in creating a better respect on the part of the public for the apprentices as a whole. Moreover a boy that is clean in his personal appearance and who keeps his machine and tools clean will make a careful and skillful workman.

Can One Instructor Instruct the Boys in Several Trades?—In a small shop having a few apprentices in each of several trades it is not possible to provide a shop instructor for each class of work, and it is necessary for one man to supervise the instruction of boys in several trades with which he is familiar only in a general way. He can nevertheless give much general instruction. He should be able to tell whether or not the job is satisfactory, and whether the boy is doing his best or "laying down." He should see that the boy is always on time and that he does not lay off without permission, and should co-operate with the school instructor and the foreman to see that the boy gets every possible opportunity to become proficient in his chosen trade. He should visit the boy daily at his work and look after him in a fatherly way, winning the boy's confidence and encouraging him to come to him in time of trouble.

Instruction of Apprentices on the Erecting Floor.—It was agreed that the instruction of the apprentices should not be left to journeymen; that it was far better when possible to assign the apprentices to work with each other rather than with a journeyman. When an apprentice is assigned to work with a mechanic he generally carries tools, cleans off dirt, does the heavy work and watches the journeyman do that which he himself should be doing. Furthermore, the journeyman frequently objects to taking the time necessary to instruct the apprentice. Apprentices should be promoted according to ability rather than

seniority. One instructor stated that it had been his experience that often when an apprentice was ready to be transferred to the floor there was no room for him, and he had to wait until there was a vacancy. It was the opinion of the instructors that it would not be a difficult task to find work for one more apprentice, and that it was the duty of the gang foreman rather than the instructor to find work for him to do. Although the instructor reports to the general foreman and not to the shop foremen he should endeavor to work harmoniously with all the foremen. If the apprentices are not being given a fair show and every opportunity to become skilled mechanics, he should not hesitate to look after their interests.

Can the Position of Foreman and Shop Instructor Be Combined?—It was agreed that when there were as many as 15 or more apprentices there was plenty of work for the instructor to do without his having the additional duties of a foreman. Instructors who had had some experience in trying to do the work of both jobs at one time testified that they had been unable to do justice to either position. Furthermore, the foreman's duties necessarily unfit him for getting the best work out of the apprentices. He is primarily concerned with getting the greatest output at the least expense; in other words, he is concerned with immediate commercial gain, whereas the primary object of the apprentice department is to make skilled mechanics for the future. Although desiring to get as much work as possible out of the apprentices each month, the instructor should subordinate this to the ultimate object of making skilled mechanics. This marked difference in the primary duties of a foreman and an instructor makes it practically impossible for both positions to be filled by one man, even though time permitted. The instructor and foreman should, however, work harmoniously. The work assigned to the apprentices should be given them through the instructor, as he is in a better position to know which apprentice is best fitted for the work in question, and by this arrangement he will be in position to give the boy any instruction he may need in starting out on the new job.

The Efficiency of Apprentices.—The instructor at La Junta exhibited a memorandum book, which contained graphically the standing of all the apprentices from the beginning of their apprenticeship. This book also contained individual sketches of the apprentices, showing the peculiar weaknesses and strong points of each. It indicated that the instructor had given each boy a thorough, careful and painstaking study, and being so well acquainted with him, was better qualified to direct him. In small shops, where it is necessary for the apprentice to stay longer on certain classes of work, he naturally becomes more efficient than he would in the larger shops where he is moved oftener from one machine or class of work to another. In the smaller shops it was evident that the apprentices received more individual instruction than in the larger ones. A high bonus efficiency of the apprentices often depends upon the instructor, upon his capacity for acquiring and holding the confidence of the boy, his watchfulness in seeing that each of the apprentices makes full use of every minute of his time and that each is given an order for the work to be done, his co-operation with the foreman and his faithfulness and watchfulness in everything pertaining to apprentices. In many shops the apprentices have kept track of their own time, marking down in a book provided for the purpose, the order number, the work to be done, the schedule time and the actual time; by keeping this record correctly the apprentice easily detects any error in his efficiency or pay check; besides, it enables him to see how his efficiency stands at any time during the month. Mr. Thomas, the supervisor of apprentices, stated that a high efficiency while serving an apprenticeship is not the paramount object. The company much preferred dullness, and everything should be sacrificed to acquire it in order that an apprentice during his four years may become an all around, first class mechanic, competent through practice to operate any machine or to perform any class of work in the trade he is learning. He would not countenance criticism or complaints because a deserving boy could

not make a high efficiency. So long as an apprentice exhibited a spirit or desire to do the job right he should be complimented and encouraged. Such a boy will win out in the end.

Moral Instruction.—The instructor should do everything in his power, by precept and example, to improve the morals of his boys. Many boys of immoral habits possess qualities which, if rightly developed and properly directed, would make them able mechanics. Instructors should be careful not to "preach," but should give advice when needed, in a friendly and fatherly way. In cases of immoral conduct or when the work of the apprentice is suffering, owing to his keeping late hours, or possibly to his dissipation, the instructor should be firm and give him to understand that he must attend strictly to business and do nothing even outside of working hours which will detract from his becoming a valuable employee. Several instances were mentioned of boys who had been greatly benefited by the instructors working along these lines.

Helping the Boys to Select the Proper Trade.—In the April 1 issue of the *Railway Age Gazette*, page 871, papers on The Boy's Side of Apprenticeship, presented at the conference by Thomas Creary and B. D. Mileham, of Topeka, were reproduced. These papers opened a decidedly new channel of thought, especially these parts which suggested that the boy be assisted in determining what trade he should follow, it being evident that so many boys come to the shop through the influence of their parents or relatives, who really know nothing of the boy's capabilities. He is often put to work to learn a trade that he knows nothing about and for which he has no talent whatever. It was suggested that it might be well in the future to allow the applicant to look around through the shops, to visit the various departments and at his leisure watch the various operations, thus assisting him to decide which trade he would probably like the best. While he is visiting the shops the instructors in each department could talk to him and explain such work as time and conditions would warrant. It is evident that a boy will be not only much happier, but will be a much better workman, if allowed to follow a trade suited to his natural inclinations. The discussion also brought out the fact that sufficient care was not being exercised in watching and studying the boy during his probationary period, instances being cited where boys had been kept on one class of work or on one machine for as long as six months without a change. It is incumbent on the instructor to see that the boy is given as great a variety of work as possible during the first six months to determine whether he is fitted for the trade. Most every boy during the first six months of apprenticeship is too young, too timid, and has not sufficient self-reliance or independence, and often does not have an opportunity to show what is in him. It is the duty of the instructor to "find out" the boy whom he is to teach the trade. Several instances were mentioned where a boy had been a failure in one trade, but after being transferred to another had proved to be a very efficient and ambitious apprentice.

FOREIGN RAILWAY NOTES.

During 1909 construction work was under way on 18 different new railway lines for the Chilean government. The total cost of these lines is estimated at \$25,100,000.

The Brussels world's fair was a great stimulus to travel in Belgium in July, when passenger earnings increased 22 per cent. as against 9 per cent. for the previous six months. Freight earnings for the seven months increased 7 per cent., a heavy increase for a country like Belgium.

At the end of 1909 there was in operation in Chili 2,241 miles of railway, with 838 miles under construction and about 1,000 miles projected. When all the work is finished, Chili will have a railway system of about 4,000 miles, of which 2,500 miles will be operated and owned by the government.

General News Section.

These findings are now being used by the prosecution in the trial of the Baltimore & Annapolis case.

At Washington, Friday, October 1, Mr. Wynn, in an interview, said that he had not yet received any information from the Baltimore & Annapolis case, but that he had received information from the Baltimore & Annapolis case.

The Pennsylvania Railroad announced that the entire New York Central system of telegraph lines will be opened for business with the Pennsylvania Railroad, which will be placed before the Pennsylvania Railroad.

The opening of the system of the Pennsylvania Railroad in Texas, which is now being opened, has been accepted in a case of the Pennsylvania Railroad, which is now being opened in the case of the Pennsylvania Railroad.

The Pennsylvania Railroad, which is now being opened, has been accepted in a case of the Pennsylvania Railroad, which is now being opened in the case of the Pennsylvania Railroad.

At the Motor Parkway course on Long Island, on Saturday, October 1, a car, driving an "Alco" automobile, traversed a course of 278.88 miles (22 laps) of a course measuring about 12.7 miles in 4 hours 15 minutes and 38.29 seconds, making an average rate of 65.4 miles an hour. The prize was the Vanderbilt cup. There were 25 or 30 competitors and, according to the reporters, there were 500,000 spectators. Four persons were killed in connection with this race and about twenty injured.

The Fulton Park and City Island Memorial Company has named its railway between Battery station on the New York, New Haven & Hartford and City Island, a distance of two miles. The whole road is within the limits of New York City. This road started to do business last July, but its car ran off the track on the first regular trip, and it has taken from then until now to put the roadway structure and car in sufficiently good condition to meet the approval of the State Public Service Commission. There are now two cars, each about 75 feet long. There are seven meeting places on the line.

In the supreme court of New York at Buffalo recently, a suit was tried in which a wireless telegraph company complained that another wireless company had maliciously interfered with the transmission of messages by the complainant. A steamer on Lake Erie had an accident and was unable to get into communication with either its Buffalo or its Dunkirk stations; and the operators of the other company were arrested for making signals which frustrated the efforts of the complainant to get notice of the trouble on the steamer. Evidence was given to show that these operators acted under instructions from their superiors.

The Atchison, Topeka & Santa Fe has filed a statement with the Kansas railway commission protesting against an order of the commission requiring railways to open a door between every two passenger coaches when a train stops at a station. The statement filed says that the road now requires its train employees to help passengers on and off, and that it has not enough men to place one at every entrance to a long train. If a train stops at a station and no employees were there to guard it, it would be easy for thieves to get on the train and steal. Another reason advanced against requiring all doors to be opened is that if passengers were allowed to enter doors at which there were no employees to warn them, the number who got on the wrong trains would be much greater than it is now.

The Southern Railway, which runs several trains each way daily to and from New York City over the Pennsylvania—all advertised as "solid trains"—is the first to announce the date for the opening of the Pennsylvania station in Manhattan—with how much accuracy remains to be seen. This event is to occur about the middle of November. President Finley, of the Southern, with 35 other officers of the company made a special trip to New York last week to inspect the new station and tunnels. The sleeping cars running between New York and Southern cities on these trains are now being remodeled, for the purpose of making them fit for use in the New York City

terminal. They will have partitioned and vestibule doors at intervals that passengers can enter or leave the train without going on a level with the doors at all cars and will have electric lights. The Postoffice department will submit a bill for the use of the new cars on the line.

The Postal Telegraph Company has announced to the New York State Public Service Commission, which it claims that when it transmits a telegram, which to reach its destination must be handed over to the Western Union Company, the Western Union unreasonably increases the cost by charging for the transmission of four or five words to indicate that the message has been transferred from one company to another. The Postal claims that it is obliged to pay the Western Union a greater sum than it receives from the sender of the message. It is declared that, although the Western Union has cables from Europe to New York City, it accepts messages at New York from other cable companies and does not charge for these additional words. The Postal further complains that its unhappy situation is due to the fact that the Western Union has gobbled up all of the exclusive contracts for telegraph lines along the railway lines, and that the favors that it gets from the railways enable it to do the business at these small towns so cheaply that the Postal cannot afford to put up lines and compete.

Ostermann Tells of Illinois Central Car Repair Frauds.

Henry C. Ostermann, formerly president of the Ostermann Manufacturing Company, testified last week at Chicago in the criminal proceedings against F. B. Harriman, C. L. Ewing and J. M. Taylor, former officers of the Illinois Central, who are charged with having participated in frauds against this road in connection with the repair of its cars. Ostermann's testimony regarding the connection of Illinois Central officers and employees with this company was similar to that which was given earlier in the trial by F. H. Niles, regarding the connection of officers and employees of the road with the Blue Island Car & Equipment Company.

He said that the following officers of the Illinois Central owned in the Ostermann Manufacturing Company the amounts of stock indicated: I. G. Rawn, 1,500 shares at first later, 2,700 shares; F. B. Harriman, 2,200 shares; Joseph E. Buker, 2,200 shares; J. M. Taylor, 1,000 shares at first, and later 5,000 shares; William Renshaw, 1,500 shares; W. J. Taylor, 500 shares; S. P. and Mildred Harriman, 100 shares each. He stated that he came to Chicago in 1896 and after working as a freight brakeman and conductor on the Illinois Central finally became a car inspector. He invented a grain door and in March, 1906, the Ostermann Manufacturing Company was organized to make and sell this appliance. The company was incorporated for \$300,000, with 60,000 shares having a par value of \$5 each. Of these about 20,000 were sold to railway conductors and other employees of the Illinois Central at \$1 a share, and Ostermann kept 39,300 shares for himself. Fifty-one cars were equipped with his grain door, and some repairs were made to cars for other roads, but practically all of the company's business was done with the Illinois Central.

The witness said he first conceived the idea of repairing cars for the railway on a trip to the Burnside shops in an effort to sell stock in his company. Soon after the company began to repair cars for the Illinois Central, the officers of the road began to acquire stock in the company. Ostermann said that Taylor and Buker told him the late I. G. Rawn, then vice-president of the Illinois Central, would have to be taken in, and suggested that he see Mr. Rawn. He said he visited Rawn at his office in the Park Row station in Chicago and told him he would give him \$5 for each car the Illinois Central turned over to the Ostermann Manufacturing Company for repairs. This was about the middle of the year 1906. Rawn accepted this proposition. Later, according to the witness, Buker called on him and said the "old man," meaning Rawn, was not satisfied and wanted \$10 a car. The amount paid to Rawn was raised accordingly, and about six months later, the witness said, Buker called again and said that Rawn then wanted \$15 a car, and he agreed to pay it. The payments were usually made each month in cash, Buker usually taking Rawn's money to him, al-

though sometimes it was paid by check. Ostermann said that the stock owned by Rawn was taken out in the name of C. B. Kirby, and that Harriman's stock was arranged for through J. M. Taylor. The certificates of stock were produced in court and identified.

The witness said that in 1907 he was told by Taylor that Harriman wanted to see him. He went to his office in the Park Row station and Harriman said he wanted to buy some more stock. Ostermann refused to sell it because this would cause him to lose a controlling interest in the company. Instead, he agreed to pay Harriman \$1,000 a month. This amount was paid sometimes in cash and sometimes by check. Ostermann testified that he had paid salaries to the following officers and employees of the Illinois Central in addition to those already mentioned: William Badsford, a yardmaster, \$150 a month; W. J. Leahy, superintendent of freight terminals, \$100 a month; H. N. Dunlap, bill clerk, \$100 a month; A. R. G. Ransom, agent at West Pullman, \$25 a month; John Watson, locomotive engineer, \$25 a month; Matthew Morgan, car inspector, \$25 a month; E. A. Jones, formerly traveling inspector and now associate counsel for the defendants in the trial of the criminal cases, \$100 a month, and William Renshaw, formerly superintendent of motive power, \$300 a month. Jones admitted in court that he had received \$100 but said he had returned it to Ostermann. Ostermann replied: "I gave \$100 to Jones, but he sent it back. I sent it back to him the following day and he kept it."

Ostermann testified that Buker called on him and told him there was room for another car repair shop, and the witness visited St. Louis, Kansas City and other points looking for a suitable location. He finally decided on South Memphis, Tenn., and organized the Memphis Car Company. He stated that H. McCort, formerly general superintendent of the southern lines of the Illinois Central; W. S. King, general superintendent of the Yazoo & Mississippi Valley, and Buker acted with him in deciding on the organization of the new company, and that five stock certificates of 164 shares each were distributed to Rawn, Harriman, Renshaw, McCort and King. Ostermann said that on one occasion 500 Illinois Central cars were received at his plant in Chicago for repairs. J. T. Harahan, president of the road, had received from the Burnside shops an estimate that the repairs would cost \$275 a car. The Ostermann company took the cars but could not repair them at that price, and Ostermann told Taylor and Buker to come out to the plant to investigate. Buker, the witness said, told him to go ahead and do the best he could with the cars and that he and Taylor would send material from the Illinois Central shops at Burnside. Attorney Fisher, who represents the Illinois Central in the prosecution, sought to introduce testimony to show that on one occasion Mr. Harahan ordered Rawn to make an investigation into the cost of the repair of cars, but that Rawn side-tracked it. As this would have had to be shown by hearsay testimony, the court refused to allow Mr. Fisher to offer his evidence.

A. C. Goodrich, an engineer formerly connected with the Illinois Central and now a consulting engineer, testified that he had acted as a "go-between" in the payment by the Blue Island Car & Equipment Company of \$15,000 to F. B. Harriman and \$10,000 to I. G. Rawn. Goodrich testified that he did not ask for or receive any information as to why he was desired to act as a "go-between."

Railway Securities Commission Confers with Railway Presidents.

Walter I. Fisher, a member of the commission appointed by President Taft to study and report on the question of regulation of the securities of railway securities, gave a dinner in Chicago on October 1 to all the other members of the commission, except the chairman, President Bradley at St. Louis, who is in Europe, and to a number of railway presidents. The following were among the railway officers present: Marvin Hughitt, president Chicago & North Western; F. M. Hayer, general counsel South Western; B. L. Wheel, president St. Louis & San Francisco; S. M. Lefson, president Chicago Great Western; J. T. Harahan, president Illinois Central; Elwell Loe, general solicitor Illinois Central; Darius Miller, president Chicago, Burlington & Quincy; H. U. Mudge, president Chicago, Rock Island & Pacific; A. J. Farling, president Chicago, Milwaukee & St. Paul; Chester M. Dawes, general counsel Burlington; F. B.

Peirce, general solicitor Rock Island; George R. Peck, general counsel St. Paul; Daniel Willard, president Baltimore & Ohio; E. P. Ripley, president Atchison, Topeka & Santa Fe; Gardiner Lathrop, general solicitor Santa Fe, and George H. Ross, vice-president Chicago & Alton. It was subsequently announced that the commission will hold its first session in Washington on November 28.

Disastrous Collision at Staunton, Ill.

In a butting collision of electric trains on the line of the Illinois Traction System, two miles north of Staunton, Ill., on the afternoon of October 4, 37 persons were killed and 20 or more were injured. Four of the killed were officers of the Illinois Traction System, and the rest were passengers. The conductors and motormen of both trains jumped off and escaped serious injury. The collision occurred at a hollow, so that both cars approached the point on descending grades, and are said to have been running at 40 miles an hour a moment before they struck. The two cars (or the two leading cars) were not merely telescoped; they were battered out of all semblance to their original shape. The two together made simply a mass of splintered wood and twisted iron and steel, in which the dead and injured victims were fastened in every possible position and every form of mutilation. The accounts show that the northbound train, a regular local, had orders to meet the southbound at Staunton, and that the southbound was in two sections; and the northbound started out after the passage of the first section and collided with the second. This second car was occupied by excursionists bound for St. Louis, Mo. Staunton is about 40 miles north of St. Louis.

Trainmen's Wants.

According to a press despatch from Cleveland, President W. G. Lee, of the Brotherhood of Railroad Trainmen, has issued a list of questions which has been mailed to all lodges of his organization and to the engineers and conductors, which it is desired to have members submit to all candidates for Congress and State legislatures, asking their stand on legislation affecting the brotherhoods. The questions relate to the following proposed bills:

An act providing for compensation to workers when injured in the service of a railway.

An employers' liability law without a contributory negligence clause except in cases of misconduct.

Government inspection of locomotive boilers.

Compulsory arbitration (which railway workers oppose).

An obstruction and clearance bill forbidding the building of structures near tracks.

An anti-injunction bill.

A bill allowing fraternal magazines the same privilege as any other publication.

A bill regulating the number of experienced workmen in a train crew and providing for amendments to the sixteen hours' continuous service law.

Employers' Liability.

In deciding the case of L'Houx vs. The Union Construction Co. the supreme court of the state of Maine has laid down a principle which will stand anywhere. The plaintiff in the course of his employment was injured by flying particles of steel in striking a cold chisel with a seven pound hammer on an iron surface. The jury believed him when he claimed that he was ignorant of the manifest possibilities of the act, and awarded damages.

In setting aside this verdict the final court of appeals says that—

"1. Employees in the prosecution of their work must exercise their sense and reasoning faculties for the discovery of the risks attending their employment, and unless they stipulate otherwise, they assume the risks such exercise would reveal to them."

"2. That the testimony of a witness is not contradicted by any other witness does not authorize a finding based on such testimony when the testimony is so contrary to common knowledge and experience as evidently to be untrue."

"3. The danger to be apprehended from the breaking off and flying about of bits of steel from the point of a small steel chisel held against an iron surface and struck hard with a seven-

posed hammer is an obvious fact an employee of mutual gain and of expense in the use of steel drills must be held to have appreciated the danger some latent his testimony that he did not.

The Maine requesting employers to exercise their sense and common prudence will stand in no better. Some day we shall see what the British system what by the employee must prove necessary, this proof as to applied only in mitigation of damages. The system of British employers under this rule is to make it their business. A fine covering all risks of \$1,000 a head is levied on the employer and the companies. The burden is shifted, even to the largest employers, and is simply made up by the money in litigation expenses. Our accident insurance companies are suffering an increase of this character. The amount under the British law are limited to \$1,500, and there is no statutory limit here, but the premium asked here is proportionately high.—*Day Street Journal*

Association of Railway Electrical Engineers.

The third annual convention of the Association of Railway Electrical Engineers was held at the Hotel La Salle, Chicago, September 27 to 30, inclusive. The total attendance was about 100.

E. M. Cutting, engineer of train lighting, heating and ventilation, Southern Railway, presided at all the meetings, retiring as president for the ensuing year in favor of J. R. Sloan, electrical engineer, Pennsylvania Railroad, Altoona, Pa. The other officers elected for the next year are: First vice-president, F. R. Frost, electrical engineer, Atchison, Topeka & Santa Fe, Topeka, Kan.; second vice-president, D. J. Cartwright, electrical engineer, Lehigh Valley; secretary-treasurer, J. S. Andreucetti, assistant to electrical engineer, Chicago & North Western.

The committee on Illumination reported that the most interesting development in incandescent lamps is the new drawn wire filament, the lamp having a long, useful life and being sufficiently strong mechanically to meet the conditions demanded by train lighting service. Tungsten lamps were standardized a year ago by but one railway in the United States, while to-day nearly every railway in the country is using this type with satisfaction. The committee presented diagrams showing the performance of various types of tungsten lamps, the information having been obtained from the National Electric Light Association. It was recommended that the two standard voltages for car lighting lamps be continued, namely, 28 to 34 volts, inclusive, and 57 to 65 volts, inclusive. It was further recommended that the use of lamps other than the round bulb lamp be abandoned as soon as possible, and that the standard G-18½ bulb be made with a long neck, making the distance from the top of cap of base to the shoulder of the bulb 1¼ in. and the maximum over all length 3¾ in., and that as few lamps as possible of each type be recommended. The report concluded with a number of tables of recommended standard lamps, the data being taken from manufacturers' catalogues.

The committee on Standards discussed in a general way the recommendations made by the committee at last year's convention. A paper on Car Ventilation was read by B. W. Stowe, it being a discussion of the use of electricity for improving air in cars. Exhaust fans were recommended for ventilation and oscillating fans for cooling the air.

The committee on Accounts and Reports presented two forms for reporting on the cost of car lighting, with a view to obtaining a standard method for making such reports. The car month and 1,000-car-miles were recommended as the standard units of cost, both units to be shown, the car month to be one car equipped for service for one calendar month, no deduction being made for service conditions or shopping periods, and car mileage to include all mileage made by a car regardless of service conditions.

The committee on Specifications considering that car lighting is at present the most important subject before the association defined its work to the preparation of specifications for incandescent lamps, conduits, installation of car wiring and electrolyte, giving complete specifications for all of this work.

The committee on Shop Practice discussed in a general way the electrical equipment of railway shops and concluded its report with the statement that "there is no doubt but that before many years line shafting and belting as a means of transmitting power will be a thing of the past."

E. F. Nichols, of Chicago, presented a paper on the Electrical Operation of Draw Bridges, in which some notable installations were described.

The committee on Train Lighting recommended the use on all roads of an electric lighting instruction car, similar to one now in use on the Pennsylvania. This car is stowed with all the equipment used in the head end, axle-generator and straight storage lighting, and will be used in the same way that air-brake and steam-heat instruction cars are being used to-day.

The convention was a success and those present enjoyed a lovely intermission at all the meetings.

American Society of Mechanical Engineers.

That modern methods of improved building construction may be depended upon for the permanent elimination of fires is the belief of Frank B. Gilbreth, contractor, New York, whose paper on "Fires: Effects on Building Materials and Permanent Elimination" will be presented at the New York meeting of the American Society of Mechanical Engineers on the evening of October 11.

The paper discusses the enormous annual fire loss of the country, shows the effect of a destructive fire on a typical steel-frame building, and outlines the methods by which a permanent elimination of fires may be assured. Following this paper, H. deB. Parsons, consulting engineer, New York, will show with lantern slides the effect of fire on a number of office buildings. The subject will also be discussed by Henry B. Keasbey, of the National Fire Proofing Company; Professor Ira H. Woolson, of the National Board of Fire Underwriters; William D. Grier, chairman of the special committee on manufacturing risks and special hazards of the National Fire Protection Association, and by C. A. P. Turner and others concerned in various phases of fireproofing and building construction.

Mr. Gilbreth's paper calls attention to the fact that the total cost of fires in the United States in 1907 amounted to almost half the cost of the new buildings constructed in the country for the year. The total fire loss, including that of forest fires and marine losses, amounted to over \$456,485,000. In addition to this waste of wealth and natural resources, 1,449 persons were killed and 5,654 injured in fires.

Railway Business Association.

It is announced that the annual Railway Business Association dinner, similar to that given in 1909, will be held in the ballroom of the Waldorf-Astoria hotel, New York, on the evening of November 22, the date of the annual meeting. The brilliant success of the dinner last year caused a widespread interest to be manifested in the function for 1910. The speakers, whose names will be announced at an early date, will be men occupying high positions in transportation, business and government.

Members of the association are now subscribing for themselves and guests, according to the detailed plan recently furnished them by circular. As the capacity of the dining hall is limited, it is desired that members be prompt in making reservations.

American Street and Interurban Railway Association.

Convention bulletin No. 4 has just been issued from the office of the secretary. It contains the detailed programs of the five associations, arrangements for the convention registration and other matters which have been more fully covered in previous bulletins.

American Society of Civil Engineers.

At the meeting held on October 5, a paper entitled "The Tieton Canal" was presented for discussion by E. G. Hopson, M. Am. Soc. C. E. This paper was printed in the August number of the proceedings.

International Railway Fuel Association.

The third annual convention of this association will be held at Chattanooga, Tenn., on May 15-18, 1911. The headquarters of the association will be at the Hotel Patten, where the meetings will be held.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thompson, Scranton, Pa.; next meeting June 22, 1911; Niagara Falls, N. Y.
AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn.
AMERICAN ASS'N. OF LOCAL FREIGHT AGENTS' ASS'N.—G. W. Dennison, Penn. Co., Toledo, Ohio.
AMERICAN ASS'N. OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew Bldg., Cincinnati, Ohio.
AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York; semi-annual, Nov. 1, 1911; St. Louis, Mo.
AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Oct. 18-20; Denver, Colo.
AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASS'N.—E. H. Fritch, Monadnock Bldg., Chicago; March 21-23, 1911; Chicago.
AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; May 6, 1911; Detroit, Mich.
AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago.
AM. RAILWAY TOOL FOREMEN'S ASS'N.—O. T. Harroun, Bloomington, Ill.
AM. SOC. FOR TESTING MATERIALS.—Prof. E. Marburg, Univ. of Penn., Phila.
AM. SOC. OF CIVIL ENGS.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and Aug.; annual, Jan. 18-19, New York.
AM. SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Haner, 13 Park Row, New York.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., New York; annual, Dec. 6-9; New York.
AMERICAN STREET AND INTERURBAN RAILWAY ASS'N.—H. C. Donecker, 29 W. 39th St., New York; Oct. 10-14; Atlantic City.
ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearboth St., Chicago; May 6, 1911; New Orleans, La.
ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; May, 1911; Montreal, Can.
ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Colegrove, I. C. R. R., Chicago.
ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston, Mass.
ASS. OF TRANS. AND CAR AG. OFFICERS.—G. P. Conard, 24 Park Place, N. Y.; Dec. 13-14, Chicago; June 20-21, 1911, Cape May City, N. J.
CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
CANADIAN SOCIETY OF CIVIL ENGS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays; Montreal; annual, last week January.
CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Conth., Chicago; 2d Monday in month; Chicago.
CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
ENGINEERS' SOCIETY OF PENN.—E. R. Dasher, Box 704, Harrisburg, Pa.
ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 808 Fulton Bldg., Pittsburgh; 1st and 3d Tues.; annual, Jan. 17, 1911, Pittsburgh.
FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich. & Pot. R.R., Richmond, Va.; 20th annual, June 21, 1911, St. Paul, Minn.
GENERAL SUPERINTENDENTS' ASS'N OF CHICAGO.—H. D. Judson, 209 Adams St., Chicago; Wednesday preceding 3d Thursday; Chicago.
INDIANAPOLIS RY. AND MECH. CLUB.—B. S. Downey, C. H. & D., Indianapolis, Ind.
INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; semi-annual, Omaha, Neb.
INTERNATIONAL RY. ENG. ASS'N.—D. E. Seaboard, La Salle St. Station, Chicago; May 1-13, Chicago, Ill.
INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.
INT. RY. MASTER BLACKSMITHS' ASS'N.—A. L. Woodworth, Lima, Ohio.
INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11, Brussels, Belgium.
IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
MASTER CAR BUILDERS' ASS'N.—J. W. Taylor, Old Colony Bldg., Chicago.
MASTER CAR AND LOCO. PAINTERS' ASS'N OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass.
NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept.; Boston.
NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d Mon. in June, July, Aug. and Sept.; St. Paul and Minn.
NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. M. & St. P., Duluth; 4th Saturday; annual, Nov. 26; Duluth, Minn.
OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Bldg.; Second Wed. Railway Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City; 3d Friday in month; Kansas City.
RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.; annual, Oct. 11-13; Richmond, Va.
RAILWAY SIGNAL ASS'N. OF U. S.—J. P. Murphy, Box C, Collierville, O.; annual, May, 1911.
RICHMOND RAILROAD CLUB.—F. O. Robinson; 2d Monday; Richmond.
ROADMASTERS' AND MAINTENANCE OF WAY ASS'N.—Walter E. Emery, P. & P. 1 R., Boston, Ill.; Oct., 1911; St. Louis.
ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago; Oct. 19-21, 1911; Baltimore, Md.
SOCIETIES ASSOCIATION OF CAR SERVICE OFFICERS.—F. W. Sawdwell, A. & W. R. Ry., Montgomery, Ala.; annual, Oct. 30; Atlanta.
SOUTHERN & SOUTHWESTERN R.R. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., Mar., July, Sept. and Nov.; Atlanta.
TOLEDO TRANSPORTATION CLUB.—G. C. Mendenhall, Washburn Spite Co., Toledo, Ohio; 13th annual, May 6, 1911; Toledo.
TRANSPORTATION CLUB OF CHICAGO.—J. M. Sells, Buffalo, La Sat after 1st Wed. annual Dec. 13; Buffalo.
TRAFFIC CLUB OF NEW YORK.—C. A. Swayne, 200 Broadway, New York; last Tuesday in month, except June, July and August; New York.
TRAIN DISPOSITION ASS'N OF AMERICA.—J. P. Mackie, 7042 Stewart Ave., Chicago; annual, June 1-3, 1911; Baltimore.
TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Boston.
WESTERN CANADA RAILWAY CLUB.—W. H. Rossignol, P. O. Box 1207, Winnipeg; 2d Monday, except June, July and August; Winnipeg.
WESTERN S. CITY OF SEVENTEENTH.—J. H. Warden, Monadnock Bldg., Chicago; Wednesdays, except July and August; Chicago.

Traffic News.

The Chicago, Milwaukee & St. Paul and the Chicago, Milwaukee & Puget Sound have decided not to establish transcontinental passenger trains until next April. The necessary cars are not ready and the new station at Seattle is not finished.

The transcontinental lines have reduced the rates on citrus fruits c. l. from Southern California to the northwest and northern points as far east as Fargo, N. D., to \$1.15 per 100 lbs. Heretofore consignments destined for the northwest have gone by way of Kansas City and St. Louis, making an added rate from the central distributing point. The Southern Pacific will hereafter take such shipments via Portland.

The officers of the Rock Island road have announced that that company will increase its passenger fares in Arkansas from 2½ cents a mile to 3 cents, notwithstanding the refusal of the State Railroad Commission to authorize such an increase. For the past year the rate in effect has been 2½ cents, which was adopted experimentally when the legislature prescribed a rate of 2 cents. Now the company says that 2½ cents is too low.

The first case called at the opening of the October term of the United States Circuit Court at Cincinnati was the injunction suit of the Receivers' and Shippers' Association of that city against the Interstate Commerce Commission and the Cincinnati, New Orleans & Texas Pacific Railroad. The association is asking for a permanent restraining order preventing the road from enforcing its proposed freight rates increase of 10 per cent per 100 lbs. to Chattanooga and other points. The new tariff took effect July 15.

Condition of the Cotton Crop.

The crop reporting board of the United States department of agriculture estimates that the average condition of the cotton crop on September 25 was 65.9 per cent. of a normal, as compared with 72.1 on August 25, 1910; 58.5 on September 25, 1909; 69.7 on September 25, 1908, and 66.6, the average of the past ten years on September 25.

Comparisons of conditions by states follow:

States.	Sept. 25, 1910.		Aug. 25, 1910.		Sept. 25, 1909.		Sept. 25, 1908.		10-year average.	
	1910.	1910.	1910.	1910.	1909.	1909.	1908.	1908.	average.	average.
Alabama	78	82	71	78	71	78	71	78	71	71
Arkansas	72	76	70	69	71	78	71	78	71	71
California	70	73	70	68	73	78	71	78	71	71
Georgia	68	71	71	71	71	71	71	71	71	71
Florida	66	74	67	74	67	74	67	74	67	74
Illinois	67	72	62	70	62	70	62	70	62	70
Mississippi	63	71	53	70	53	70	53	70	53	70
Louisiana	51	60	39	53	39	53	39	53	39	53
Texas	63	69	52	71	52	71	52	71	52	71
Arizona	68	78	54	70	54	70	54	70	54	70
Colorado	73	78	68	78	68	78	68	78	68	78
Montana	70	78	72	70	72	70	72	70	72	70
Oklahoma	70	83	63	70	63	70	63	70	63	70
Nebraska	80	93								
United States	65.9	72.1	58.5	69.7	66.6					

The Function of a Shippers' Association.

"To see that the rights and desires of its city or district are clearly formulated, and logically and consistently expressed to the proper officers at the right time, and then to follow up vigorously and push to a conclusion the propositions thus formulated, should be the aim of municipal boards of transportation."

"When propositions are thus formulated and express the practically unanimous views of a shipping community, it is clearly the duty of the transportation companies to strive to meet these views, and even if the requests or suggestions seem impractical to endeavor thoroughly to understand the point of view, before declining to comply."

"On the other hand avoiding conferences with shippers or delegating negotiations to subordinate officers without authority or with instructions not to deviate from a certain course, or excuses to not add the all efforts of non-compliance with requests."

(To be continued in N. Y. Traffic Club)

REVENUES AND EXPENSES OF RAILWAYS.

MONTH ENDING 31st Sept.

Name of road	Mileage operated, of road.	Operating revenue			Maintenance		Operating expenses		General	Total	Net operating	Increase or decrease, per cent.
		Freight.	Passenger.	Total.	Way and structures.	Of equipment.	Traffic.	Taxes and other.				
Banger & Amosburg	599	\$116,487	\$30,932	\$147,419	\$41,300	\$41,300	\$116,487	\$24,316	\$141,171	\$161,487	\$24,316	17.2
Bassett & Lincoln	294	225,161	34,000	259,161	92,509	166,652	259,161	24,316	234,845	259,161	24,316	10.1
Bassett & Lincoln & Pikesburg	96	722,213	28,741	750,954	118,314	637,640	750,954	118,314	632,640	750,954	118,314	18.1
Central New England	277	296,359	5,662	302,021	100,118	201,903	302,021	11,412	290,609	302,021	11,412	3.8
Chicago & Erie	299	1,098,500	1,687,401	2,785,901	1,098,500	1,687,401	2,785,901	11,412	2,774,489	2,785,901	11,412	0.4
Chicago & North Western	1,339	608,042	143,601	751,643	186,603	565,040	751,643	11,412	740,231	751,643	11,412	1.5
Chicago, St. Paul, Minneapolis & Omaha	212	1,892,736	66,839	1,959,575	306,809	1,652,766	1,959,575	11,412	1,948,163	1,959,575	11,412	0.6
Cincinnati Hamilton & Columbus	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Cleveland Valley	162	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Delaware, Lackawanna & Western	999	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Duluth, Missabe & Northern	401	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
El Paso & Southwestern Co.	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Erie	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Fort Worth & Denver City	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Grand Rapids & Indiana	357	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Indianapolis & Chicago	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Kansas City Southern	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Lehigh Valley	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
New Orleans Great Northern	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
New York, New Haven & Northern	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
New York, Buffalo & Northern	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Norfolk Southern	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Norfolk & Western	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Pennsylvania Company	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Pennsylvania R.R. Co.	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Piedmont, Baltimore & Washington	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Pittsburgh, Cincinnati, Chicago & St. L.	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Union Pacific	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Vandalia	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Virginian	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
West Jersey & Shore	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6
Wheeling & Lake Erie	1,031	1,031,424	1,031,424	2,062,848	1,031,424	1,031,424	2,062,848	11,412	2,051,436	2,062,848	11,412	0.6

— Indicates Deficits, Losses and Decreases

Testimony in Western Rate Hearing.

Frank E. Ward, general manager of the Chicago, Burlington & Quincy, in testifying at the hearing in Chicago by the Interstate Commerce Commission regarding the proposed advances in rates, said that advances in wages made by his road during the present year already had amounted to \$350,000 per annum, and that if proportionate increases were given to other employees the total amount of the increase will be approximately \$2,700,000.

G. O. May, expert accountant with Price, Waterhouse & Company, was called by General-Attorney Norton, of the Santa Fe, to give expert testimony regarding railway valuation. It was intended that Mr. May should appear as a witness for all of the railways, but one of his first statements was that the cost of reproduction of a railway is not a proper basis of valuation or rate-making. Chester M. Dawes, general counsel of the Burlington, at once indicated that this opinion was not to be taken as testimony for the Burlington, and Mr. May was then treated as a witness exclusively for the Santa Fe. Mr. May contended that rates should be based mainly on the value of the service to the shipper. Taking the present rate structure, he would raise those rates which have been disproportionately reduced by competition, so that all rates would be on an equitable basis, and then make such general advances as might be necessary to enable the roads to earn a proper return. He contended that reasonable rates should be made and that if the result of fixing reasonable rates was to cause some railways to earn a small return and to enable other railways to earn a large return that was no reason why the rates should be interfered with. If rates were to be reduced because well-managed roads could earn a large return on them the effect would be to discourage good management. He thought that the adoption of Professor Henry C. Adams' plan to have the profits in excess of a "fair return" earned by the more prosperous roads paid into the treasury of the government would cause the maximum rates to be charged. Commissioner Clark asked Mr. May, as well as other witnesses, for his opinion as to how the commission should adjust rates on competing railways having widely different valuations or capitalizations. For example, if one road is capitalized for \$100,000 a mile, another for \$80,000 a mile and another for \$60,000 a mile, shall the commission so fix the rates as to enable the road having a capitalization of \$100,000 a mile to earn a "fair return" or shall it so reduce them as to enable only the road having a capitalization of \$60,000 a mile to earn a "fair return?" Mr. May said that the commission should take into consideration the entire situation; that it was under no obligation to guarantee any return to a poorly managed property and that it was not its duty to prevent a well-managed property from earning a large return.

Sisson Thompson, manager of the Bureau of Railway News and Statistics, also was called as a witness for the Santa Fe, and gave statistics to show that the average capitalization of European railways is larger and their rates higher than those of American railways.

Clifford Thorne, representing certain cattle shippers and himself as a candidate for railway commissioner of Iowa, sought to get from witnesses for the railways testimony indicating that rebates are being paid in the form of loss and damage claims. James Peabody, statistician of the Santa Fe, showed that 24.39 per cent. of the loss and damage claims paid by that road are paid to the cattle shippers whom Mr. Thorne represents, and that these settlements amounted to 7.12 per cent. of the total revenue derived by the railway from its cattle traffic.

Before the hearing was adjourned statistical statements for the Chicago Great Western and other roads which have not put in any oral testimony were filed. The attorneys for the shippers tried to get the introduction of their testimony postponed for some months. Commissioner Clark suggested that the hearing ought to be resumed about October 17 but fixed no date.

Water Transportation in the United States.*

Probably the greatest single deterrent to water terminal advancement in the United States is the present adverse attitude of rail lines toward independent water traffic in their exclusive control of frontage, in refusal or neglect to coordinate with

general water traffic, and in refusal to pro-rate generally with water lines in through movement of traffic.

Considering water terminals, Commissioner Smith finds five salient facts regarding them, as follows: That terminals are as important as channels; that the harbors of the country have not fully developed their terminal frontage, nor are they properly organized or controlled; that railways largely control water terminals, often to the disadvantage of general water traffic; that there is almost no linking up of the rail and general water systems at the water's edge, but rather the opposite tendency, and that there is little co-operation by localities with the federal government, which improves the channels.

Concerning New York Harbor conditions the report says in part:

"New York is, of course, the most important harbor in the United States. As a terminal organism, its complexity and diversity make it a most interesting study. The congestion of business is complicated by an enormous volume of local passenger traffic, a large proportion of which, until the recent completion of tunnel systems, was handled by ferries, thus requiring a considerable portion of the waterfront in the most central portions of the harbor; this ferry traffic still seriously aggravates the confusion of business on marginal streets.

"The congestion of traffic at present is extreme, especially on Manhattan Island. Co-ordination of rail and water traffic is very defective, except as to the rail controlled terminals for through traffic. There is very little rail connection between the water terminals and local industries. Perhaps the highest terminal development has been reached in the so-called 'Bush terminals,' on the Brooklyn front. This is an important dock company, holding 29 blocks in South Brooklyn, with a frontage of 3,120 feet, with 6 piers, 115 warehouses, a terminal railroad with large car yards, spur tracks on and about the docks and in the warehouses sufficient to accommodate 1,200 cars, and a number of car floats. It has excellent mechanical transshipping equipment, and its entire system of docks, warehouses and equipment is well co-ordinated with the trunk line railroads. Its terminal railroad connects with the Brooklyn terminals of about eight or ten railroads and acts as their terminal agent. Most of its wharves are leased to ocean steamship lines. The city is at the present time building a series of large docks adjacent to the Bush terminals.

"For a number of years it has been the policy of the city to acquire important portions of its waterfront, particularly on Manhattan Island. In 1905 it was stated in a published report that out of a total of 309 piers on Manhattan Island the city owned 207. At present (1910), taking perhaps the most important section, there are about 180 piers from West Seventieth street to the Battery and thence up to East Forty-second street, and of these the city owns about 150. Railways occupy a comparatively small frontage in New York (about five and a third miles), but that part is very important, constituting about 34 per cent. of the North River front, the best part of the harbor. About ten railways are located there."

The state of New York in 1903 appropriated over \$100,000,000 for enlarging the Erie Canal, and construction work is now in operation. Even with this improvement, however, transportation by the Erie Canal will depend largely upon the condition of its terminals at New York and Buffalo and upon the control of those terminals. The canal, as a rival of parallel railways, is naturally an object of great interest to those roads, and there are strong indications that their policy has been to suppress canal traffic by control of the terminals and by influence upon the floating equipment as well as by active rate competition.

INTERSTATE COMMERCE COMMISSION.

Complaints to the Commission and Suspensions of Tariffs.

The Interstate Commerce Commission has postponed to January 1, 1911, the enforcement of its recent orders against the Southern Pacific and the Atchafalaya, Topeka & Santa Fe, requiring the abolition of a switching charge of \$2.50 per car on freight going to and from certain private sidings (though holding the charge not unlawful on cars coming from or to another road). The order applied to certain cities in California.

The Interstate Commerce Commission has suspended until February 6, 1911, freight tariffs on lumber from the Pacific

*From a report by H. R. Smith, Commissioner of Corporations, Department of Commerce and Labor.

northwest to eastern points, increasing the rate, which had been announced by the railway to go into effect October 15.

The Interstate Commerce Commission has suspended until February 6, 1911, a number of freight tariffs which have been filed by the Transport and Terminal Freight Bureau showing increases on many commodities from the Atlantic seaboard to points on the Pacific Coast and to points in Utah and other western states. The tariffs were filed August 12, to go into effect October 10.

Hearings on the western freight rate cases, which have been held at Chicago, will be resumed in that city October 25.

A hearing will be held at Boston, October 12, on the complaint which has been made against the new demurrage rules in New England.

Hearing Fixed on New Vehicle Rates.

On October 12, at St. Louis, there will be a hearing on the proposed new rates on vehicles published by the Southwestern and the Central associations.

STATE COMMISSIONS.

The Chicago Railway Commission has ordered a reduction of about 20 per cent. in class rates on the Southern Pacific lines in that state.

The New York State Public Service Commission, Second district, has appointed Francis U. Wilcox of Buffalo, accountant on the telephone and telegraph department at \$2,500 a year, and James M. Kite of Elmira, N. Y., engineer in the same department at \$2,100.

The New York State Public Service Commission, Second district, has appointed H. C. Hasbrouck, of Troy, and W. P. Coleman, of New York City, traveling accountants for the commission at a salary of \$1,800 each. The duties of these men will be to go about the state and visit the offices of the corporations.

Richard T. Higgins has been appointed a member of the Connecticut railway commission, succeeding A. F. Gates, resigned. Mr. Higgins was born in Washington, Conn., September 24, 1865. He was educated in the public schools of that place, at the Parker Academy at Woodbury, and at St. Francis College at Brooklyn, N. Y. He studied law in the office of Huntington & Warner at Woodbury, and was admitted to the bar of Litchfield county in 1890. In 1891 he located at Winsted, where he has since practised law. Mr. Higgins was the Democratic leader of the House of Representatives in the session of the General Assembly in 1909. He is a justice of the peace and served one term as prosecuting attorney of the town court of Winsted.

Illegal to Charge Owner for Use of His Own Cars.

The New York State Public Service Commission, Second District, has upheld the contention of the General Electric Company in challenging the legality of the steam railway companies' demurrage rule, which applies demurrage on inbound private cars belonging to the General Electric Company after such cars have been removed from the interchange track at Schenectady by the complaining company and taken by its own power and on its own tracks into its plant, such rule continuing to apply until the time of actual unloading within the plant. The complaint was made against the New York Central and the Delaware & Hudson. The decision of the commission, which was prepared by Commissioner Decker, rules as follows:

That these carriers have no lawful right to enter upon the tracks of the General Electric Company beyond the interchange track for any purpose is beyond dispute; and it is well settled in law that the General Electric Company cannot require of either respondent the performance of railroad service upon its industrial tracks. Neither in fact nor in laws does railway service by the respondents extend beyond their interchange tracks with the General Electric Company. The right to collect car demurrage cannot be predicated upon a fiction. Such right must arise from ownership, holding by agreement, and any extension of control through carrier's operation or carrier's liability. None of these extends to a loaded car delivered upon an interchange track to the car-owning company after removal by that company to its own tracks by its own power from the interchange or place of delivery.

Even if upheld the rule is ineffectual as practical enforcement, since the car and its loading after removal from the interchange track are in the exclusive possession and control of the industrial company, and obviously any requirement by the carrier of a report from the owning industrial company of the time of unloading as a basis for the assessment of demurrage charges could be successfully denied. This point is to be (iii) recognized in the demurrage rules themselves in the exemption from demurrage of the loaded private car outbound from the owning industry.

The commission further says that this rule is part of the uniform demurrage code adopted by the National Association of Railway Commissioners and largely put in effect by carriers throughout the country. Such action, the commission says, has resulted in attainment of uniformity in demurrage rules to a degree which was not deemed possible a few years ago. The purpose of fairness to shippers, as a whole, and the abolition of widespread discriminating practices as between shippers are so thoroughly indicated in the preparation and application of the demurrage code that the commission comes with great reluctance to the conclusion that this rule as it applies to private cars under load to the car-owning industry doing its own switching from interchange tracks is without legal justification, and must be modified so far as it relates to traffic within the state of New York.

In this case the complaint also attacked the rule in the demurrage code relating to averaging demurrage, known as Rule 9, upon the claim that the rule unjustly and unreasonably separates cars into two classes—box cars (including refrigerator cars) in class 1, and freight cars of all other descriptions in class 2. The evidence was not convincing in favor of complaint upon this branch of the case. No material damage was shown, and no evidence was presented indicating any unjust effect of the rule upon shippers or consignees generally. As to this branch of the case the complaint is held not sustained.

COURT NEWS.

The Texas state railroad commission has ordered suits brought against the roads entering Dallas for failure to comply with the commission's order to build a union passenger station, and against the roads entering Hillsboro for the same cause.

The supreme court of New York (Erie county) has sustained the constitutionality of the workmen's compensation act (chapter 674), which was passed by the legislature of that state this year. The suit was that of Ives vs. South Buffalo Railway. Ives was a switchman, injured in his work without negligence on his part. The railway claimed that the law unduly discriminated against the railway, and also found fault with it on the ground that it imposes "liability without fault." The decision, by Justice Pound, was in favor of the plaintiff on all points.

The Michigan Supreme Court has rendered a decision invalidating the car demurrage rules issued by the state railway commission, so far as they apply to interstate traffic. The commission did not approve of the uniform demurrage rules which were endorsed by the Interstate Commerce Commission and sought to put into effect rules of its own more favorable to shippers and consignees. The state supreme court holds that by doing so it undertook to regulate interstate commerce in violation of the federal constitution. A number of interesting points presented in the complaint filed by the railways were left untouched, the court basing its decision upon the construction of the statute establishing the Michigan railway commission. This statute expressly confines the powers of the commission in this matter to shipments originating and terminating within the State. A lower court had sustained the Michigan commission, but on appeal by the railways this order is now reversed.

The Ottoman American Development Company is seeking a concession to build a railway in Turkey from Alexandretta northward toward the Persian border, something more than 200 miles. It is reported in London that the minister of public works has reported favorably on the granting of this concession, and that the next parliament of Turkey will probably confirm his report.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

J. T. Egan, Wilcox has been appointed assistant to Lewis Neilson, secretary of the Pennsylvania Railroad, with office at Philadelphia, Pa.

E. G. Warfield, formerly traffic manager of the Mallory Steamship Co., has been elected vice-president of the Houston & Brazos Valley, with office at New York.

J. T. Welch has been appointed auditor and general freight and passenger agent of the Hearne & Brazos Valley, with office at Hearne, Tex., succeeding E. S. Horton, resigned.

J. H. Pierson has been appointed assistant auditor of freight accounts of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Cincinnati, Ohio, succeeding C. G. Stamm, resigned to engage in other business.

J. B. Munson, vice-president and general manager of the Georgia, Southern & Florida at Macon, Ga., has been appointed permanent receiver of the Macon & Birmingham, succeeding Samuel F. Parrott, deceased.

N. H. Lassiter, general attorney of the Rock Island lines in Texas, has been appointed also general attorney of the Trinity & Brazos Valley, with office at Fort Worth, Tex., succeeding Andrews, Ball & Streetman, resigned.

The officers of the Marianna & Blountstown are as follows: C. R. Evans, president and treasurer; R. Pennington, vice-president and general manager, both with offices at Marianna, Fla.; F. L. Sweat, secretary, with office at Douglas, Ga.; T. J. Millhollin, superintendent and general freight and passenger agent, and W. W. Crews, auditor, both with offices at Marianna.

E. H. Coapman, general manager of the Southern Railway at Washington, D. C., has been elected vice-president and general manager in charge of the operating and maintenance departments, with office at Washington. A portrait of Mr. Coapman and sketch of his railway life was published in the *Railway Age Gazette* of January 21, p. 162. R. D. Lankford, secretary at New York, has been elected vice-president and secretary, in charge of the New York office. He will assist the president in matters relating to the treasury and accounting departments and perform such other duties as may be assigned to him by the president.

Operating Officers.

H. S. Phillips has been appointed superintendent of the Abilene & Southern, with office at Abilene, Tex.

J. R. Nolan has been appointed superintendent of the St. Johns River Terminal Co., with office at Jacksonville, Fla.

F. J. Mackie has been appointed a trainmaster on the Rio Grande division of the Atchison, Topeka & Santa Fe.

Fowler Hopkins has been appointed a superintendent of the St. Louis & San Francisco, with office at Sapulpa, Okla.

W. T. Stewart, superintendent of the Gulf & Ship Island, has been appointed general superintendent, with office at Gulfport, Miss.

C. J. Fellows has been appointed superintendent of car service of the Cincinnati, Hamilton & Dayton, with office at Cincinnati, Ohio, succeeding A. R. Duncan, resigned.

E. R. Rockwell has been appointed general superintendent of the Colorado line of the Denver & Rio Grande, with office at Pueblo, Colo., succeeding J. W. Dean, resigned.

W. G. Beach has been appointed chief train dispatcher of the western division of the Minneapolis & St. Louis, with office at Watertown, S. D., succeeding G. F. Downing, resigned.

E. W. Stanyan, general superintendent of the Barre Railroad

at Montpelier, Vt., has been appointed general manager, his former position having been abolished. A. A. Stebbins has been appointed superintendent, with office at Barre.

H. W. McAbee has been appointed superintendent of dining car and hotel departments of the Denver & Rio Grande, with office at Denver, Colo., succeeding T. A. Dempsey, resigned to accept a similar position with another company.

M. C. Coyle has been appointed superintendent of the Detroit & Charlevoix, with office at East Jordan, Mich., and all reports, statements, etc., previously sent to Clark Haire, former general manager, should be addressed to Mr. Coyle.

C. Murphy, general superintendent of the Eastern division of the Canadian Pacific at Montreal, Que., has been appointed general superintendent of transportation, Eastern lines, with office at Montreal, succeeding J. W. Leonard, assigned to other duties.

J. W. Farrell, chief dispatcher of the First and Second districts, Eastern division of the Grand Trunk, at Island Pond, Vt., has been appointed trainmaster of the Third district, with office at Richmond, Que., succeeding P. G. Flaherty, resigned. E. S. Cooper succeeds Mr. Farrell.

E. F. Blomeyer, assistant general freight agent of the Pere Marquette at Milwaukee, Wis., has been appointed general manager of the Chattanooga Southern, in charge of the engineering, construction and operating departments, with office at Chattanooga, Tenn., succeeding C. Hicks, resigned.

W. B. Throop, general superintendent of the Nebraska district of the Chicago, Burlington & Quincy at Lincoln, Neb., has been appointed general superintendent of the Quincy, Omaha & Kansas City, with office at Kansas City, Mo., succeeding to the duties of W. G. Brimson, vice-president and general manager, on leave of absence.

C. J. Shea, superintendent of the Auburn division of the Lehigh Valley, at Auburn, N. Y., has been appointed superintendent of the Wyoming division, with office at Wilkesbarre, Pa., succeeding N. L. Moon, assigned to other duties. W. W. Abbott, superintendent of the New York division at Jersey City, N. J., succeeds Mr. Shea, and M. C. Roach succeeds Mr. Abbott.

Traffic Officers.

F. W. Green has been appointed an immigration agent of the St. Louis & San Francisco, with office at St. Louis, Mo.

J. N. Steele has been appointed agent of the Empire Line, with office at Indianapolis, Ind., succeeding N. H. Kipp, retired.

J. G. North has been appointed a soliciting freight agent of the Georgia Railroad, with office at Macon, Ga., succeeding J. W. White, resigned.

E. N. Kendall has been appointed division freight agent of the Baltimore & Ohio, with office at Columbus, Ohio, succeeding H. Sheridan, resigned.

D. R. Simpson has been appointed traffic manager of the Paris & Mount Pleasant, a line under construction in Texas, with office at Paris, Tex.

J. T. Welch has been appointed general freight and passenger agent of the Hearne & Brazos Valley, with office at Hearne, Tex., succeeding E. S. Horton, resigned.

C. R. Krause, soliciting freight agent of the Chicago, Burlington & Quincy at Kansas City, Mo., has been appointed soliciting freight agent of the International & Great Northern, with office at Kansas City.

Walter S. Williams, commercial agent of the Rock Island lines at Cedar Rapids, Iowa, has been appointed general agent in the freight and passenger department, with office at Spencer, Wash. T. H. Simmons succeeds Mr. Williams.

A. H. Peit, formerly traveling freight and passenger agent of the Southern Pacific at Reno, Nev., has been appointed general agent of the Tonopah & Goldfield, with office at San Francisco, Cal., succeeding M. Clarke.

E. H. George has been appointed eastbound freight agent of

the Webbs, and G. B. Ingram, assistant contracting freight agent at Chicago, has been appointed weathered freight agent, with office at Chicago.

A. J. Dauter has been appointed a general agent of the Houston & Texas Central, the Houston East & West Texas and the Houston & Alton, with office at Atlanta, Ga., succeeding J. T. Van Rensselaer.

J. J. McQueen, Jr., city passenger agent of the Missouri Pacific, Iron Mountain system at Chicago, has been appointed a traveling passenger agent with office at Chicago, succeeding H. L. Peake. W. H. Dancy succeeds Mr. McQueen.

Alfred S. Larp has been appointed freight solicitor of the Union Line, Pennsylvania Lines West, with office at Wheeling, W. Va., succeeding C. D. Howe, promoted to district freight solicitor at Wheeling. George E. Tremain has been appointed agent, with office at South Bend, Ind.

The office of traffic manager of the Colorado & Southern, which has not been filled since the death of C. L. Wellington last July, has been abolished, and the duties of that office will devolve on T. E. Fisher and H. A. Johnson, respectively general freight agent and general passenger agent.

Walter S. Williams, commercial agent of the Rock Island Lines, at Cedar Rapids, Iowa, has been appointed general agent of the freight and passenger departments, with office at Spokane, Wash. T. H. Simmons succeeds Mr. Williams, with office at Cedar Rapids.

J. W. Graham has been appointed assistant general freight agent in charge of the tariff department of the Toledo, St. Louis & Western, the Chicago & Alton, the Minneapolis & St. Louis and the Iowa Central, with office at Chicago, and the position of chief of the tariff bureau has been abolished.

S. K. Hooper, general passenger and ticket agent of the Denver & Rio Grande and general passenger agent of the Rio Grande Southern at Denver, Colo., has been appointed assistant to the general traffic manager, with office at Denver. Frank A. Wadleigh, assistant general passenger agent, succeeds Mr. Hooper.

J. L. Amos, general agent of the Missouri Pacific and the St. Louis, Iron Mountain & Southern at Pueblo, Colo., has been appointed commercial agent at Philadelphia, Pa., succeeding L. F. Klein, resigned, to go to the Illinois Central. J. R. Duckworth, commercial agent at Salt Lake City, Utah, succeeds Mr. Amos. J. J. Kavanaugh, commercial freight agent at Monroe, La., succeeds Mr. Duckworth. C. G. Johnson succeeds Mr. Kavanaugh.

Engineering and Rolling Stock Officers.

A. M. Gracie has been appointed foreman of the car department of the Northern Central at the Elmira, N. Y., shops, succeeding J. W. Hawthorne, deceased.

F. C. Kyte, engineer of the Pine Bluff & Northern, a line under construction in Arkansas, has resigned to take a position on Madeira-Mamore Railway in Brazil.

J. M. R. Fairbairn, principal assistant engineer of the Canadian Pacific, has been appointed engineer maintenance of way, Eastern lines, with office at Montreal, Que.

H. F. Wardwell has been appointed superintendent of power and equipment of the Chicago & Western Indiana and the Belt Railway Company of Chicago, with office at Chicago.

J. H. Knowles, assistant engineer of the San Pedro, Los Angeles & Salt Lake at Salt Lake City, Utah, has been appointed a division engineer on the Western Pacific, with office at Elko, Nev.

C. James, master mechanic of the Erie Railroad at Port Jervis, N. Y., has been appointed master mechanic of the New York division and branches at Jersey City, N. J., succeeding J. J. Dewey, resigned to go into other business. F. H. Murray succeeds Mr. James, with office at Port Jervis.

W. I. Elliott, roadmaster on the Twenty-first track division of the St. Louis & San Francisco at Pittsburg, Kan., has been trans-

ferred to the Twenty-first track division, with office at Port Jervis, N. Y., succeeding J. Coughlin, resigned. D. C. Dunn, roadmaster on the Twenty-second track division at Pittsburg, succeeds Mr. Dunn, and S. B. Peters succeeds Mr. Elliott.

The office of M. A. Hyman, engineer maintenance of way of the Cincinnati, Hamilton & Dayton at Cincinnati, Ohio, has been appointed division engineer of the Toledo division, with office at Dayton, Ohio, his former position having been abolished. I. F. White, division engineer at Dayton, has been transferred to the Indianapolis-Springfield division, with office at Indianapolis.

Hugh McGehee Taylor, who was appointed director of construction of the National Railways of Mexico, in June, with office at Mexico City, Mex., has had his authority extended over the Pan-American Railroad. Mr. Taylor was born March 5, 1870, at Montgomery, Ala. He was educated in the public schools of Montgomery and graduated from the Alabama Polytechnic Institute in 1889 with the degree of B.E. He began railway work in May, 1889, as a draftsman on the Louisville & Nashville and was later masonry inspector and resident engineer on the Alabama Mineral and Birmingham Mineral divisions of the same road. In September, 1891, he went to the National Railroad of Mexico, now a part of the National Railways of Mexico, as supervisor of track, and from October, 1893, to January, 1895, he was consecutively station master, yard master, brakeman and conductor on the same road. He was promoted to trainmaster in January, 1895, with office at Laredo, Tex., and in January, 1900, he was appointed superintendent of the San Luis division. From February, 1902, to March, 1904, he was superintendent of construction for all the lines of the National Railroad of Mexico, and from March, 1904, to June, 1907, he was general manager of the Inter-oceanic Railway of Mexico, now a part of the National Railways of Mexico. He was appointed assistant general manager of the National Railways of Mexico in June, 1907, and in June, 1910, was appointed director of construction of the same company.

Purchasing Officers.

S. L. Carter has been appointed general storekeeper of the Southern Indiana and the Chicago Southern, with office at Bedford, Ind., succeeding T. J. McGrath, resigned.

C. C. Hubbell, auditor of disbursements of the Delaware, Lackawanna & Western at New York, has been appointed purchasing agent, with office at New York, succeeding George F. Wilson, resigned on account of ill health.

OBITUARY.

W. J. Carnahan, roadmaster of the St. Louis, Brownsville & Mexico, with office at Kingsville, Tex., died at Kingsville on September 28.

Nicholas Monsarrat, president of the Kanawha & Michigan and the Wellston & Jackson Belt, died in New York, September 30, at the age of 71 years.

Samuel Calloway, formerly superintendent of the Owensboro & Nashville division of the Louisville & Nashville, died on September 26, at Snowdown, Ala., at the age of 50 years. Mr. Calloway was born at Snowdown, and for a number of years he was in the employ of the Louisville & Nashville Railroad, with headquarters at Birmingham, Ala. In 1887 he was appointed assistant engineer of the Birmingham Mineral division of the L. & N., and then was appointed assistant roadmaster of the same division. In 1890 he was made roadmaster of the Birmingham Mineral and the South & North Alabama divisions, remaining in that position for nine years, when he was appointed assistant superintendent of the same divisions. Mr. Calloway was appointed superintendent of the Owensboro & Nashville division in 1905, and two years later he resigned from the service of the Louisville & Nashville to go into the contracting business. His last work was in Ohio, where he was associated with W. J. Oliver & Co.

Thomas A. Dugan, general freight agent of the Boston & Maine, died at the home of his brother in Brooklyn, N. Y., September 30, after an illness of three days. Mr. Dugan was born December 29, 1858, at Charleston, N. H. He was educated

in the public schools and began railway work on November 1, 1880, as a clerk in the freight office of the Central Vermont, at Bellows Falls. From November, 1882, to November, 1884, he was clerk in the freight office of the Cheshire Railroad, now a part of the Boston & Maine, and from January, 1885, to May, 1892, he was clerk in the auditing department of the Fitchburg Railroad, and then was chief clerk in the general traffic manager's office of the same road. In January, 1894, he was appointed chief clerk in the general freight office, and in July, 1898, he was appointed assistant general freight agent, remaining in that position until the Fitchburg was absorbed by the Boston & Maine. He was appointed assistant general freight agent of the Boston & Maine in July, 1900, and in August, 1907, he was appointed general freight agent.

Rufus Blodgett, superintendent of the New York & Long Branch and formerly a United States senator, died on October 3 at his home in Long Branch. Mr. Blodgett was born on October 9, 1834, at Dorchester, N. H., and began railway work in March, 1856, as a machinist in the shops of the Boston, Concord & Montreal. Three years later he went as a machinist to the New Haven, New London & Stonington, now a part of the New York, New Haven & Hartford, in the same capacity. From March, 1866, to February, 1874, he was master mechanic of the Raritan & Delaware Bay, now a part of the Philadelphia & Reading. From February, 1874, to August, 1884, he was superintendent of the New Jersey Southern, now a part of the Central of New Jersey. In August, 1884, he was appointed superintendent of the New York & Long Branch, which is operated jointly by the Pennsylvania Railroad and the Central Railroad of New Jersey. Mr. Blodgett was interested in county affairs, served four terms as mayor of Long Branch and held other offices in the state. His term as senator was from 1887 to 1893.

Henry S. Bryan, superintendent motive power of the Duluth & Iron Range, at Two Harbors, Minn., died October 2 at Rochester, Wis. Mr. Bryan was born September 7, 1836, at Cazenovia, N. Y., and began railway work in March, 1859, as a machinist on the Chicago, Burlington & Quincy. In April, 1863, he went to the Chicago, Milwaukee & St. Paul in the same capacity, and in December of the same year was made foreman of the machine shops on the Galena division of the Chicago & North Western. About two years later he went as a machinist to the Chicago, Rock Island & Pacific and the following year he went to the Pittsburgh, Fort Wayne & Chicago. In July, 1867, he was appointed machinist and foreman of roundhouse on the Lake Shore & Michigan Southern, and from May, 1872, to May, 1886, he was master mechanic of the Chicago & Iowa, now a part of the Chicago, Burlington & Quincy. From April, 1873, to April, 1876, he was also general master mechanic of the Chicago & Alton, the Chicago & Paducah and the Chicago, Pekin & Southwestern, and from January, 1886, to May, of the same year, he was general master mechanic of the Chicago & Iowa and the Chicago, Burlington & Northern. He was then for over two years master mechanic of the Chicago, Burlington & Northern. From April, 1889, to April of the following year he was out of railway work. He was appointed master mechanic of the Duluth & Iron Range in April, 1890, and has been superintendent of motive power of the same road since January, 1901.

Construction of the Zemmurray Line.

Work was commenced June 27 on the new Zemmurray Railway line in Honduras from Veracruz, through the rich banana lands of the coast up to the Cuyamel plantation and on to the Guatemala boundary. This line, narrow gage, on which about \$300,000 gold will be expended, will be about 30 miles long. Although built by a wealthy fruit company of Italians doing business between this port and coast and Mobile, Ala., the entire equipment of light Baldwin engines, ties, rails, cars, provisions, skilled workmen, etc., will be brought from the United States, the company seeming to be quasi-American. Veracruz is a small hamlet situated on the coast some 25 miles west of Puerto Cortes, on a small bight or recess in Amatique bay, in the southeastern part of the Gulf of Honduras, offering a sheltered position for the anchoring of vessels while loading. The land on both sides of this railway is considered to be unsurpassed in fertility and general suitability for the cultivation of fruits, and is also ideal land for raising cotton.

Railway Construction.

New Incorporations, Surveys, Etc.

ABILENE & SOUTHERN.—This company, now operating a line from Abilene, Tex., south to Ballinger, 54 miles, has amended its charter, permitting a change of route. The amended charter calls for a line from Ballinger north through Runnels, Taylor, Jones, Fisher, Stonewell, Kent, Dickens and King counties, 150 miles. The 54 miles of completed line will form part of the through route. An east and west line is to be built from Hamilton through Fisher and Scurry counties to Snyder, 50 miles. (June 3, p. 1390.)

This road has been extended from Abilene, Tex., northward to Hamlin, 42 miles.

ARIZONA EASTERN.—See Southern Pacific.

ATCHISON, TOPEKA & SANTA FE.—The report of this company for the year ended June 30, 1910, shows that under date of September 13 the total number of miles in operation on lines of the Atchison system was 9,961.25 miles, as compared with 9,792.5 miles for the previous year, an increase of 168.75 miles. In addition, there was finished on June 30, 211.78 miles, of which 88.57 miles was ready for operation on July 1. During the year the extension of the Arizona & California, from the west bank of the Colorado river to a junction with the main line at Cadiz, Cal., 83 miles, was finished and opened for traffic on July 1. The Concho, San Saba & Llano Valley, extending from Miles, Tex., to Paint Rock, 16.73 miles, was acquired during the year, and an extension from San Angelo to Sterling City, about 41 miles, under construction at the close of the fiscal year, has since been completed, and is now open for traffic. In order to shorten the distance from San Bernardino, Cal., via Riverside to Los Angeles, a cut-off was constructed under the name of the Fullerton & Richfield, between Fullerton and Richfield, 5.4 miles, and is now open for traffic. The Gulf & Interstate Railway of Texas, which extends from Beaumont, Tex., to Port Bolivar, where the company has extensive dock facilities, at which ocean steamers can receive and discharge cargoes, has been acquired. The company operates a tug and barge line between Port Bolivar and Galveston, and furnishes the shortest line between Galveston and Beaumont, where it connects with the leased lines of the Gulf, Colorado & Santa Fe. In West Texas substantial progress has been made on the main line connecting the G. & S. Fe. at Coleman with the Eastern Railway of New Mexico at Texico, N. M. The 45 miles immediately southeast of Lubbock, Tex., was finished at the close of the year, and 155 miles of the remaining section between Lubbock and Coleman has been graded and is ready for track laying. Branches from Plainview to Lubbock, 46.23 miles, and from Plainview to Floydada, 25.75 miles, have been finished, and are open for traffic. Other branches under construction include one from Slaton Junction to Lamesa, 54 miles, which has been finished since the close of the year and will be open for traffic in the near future, and another branch from Lometa to Eden, 98 miles. Heavy work is in progress to reduce the grades and curvature of the San Angelo branch of the G. & S. Fe. between Coleman and Temple, to secure a low grade short line in conjunction with the new main line between Coleman and Texico, the railways of the Eastern Railway of New Mexico as well as the Atchison company for traffic between points on or near the Gulf of Mexico and the Pacific coast. The second track in operation on June 30, 1910, was 526.95 miles, as compared with 492.8 miles for the previous year, an increase of 34.15 miles. Second-track work is in progress on the Illinois and Missouri divisions on 123.51 miles, and on lines west of Albuquerque, N. M., on 130.38 miles, a total of 253.89 miles. Of the second-track work in progress it is expected that 91.76 miles on the Illinois and Missouri divisions and 50.54 miles on the lines west of Albuquerque will be completed by January, 1911. See report of this company elsewhere in these columns.

The Las Animas district of the Arkansas River division has been opened for business from Waveland Junction, Colo., to Las Animas, 2.8 miles.

BEAUMONT & GREAT NORTHERN.—An officer writes that a grading contract has been given to Smith Brothers, Crockett, Tex., to build an extension from Trinity, in Trinity county,

northwest to Weldon, in Houston county, 20 miles. There will be one 60 ft. girder bridge. Track has been laid on two miles. The line will carry lumber, cotton, timber and other farm products.

LOUISVILLE & NASHVILLE.—An officer writes regarding the work now going on in connection with the East Cambridge extension that the extension connects the old railway at its northerly end with East Cambridge at or about Lechmere square, and is about 4 miles long. The structure is of steel and provides for track laid on trestle or a concrete floor or platform. It is to be used for the present for surface cars only. The only station on the line is to be directly opposite the North Union station of the Boston & Maine on Causeway street, the northerly platform adjacent to the station being used in common by the surface cars and elevated trains. Convenient transfers for passengers from surface cars to elevated trains, or vice versa, can be made at this station. There are two physical connections with the Boston & Maine station by means of foot passages, also additional stairs to and from the sidewalk directly in front of the railway station. The station itself is to be of steel and reinforced concrete. Work is now under way on a reinforced concrete bridge to be 1,830 ft. long, over the Charles river, to have granite piers to an elevation of about 16 ft. above high water, and above this point the superstructure is to be entirely of reinforced concrete. The work on the bridge is being done by the Holbrook, Cabot & Rollins Corporation; they also built a portion of the foundation for the steel structure in Cambridge. Work is under way on the foundations in Boston opposite the North Union station of the Boston & Maine by the Hugh Nawn Contracting Co. No other contracts on this work have as yet been let.

CANADIAN NORTHERN.—According to press reports, bids are to be asked for during October to build from Chilliwack, B. C., to Lytton, about 90 miles. The work will be heavy along the south bank of the Fraser river, including the canyon. A contract was recently given to the Northern Construction Co., Winnipeg, Man., for building the first 60 miles from Port Mann to Chilliwack. Bids may also be asked this fall for work on a 90-mile section north from Kamloops through the valley of the North Thompson.

CAZENOVIA & SAUK CITY.—Work has been finished from Lavallo, Wis., southwest to Cazenovia, and the line will soon be put in operation. The plans call for an extension to Richland Center. (July 29, p. 206.)

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—The report of this company for the year ended June 30, 1910, shows that a contract has been let and work is now under way on an extension from Kennedy, Wis., easterly for about 4.93 miles. It is expected to have the work finished and the line in operation before the close of 1910. During the year the company put up a new freight and passenger station at Bennett, Wis., and new brick passenger stations at Rice Lake and Shakopee, Minn. A new six-stall brick engine house was constructed at Ashland, Wis. The length of wooden bridging was decreased 2,013 ft. This was accomplished by making the following improvements: Construction of permanent bridges, 468 ft.; construction of iron pipe culverts, 906 ft., and by filling, 639 ft. See report of this company elsewhere in these columns.

CHICAGO, MILWAUKEE & PUGET SOUND.—This company has opened for business a new section from McKenna, Wash., west to Portola, 32.8 miles. With the completion of this work, train service is now in operation over the Grays Harbor line between Tacoma, Wash., and South Aberdeen. Trains are operating over the Tacoma Eastern from Tacoma to McKenna, thence over the C., M. & P. S. to Portola, and thence over the tracks of the Oregon & Washington to South Aberdeen.

CONCORDIA CENTRAL.—This company has secured a right-of-way, it is said, to build from Morville, La., through Concordia parish, for six miles. The line is to be built by the D. K. Jeffries Lumber Co., with headquarters at Natchez, Miss.

DULUTH, PIERRE & BLACK HILLS.—See Minneapolis & St. Louis.

IDAHO & WASHINGTON NORTHERN.—An officer writes that grading work has been finished, and the 10-mile extension from Lone, Wash., north to Metaline Falls, is ready for track laying. The

work included one steel bridge, 500 ft. long; 1,500 lin. ft. of trestle and 700 lin. ft. of tunnels. The line will have 9.2 per cent. grades and 6 deg. of curvature. The grading and bridge work cost \$40,000 a mile. Grant, Smith & Co., Spokane, were the contractors for the grading work, and McCrary & Willard were the contractors for the steel bridge. (March 24, p. 592.)

ILLINOIS CENTRAL.—The report of this company for the year ended June 30, 1910, shows that the Indianapolis & Eastern was completed during the year from Kensington, Ill., southeast to the Indiana state line, 6.71 miles. See report of this company elsewhere in these columns.

KALAMAZOO RAILROAD.—Incorporated in Michigan, with \$25,000 capital, to build from Kalamazoo to Benton Harbor. W. A. Blake, president, Coloma, and W. C. Klumb, secretary, Kansas City, Mo.

KANSAS CITY SOUTHERN.—An officer is quoted as saying that work will probably be started soon on a branch from Leesville, La., southwest to Houston, Tex., about 140 miles.

KENTUCKY HIGHLANDS.—See Louisville & Nashville.

LANCASTER & NORTHERN RAILROAD.—See Lancaster & Northern Railway.

LANCASTER & NORTHERN RAILWAY.—This company was organized to build from Millway, Pa., on the Philadelphia & Reading, southwest to Lancaster, on the Pennsylvania Railroad, about 10 miles. Construction work was started this spring and about four miles of the line has been completed. The National Engineering & Construction Co. has finished all the engineering work. Surveys have been made for a branch from a point on the main line near Brownstown, on the Lancaster & Northern Railroad, northeast to a connection with the Schuylkill division of the Pennsylvania Railroad at Gibraltar. All the right-of-way has been secured and the engineering work is nearing completion. It has not yet been decided when bids will be asked for this work. R. Williams is vice-president of the Lancaster & Northern Railroad, 407 Woolworth building, Lancaster.

LOUISVILLE & NASHVILLE.—An officer writes that work is well under way on an extension of the Kentucky Highlands between Millville, Ky., and Versailles. It is expected to have the work finished by the end of 1910.

MEXICO NORTHWESTERN.—Train service has been extended on this road from Nueva Casas Grandes, Mex., south to Pearson, 30 miles.

MINNEAPOLIS & ST. LOUIS.—This company expects to begin construction work soon, it is said, from Pierre, S. D., northeast to Aberdeen, 125 miles, using the old grade which was constructed about 20 years ago. The Duluth, Pierre & Black Hills, which owned the old grade, recently asked for incorporation in South Dakota, with \$3,000,000 capital and headquarters at Pierre, to build the line at an estimated cost of \$5,500,000. The incorporators include: George W. SeEVERS, W. G. BIERD, C. F. Foote, Minneapolis, Minn.; C. E. Deland and John I. Newell.

MOUNT HOOD RAILROAD.—Grading contracts are to be let at once, it is said, to build a 21-mile extension of this line to the Sandy and Blue Run power sites, at which place the construction of a power plant will be started soon. The company now operates 22 miles of line from the city of Hood River, Ore., to Parkdale.

NUCES RIVER RAILWAY.—This company, which proposes to build from Beeville, Tex., west to Eagle Pass, about 180 miles, has completed survey on the first 15 miles from Beeville, Tex., west, and it is expected that construction work will be begun on this section before January 1. Bonuses for about \$500,000 have been secured, also the right-of-way from Beeville west to Co-tulla, which is about midway between Beeville and Eagle Pass. The right-of-way is being secured for the remaining section to Eagle Pass. It will take about two years to complete the line. W. A. Frisby, president; G. C. Ehrenborg, chief engineer, Beeville. (Sept. 16, p. 520.)

OREGON & WASHINGTON.—The Grays Harbor branch has been opened for business from Centralia, Wash., west via Portola to

South Aberdeen, 52.8 miles. (See Chicago, Milwaukee & Puget Sound.)

PALACIOS, SAN ANTONIO & PECOS VALLEY.—Financial arrangements have been made, it is said, and work is to be started soon on the section from the deepwater harbor at Palacios, in Matagorda county, Tex., northwest to San Antonio, with branches, about 160 miles. The company was recently incorporated in Texas with \$200,000 capital. J. P. Pierce, president, and H. W. Dean, secretary and manager, Palacios. (April 29, p. 1114.)

PAYETTE VALLEY.—This road has been extended from New Plymouth, Idaho, southeast to Emmett, 18 miles. (May 27, p. 1124.)

PENNSYLVANIA ROADS.—Representatives of the New York Central & Hudson River and the Pennsylvania Railroad are said to be back of a project to build a line from Burns Summit, Pa., to Possum Glory. The plans include buying the Black Lick & Yellow Creek, which operates a line from a connection with the Pennsylvania Railroad at Rexis, near Vintondale, north to Burns Summit, 10 miles, and building from Burns Summit to a connection with the New York Central & Hudson River at Possum Glory.

PORTERVILLE NORTHEASTERN.—An officer writes that bids will be let early in October to build from Porterville, Cal., to Springville, in Tulare county, 16 miles. F. U. Nofziger, president, and C. S. Freeland, chief engineer, Porterville.

PRAIRIE FARM & SOUTHWESTERN.—This company, which has already been granted a certificate of convenience and necessity by the Wisconsin State Railroad Commission to build from Prairie Farm, Wis., southwest to Emerald, 16 miles, has filed an amendment to its charter, increasing its capital stock from \$25,000 to \$100,000. G. E. Scott, president, Prairie Farm. (June 24, p. 1813.)

ROANOKE VALLEY.—Incorporated in North Carolina, with \$50,000 capital, to build from Thelma, N. C., on the Seaboard Air Line, north to the Virginia boundary, about 10 miles. The incorporators include: D. P. Camp, Franklin, and W. E. Jones, Raleigh.

SOUTH DAKOTA ROADS.—A line is projected from Chamberlain, S. Dak., northeast via Huron and Bryant to Watertown. Surveys are now being made between Chamberlain and Huron, and it is expected that construction work will be begun early next spring. A. E. Parsons, Darlington, Wis., and residents of South Dakota are back of the project.

SOUTHERN PACIFIC.—The Phoenix division of the Arizona Eastern has been extended from Phoenix, Ariz., westward to Hassayampa, 39 miles.

TEMISKAMING & NORTHERN ONTARIO.—This company has opened for business the Kerr Lake branch, from Cobalt, Ont., to Kerr lake, five miles.

TUSCALOOSA MINERAL.—An officer writes that contracts will be let soon and work will be started on a line from Brookwood, Ala., southwest, for 21 miles. The work will be difficult, and there will be a large amount of cut and fill work. There will be two or three steel bridges, eight trestles and one tunnel; a terminal station at Tuscaloosa; a station at Brookwood, and an intermediate station. The line will carry furnace supplies and products, the output of coal mines and timber.

VIRGINIA & CAROLINA SOUTHERN.—A new branch has been opened for business from St. Paul, N. C., south to Tar Heel, 11 miles.

WAMEGO RIVER & ROCK CREEK VALLEY.—An officer writes that a contract has been let to C. F. Coon & Co. to build from Westmoreland, Kan., south via Flush and Louisville, to Wamego, 20 miles. Grading is now under way by A. C. Wheeler, of Westmoreland, who has given a sub contract. Maximum grades will be 1 per cent. and maximum curvature 3 degs. It is expected to have the work finished by June, 1911. C. F. Morris, president, and C. C. Eastman, chief engineer, Westmoreland. (May 20, p. 1182.)

YOUNGSTOWN & OHIO RIVER.—This road has been extended from East Liverpool, Ohio, south to Diamond.

Railway Financial News.

BOSTON & MAINE.—See Fitchburg Railroad.

CALDWELL & NORTHERN.—See Carolina & Northwestern.

CAROLINA & NORTHWESTERN.—This company has bought the property of the Caldwell & Northern, running from Lenoir, N. C., to Edgemont, 23 miles. The Caldwell & Northern was formerly controlled by the Carolina & Northwestern, and the \$543,000 first mortgage 5 per cent. bonds of the former have been assumed by the latter. The Carolina & Northwestern now operates 133 miles of road running from Chester, S. C., to Edgemont, N. C.

CENTRAL NEW ENGLAND.—The owners of all but 300 shares of the total Philadelphia holdings of minority stock of the Central New England have been turned over to the New York, New Haven & Hartford, in accordance with the offer of the New Haven to pay \$45 a share for the preferred and \$22.50 for the common. Of the remaining 300 shares, at least 125, it is said, are held by a man who is abroad and with whom it has not been possible to communicate.

CHESAPEAKE & OHIO.—The \$31,390,000 4½ per cent. convertible bonds, sold in part to stockholders and in part to Kuhn, Loeb & Co. last spring, are now all outstanding, Kuhn, Loeb & Co. having sold or given an option on the amount, said to be about \$11,000,000, that they took.

CLEVELAND, CINCINNATI, ST. LOUIS & CHICAGO.—This company has leased for 99 years the property of the Evansville, Mt. Carmel & Northern. The capital stock of the company will be increased from \$50,000 to \$500,000 at once, and the purchaser will issue bonds to the amount of \$5,000,000 to complete the new road.

ERIE.—The company has asked the New York Public Service Commission, Second district, for permission to issue \$1,000,000 general lien bonds to reimburse the company for expenditures for coal cars.

FITCHBURG RAILROAD.—Stockholders have noted to issue \$400,000 preferred stock to reimburse the Boston & Maine for expenditures on permanent additions and improvements financed by the Boston & Maine up to June 30.

ILLINOIS TUNNEL CO.—Judge Kohlsaat, in the federal court, has authorized the receivers to pay the semi-annual dividend on the \$665,000 Chicago Dock Co. 4 per cent. bonds due October 1.

SEABOARD AIR LINE.—W. K. Whigman has been elected a director, succeeding C. Sydney Shepard. N. S. Meldrum, president, has been elected a member of the executive committee, succeeding Mr. Shepard.

SOUTHERN INDIANA.—The United States Circuit Court at Chicago has ordered the sale under foreclosure of the Southern Indiana and the Chicago Southern. The Southern Indiana is to be sold November 3 at Terre Haute, Ind., and the Chicago Southern November 4 at Danville, Ill.

WABASH-PITTSBURG TERMINAL.—Judge Young, in the United States Circuit Court, has authorized the receivers of the West Side Belt to issue \$700,000 receivers' certificates to retire \$615,000 receivers' certificates falling due September 1, 1910, and the receivers of the Wabash-Pittsburg Terminal have been authorized to issue \$974,211 receivers' certificates to retire \$875,000 receivers' certificates.

About 17,000 square miles of territory came within the sphere of British influence by the treaty signed at Bangkok in March, 1909. It includes the states of Kedah, Tringganu and Kelantan. Great Britain made concessions respecting extrajurisdictional rights over certain proteges of Siam, and the Federated Malay States agreed to loan Siam \$30,000,000, at 4 per cent., to be used in building a railway which would link the Siamese and Malay systems, thus giving a line 900 miles long connecting Bangkok with Singapore. It is now reported that the Siamese Ruler's Administration has contracted with an English bridge company for all the steel work for 15 new bridges, varying from 18 to 360 ft. in length, necessary for the construction of the road. When this road is completed a connection between the Burmese and Malay States lines will be constructed.

Supply Trade Section.

The Eastern Railway Supply Company, Baltimore, Md., is now completing an order for 1,000 tons of cast iron pipe for the Western Maryland.

The Illinois Steel Company has broken ground for a new power plant at the Ithet works. The total cost of the improvement is given as \$1,000,000.

Charles W. Coleman, electrical engineer of the Hall Signal Company, New York, and for many years a member of the Railway Signal Association, died at his home in Westfield, N. J., on Monday, October 3.

P. H. Wilhelm, for some time with the American Steel & Wire Company, has been made general railway representative of the Boston Woven Hose & Rubber Company, Boston, Mass. Mr. Wilhelm's headquarters will be at Boston.

Effective October 1, E. Stutz, vice-president and general manager of the Goldschmidt Thermit Company, New York, retired from the direction of the company. He was succeeded by William C. Cuntz. Mr. Cuntz, for 18 years, was connected with the Pennsylvania Steel Company.

James F. Miner, who has been in the employ of the Nathan Manufacturing Company, New York, for the past 28 years, died on Tuesday, September 27, at the age of 67. At the time of his death Mr. Miner was in charge of the company's interests in the southern territory of the United States, in Mexico and Cuba.

The Isthmian Canal Commission will receive bids until October 27 for lumber, steel cable, washer-cutting machine, portable electric grinder, machine and hand taps, sellers and pipe hobs, reamers, steel sockets, twist drills, chucks, punches, dies, rivet sets, etc. (Cir. No. 608), and for 36-in. troughing belt conveyors and wood boring machines (Cir. No. 608-A).

The McKean Motor Car Company, Omaha, Neb., has received an order for one 70-ft. motor car from the Southern Pacific and for a similar car from the Rock Island lines, in addition to orders recently mentioned in the *Railway Age Gazette*. This company has also just delivered a 70-ft. gasoline motor car to the Chicago Great Western for operation out of St. Joseph, Mo. The St. Joseph & Grand Island now operate six of these cars out of this point.

The 6,000th locomotive built by the Hannoversche Maschinenbau-Actien Gesellschaft vormals Georg Egestorff (Hanover Locomotive & Engineering Works), of Hanover-Linden, Germany, left the works on September 28, and the 5,000th locomotive was completed on June 15, 1907. The former, which is an eight-wheel coupled freight locomotive, fitted with a Schmidt superheater, was built for the Elberfeld Direction of the Prussian State Railways. The locomotive has cylinders 23.6 in. x 25.9 in. and driving wheels 53.1 in. in diameter. The heating surface, including that of the superheater, is 1,911.7 sq. ft. and the light weight of the locomotive is 55.2 tons.

1911 M. M. and M. C. B. Conventions.

The annual conventions of the American Railway Master Mechanics' and Master Car Builders' associations will be held at Atlantic City, N. J.; the former from June 14 to 16, inclusive, and the latter from June 19 to 21, inclusive. The headquarters will be at the Marlborough-Blenheim hotel, and the rates for accommodations will be the same as for 1910. The plans of the Railway Supply Manufacturers' Association provide for an exhibit space of 75,000 sq. ft., or about 4,000 sq. ft. more than were occupied in June last. This increase will be obtained by a rearrangement of the hotel men's annex and annex court. All applications for exhibit space should be made to the secretary, John D. Conway, 2135 Oliver building, Pittsburgh, Pa.

TRADE PUBLICATIONS.

Rail, Equipment & Machinery.—Walter A. Zelnicker Supply Company, St. Louis, Mo., has just issued its sheet No. 116, covering rail, equipment and machinery offerings.

Emery Wheel Machinery.—Joseph T. Ryerson & Son, Chicago, have issued a 16-page booklet giving the advantages of

emery wheels in machine shops and listing the company's product in that line.

Draft Gear.—The Union Draft Gear Company, Chicago, has just issued a small pamphlet containing an article, entitled "Mike," supposedly a discussion with a car foreman on the subject of draft gears.

Titanium Rails.—The Titanium Alloy Manufacturing Company, Pittsburgh, Pa., in a catalogue recently issued, discusses the treatment of steel with titanium alloy and the use of rails made of this steel. A large number of full page illustrations show installations of titanium rails, on both steam and electric railways, where traffic is very heavy. Several photographs also show tests to which these rails are subjected and their effects.

Steel Specifications.—The Carnegie Steel Company, Pittsburgh, Pa., has just issued a booklet containing standard specifications for structural steel; special plate and rivet steel; building, bridge and ship material; concrete reinforcement bars; forgings; axles; wheels and structural nickel steel. These specifications are those of the Association of American Steel Manufacturers, the Carnegie Steel Company and the American Society for Testing Materials.

RAILWAY STRUCTURES.

BELTON, TEX.—The Gulf, Colorado & Santa Fe has authorized the building of a viaduct along Main street across the company's main tracks. The structure will be of trestle construction over the tracks with earth approaches along Main street on a 5 per cent. grade. The roadway will be 36 ft. wide and will be macadamized.

BETHLEHEM, N. Y.—The petition of the State Highway Commission for the elimination of grade crossings has been granted by the New York Public Service Commission, Second district. This call for the elimination of grade crossings as follows: On the Delaware & Hudson at Slingerland, in the town of Bethlehem, Albany county, N. Y.; on the Boston & Maine in Glenville, Schenectady county, and on the Buffalo, Rochester & Pittsburgh in Wheatland, Monroe county. All of the highways are to be carried under the grade of the railways by means of under-grade crossings.

BOSTON, MASS.—See Boston Elevated under Railway Construction.

BROOKWOOD, ALA.—See Tuscaloosa Mineral under Railway Construction.

DULUTH, MINN.—The new passenger station of the Minneapolis, St. Paul & Sault Ste. Marie in Duluth was recently opened for traffic.

GLENVILLE, N. Y.—See Bethlehem, N. Y.

INDIANAPOLIS, IND.—The Cleveland, Cincinnati, Chicago & St. Louis freight house was damaged by fire on October 2. The loss to the building will amount to about \$5,000, and in addition to this the freight records for many years were destroyed. The building will be repaired at once.

JONE, WASH.—See Idaho & Washington Northern under Railway Construction.

MADISON, WIS.—It is expected that work on the new passenger station of the Chicago & North Western in Madison will be finished about December 1. G. A. Johnson & Son, Chicago, are the contractors. (March 25, p. 853.)

READING, PA.—Experts report that the combined highway and street railway bridge over the Schuylkill river at Penn street is unsafe, and recommend that it be replaced with a new structure.

TUSCALOOSA, ALA.—See Tuscaloosa Mineral under Railway Construction.

WHEATLAND, N. Y.—See Bethlehem, N. Y.

WILKES-BARRE, PA.—The City Council has asked the Pennsylvania Railroad and the traction company to co-operate in carrying out improvements to strengthen the present South street bridge, or to build a new structure.

Late News.

The items in this column were received after the classified departments were closed.

D. H. Morris has been elected vice-president of the St. Louis Southwestern, succeeding N. A. Campbell.

W. H. Finley, signal engineer of the Chicago Great Western at Chicago, has resigned to become associated with the Chicago sales office of the Union Switch & Signal Co., Swissvale, Pa., effective October 15.

The Wamego & Rock Creek Valley, C. C. Eastman, chief engineer, Westmoreland, Kan., a new line under construction from Westmoreland, south to Wamego, 20 miles, advises that it will buy car equipment in about 90 days.

The National Railways of Mexico recently received bids, it is said, for the clearing, grading and masonry work on a connecting line to be built from Penjamo, in the state of Guanajuato, Mex., south to Ajuno, Michoacan, 75 miles. This is for work on the first section of a line which will eventually have a total length of 300 miles.

The board of Railroad Commissioners for South Dakota has filed a complaint against the Chicago, Milwaukee & St. Paul and other roads doing business in that state, with regard to the proposed increased rates on grain, flaxseed, etc., to Minneapolis, Duluth, Milwaukee, Chicago and Omaha. The case will be heard at the general inquiry on this class of rates, which the commission has ordered to be held at Aberdeen, S. D., on October 10, before Examiner Hilzer.

A contract for 450 tons of steel for bridges in connection with changes to be made in the Union loop at Chicago has been let to the C. L. Strobel Construction Co. of Chicago. George W. Jackson, Inc., was given a contract for 3,800 tons for the Commonwealth Edison power-house and railroad trestle work in Chicago. Bids soon will be asked by the Sanitary district for the new bridges to be constructed over the Chicago river at Van Buren street, Adams street, Jackson boulevard and the Metropolitan Elevated crossing.

The Chicago & Alton has acquired by lease the Rutland, Toluca & Northern (formerly the Toluca, Marquette & Northern), and the duties of the following officers of the accounting and treasury departments of the C. & A. at Chicago are extended over that line: E. S. Benson, comptroller; W. D. Tucker, general auditor; W. R. Mozier, auditor freight accounts; F. B. Smith, auditor passenger accounts; H. B. Belt, freight claim agent; H. M. Burnett, chief clerk car accounting bureau; H. E. R. Woods, assistant treasurer.

An officer of the St. Louis Southwestern writes that the Stephenville North & South Texas has work under way from Hamilton Junction, Tex., which is 5.5 miles north of Hamilton, via Gustine to Comanche. Three miles of the work will be heavy, and work on the rest of the section, 28.5 miles, will be light. There will be two steel bridges. Maximum grades will be 1 per cent. and maximum curvature 4 degrees. Thompson & Scott, St. Louis, Mo., are the contractors. (July 1, p. 54.)

A bill in equity asking that the order of the Interstate Commerce Commission ordering the Pennsylvania Railroad to abolish its rules and regulations as to the distribution of coal cars in the bituminous fields be annulled, has been filed in the United States Circuit Court by the railway. On January 1, 1906, the Pennsylvania adopted a system of allotting coal-carrying vehicles to mines in Tyrone, Cambria and Clearfield, East End and South Fork and Scalp Level districts of Pennsylvania by which the transporters were to receive cars according to the rated capacity of their mines. Soon after the method went into effect several coal companies complained to the Interstate Commerce Commission that the system of allotment was discriminatory and intended to bestow great favor upon certain of their competitors. After a hearing the commission entered an order forbidding the railroad from continuing the system after October 1 of the present year. In the bill in equity filed it is set forth that the system does not give any undue or unreasonable preference to anyone and that it is not unlawful.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Wamego & Rock Creek Valley, C. C. Eastman, chief engineer, Westmoreland, Kan., a new line under construction from Westmoreland, south to Wamego, 20 miles, advises that it will buy motive power in about 90 days.

CAR BUILDING.

The Baltimore & Ohio is asking prices on 30 all-steel baggage cars.

The Maine Central has ordered 500 heater cars from the Laconia Car Company.

The Sorocabana Railway, Brazil, is in the market for a number of passenger cars.

The Erie is said to be in the market for 200 refrigerator cars. This item is not confirmed.

The Atlantic Seaboard Despatch has ordered 30 all-steel, 8,000-gal. tank cars from the Chicago Steel Car Company.

The City of Chicago, Department of Public Works, 200 Randolph street, will take bids until October 11 on six dump cars.

The Kingan Refrigerator Car Company, Indianapolis, Ind., is receiving from the American Car & Foundry Co. 75 dressed beef cars of 30 tons capacity, weighing approximately 46,000 lbs.

MACHINERY AND TOOLS.

The Transcontinental Railway of Canada has ordered a number of machine tools divided among several toolmakers. Joseph T. Ryerson & Son, Chicago, received the largest part of the orders given to American companies, the order including hydraulic presses, bulldozers, punches and shears, riveting machinery, flanging machines, high-pressure pumps, accumulators, steam hammers, Ryerson flue cleaning machine, metal sawing machines, automatic tube cutting off machines, rotary bevel shears and rotary splitting shears.

The Chicago, Burlington & Quincy, reported in the *Railway Age Gazette* of July 8 as in the market for machine tools, has ordered the following: Lucas Machine Tool Company, three forcing presses; Marshall & Huschart Machine Company, one vertical turret lathe, three boring mills, one gear cutting machine, three portable bolt lathes, one radial drill, one cutter and reamer grinder, one cold saw; Wm. Sellers & Company, one car wheel boring mill, one drill grinder; Manning, Maxwell & Moore, one drill, three centering machines, one link radius grinder, two arbor presses, one slotter, one turret drill, two engine lathes, one staybolt drill, four 24-in. post drills, one die grinder, one pipe-bending machine; O. L. Packard, one radial drill; Chandler Raner Company, two geared planers; Niles-Bement-Pond Company, four turret lathes, one quartering machine; Armstrong & Blum, two power hack saws; Springfield Mfg. Company, nine grinders; Brown & Sharpe, one universal grinder; McDowell Stocker & Company, two bolt cutters, one nut taper, three power hammers, two double punch and shears, one staff riveter, one horizontal flange punch, one forging machine; Whiting Foundry Company, one rotary sand sifter; Watson-Stillman Company, one car wheel press; Railway Materials Company, one tool furnace, one babbit furnace, two blocking out furnaces, one heavy forging furnace, one case hardening furnace; Hawley Down Draft Furnace Company, one metal melting furnace; Calumet Engineering Works, one brass rattler; Electric Controller & Supply Company, one lifting magnet; Colcord Machinery Company, one shaper. Two steam hammers will be built in company shops. The remainder of the original inquiry, about 16 tools, are still to be bought.

IRON AND STEEL.

The National Railways of Mexico have ordered 10,000 tons of rails.

The Duluth, Rainey Lake & Winnipeg has ordered 10,000 tons of rails.

The Portoric & Fremont (Electric) has ordered 2,000 tons of rails from the Carnegie Steel Company.

The Chicago & Western Indiana has ordered 2,200 tons of structural steel for track elevation work in Chicago.

The Philadelphia & Reading is in the market for 4,000 tons of structural steel for terminal work in Philadelphia, Pa.

The Atlantic Coast Line is said to have ordered 15,000 tons of rails from the Tennessee Coal, Iron & Railroad Company.

The Kansas City Southern has ordered 300 tons of structural steel from the Virginia Bridge & Iron Works for shops in Shreveport, La.

The Central of New Jersey has ordered 300 tons of bridge steel from the Phoenix Bridge Works. This material was mentioned in the *Railway Age Gazette* of September 23.

General Conditions in Steel—Although a feeling of improvement in the steel market is beginning to be evident, there has been little change in fundamental conditions, that is, buyers have not yet come into the market for large amounts of steel. It is thought that the railways must soon issue requirements for 1911 delivery, and it is generally thought that several large systems, now working on 1911 estimates, will purchase fewer rails than at this time a year ago. The *Wall Street Journal* says: "Buying of steel products on a large scale should have started in about the middle of August. Instead of an increase there has been a shrinkage, new business having averaged close to 50 per cent. of capacity. The blast furnaces of the Steel Corporation are operating about 67 per cent. of normal capacity, while steel production is in the neighborhood of 75 per cent. of capacity. The Steel Corporation, as well as a majority of the independents, have cut down mill operations, and unless there is an improvement within the next six weeks steel production will be running very close to pig iron output. As prices for steel are much lower than they were in the early part of the year, earnings will show a shrinkage compared with the first three quarters of the year. The earnings of the United States Steel Corporation for the third quarter are estimated between \$36,000,000 and \$36,500,000, a shrinkage of from \$3,500,000 to \$4,000,000, compared with the preceding quarter. For the month of September there was a heavy shrinkage in unfilled tonnage, estimated between 300,000 and 350,000 tons. This will bring the unfilled business of the Steel Corporation down to a level close to the lowest ever reached."

SIGNALING.

The Chicago, Rock Island & Pacific now has automatic block signals in service, recently installed, between Linn Junction and Vinton, on the Minnesota division, 19 miles, single track, and between Eldon and Clio, on the Missouri division, 78 miles, single track.

Judge Lacombe, in the federal court at New York City, has denied the application of the Kinsman Block System Company for an injunction to forbid the Pennsylvania Tunnel and Terminal Company to use a certain patented apparatus for announcing the arrival of trains at stations.

George S. Pfisterer, since 1903 in charge of the signal department of the Nashville, Chattanooga & St. Louis, has received the title of signal engineer. He is on the staff of the president and general manager. Mr. Pfisterer was born in 1869, near Allegheny City, Pa., and began work in the signalling field as a laborer in a construction gang of the Union Switch & Signal Company in the summer of 1889. After three years he became foreman for the Johnson Railroad Signal Company, and a year later went to the Chicago & Eastern Illinois, where he was supervisor of signals for eleven years. Then he went to the Nashville, Chattanooga & St. Louis, where, like Jacob of old, he has served seven years while waiting for the recognition which has now come.

Chicago Signal Club.

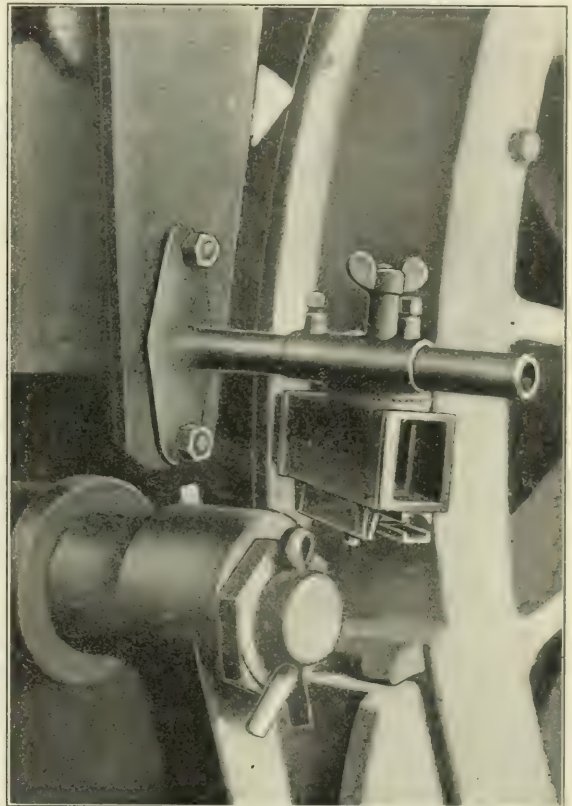
The regular meeting of the Chicago Signal Club was held on Monday, September 26, at 402 Plymouth building, Chicago, Ill. The early part of the evening was given over to a discussion of storage battery care and operation. H. M. Beck, of the Electric Storage Battery Co., read an interesting and instructive paper on this subject, after which he answered questions presented by members. The discussion developed many fine points connected with the care of storage cells, gathered

from the experience of the men who have had to maintain them in interlocking and signal work.

Mechanical towers and lockouts were discussed at length. Excellent ideas were brought out, and the practices of the different signal departments furnished interesting comparisons. The meeting adjourned after nearly three hours of profitable discussion. The attendance was larger than at any previous meeting. The next regular meeting will be held Monday evening, October 10. The subjects to be discussed are gravity battery v. storage battery for track circuits, and detector bars v. track circuits. The club voted to have a Question Box in which anyone may drop an unsigned question or communication which he would like to have taken up and discussed.

Wheel Flange Lubricator.

The manufacturers of the Collins wheel flange lubricator, the Collins Metallic Packing Co., 407 Cherry street, Philadelphia, Pa., claim that it will increase the life of the flange by 200 per cent., and saves the loss of time due to taking the engine out of service for wheel repairs; that it reduces the wear on the ball of the rail on curves, since when the flange strikes the ball of the rail the lubricant becomes operative and the coating, which is removed by the contact, is immediately replaced; that it does not interfere with the tractive power of



Lubricator Attached to Bracket for Service on Forward Driver.

the locomotive, as it is applied to the flange only; and that the heating of the tire, due to excessive braking, will not affect the lubricator in any way or diminish its efficiency. This lubricator, shown in the accompanying illustration, is simple and substantial in construction and easily adjusted to suit any condition. The ease with which it can be applied is evident. It may be bolted directly to the frame or to a light bracket. The adjusting device permits the block holder to be set at any desired angle, though 25 deg. with the frame is preferable. It may be placed so as to avoid sand pipes or other parts of the locomotive on either the front or the back wheel, but pre-

ferably should be placed on the front of the leading wheel or rear of the back driving wheel. It should, however, always be set slightly above the center line.

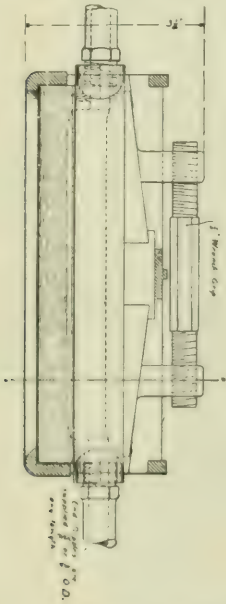
There is a compression latch on the bottom of the device, engaging the lubricating block, which is used to feed the lubricator toward the flange. A new lubricating block can be applied very easily and quickly.

This wheel flange lubricator is said to have been in use for over a year on both road and switching locomotives, and that in one instance one lubricating block made from 3,500 to 4,000 miles on a switching locomotive and from 2,500 to 3,000 miles on a high-speed passenger locomotive.

Klinger Type Self-Adjusting Reflex Water Gage.

It is often impossible, with the ordinary round tube gage, to distinguish the exact height of the boiler water, due in part to the clouding effect of the impurities in the water and also because the light does not always strike the water gage at the proper angle. The gage shown in the accompanying illustrations is designed to facilitate a quick and accurate determination of the water height.

It consists of a container, in the form of an elongated hollow block or tube having a rounded end threaded to receive the ends of the nipples for the connection with the upper and lower fittings of the boiler. This tube has an elongated lateral opening over which is placed



Klinger Type Reflex Water Gage.

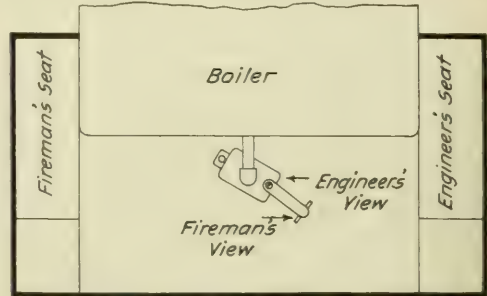


the Klinger reflex glass, the characteristic features of which are the facets on the inner side arranged in such a manner that the part of the glass which is covered by the liquid will permit a cast of light, while from that part of the glass covered by steam or air, the light will be reflected from the facets so that a sharp and clear line of demarcation is produced between the two bodies, which will permit the level of the liquid in the gage to be plainly seen at a distance.

Wedges are introduced between the frame and the back of the container by which the glass and the container are drawn together. The frame is provided with an inner inclined surface to conform to the taper of the wedges. These wedges have ears projecting outward through the elongated opening in the frame, and these are threaded to receive the oppositely threaded ends of a screw by which they are adjusted. In use, the gage will be heated to very high temperatures, and this heat will be conducted and radiated to the screw, the expansion of which will tend to spread the wedges further apart, drawing the glass more firmly to the container.

It is said to be impossible to make a thick elongated stick of glass, such as is used in this type of gage, which will be uniform in thickness. It is therefore essential to provide a glass-securing device which will compensate for the variation in thickness, and the one used, it is said, admirably meets this condition.

As the devices for securing the glass over the aperture in the container do not enter the container tub but are applied on the exterior of it, the possibility of leakage is reduced to a minimum. The parts of the gage are few in number, simple, strong in construction and readily assembled. It is not neces-



Klinger Water Gage in Locomotive Cab.

sary to watch the gage for leaks or to tighten the adjustments, as this is done automatically.

As it is essential in using this gage in a locomotive cab that it be seen by both the engineer and fireman, the mirror arrangement indicated in the plan view was devised. The gage is shown turned toward the engineer's seat and the mirror allows the fireman also to see the reflection of the water level.

This water gage is manufactured by the Jerguson Manufacturing Company, Boston, Mass.

Pennsylvania Railroad Submarine Cables.

The difficulty of caring for the numerous telephone, telegraph and signal wires necessary in railway operation at points where the tracks cross navigable rivers, making a draw bridge a necessity, has recently been met by the Pennsylvania at its new Hackensack draw, where the Pennsylvania Terminal and Tunnel division crosses the Hackensack river, a few miles west of Jersey City, N. J.

Two submarine cables were placed, one, a 35-pair, No. 13 gage, triple wrapped, paper insulation, to be used for telegraph circuits, and one 45-pair, No. 13 gage, double wrapped, paper insulation, having the wires of the inner core triple wrapped and having eight pairs of this core twisted into double pairs, thus forming four phantom circuits. Each cable is 1,225 ft. long, the 35-pair cable weighing 11½ tons and the 45-pair, 12½ tons. Each cable has a lead sheath 5-32-in. thick. Each sheath was saturated with a non-corrosive preservative compound, over which was wound two layers of saturated jute, put on in reverse directions. Over this sheath was placed an armor of No. 4 B. W. G. iron wire, the armor being saturated with a preservative compound, and over this was placed two thicknesses of hemp rope, laid on in adverse directions and thoroughly saturated with the preservative compound. The average mutual electrostatic capacity of this cable was between .06 and .074 micro-farad per mile.

These cables were made by the Western Electric Company, New York, at its Hawthorne, Ill., factory. The work of laying them was done by the Postal Telegraph Cable Company, under the personal supervision of M. Kelly, who represented J. C. Johnson, superintendent telegraph of the Pennsylvania.

One very interesting feature, aside from the laying of the cable, was the very efficient and durable line of concrete poles which terminated on either shore. These poles were cast by the railway company in accordance with its specifications, and it is expected that they will be found much more suitable in the low, swampy ground where they are placed than wooden poles.

The weight of this cable was such that it was not necessary to do any dredging along the river bottom, as it is expected that its weight will be sufficient to sink it far enough into the mud to prevent its receiving any injury.

The foregoing average maintenance charges include a proportion of unallocated expenditures for Maintenance of Equipment charged to Superintendence, Shop Machinery and Tools, Injuries to Persons, Stationery and Printing, Other Expenses and Maintaining Joint Equipment at Terminals.

The amount to the credit of the Equipment Depreciation Reserve June 30, 1909, as shown in the last annual report, was \$181,617.45, to which should be added \$2,150.69, representing credit balance in reserve of the Texas and Gulf Railway Company not previously included in operations of the system, making a total of \$183,768.14.

The following sums were credited to the reserve during the year:

Estimated depreciation accrued.....	\$2,275,711.31
Renewal charges.....	157,324.38
Salvage.....	143,683.40
Cash collected for equipment sold and equipment destroyed on foreign lines, including insurance collections.....	281,911.15
	<u>2,858,630.24</u>

\$3,072,293.33

Charges to the reserve for equipment retired during the year were as follows:

3 locomotives.....	\$15,526.46
9 passenger-train cars.....	26,314.83
13 freight-train cars.....	647,935.39
13 miscellaneous cars.....	8,929.70
	<u>698,706.38</u>

\$2,373,592.00

Add—To adjust Equipment Depreciation Reserve so that this account shall reflect the depreciation accrued since July 1, 1907, on equipment in service.....

3,990,120.34

Balance in reserve June 30, 1910.....

\$6,368,722.34

The following charges were made to Additions and Betterments in respect of additional equipment purchased and built during the year and in respect of payments made for equipment received during prior years:

52 locomotives.....	\$1,087,973.19
208 passenger-train cars.....	2,318,799.80
424 freight-train cars.....	5,267,996.42
208 miscellaneous cars.....	187,996.55
	<u>\$8,862,765.96</u>

Less—Value of equipment retired during the year charged to the Equipment Depreciation Reserve.....

698,706.38

\$8,164,059.58

MAINTENANCE OF WAY AND STRUCTURES.

The following statement shows the sums charged to Operating Expenses for Maintenance of Way and Structures during each year since July 1, 1896:

Year ending June 30,	Average operated mileage.	Total expenditure.	Expenditure per mile.
1897.....	6,443.31	\$6,282,923.15	\$975.03
1898.....	7,936.02	8,281,397.88	1,193.97
1899.....	7,032.62	7,672,107.62	1,090.93
1900.....	7,341.34	6,354,372.10	865.56
1901.....	7,807.31	6,433,840.36	824.08
1902.....	7,855.38	6,141,466.39	781.82
1903.....	7,965.13	9,304,892.04	1,168.20
1904.....	8,179.59	9,170,224.07	1,121.11
1905.....	8,305.40	11,385,418.33	1,370.85
1906.....	8,433.99	12,475,407.97	1,479.18
1907.....	8,278.15	15,286,062.66	1,846.42
1908.....	9,415.01	14,120,828.02	1,499.82
1909.....	9,794.86	12,884,406.81	1,315.43
1910.....	9,914.33	17,807,136.20	1,795.74

COMPARISON OF OPERATING RESULTS.

The following is a statement of revenues and expenses of the system for the fiscal year ending June 30, 1910, in comparison with the previous year:

	Year ending June 30, 1910.	Year ending June 30, 1909.	Increase.
Operating revenues:			
Freight.....	\$71,194,066.50	\$64,212,638.10	\$6,981,428.40
Passenger.....	25,437,181.98	22,734,505.32	2,702,676.66
Mail, express & miscellaneous.....	8,361,957.10	7,318,573.45	1,043,383.65

Total operating revenues.....\$104,993,194.67

\$94,265,716.87

\$10,727,477.80

Operating expenses:

Maintenance of way and structures.....	\$17,807,136.20	\$12,884,406.81	\$4,922,729.39
--	-----------------	-----------------	----------------

Maintenance of equipment.....	15,560,047.44	18,009,807.37	2,449,759.93
-------------------------------	---------------	---------------	--------------

Traffic expenses.....	1,399,892.11	209,428.38	1,190,463.73
-----------------------	--------------	------------	--------------

Transportation expenses.....	31,821,525.28	20,674,863.83	11,146,661.45
------------------------------	---------------	---------------	---------------

General expenses.....	3,438,600.92	2,127,266.07	1,311,334.85
-----------------------	--------------	--------------	--------------

Total operating expenses.....\$60,761,819.88

\$57,495,195.19

\$3,266,624.69

Net operating revenue.....\$35,231,374.79

\$36,770,521.68

*\$1,539,146.89

Ratio of operating expenses to operating revenues.....

56.44 59.99 54.45

*Decrease.

The foregoing averages are deduced from tables showing freight and passenger car-miles.

The average tons of freight per loaded car mile increased from 18.35 to 19.05 or 3.9% per cent.

The average tons of freight carried per freight-train mile increased from 66.06 to 388.80, or 6.21 per cent.

The average freight revenue per freight-train mile decreased from \$3.06 to \$2.87 or 1.91 per cent.

The average passenger revenue per passenger-train mile was \$1.21, or the same as in the previous year.

The average passenger-train revenue per passenger-train mile increased from \$1.02 to \$1.21 or 18.6% per cent.

The tons of freight carried one mile (revenue and company) increased from 1,522,000 to 1,528,000 per cent, while freight-mileage (loaded and empty) increased from 94,000 to 11,700 per cent, and freight-train mileage (loaded and empty) increased from 2,114,428 to 14,884 per cent.

The number of passengers carried one mile increased from 188,971,624, or 11.64 per cent, while passenger-train mileage increased from 1,199,807, or 10.55 per cent, and the passenger-train revenue (passenger and mixed) increased from 2,400,000 to 14,884 per cent.

The following is a condensed statement of the business of the system for each fiscal year during the period since January 1, 1896:

Year.*	Average miles operated.	Gross revenues, including income from other sources.	Expenses, including rentals and other charges.	Interest on bonds.	Net revenue.
1897.....	6,443.31	\$44,532,938.99	\$36,038,455.30	\$8,440,387.91	\$53,785.78
1898.....	6,936.02	39,396,126.41	30,513,553.17	7,045,988.30	1,886,584.94
1899.....	7,032.62	40,762,933.47	29,332,964.11	7,241,972.00	4,187,997.36
1900.....	7,341.34	46,498,899.04	29,414,427.56	7,345,166.50	9,739,304.98
1901.....	7,807.31	54,807,379.78	34,502,039.87	7,339,810.37	13,474,629.08
1902.....	7,855.38	60,275,944.33	36,272,432.45	8,438,985.00	15,564,526.88
1903.....	7,965.13	68,668,390.99	40,635,576.48	9,184,485.24	18,998,329.27
1904.....	8,179.59	69,419,975.41	44,641,434.10	9,416,770.00	15,359,771.31
1905.....	8,305.40	69,189,739.65	47,835,883.50	9,611,510.09	11,742,346.06
1906.....	8,433.99	79,390,749.05	51,035,355.71	10,622,184.22	17,738,209.12
1907.....	8,278.15	94,436,574.68	61,779,916.17	11,487,934.70	21,168,703.82
1908.....	9,415.01	91,289,770.61	65,031,582.67	12,379,301.77	13,678,886.17
1909.....	9,794.86	95,424,091.39	61,458,019.13	13,543,081.93	20,417,990.83
1910.....	9,916.33	107,543,250.16	75,133,314.54	11,984,151.36	20,425,784.26

*For fiscal year ending June 30; the year 1897 is for 18 months.

The following statement shows the gross operating revenues of the system (exclusive of income from other sources) per mile of road operated for each fiscal year since July 1, 1896:

Year ending June 30,	Gross operating revenues.	Average per mile of road.
1897.....	\$30,621,230.10	\$4,732.04
1898.....	39,214,099.24	5,653.69
1899.....	40,513,498.63	5,760.80
1900.....	46,232,078.23	6,297.49
1901.....	54,474,822.61	6,977.41
1902.....	59,135,055.87	7,527.97
1903.....	62,350,397.28	7,837.92
1904.....	68,171,200.18	8,334.31
1905.....	68,375,837.25	8,232.70
1906.....	78,044,347.25	9,235.55
1907.....	93,683,406.91	10,102.65
1908.....	90,617,796.38	9,624.39
1909.....	94,265,716.87	9,624.00
1910.....	104,993,194.67	10,587.91

The following statement shows the development of the freight and passenger revenues of the system since July 1, 1896:

Year ending June 30—	Freight.	Passenger.
1897.....	\$22,067,686.77	\$5,574,288.31
1898.....	28,588,716.07	7,347,361.59
1899.....	29,492,536.65	8,126,141.85
1900.....	33,729,332.83	9,334,661.57
1901.....	39,052,557.43	11,678,017.25
1902.....	41,815,607.05	13,439,384.57
1903.....	44,622,438.71	13,469,985.78
1904.....	47,762,653.23	15,433,773.63
1905.....	47,408,932.36	16,045,388.67
1906.....	54,595,032.82	18,018,988.56
1907.....	65,500,309.42	21,171,629.03
1908.....	61,848,638.51	21,643,427.49
1909.....	64,212,638.10	22,734,505.32
1910.....	71,194,066.50	25,437,181.98

TREASURY.

Neither this Company nor any of its auxiliaries has any notes or bills outstanding.

The Company held in its treasury on June 30, 1910, \$34,814,895.07 cash, and had available \$3,780,000 General Mortgage Bonds, including bonds not yet certified by the Trustee. The Company also has in the treasury unpledged a large amount of stocks and bonds of other companies, of which part are carried in the balance sheet as Investments and part are included under Railroads, Franchises and Other Property.

In addition to the funds derived from Four Per cent. Convertible Bonds, Issue of 1909, referred to in the last annual report, the Company has apparent for further sums to complete new lines under construction, purchase additional equipment and for other contemplated extensions and improvements. Therefore, your Directors on March 29, 1910, authorized a further issue of Four Per cent. Convertible Bonds, to be known as Issue of 1910, to which stockholders were given the right to subscribe at 102½% and interest to the extent of 14 per cent. of their holdings. During the year \$41,668,682.71 have been received on account of the principal of these two issues, of which \$39,947,000 payment has been fully paid for which bonds have been delivered. Further installments of principal which will mature during the current fiscal year amount to \$30,275,367.29.

Exchanges of Convertible Bonds for common stock aggregated \$43,959,000 during the year.

FUEL RESERVE FUND.

The fund has been increased by earnings derived from certain fuel properties:

Amount to credit of Fund June 30, 1909.....	\$313,676.85
---	--------------

Added during the year.....	703,289.95
----------------------------	------------

In Fund June 30, 1910.....\$1,016,915.80

On June 30, 1910, there remained in the treasury of the Cherokee and Pittsburgh Coal and Mining Company an unexpended surplus amounting to \$152,513.08, so that the total amount available for replacement of fuel properties in which your Company is interested is \$1,169,428.88.

ARIZONA AND CALIFORNIA RAILWAY.

The extension of this line from the west bank of the Colorado River to a junction with the main line at Cadiz, California, a distance of 83 miles, was completed during the year and opened for traffic July 1, 1910.

CONCHO, SAN SABA AND LlANO VALLEY RAILROAD.

This line, extending from Miles to Paint Rock, Texas, a distance of 16.78 miles, was acquired during the year. An extension under its charter from San Angelo to Sterling City, Texas, approximately 41 miles, under construction at the close of the fiscal year, has since been completed, and was opened for traffic August 1, 1910. The results of the operations of this line will be included in statements covering System operations hereafter published.

FULLERTON AND RICHFIELD RAILWAY.

In order to shorten the distance between San Bernardino and Los Angeles via Riverside, a cut-off between Fullerton and Richfield, a distance of 5.4 miles, was constructed under the charter of the above-named company and opened for traffic July 1, 1910.

GULF AND INTERSTATE RAILWAY OF TEXAS.

The capital stock of this company has been purchased and may be treated as a liquid line in reports hereafter published. The Gulf and Interstate Railway extends from Beaumont to Port Bolivar, Texas, where it has extensive dock facilities, at which ocean-going vessels can receive and discharge their cargoes. It operates a tug and barge line between Port Bolivar and Galveston, and constitutes the shortest line between Galveston and Beaumont, at which latter point it connects with the leased lines of the Gulf, Colorado and Santa Fe Railway Company.

Less value of old rails and other items.....	140,721.26	292,971.43	152,250.17
Net charge for rails.....	\$81,350.04	\$84,817.12	\$3,466.48
Charges for ties.....	176,127.55	231,291.37	55,163.84
Track labor.....	644,863.82	802,020.76	157,166.94
Miscellaneous track material.....	171,502.29	186,958.92	15,456.63
Total charges for roadway and track.....	\$1,073,841.30	\$1,305,088.17	\$231,233.87
Other expenses account of maintenance and structures were as follows:			
Repairs and renewals of signals and interlocking plants.....	7,328.97	6,195.31	*1,133.66
Repairs and renewals of bridges, trestles and culverts.....	224,155.47	221,227.49	*2,927.98
Repairs and renewals of buildings, fixtures and grounds.....	110,361.15	152,898.49	42,537.34
Repairs and renewals of docks and wharves.....	13,420.22	7,304.29	*6,116.03
Repairs and renewals of crossings, fences, cattle guards and signs.....	43,113.15	53,964.62	10,851.47
Miscellaneous charges.....	171,570.18	209,822.00	38,251.82
Total charges account of maintenance of way and structures.....	\$1,643,783.54	\$1,956,500.37	\$312,716.83

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY TUESDAY AND FRIDAY, FOR THE EDITOR, J. H. LEE, BY
THE RAILROAD GAZETTE (INC.), 38 FIFTH ST., NEW YORK.

CHICAGO: PUBLISHED BY THE CHICAGO RAILROAD GAZETTE CO., 111 N. LAKE ST., CHICAGO, ILL.
CLEVELAND: Williamson Bldg.
LONDON: Alfred Webb & Co., Ltd., 1, Abchurch Lane, E.C. 4.

W. H. BOARDMAN, President

E. A. SIMMONS, Editor, & H. H. SIMMONS, Secretary.
The address of the company is the address of the officers.

EDITORS:

W. H. BOARDMAN, Editor.	ROY V. WRIGHT	B. B. ADAMS
SAMUEL O. DENN,	FERNES McCLELLAND	W. E. HOOPER
Western Edit. Mgr.	G. L. FOWLER	E. E. LEISER
BOARDMAN, Boardman,	WILLIAM FORSYTH	F. W. KRAEGER
Eastern Edit. Mgr.	S. W. DENNING	H. H. SIMMONS
	CLARENCE DEMING	

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada.....	\$6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies.....	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49. FRIDAY, OCTOBER 14, 1910. NUMBER 16.

CONTENTS

EDITORIAL:

Editorial Notes.....	681
The Safety Appliance Order.....	682
Railway Efficiency versus Prices.....	682
Pere Marquette.....	683
Boston & Maine.....	684
New York, New Haven & Hartford.....	685
New Books.....	687

LETTERS TO THE EDITOR..... 687

ILLUSTRATED:

Reinforcement of the Pecos River Viaduct.....	693
Lucius Tuttle.....	698

MISCELLANEOUS:

The Mann-Elkins Act.....	698
New Nationalism and Industrialism.....	696
Hand Signaling at Interlocking Plants.....	696
Terminal Conditions in Chicago.....	698

GENERAL NEWS SECTION..... 701

SUPPLY TRADE SECTION..... 713

PURCHASING coal on the B.t.u. basis has found favor with many industrial consumers, especially in those sections of the country where the use of soft coal of varying heat value predominates. In Illinois, for instance, coal varies from 11,000 B.t.u. per pound of dry coal as mined in the northern counties, to 14,000 B.t.u. in the most southerly counties, and a large amount of the tonnage used by Chicago consumers is bought on the heat value basis. This requires, of course, taking representative samples and making accurate chemical tests of all coal delivered. Although this requirement has been successfully met by industrials, aided by favorable conditions, no railways have adopted it. One railway officer tells us, "If it were possible to

analyze automatically each and every shipment of coal, we get to eliminate the possibility of some one's tampering the figures with a true representation of the full statement, it would certainly be a great advantage to purchase the coal on the heat value basis." But the best railway method is to make a coal sample test on a weekly basis. At the meeting of Mr. H. H. Lee, and his paper on "The Testing Department of a Railroad," at the September meeting of the New York Railroad Club, "By careful systematic checking of the coal shipments from the mines, to its consumption to the firebox door * * * very material economies can be obtained," sufficient, in fact, to "cover the cost of the maintenance of the testing department many times over," how much greater saving could be made if a railway's fuel were bought on a contract which specified a certain amount of heat rather than weight? There would be not alone the money saving resulting when a below-contract coal is delivered, but the decrease of tonnage required when the contract grade is maintained.

IN a rough way, conservative institutions holding large investments in securities may be divided into two classes: One is the group, like the eastern savings banks, held rigidly by law to certain investment lines; the other is made up of institutions like hospitals, colleges and universities, conservative in intrinsic character, but in general not closely restricted as to investments. The latter are morally but not legally trust institutions. One of them is Yale University, whose treasurer's annual report, just published, is striking evidence of the extent to which our quasi trust institutions hold railway securities. Yale has total investments of \$12,101,993, of which analysis shows \$7,599,925, or about 63 per cent., in stocks and bonds—represented by 286 separate investments in bonds and 92 investments in stocks. Of the 286 bond investments, 182, or about 64 per cent., are in railways, and of the 92 stock investments, 46, or 50 per cent., are in the same class. The larger proportion of these represent unrestricted funds, the investment of which has rested on the trust theory administered by intelligence. It illustrates the nature of a great part of American railway holdings only one degree removed from those of the "widow and orphan" type and certifying to the moral responsibility which falls alike on the railway officer for honest and capable management and on the state for protective justice.

IF the Interstate Commerce Commissioners expected to get help from the railways at the hearing held in Washington last Saturday, on the question of what form the railways shall use in making an application for a suspension of the amended long and short haul clause, they were certainly disappointed. There are, of course, thousands of rates which violate the long and short haul clause and which are now in effect. The railways, under the amended act, are given six months in which to file applications asking the permission of the commission to continue to charge more for a short than for a long haul, when the shorter distance is contained within the longer. The railways' representatives at the hearing on Saturday claimed that if they were to name specifically in their applications each rate that violated the fourth section, and asked specifically to continue that rate, the clerical labor alone involved in compiling such an application would take years instead of months. In effect, the railway lawyers and traffic men threw up their hands and asked the commission to postpone indefinitely the effective date of the long and short haul clause. They asked that they be permitted to make an omnibus form of application, simply stating that they were not complying with the long and short haul rule in innumerable instances and asking the commission to permit them to continue to do so. It seemed to be the sincere intention of the commission to get from the railway men some suggestion as to a form of application which would not be simply a postponement of the effective date of the amended law. The representatives of the southwestern roads hinted at, rather than actually described, a form of application which

would divide rates territorially; for instance, it would ask the commission to sanction the charging of higher rates to Texas common points than to Houston. The railways contend that Congress itself cannot absolutely prohibit a railway in any case from making a higher charge for a shorter than for a longer haul, because that would compel the longer line between any two points in many cases to refrain from meeting a rate for a shorter haul to a competitive point, and this would be to confiscate its right of property to make a reasonable rate. In other words, the right to make a reasonable rate is a property right of the railway, and to confiscate that right is to confiscate its property in violation of the constitution. A strong argument was made to show that the only change that the Mann-Elkins amendment to the Interstate Commerce law had made was to give the commission the initiative in rate making, where before the initiative had belonged to the railways; that the principle of rate making should remain unchanged. Granting that this is so, it seems hardly likely that the courts or the public would justify the railways in asking the commission to be responsible for the initiative when they—the railways—do not even go through the form of justifying any of their violations of the long and short haul clause. Certainly it would seem possible for the railways to make out a case in such a way that the commission could grant them permission to charge more for a short haul under certain specific circumstances. They might group their rates that were violations of the fourth section; as, for instance, ask permission to continue all rates where the long haul low rate was made to meet water competition; to continue all rates where the long haul low rate was forced by the fact that the railway in question was not the short line between two points and the rate was fixed by the short line, etc. Almost any definite proposals from the railways would have seemed wiser than the attitude of simply waiting for the commission. It is easy to understand why the railways should feel that, since the commission, after being overruled by the Supreme Court on the long and short haul question, succeeded in getting from Congress a further grant of power, it was no part of the railways' business to help the commission to exercise that power; but the wisdom of such an attitude is less obvious.

THE SAFETY APPLIANCE ORDER.

ON Friday of last week there was a final conference between the three interested parties to the Interstate Commerce Commission's promulgation of the requirements for safety appliances on railway cars. The special committee made its report and the result was some modification of the original requirements. In the first place, it is understood that the standards are to apply to new cars only. One of the principal modifications was that of limiting the 12-in. end clearance to the outer 30 in. of a car, each side. This will permit of the projection of the truss rod washers and ends for the center sills, and will afford a great relief. As to the use of four ladders and sill steps, the railways stood as a unit against this rule, and if it is enforced it will be on the responsibility of the commission, a responsibility that can be most easily and jauntily assumed, when it is known that the blame and the pecuniary loss for any accident that may occur will be placed on the shoulders of the railway company until it has been cleared by the courts. The Pennsylvania also had a chance to put in a vigorous protest against the ruling to place all brake staffs on the left-hand side of the car, because of the desire of its own trainmen to have them in their present position. This protest showed how divergent were the opinions of the advocates of the measure as to what they did want.

To an outsider and disinterested party, who has some slight knowledge of the work to be done, the whole thing seems like a farce, and more worthy of opera bouffe than of the work of sober-minded business men and engineers. The Master Car Builders' Association has been at work for thirty odd years in the formulation and establishment of a number of standards. They have been built up on a system of trial and error, the

adjustments and modifications have been innumerable. The requirements of the railways of the mountain and the plain, of the north and the south, had to be considered, and a compromise effected that would be generally well adapted to all classes of service. When the work was started, it was the custom to talk and discuss until a majority could agree, and then to adopt a standard. But experience showed that the standards so adopted were invariably faulty, and needed modifications almost before the ink of their first promulgation was dry. This led to caution, and of late years nothing has been adopted as a standard until it has first been tried as recommended in practice and its weaknesses developed, so that when it is finally adopted as a standard it is probably complete and not in need of change. This was the work of experts. But when the politician enters the field, he undertakes in a brief six months to do the whole thing. He can formulate a series of standards that must be adopted; he can do it out of whole cloth; he can tell the railways what they must and ought to do in the free and easy, offhand manner of the stump speech, and do it from that instinctive knowledge of all things that comes from much talking and little thinking. The point is that the impossibility of the task makes its serious consideration simply laughable. But it is laughable with the grim mirth that comes from desperation, when it is considered how much these new standards mean in money to the railways, in peace of mind to the officials and in safety to the employees. The details of the order are not yet available, but when they are they will be given careful consideration, and it is to be hoped that the commission will then fully realize what they are doing.

RAILWAY EFFICIENCY VERSUS PRICES.

OPPONENTS of the proposed increase of railway rates, whether freight or passenger, are constantly making, these days, the counter plea based on increased railway efficiency. The line of reasoning runs somewhat as follows: It is true that railway supplies have of late years increased greatly in cost. It is true also that within the last year there has been a very great increase in the wages for the various forms of railway labor. But the railways have been able to offset such increases by greater efficiency. They have increased the train load. A single locomotive—not the old type locomotive but one more powerful—hauls more passengers and more freight. The paying load is greater; and in other directions, such as the substitution of steel bridges for wooden structures, there has been opportunity for other economies and efficiencies in operation. The argument as an absolute one, that is to say, the fact of efficiency must be conceded. But how about its concrete application? As a case right to the point, let us take the example of the New York, New Haven & Hartford, whose annual report has just been published.

Looking back to a point of time arbitrarily taken as ten years, one finds that corporation, then under the presidency of John M. Hall, taking gross earnings from operation of \$40,325,151, as against operating expenses of \$28,224,389 on an operating ratio of 69.99 per cent. (before taxes). Three years later Charles S. Mellen took the presidency. He came, not merely with the highest conceptions of the values of the factor of efficiency in railway operation, but with practical and successful experience in it on a great railway scale. What he had done on the Northern Pacific in rehabilitating it, while at the same time increasing the train load and uplifting it financially, is even now, after the lapse of years, a record too conspicuous to need review. He came to the New Haven with this rich store of prior knowledge—to a system very different, to be sure, in its location, traffic and traditions, but one which, in its new president, had its first operating head following a line of presidents who, with one exception, were, in a railway sense, civilians. The New Haven system was then, in many respects, green soil for the application of efficient methods of railway cultivation.

On a basis of gross earnings of \$60,693,667 the operating ratio of the property has fallen from 69.99 per cent in 1900, as

ated to 63.15 per cent in 1910. But it is more striking to note the increased efficiencies during the last three years, in which the Mellen policy of better construction and increased train loading has matured. In 1907 the operating ratio was 68.97 per cent. Naturally in the black year 1908, without the opportunity to reduce wages much, the ratio rose to 72.03 per cent. But in 1909 the ratio fell to 66.39 per cent, and in 1910 to 76.1 per cent lower. This impressive result has been brought about mainly by increased efficiency by larger train loads, stronger bridges, and the removal of limitations on traffic, like the old and narrow cut through New Haven city with its low street bridges. All that energy and experience could accomplish in the way of these efficiencies has been set in operation by President Mellen.

Yet at the end of them, or, at least, near their end, and at the close of a fiscal year with gross earnings much the largest in the history of the corporation, what would otherwise be the handsome margin of about 1 per cent. in net earnings (\$1,037,793) over the normal 8 per cent. dividend rate is met hereafter by increased wages of \$1,757,506. This in part will be covered by an increase in passenger fares, but to an uncertain figure, while an increase of freight rates, should it come, will be still more indefinite in amount. In other words, the New Haven, like other railway corporations, has had to pay for increased operating efficiency by increased capitalization, and for the time being the efficiency has been offset, or very largely so, by an increased interest charge. It is true enough that, in the case of the railways, not all the increased interest charge—using the term broadly so as to include the larger dividend requirement due to stock issues—is to be laid on new efficiencies and their cost. There are plenty of other directions of railway investment, some of them making quick, others slow, returns; and the New Haven itself is an example to the point. But does not the fact remain that efficiency does not come except at a high initial cost? And when, as in the case of the New Haven, where efficiency has been pushed so quickly and so far by a progressive president with an old efficiency record, the corporation finds a small margin over dividends, the instance is at least suggestive as against the claim that efficiency can meet the higher wage rate plus higher cost of supplies.

And, in the ultimate aspects of the question, there is the law of limitation. Efficiency is under pretty definite mechanical restrictions. There is a point in the improvement of equipment, structures, grades and high organization beyond which no railway administration can pass. But in wages and the price of material, both based on the human nature that seeks all that it can get, what limitation is in sight?

E MARQUETTE.

THE fortunes of the Pere Marquette have in the past been closely interwoven with those of the Cincinnati, Hamilton & Dayton. After the Baltimore & Ohio acquired control of the C. H. & D. it, of course, became the dominant interest in Pere Marquette as well. In the fiscal year ended June 30, 1910, the Pere Marquette was operated as an independent property, with friendly relations with the C. H. & D. Its operating revenues were considerably greater than in the previous year, and it was able to save some of the increase in gross for net. In 1910 its gross was \$7,000 a mile, and net, \$2,000. The property forms a network across the state of Michigan, with two main east and west lines, one running from Ludington, on Lake Michigan, to Port Huron, on the southern end of Lake Superior, and the other running from Chicago, via Grand Rapids and Detroit, to St. Thomas. From St. Thomas to Buffalo the company uses the Michigan Central tracks. The main north and south line runs from Chicago, via Grand Rapids, to Bay View.

Of the total tonnage carried last year 39 per cent. was furnished by products of mines, 16 per cent. by products of agriculture, 15 per cent. by products of forests, and 12 per cent. by products of manufactures, the remaining tonnage being merchandise and miscellaneous. Last year products of manufac-

tures furnished 1,243,427 tons. This is an increase of 233,232 tons over the tonnage of manufactures carried in 1909, the only important decrease in tonnage of products of manufactures being in the tonnage of ice. The most important gains in freight traffic are accounted for by increased shipments of coal and coke, stone, sand, etc., lumber and the manufactured products of lumber.

In 1910 the company earned \$16,500,000, an increase of \$1,900,000 over the operating revenues in 1909. Freight revenue amounted to \$11,100,000 last year, comparing with \$9,700,000 the year before. Passenger revenue amounted to \$3,700,000 in 1910 and to \$3,400,000 in 1909.

The total number of tons of revenue freight carried one mile amounted in 1910 to 1,885,000,000, comparing with 1,681,000,000 in 1909. The average revenue per ton per mile was 5.91 mills last year and 5.77 mills the year before; the increased average revenue being accounted for presumably by the greater proportion of high class commodities, such as manufactures, carried in 1910, as compared with the previous year. The average haul of revenue freight was 179 miles in 1910 and 180 miles in 1909; the average train load was 323 tons in 1910 and 307 tons in 1909. The number of passengers carried one mile totaled 299,500,000 last year as against 189,700,000 the year before; the average revenue per passenger per mile was 1.77 cents in 1910 and 1.74 cents in 1909. The increase in passengers carried one mile, about 10 per cent., is, the report says, slightly over the normal increase per year and is accounted for by the fact that additional passenger trains were placed in service.

Total operating expenses amounted in 1910 to \$11,700,000, an increase of \$1,100,000. After the payment of taxes and fixed charges the company had a surplus in 1910 of \$470,000, as against \$41,000 in 1909. The chief increases in expenses came in the cost of transportation and of maintenance of way. Transportation expenses amounted to \$6,370,000, an increase of \$660,000 over 1909; and maintenance of way cost \$1,900,000, an increase of \$260,000 over 1909. The following table shows the unit costs of maintenance:

	1910.	1909.
*Maintenance of way per mile.....	\$712	\$615
†Repairs per locomotive.....	2,040	2,113
“ “ passenger car.....	553	492
“ “ freight car.....	43	38

*Per mile of first, second, third, etc., track, the cost of two miles of siding and switch tracks being taken as equal to the cost of maintenance of one mile of main track.

†This is for repairs only and does not include renewals, depreciation or superintendence charges.

The principal reason for the increase in expenses, beside the larger train movement due to more business handled, was the cost of fuel and the higher prices paid for labor. These higher prices paid labor contrast strongly with the strict economy indicated by a decrease in the salaries and expenses of general officers, being \$47,000 in 1909 and \$44,000 in 1910. An indication of the severe winter last year is shown by the cost of the removal of snow, sand and ice, amounting in 1910 to \$106,000, considerably more than twice as much as the cost in 1909.

The balance sheet shows the company in a better position as regards cash and marketable securities at the close of 1910 than it was at the close of 1909. Total working assets amounted to \$4,400,000, of which \$653,000 was cash, an increase in cash of \$384,000 over 1909. There is in the treasury \$800,000 of marketable securities which were not owned in 1909. Working liabilities amounted to \$4,500,000, of which \$1,550,000 was loans and bills payable. This is an increase of \$686,000 over loans and bills payable in 1909. The fact that working assets were slightly less in amount than working liabilities indicates that the Pere Marquette will need to do some additional financing before very long, especially in view of the fact that the company has outstanding \$5,000,000 debentures, due July 1, 1912, and \$1,300,000 gold notes, due March 1, 1912, representing extensions of Eastern Equipment Co. bonds for like amount deposited with the First Trust & Savings Bank under an agreement of February 7, 1908. President Cotter sums up the results of operation in 1910 in the following manner.

"Notwithstanding the gross revenues of the company exceed those of any previous year, the company is not able therefore to make much needed improvements. The increase of 30.98 per cent. in taxes, the increases in wages, the higher prices for material and the loss in net revenues through the continued operation of the two-cent fare law in the sparsely settled communities in Michigan have made this impossible."

The report is given in the form prescribed by the Interstate Commerce Commission and is to be commended for completeness and frankness. This is especially noticeable, for instance, in the statement of equipment owned and in service. The number of each class of locomotive is given, together with the tractive power and the changes that have taken place during the year. In the list of passenger car equipment, the number of cars in each class is given and the seating capacity of each class. In freight car equipment the tonnage capacity of each class of cars is given.

The following table shows the results of operation in 1909 and 1910:

	1910.	1909.
Average mileage operated.....	2,321	2,340
Freight revenue.....	\$11,131,076	\$9,705,565
Passenger revenue.....	3,707,311	3,366,466
Total operating revenue.....	16,542,271	14,629,827
Maintenance of way.....	1,952,437	1,669,220
Maintenance of equipment.....	2,117,700	2,018,494
Traffic.....	420,298	349,971
Transportation.....	6,370,632	5,713,493
Total operating expenses.....	11,698,842	10,581,580
Taxes.....	755,641	576,893
Operating income.....	4,087,788	3,471,354
Gross corporate income.....	4,070,968	3,709,563
Net corporate income.....	469,714	40,651

BOSTON & MAINE.

THE Boston & Maine, after legislative tribulations in Massachusetts, has just become the legally adopted child of the New York, New Haven & Hartford. A brief reference, therefore, to some analogies and contrasts of the two systems is timely. One system is an almost complete railway monopoly of southern New England; the other is a somewhat less complete monopoly of northern New England. Both have one common terminal and interest—a region of intensive population with many factories—though the disparity in favor of the passenger traffic is largely with the New Haven. But it is in capitalization, liabilities and operation that the contrasts become most striking. The New Haven system, with 4,460 miles of track and siding, has outstanding \$121,878,100 capital stock, the Boston & Maine, with 4,175 miles, only \$31,991,000. The New Haven has of bonded or secured debt, \$232,527,903; the Boston & Maine, including debt of leased lines, \$86,337,000. But the child carries a rental of \$5,265,497, as compared with the parent's \$5,133,717. The New Haven owns a great boat system and 1,300 miles of trolleys; the Boston & Maine, relatively speaking, almost none. Finally, and being striking of all, the Boston & Maine ratio of operating expenses to operating revenue reaches the high figure of 72.57 per cent. and hence of taxes, the New Haven, in defiance of taxes, 60.50 per cent. and, finally, of taxes, only 6.74 per cent.

The revenue of the Boston & Maine shows the looked for recovery from the severe depression in gross earnings of a year, which President Tuttle described as marked by "active and prosperous business in the sections of middle and northern

New England. Operating revenue rose from \$39,528,698 to \$43,357,175 and net operating revenue from \$11,264,843 to \$12,020,851. This, though operating expenses cut in heavily, with their rise from \$28,263,855 to \$31,336,324 and though new equipment costing \$940,992 appears in the former, and, if actually in the latter, is not so stated. Taxes rose, as on other roads, and show an increase from \$1,789,932 to \$2,070,880. Other additions and subtractions from operating revenue remain substantially unchanged, though a decrease in the interest charge from \$1,879,357 to \$1,783,910 is noteworthy in a period of generally expanding interest charges. In the final figures the net over all applicable for dividends is \$2,850,621, as compared with \$2,387,602 in 1909; and there is a surplus of \$982,101 after the payment of 6 per cent. dividends on both classes of stock, as compared with \$570,242 in 1909. This, in the present tense, is a handsome showing, and would be so in a future tense but for the factor of increased wages, to be referred to later.

The financing of the year has been of considerable importance. There have been 16,983 new shares sold for \$2,453,129, used for additions and betterments which total for the year \$4,577,553, the leading items being: Equipment, \$2,535,235; right-of-way and station grounds, \$375,243; block and signal apparatus, \$239,171; shops, engine power and turntables, \$256,866, and dock and wharf property, \$275,711. These outline the initial debts toward the rehabilitation of the property which has been so long demanded. There has been purchased during the year for \$2,776,142 a majority, 17,331 shares, of the capital stock of the Worcester, Nashua & Rochester, representing a line leased at 5½ per cent. on the stock—a mere transfer of capital plus control, though obviously at a pretty high price.

Physical improvements of the year in the same line of up-building the property are noteworthy. They include the laying of 139 miles of new rail on main tracks and 106 miles of relaying rail on branches and sidings; the expenditure of \$563,170 in the



Boston & Maine.

elimination of heavy crossings, the total cost of which to the end of the fiscal year was \$1,812,993; the steady installation of automatic block signals, the cost of which has thus far reached a total of \$943,577, replacing and strengthening bridges in the northern portion of the system and in the Fitchburg division, with the purchase of large locomotives to overcome the heavy grades, and the purchase of four Miller oil burning engines, at \$9,450 each, for the Housatonic Tunnel service to eliminate smoke. But President Tuttle says the expenditure is probably but tem-

porary and preliminary to electrifying the tunnel and increasing its efficiency, the tunnel now being the limiting point of service on the Fitchburg division. In two or three years, if present plans are fulfilled, the electrification will be completed.

Turning again to the fiscal aspects of the property, general as well as detailed, we note the 1,991 stockholders living in Massachusetts, owning 26,113 shares, 1,135 in New Hampshire, with 17,552 shares; 599 in Maine, with 14,436 shares, and 593 elsewhere, with 11,150 shares. It shows the high centralization of the individual holdings in Massachusetts; but there is the important qualifying fact of the Boston Holding Company's major interest, now under control of the New Haven. The company's general balance sheet runs up to \$99,354,481, from \$91,651,613, the profit and loss surplus rising from \$2,659,929 to \$3,610,423. Its two street railways, with trackage of 50.69 miles, brought in during the year \$22,206 of revenue and a net of \$22,213. The most noteworthy outside asset of the company is its controlling interest of 25,160 shares of the Maine Central, with a book value at par and 8 per cent. dividends. To a mild way it suggests the fiscal relation of the Lake Shore to the New York Central. One dwells with some interest on the classification of freight traffic, which shows, out of a total tonnage of 22,815,528, that 4,659,081 tons—roughly speaking, 25 per cent.—are manufactures, while the lumber item, 2,644,853 tons, hints that northern New England is not quite denuded of her forests; and Aroostook county—mainly—sends her freight tribute of 386,578 tons of potatoes.

But it is the immediate future of the Boston & Maine that commands serious attention, rather than its present and its past. It is a railway system with small capital stock in ratio to the fundamental value of the property and, in high prosperity, should be a strong dividend earner. It will be so in time. But, meanwhile, it must be a property in transition. As indicated, for one thing, by its extremely high operating ratio, it has not been progressive either in efficiency or as a medium of public necessity or convenience. President Mellen, in taking now full charge and responsibility for the property, faces somewhat the same problem as in his improving the New Haven's efficiency, by which, though at great cost, he has succeeded in reducing the operating ratio to so low a figure. But there is a specific trouble ahead. In his report President Tuttle makes no reference to the comparatively recent increase of Boston & Maine wages. The increase has been given unofficially as \$2,700,000 a year. If that sum is correct, it cuts almost to nothing the net over all in 1910 applicable to dividends—\$2,850,621; and the vote of the directors, since the report was issued, of \$10,000,000 for improvements does not suggest reduction of fixed charges, though it does imply higher profits as an ultimate. There will undoubtedly be offsets, in a degree, to the increased wage scale. The closer union with the New Haven spells also higher development and closer harmonies of traffic, and those very soon; nor can the New Haven itself, with an investment of considerably more than one-half the shares, afford to let reduction of dividends go too far. But for some temporary reduction of dividends, as a direct result of the wage increase, less some increase of revenue from higher passenger fares and possible increase of freight rates, the stockholders of the Boston & Maine must be prepared. It is the price to be paid, in part, for the unprogressiveness of the past.

The table annexed shows the results set forth in President Tuttle's final report for the last two fiscal years:

	1910.	1909
Average mileage operated.....	1,175	1,155
Freight revenue.....	\$23,471,239	\$23,011,438
Passenger revenue.....	14,655,065	13,491,551
Total operating revenue.....	38,126,305	36,502,989
Maint. of way and structures.....	5,253,611	4,951,565
Maintenance of equipment.....	5,446,734	4,730,778
Traffic expenses.....	511,016	516,417
Transportation.....	19,075,788	17,800,498
Total operating expenses.....	16,207,139	15,199,558
Taxes.....	2,076,880	1,789,932
Total operating revenue.....	38,126,305	36,502,989
Gross corporate income.....	10,789,980	10,177,234
Net corporate income.....	2,850,621	2,387,602
Dividends.....	1,868,320	1,917,360
Surplus.....	981,101	570,242

NEW YORK, NEW HAVEN & HARTFORD

Of late years such annual reports as the New York, New Haven & Hartford Railway Company, shows a somewhat more or less constant railway enterprise. The rapid but steady development of the company's property and so varied have become its interests that each new year brings fresh scenic aspects. In view of the composite nature this unique property, it is fitting to treat it in the scholastic phrase, by the "group system," taking it in its three larger divisions—steam, trolley and navigation properties—though they are of unequal proportions and importance and the returns of two of the divisions incomplete. It may be added that the present report is one of somewhat special significance, as it marks a railway climax in New England when the New Haven legally, as well as actually, comes into responsible control of the Boston & Maine and acquires a railway monopoly of the six New England States, so nearly complete that it may as well be called so. The situation has just been officially certified by the accession of President Mellen to the place of President Tuttle.

The New Haven feeds and drains a railway region more essentially a manufacturing one than that of any other great railway system in the land, not even excepting the Pennsylvania. Such regions, as they feel suddenly and deeply industrial depression, are also quick in the rebound. The New Haven reflects these conditions vividly. In the stressful year 1908 its net earnings over all dropped \$2,516,692 below the 8 per cent. dividend requirement. In the next year it gained to within \$453,613 of that requirement, and now goes \$1,037,793 above it, notwithstanding the sum of \$446,395 called for as dividends on part-paid stock. But comparisons for the two years past in the regular gross returns are even more impressive than the net. Freight earnings for 1910 rise to \$30,110,588, as compared with \$26,595,969 in 1909; passenger revenue to \$24,885,864 from \$22,852,741; and other revenue from transportation to \$4,392,643 from \$3,713,867. The whole operating revenue rises from \$54,347,630 to \$60,693,667, a gain of \$6,346,037, the gross earnings, with their increase of 11.66 per cent., being the largest in the history of the corporation.

Operating expense, of course, had its increments, too, with their rise from \$6,130,506 to \$7,132,375 in maintenance of way and structures; from \$5,906,356 to \$6,461,772 in maintenance of equipment; and from \$1,242,967 to \$1,801,441 in general expenses; while, very strikingly, the major item of transportation expenses lifts only from \$22,491,376 to \$22,942,672. But these comparisons include but little of the advance in wages, which, to the amount of more than \$1,750,000 a year, are now in force. They will be referred to later. But most impressive of all and showing close watch and ward is the reduced ratio of operating expenses and taxes to gross earnings, which falls to 70.30 per cent. in 1910 from 72.73 per cent. in 1909.

Noteworthy in the New Haven's case is the increase of taxes, so marked to-day all over the land. They were \$3,338,305 in 1908. Two years later (1910) they rise to \$3,983,377, including the new corporation tax, \$132,370. They are approximately 6.6 per cent. of gross earnings and would pay something like 4 per cent. dividends on the stock outstanding. It throws a fantastic side light on the attitude of the state of Massachusetts to the company in past years, a state which, however, has recently subsided in her frenzy.

It has been said with less than truth that the New Haven corporation is two-thirds a separate steam railway proposition—that is, considering the gross earnings of the controlled lines. Such a computation has failed to take in the Boston & Maine, which, if admitted, would raise the gross annual earnings of the real New Haven system, including trolley and boat lines, to more than \$130,000,000. A fairer computation, allowing only for stock interests in controlled lines in ratio to outside interests, indicates the New Haven as about 50 per cent. a separate railway proposition. The situation shows itself, to cite one piece of evidence, in the income from other sources. Not counting, for reasons to be stated later, the Connecticut Trolley Company's

net revenue for eight months (\$2,254,278) this other income is, this year, \$6,737,140, as compared with \$4,593,488 in 1909. It is somewhat more than 6 per cent. upon the stock. Of much the same favorable tenor, in view of the system's rapid expansion, is the comparatively slight rise of deductions from income from \$16,843,079 to \$17,524,095. They rose to the former figure from \$14,550,387 in 1908.

The textual part of the report, besides its references to improvements completed or in progress, brings out facts of more than passing interest. Most noteworthy, perhaps, is the schedule of wage advances, now for the first time stated officially, and amounting on a basis of last year's returns, to \$1,757,506, as partial offsets to which are the estimated advances, amounting to \$1,058,733, in passenger rates, with a deduction of \$200,000 for increased use of mileage books, thus reducing it to \$858,753. In the present year's results probably there will also, it may be added, be a deduction for passenger business transferred to the parallel trolleys. But, as the steam corporation owns the trol-

England investment; and, finally, there are the economies that can tide the company over a hard year until revenue from improvements and extensions—such as the costly New York, Westchester & Boston, on which not less than \$15,000,000 has already been invested—become available. The calendar year 1911 looks like twelve months of pretty close reefing; but, beyond it is the harbor of permanent 8 per cent. dividends, barring general hard times.

In the way of what may be called primary improvements are the Harlem branch, six tracking, completed; the expensive, but necessary, double tracking work between Hawleyville and Shelton, in rapid progress; the New Haven cut and trolley viaduct, finished; Waterbury improvements, completed; double track between Waterbury and Bristol, in progress, and the Terryville tunnel, 75 per cent. done; elimination of Worcester grade crossings, 60 per cent. done; survey complete for the Stamford-New Haven electrification; and new equipment worth \$2,969,697, bought during the year.



New York, New Haven & Hartford and New York, Ontario & Western.

leys also, it only means the transfer of dollars, methodically speaking, from the trouser pocket to the vest pocket. Mr. Mellen trusts for liquidation of the wage balance from the advances in through freight rates now under investigation by the Interstate Commerce Commission and hints, significantly, that they and new economies may be needed to maintain the 8 per cent. dividend.

This, obviously, for the stockholders, is a matter of pretty absorbing interest. On the present capitalization of the company there would be no doubt of such maintenance. But next January \$30,000,000 of convertibles change preemptively to \$20,000,000 of stock, calling for an increase of \$550,000 in disbursements, being the difference between the new dividend requirement and the present interest charges, and on June 20, 1911, 446,438 new full-paid shares go on the capital list, calling on their face for \$1,371,504 additional dividend requirement. On the other hand, the total face increase in dividend requirements of, say, \$1,000,000 will be considerably reduced by interest on bonds to be paid; there are outside sources of fresh income, like the Central New

Next to the steam property the large investment of the New Haven company in trolleys calls for attention—some 1,300 single-track miles with gross earnings of \$12,385,122 in Connecticut and Rhode Island alone. For prudential reasons the returns of the Massachusetts lines are omitted, but the legal acquisition of the Berkshire lines indicates that the time draws near when Massachusetts must recede further and let the fiction of the New Haven's non-ownership of the other acquired lines in the state be abandoned. Counting in the guaranteed interest of the Providence Securities Company (\$800,000) and subtracting net income over all (\$573,565) the net loss on the Rhode Island properties is \$226,435; the net gain on the Connecticut trolleys cannot be derived from the figures of the report. But the recent trolley arbitration in Connecticut brought out the fact that fixed charges and rentals were approximately \$2,700,000. This year's net income over operation is \$2,873,086, indicating that the Connecticut investment is probably—allowing for past advances—taking care of itself, especially if the power accounts, now for the first time separated and showing a net of \$102,651, are in-

cluded. Taking the total of the trolleys in the three states, there is probably a very slight deficit, which would tend to net us out for the deficit in Rhode Island. But the large increase of gross earnings—\$28,508 in Connecticut and Rhode Island alone—forecasts the profit of the future, to say nothing of the indirect advantages of substantial control of the trolley systems of two states and their block on long distance rivals of the steam lines.

The Connecticut trolley Company calls for a little more specialized reference in regard to new financing. It appears in the list of securities held by the steam corporation that the Connecticut Company's capital is varied from \$275,000 to \$40,000,000. This means that the steam (parent) corporation assumes the debts and advances to the Connecticut Company that amount, pays the debts at maturity and then obtains the property clear. It pays for the property in assumed obligations representing original cost of the road.

Coming to the third group, the boat properties, as the New England Navigation Company is also a holding corporation, the best test of the year is a decrease in net earnings from \$890,444 to \$822,744, probably due in part to the competition of the outside line and the withdrawal of one of the subsidiary lines. On the Hartford line, although gross earnings rose from \$1,087,106 to \$1,210,645, higher expenses and fixed charges reduced the net over all from \$279,473 to \$223,022.

Reference in closing should be made to the remarkable development of the Central New England (the Poughkeepsie Bridge line), with its rise in gross from \$2,530,213 to \$3,022,720 and from net operating revenue of \$931,030 to \$1,289,487. It has begun payment on its income bonds, of which the New Haven owns \$7,037,442 besides other bonds and 77,595 shares of common and preferred stock, sure to begin dividend payments ere long. Allusion should also be made to the increased control in the Boston & Maine, of whose total preferred shares, 31,498, the New Haven—by its Boston Holding Company—holds 6,543 and 153,371 common shares out of 288,413. Other matters to be noticed are the great schedule of minor physical improvements for the year; and the general balance sheet, rising to \$450,764,376 on each side with a profit and loss surplus of \$14,196,253, as compared with \$12,999,443 for the fiscal year 1909—figures that would make the old conservative father of the property stare.

The annexed table shows the important comparative figures in the returns for 1910 and 1909:

	1910.	1909.
Total mileage operated	4,460	4,414
Freight revenue	\$30,110,588	\$26,595,969
Passenger revenue	24,865,864	22,852,741
Total operating revenue	60,693,667	54,347,630
Maintenance of way and structures	7,132,375	6,130,606
Maintenance of equipment.....	6,461,772	5,906,356
Traffic expenses	350,943	308,999
Transportation expenses	22,942,674	22,491,376
Total operating expenses.....	38,689,215	36,080,306
Taxes	3,983,377	3,446,125
Operating income	21,583,823	19,679,819
Income from other sources.....	6,737,146	4,593,488
Total income	28,320,969	24,273,308

NEW BOOKS.

Rule Four of the Standard Code of Train Rules has been made the subject of a book by itself, filling 109 pages. It is an elaborate study of this rule, which has caused more perplexing discussions than any other, by William Nichols, of the Southern Pacific Company, who is chairman of the board of examiners in the assistant general manager's office at San Francisco. By the use of about 40 examples, illustrated by fac-similes of sections of time-tables, Mr. Nichols takes up and answers every possible question that can arise in connection with the adoption of a new time-table in which there are changes in the schedules of existing trains. The book is for sale at \$1 a copy by W. H. Sheasby, 2246 San Pablo avenue, Berkeley, Cal.

Letters to the Editor.

THE STATUS OF THE MANUFACTURERS' RAILWAY OF ST. LOUIS.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE.

I have before me your issue of September 23, and have read with much interest your editorial on "The Big Railways and the Little Railways."

In the main you have fairly presented the great proposition and have enumerated some of the many difficulties in the way of a proper and just solution. I believe it is the intention of the *Railway Age Gazette* to deal fairly with all matters pertaining to the railway situation and that its editorials would not knowingly reflect erroneous information.

In the editorial referred to the Manufacturers' Railway of St. Louis has been featured to a greater extent than any other individual small line. By inference it has been classed with "tap lines" and railway serving lumber interests. Its ownership has been misstated and its profits, when any, have supposedly reverted to the great brewing interests furnishing much of the traffic handled by the Manufacturers' Railway.

The Manufacturers' Railway is a switching and terminal company located wholly within the city of St. Louis; built by virtue of a Missouri charter and numerous city franchises. The ownership has never rested in any industrial institution furnishing tonnage handled by the Manufacturers' Railway, and no single share of its stock was ever owned or controlled by any corporation or industrial plant.

It reports fully to the Interstate Commerce Commission, and its earnings are based on tariffs filed regularly with the commission. Therefore it cannot conceal any large rebates either to the brewery or another shipper on its lines. The property and its accounts have been twice examined by representatives of the Interstate Commerce Commission, and when the divisions allowed the Manufacturers' Railway were canceled it voluntarily submitted its past, present and future into the hands of the Interstate Commerce Commission.

I believe each of the above statements can be verified by evidence given under oath at a hearing before an Interstate Commerce Commission examiner, and are accessible to the public as a part of the record of the Interstate Commerce Commission, docket No. 3151. Inasmuch as your articles are read by the great railway fraternity, I would ask that the erroneous conclusions and statements contained in your editorial be corrected in accordance with what has been established in the evidence in the case at hand.

G. F. MOORE,

President Manufacturers' Railway of St. Louis.

[The *Railway Age Gazette* had no intention of doing injustice, in the editorial referred to by Mr. Moore, to the Manufacturers' Railway. It has learned since this editorial was published that its statement that the Manufacturers' Railway is owned by one of the large brewing companies of St. Louis was incorrect. The inception, development and bona fide ownership of this road are shown by evidence and exhibits presented to the Interstate Commerce Commission, in the case which the Manufacturers' Railway has brought to compel the trunk lines to make through routes and through rates in connection with it. This evidence and these exhibits show that 95 per cent. of the securities that have been issued by the Manufacturers' Railway are owned by Adolphus Busch and his son, A. A. Busch, and that 5 per cent. of them are owned by the Schuttler estate, of Chicago. Messrs. Busch and the Schuttler estate also own 72 per cent. of the stock of the Anheuser-Busch Brewing Company. While our statement that the Manufacturers' Railway is owned by one of the large brewing companies was incorrect, and Mr. Moore's statement that "the ownership has never rested in any industrial institution furnishing tonnage handled by the Manufacturers' Railway Company, and no single share of its stock was ever

owned or controlled by any corporation or industrial plant," is true, it is perfectly plain that any excessive tap line allowance which was made by the trunk line railways to the Manufacturers' Railway would inure to the benefit of the largest stockholders of the Anheuser-Busch Brewing Company just as surely as if the Manufacturers' Railway were owned outright by the Anheuser-Busch Brewing Company.—EDITOR.]

HIGH VOLTAGE DIRECT CURRENT TRACTION.

New York City, September 7, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In your issue of Dec. 29, 1905, you did me the courtesy to refer editorially to an announcement of mine of the week before that I was prepared to undertake 1,500 volt d. c. traction; and, while making sundry comments based upon the assumed difficulties of operating at this higher potential, you stated that: "If it can be done, as he claims, economically and safely, his invention will rank higher than his previous work, which has given him the standing among electrical engineers which entitles this proposal to serious consideration."

The results predicted are now not only possibilities, but facts of daily occurrence with both trolley and third rail construction. Of the latter, the Central California Traction Company's equipment from Stockton to Lodi, now being extended to Sacramento, where 1,200 volts was adopted on my advice in 1906, has given unqualified satisfaction. No less than thirteen interurban trolley lines in this country are now operating or are to be operated at this or a higher potential. Some were equipped originally for 500 to 600 volts d. c., others for a c.—d. c. operation and later changed over, and some were originally designed for 1,200 volts.

The first of these was the Pittsburgh, Harmony, Butler & New-castle road, contracted for in May, 1906. Included in the list is the Oakland division of the Southern Pacific Company, where by the adoption of this system there has been effected a capital saving of about \$500,000. One of the most significant changes is that of the Washington, Annapolis & Baltimore road, where I advised 1,200 d. c. operation in 1906, but which elected to first try out the single phase alternating current system under conditions which made its successful operation impossible, and resulted disastrously. One of the latest equipments being contracted for, that for one of the Southern Pacific suburban properties, is for a somewhat higher potential, namely, 1,500 volts, using machines primarily designed for 1,200 volts.

In some of these various equipments 600-volt machines are used in series, but elsewhere full potential is used directly on the individual motors. The aggregate trackage exceeds 500 miles. Without expressing any present opinion as to the comparative value of different systems, or their limitations, it seems proper to now record the above facts as verification of a prediction which you thought of sufficient importance to note editorially.

I was, of course, not insensible to the compliment of your reference, but it is proper to say that in spite of the many difficulties which seemed to stand in the way of the use of higher d. c. potentials, the results achieved are not due to any new and radical inventions on my part, but rather to my reiterated insistence upon the advisability of determining the possibilities in d. c. motor construction as influenced by the use of the interpole, the modern outcome of an old invention of mine, first tested upon the Elevated Railroad many years ago, but which long lay dormant. Certainly there has been no invention in the matter, otherwise, which in my opinion compares in importance with the multiple unit system, now a fundamental requisite in all electric train operation where it is necessary to have consolidation of power under a common control, and upon which all rapid transit train systems are absolutely dependent.

FRANK J. SPRAGUE.

The Prussian Ministry asserts that where the landscape is defined by railway embankments, etc., these be planted with birches, etc., having an eye to the production of fruit and food for bees, as well as the beauty of the landscape.

THE MANN-ELKINS ACT.*

BY FRANK HAIGH DIXON.

Considering the radical character of the Mann-Elkins act, it is somewhat surprising that it was debated and passed with so little demonstration on the part of either public or carriers. No such extraordinary campaign of publicity was undertaken by the railways as was the case four years before, nor did the discussion of the question occupy the same space in the press or the same attention in public address.

Upon the Interstate Commerce Commission, whose jurisdiction had been extended by the amendments of 1906, the new act lays still further responsibilities. Interstate telegraph, telephone, and cable companies, whether wire or wireless, are declared to be common carriers within the purpose of the act, and are placed under the regulating authority of the commission. The original suggestion for the inclusion of these carriers came from a democratic member of the House of Representatives, and his amendment was promptly adopted over the objections of those in charge of the railroad bill in that body, who protested against hasty action that would bring these carriers under a law ill-adapted to their regulation, and framed for transportation corporations whose operations were of a distinctly different character. Yet with the right to classify messages, the principle of just discrimination is recognized, and there seems to be no good reason why the commission cannot apply to agencies of this character the same rules of action that are applied to transportation companies. Beyond this the jurisdiction of the commission over interstate carriers remains as before.

LONG AND SHORT HAUL CLAUSE.

The amendment to the act which will probably be most far-reaching in its effects is that which restores the long and short haul clause to a place of active participation in the task of railway regulation.

This clause was shorn of all significance by a Supreme Court decision in 1897† which virtually declared that competition of railways at terminal points created those dissimilar circumstances that warranted a suspension of the clause, and furthermore, that if circumstances were substantially dissimilar, the railways were not in violation of the statute if they charged a less rate for the longer distance without permission of the commission. Justice Harlan in his dissenting opinion said, "Taken in connection with other decisions defining the powers of the Interstate Commerce Commission, the present decision, it seems to me, goes far to make that commission a useless body." That the decision was a severe blow to the power and prestige of the commission was clear, and it became clearer as time went on, for this evil, which Chairman Knapp called "the most irritating and obnoxious form of discrimination that has been encountered," did not cease, but became if anything more widespread and burdensome. It has been present in full force in the South in the basing-point system. As the cities of the Rocky mountain region have grown in strength, they have wished to build up a distributing business in mountain territory, and the practice of giving rates to Pacific coast points lower than those granted to the interior has become to them well nigh intolerable. Every attempt on the part of public or commission to equalize rates on a plan which approximated the distance basis has been met by the roads with the plea that such a revolution would utterly destroy established industries. "God help New England if the long and short haul clause is restored," is the remark of a railway president which typifies fairly the position of the carriers.

It was the House amendment which finally became law. This eliminated from the old section the words "under substantially similar circumstances and conditions," thus making it unlawful under any circumstances to charge more for the longer than for the shorter distance, unless permission should be secured in ad-

* Adapted by permission from a paper in the *Quarterly Journal of Economics*, Vol. XXV, No. 4, 1910.
† Interstate Commerce Commission v. Alabama Mobile Ry. Co., et al., 168 U. S. 357.

vance from the commission. No other changes were made in the act except that (1) the prohibition was extended to include *route* as well as *line*, thus making it clear that jurisdiction extended over routes made up of more than one railway line, and (2) carriers were prohibited from charging more for a through route than the aggregate of the intermediate rates, which legalizes a rule that the commission has consistently followed in its decisions. No rates are required to be changed under this clause until six months after the passage of the act. If held constitutional in its amended form, the section will put into the hands of the commission a power by which they may readjust the entire rate structure of the country, subject only to the limitation that rates must be reasonable. How far they will take advantage of this sudden and extraordinary increase in their authority remains to be seen. Judging from recent decisions, they are likely to continue their readjustment of rates in trans-Mississippi territory with much more confidence that their findings will be sustained by the courts.

An amendment which had been recommended by the National Waterways Commission in its recent report to Congress was submitted by its chairman, Senator Burton, and became a part of Section 4. It provided that whenever a railway in competition with a water route should reduce its rates to competitive points, it should not be permitted to increase them unless, after hearing before the commission, it should be found that such increase rested upon changed conditions other than the elimination of water competition. The only provision of this kind previously in existence in this country is to be found in the constitution of California, under which document the railway commission of that state is created, and it was from this source that the suggestion of the Waterways commission came. The clause therein contained is practically identical with the one adopted by Congress.

RATES AND ROUTES.

The Hepburn act gave the commission power to prescribe rates, but only after hearing and upon complaint, and no complaint could be entertained until a rate was actually in effect. It is clear, therefore, that a shipper had no satisfactory method of avoiding the burden of an increased rate, until he could actually prove by experience that it was unreasonable. In probably a majority of cases, the burden of the freight rate is shifted to the consignee, is absorbed into the retail price of the goods, and paid by the ultimate consumer, who is not a party to the shipment and has standing before court or commission.

In addition to demands on the commission for reparation, the shipper has to some extent invoked the aid of the courts to restrain an advance in rates. This method has not proved satisfactory. In the first place, the power of the courts to suspend rates before they become effective has been bitterly contested.

But even if the power exists in the courts to restrain rate increases, an injunction can issue only in favor of the petitioners, and only upon the filing of a bond. The large body of shippers who cannot file a bond, and who do not petition the courts, are obliged to pay the new rate. Again, such a court injunction applies only to the circuit over which the court has jurisdiction, and hence may cause confusion in cases of shipments which pass through more than one circuit.

It is obvious that no carrier should be compelled to lower a rate without a hearing. It should be equally obvious that no shipper should be compelled to suffer an increased burden without having an opportunity to present his case. A rate long in existence is presumptively reasonable, and no serious hardship can arise if a postponement of the effective date of a change in such rate is made pending an examination of its reasonableness.

This was the situation which influenced the administration and Congress to make a radical change in our method of rate control. It is now provided that whenever there shall be filed with the commission any new rate or fare or classification, or any regulation affecting a rate, the commission is authorized, either upon complaint or upon its own motion, after reasonable notice to the carrier, to enter upon a hearing, and pending such

hearing and decision, it may suspend the operation of the rate or other regulation for not more than 120 days beyond the time when it would have gone into effect. If the hearing is not then completed, it may extend the time of suspension for a further period of six months. After full hearing, the commission may make such order as would be proper in a proceeding instituted after the rate became effective. In any hearing involving a rate increased after January 1, 1910, the burden of proof is on the carrier to show that the increased rate is just and reasonable.

Those who consider this legislation as revolutionary and drastic should bear in mind that this is merely giving those same safeguards to the shippers and the public, that we have long given through statute and constitutional privilege to the common carriers. If a rate has been lowered by order of the commission, the carrier has had the right to enjoin its enforcement and the ultimate determination of the question has been postponed often for years, the old rates in many instances continuing in force. Except in complicated cases involving extensive changes over wide areas of country, it is unlikely that the commission will take advantage of the full ten months permitted by law, and preliminary notice of from four to six months of changes in rates, which is likely to be the practice, should not injure the carriers and should prove of immense value to shippers.

Section 6 has been amended by providing that if, after written request has been made upon the agent of a common carrier for a written statement of a rate applicable to a desired shipment between stated places, under tariffs to which the carrier is a party, such common carrier shall refuse or omit to give such statement within a reasonable time, or shall misstate in writing the applicable rate, and if the applicant suffers damage, either through making the shipment over an unnecessarily costly route, or through entering into a contract to pay the freight charges, then the carrier is liable to a penalty of \$250 which is to accrue to the United States. The misquotation or non-quotation of a rate after a proper request is now made a misdemeanor, with a penalty payable to the United States. A majority of Congress felt that any scheme which would have permitted a civil suit for damages, with recovery by the shipper, would have opened an easy road to rebates, and it was for this reason that a Senate amendment giving a shipper this right of recovery was dropped out in conference. But with the heavy penalties in existence against rebating, and with the ease with which the carrier and shipper could be detected through the written statements required under this section, it is not at all clear that a provision which would permit shippers to recover damages would promote rebating. Yet to the law-makers a penalty that would serve to make agents more responsible seemed to be the only feasible plan.

The Hepburn act authorized the commission to establish through routes and joint rates when carriers had refused or neglected to establish such routes and rates voluntarily, and no reasonable or satisfactory through route existed. The difficulty in the enforcement of this provision has been in the interpretation of the words "reasonable or satisfactory," for what might be reasonable or satisfactory for one purpose and under one set of conditions, was not so for another purpose or under other conditions. This was shown in the Portland Gateway case,* in which the commission held that because a large group of passengers could not secure joint rates from St. Louis to Seattle by way of Portland, but could do so only by the Hill lines, no satisfactory through route existed for them, and they ordered one established by way of Portland. Against this order, the circuit court granted an injunction basing its action upon the literal wording of the statute. The commission, therefore, urged that this limitation upon its power to prescribe through routes be removed, at least so far as passenger business was concerned. Again, there are frequently conditions in freight traffic due to

*Northern Pacific Railway Co. vs. Interstate Commerce Commission, 23d Annual Report of Commission, p. 36.

car shortage, lack of facilities, and the like, when public necessity demand that some pressure should be brought to bear upon the initial carrier to provide additional through routes.

In the act under consideration, the proviso that "no reasonable or satisfactory through route exists" is eliminated, and the commission may, after hearing, order such through routes and prescribe such joint rates as seem desirable, even when one of the connecting carriers is a water line. The only limitations upon its power in this regard are, (1) that because of its obvious impracticability, no through route shall be formed with a street electric passenger railway not engaged in freight business, (2) that no route may be established when the transportation is wholly by water, as this would be beyond the jurisdiction of the commission, and (3) that no railway company shall be required without its consent to embrace in the through route substantially less than the entire length of its road, or any intermediate road under its control, which lies between the termini of the proposed route, unless this would make such route unreasonably long as compared with a more practicable route. This last limitation, embraced in the administration bill, was eliminated from the House bill, but was restored on the floor, in response to the urgent demands of the railways who feared that the commission might, in seeking for the speediest routes, take small portions out of their lines, and deprive them of much of their long haul business. Yet in its present form it is doubtful whether the clause is workable at all, and whether the commission's power over through routing is not less than before. When each railroad can include substantially all of its line in a through route to which it is a party, it will establish it voluntarily, and the commission's authority will not be invoked. It is in cases where the through route requires the inclusion of a part only of a carrier's line that conflict will arise and the commission will be requested to exercise its authority, and it is in just such cases that the hands of the commission are tied. It is not unlikely that this limiting proviso has nullified the entire clause.

In the California Orange Routing cases, it appeared that the carriers had reserved the control over the routing of the fruit to prevent alleged rebating upon certain connecting lines, over which the fruit shippers wished their product to move. This practice of the initial carriers was held by the commission to be an undue prejudice and disadvantage to the orange shippers, and a violation of Section 3 of the act; but the practice was sustained by the Supreme Court of the United States.* In their appearance before the House Committee on Interstate Commerce, the shippers contended that the carrier had no property right in the goods, and should leave the routing to the owners, that it was frequently necessary to know the route in advance in order to safeguard the shipments and arrange for their receipt, that if they arranged the routing, delays in transit due to blockades or to the reloading practices of connecting roads might be avoided, and that in general the shipper would be in a better position to secure the most efficient service. It was contended further that the present policy of leaving the routing to the initial carrier tended to the development of pooling and exchange of traffic between certain carriers to the exclusion of competitors, and hence resulted in increase of rates and in deterioration of the service. The right to route traffic would be of special value to the local shipper who could not make as effective demands upon the carrier as the large shipper at the competitive port. The main argument of the railways for a continuation of the existing practice was that without a policy of cooperation between connecting lines, it would be impossible to secure the facilities necessary to serve the public, and a withdrawal of the practice would tend to less efficient and more expensive transportation.

It is now provided that when two or more through routes and through rates exist, to which the initial railway is a party, the shipper, subject to such exceptions as the commission may prescribe, may designate in writing the route which he prefers,

and a bill of lading must then be issued in conformity with his instructions. It is further provided that where competing lines form part of a through route, the shipper may designate over which of the competing lines his freight shall be transported, even though no joint rates have been agreed upon or filed. This additional proviso would seem to give the shipper all the freedom he could possibly wish for shipments of any distance. For it would be difficult to find any route of any considerable length in which for at least a portion of the way there do not exist competing lines of railway. Yet it is doubtful whether in the long run this radical change of policy will work out to the best interest of the shipper. His main concern is to name the delivering road, and he will, to be sure, have more freedom in this respect hereafter. But his requests, when reasonable, have heretofore usually been granted by the initial carrier. Now by naming his own route, he assumes all responsibility and the carrier must follow his instructions, strikes, blockades, and acts of God to the contrary notwithstanding. To be sure, the so-called Carmack amendment, adopted in 1906, which makes the initial carrier liable to the shipper for damage, even if the damage occurs off its own line, is still in force. In fact, a Senate amendment relieving the carrier from liability beyond its own line, when the shipper selects a line over which no through route has been established, was thrown out in conference. Yet it is inconceivable that the courts will ever insist upon the liability of an initial carrier for a shipment over a series of connecting roads, where neither a through route nor a joint rate has been agreed on.

For the first time, the act specifically provides that carriers shall establish and enforce reasonable classifications of property for transportation. This gives the commission no authority which it has not exercised since 1906, but merely puts its power beyond dispute. A provision in the Senate bill directing the commission to investigate and report as to the feasibility of a uniform classification of articles of commerce throughout the country was eliminated in conference.

ADDITIONAL POWERS OF COMMISSION.

It was of the greatest importance from the public standpoint that the commission should continue to act on its own initiative whenever a situation seemed to warrant it. Frequently it was desirable that complaints should be broadened, and that the commission should investigate on a more comprehensive plan than the complaint as filed would permit. The commission has in a few instances followed this policy, but it seemed undesirable that it should continue to exercise the right under a clouded title.

Section 13 has now been amended so as to leave no doubt as to the powers of the commission. It is given full authority at any time to institute any inquiry on its own motion, as to any matter concerning which any complaint is authorized, or any question may arise under the provisions of the act, and its powers are to be the same, including the power to make and enforce orders, as though the matter had arisen through formal complaint. Section 15, which gives the commission power to prescribe rates upon complaint and after hearing, is amended by authorizing the commission to issue orders "after full hearing under an order for investigation and hearing made by the commission on its own initiative (either in extension of any pending complaint or without any complaint whatever)."

It is required by the new act that carriers shall prescribe just and reasonable regulations concerning the issuance, form and substance of tickets, bills of lading, manner of marking, packing and delivering property, carrying of personal, sample and excess baggage, and all other matters relating to the handling or storing of property, and all unreasonable regulations are prohibited and declared to be unlawful. This clause covers a multitude of details in connection with both passenger and freight traffic, concerning which there has been from time to time complaint on the part of shippers and passengers. One instance is that of sample baggage. Representatives of the traveling salesman, in hearings before the House committee, complained of the

anomalous position which they occupy with respect to their baggage. Sample baggage in some states cannot be carried as personal baggage, in some sections railways refuse to carry it at all; in other sections, railways accept it, but assume no responsibility and the salesman is without standing before the commission if he complains of unreasonable treatment.

Another illustration of the kind of supervision which the commission is expected to exercise under this section is found in the act regulating the transportation of explosives, passed originally in 1908 and re-enacted in 1909, which directed the commission to prepare regulations for the safe carriage of such traffic. Such power of supervision is now conferred in a general way by this amendment over all methods of handling and transporting property.

It is made unlawful for a railway to enforce other than reasonable regulations, and by an amendment to Section 15, the commission is given jurisdiction over all regulations and practices of carriers and the power to prescribe reasonable regulations to be hereafter followed.

In connection with the requirement that every carrier shall establish through routes and just and reasonable rates applicable thereto, it is now made the duty of each to provide reasonable facilities for the operation of these routes, proper rules for the interchange of cars, and reasonable compensation to those entitled to it. This clause was aimed at those railways which limit the range of movement of their equipment, and was designed to promote the efficiency of through business.

PROCEDURE.

The entire questions of procedure may best be considered in connection with the sections creating the Commerce Court. This court is to consist of five judges appointed for terms of five years. At the beginning, the President is to appoint five additional circuit judges for terms of from one to five years. At the expiration or termination of the assignment, the chief justice of the Supreme Court is to designate a circuit judge to fill the vacancy. After 1914, no circuit judge is to be reassigned to service in the Commerce Court without an interval of one year. Four judges constitute a quorum of the court, and a majority must concur in all decisions. Regular sessions of the court are to be held in the city of Washington. If at any time the business of the court is not sufficient to demand the services of all the judges, the chief justice of the United States may terminate the assignment of any judge, or temporarily assign him for service in any circuit court or circuit court of appeals.

Exclusive jurisdiction is conferred upon this court over the following kinds of cases:

1. All cases for the enforcement of any order of the commission other than for the payment of money, where enforcement does not involve the collection of a forfeiture or penalty, or the infliction of criminal punishment.
2. All cases brought to enjoin or set aside in whole or in part any order of the commission.
3. Suits brought under the Elkins act to enjoin illegal discriminations or departures from published rates.
4. Suits brought under Section 20, praying for the issuance of writs of mandamus, to compel the filing of proper reports or the keeping of prescribed accounts, and under Section 23 to compel the movement of interstate traffic or the furnishing of facilities.

The first class of cases comprises those in which an order of the commission has been disobeyed by the carrier, and suit is brought for its enforcement. Suits for the collection of damages are left as in the Hepburn act. The complainant files his petition in the circuit court of the United States, and the case proceeds as do other civil suits of similar nature. The only change made in the new act in this respect is the inclusion of a permission to file such suits also in state courts of general jurisdiction. If orders other than those excepted are disobeyed, the commission or any party injured, or the United States, may apply by petition to the Commerce Court, and this court, if it determines "that the order was regularly made and duly served,

shall enforce obedience by a writ of injunction or other proper process."

In the second class of cases are included orders of the commission which the carrier seeks to enjoin or annul. Such appeal by a carrier does not operate of itself to stay the order of the commission, but the court may suspend in whole or in part the operation of the order pending final hearing of the suit. No injunction may issue except upon notice and after hearing. In cases where irreparable damage is liable to ensue, the court, or a single judge thereof, may grant a stay of not more than sixty days, but such stay can only be granted upon hearing, and after three days' notice to the commission and the attorney-general, and the order granting the stay must contain a specific finding based upon evidence that such irreparable damage will ensue, and specifying its nature. Upon hearing the application, the full court may continue the temporary stay beyond the sixty-day period until its final decision. The procedure retains in modified form the principle so bitterly contended for in the passage of the Hepburn act, that notice and hearing must precede the issue of even a temporary injunction. The five days' preliminary notice of the act of 1906 has been now reduced to three days.* As in the Hepburn act, appeals may be taken from an interlocutory order granting an injunction, if made within thirty days, and from a final judgment of the Commerce Court if made within sixty days. Such appeals do not operate to supersede or stay the judgment unless so directed by the Supreme Court, and such cases have priority in hearing and determination over all except criminal cases.

It should be noted that in exercising jurisdiction over the first two classes of cases, those for enforcement of the commission's order following disobedience by the carrier, and those brought by a carrier in protest of the commission's order, the new law holds the ground gained by the judicial interpretation of the Hepburn act. That act put all orders of the commission into effect unless suspended or set aside by a court of competent jurisdiction, and it also provided that "if upon such hearing as the court may determine to be necessary it appears that the order was regularly made and duly served . . . the court shall enforce obedience." In the recent case of the Interstate Commerce Commission vs. Illinois Central Railroad Company the court seems to hold that it can only inquire as to the power of the commission to make the order, and not into the expediency or wisdom of it; and in determining whether it should be set aside, it must consider solely whether the order was constitutional and whether it was within the scope of the commission's delegated authority. So significant did this decision appear to be in limiting the powers of the circuit courts, and in strengthening the administrative powers of the commission, that the advocates of administrative supervision insisted upon restricting the powers of the new court explicitly to those which, by this decision of the Supreme Court, the regular circuit courts were held to possess.

The question of procedure which the administration had most at heart was that which provided for the bringing of suits against the United States, instead of against the Interstate Commerce Commission; gave to the attorney-general of the United States entire charge of all cases in the Commerce Court and in the Supreme Court on appeal; and stipulated that the Interstate Commerce Commission and its attorneys should take no part in the litigation.

Heretofore, suits to review or set aside orders of the commission have been brought against it *eo nomine*, and have been defended by its own attorneys under the nominal supervision of the attorney-general. This practice has given rise to the criticism that the commission assumes the functions of investigator, judge and then prosecutor, and that it is undignified for the commission, having once rendered a judicial decision to

*The measure as it passed the House provided for no preliminary notice, but limited the operation of the injunction to seven days. The Senate bill provided a five-day's preliminary notice, and a stay of sixty days.

†The Illinois Central case, just referred to, would seem to imply that the commission is a legislative and not a judicial body.

go into the courts as a litigant in defense of its own orders. But the influence that was probably responsible for this provision emanated from a sensitive department of justice, which felt that the prosecuting force of the Interstate Commerce Commission was invading its territory. This clause was framed by the attorney-general of the United States with the purpose of defining clearly the functions of two conflicting departments, and re-establishing the department of justice in the position he thought it properly belonged. But his ambitious program received a serious check at the hands of the "insurgents" in both houses, particularly in the Senate, where generous provision for intervention of interested parties was made. Suits are to be brought against the United States rather than the Interstate Commerce Commission, and the attorney-general is to have control of the interests of the government in the Commerce Court and on appeal; but the Interstate Commerce Commission, and any party in interest to the proceeding before the commission, may appear as parties of their own motion and as of right, and re-establishing the department of justice in the position where general, is to make all rules concerning appearances, procedure and number of counsel. This procedure, which seems to carry informality to an extreme, came in response to the wellnigh unanimous protest of shippers against the administration program. They contended that if cases were taken out of their hands, and if the commission itself were denied participation, there would be no one connected with the case in the courts who had had any familiarity with it in its earlier stages, and than in complicated traffic questions this lack of association with the contest from the beginning would render the United States attorneys so helpless in contest with the railways that a disastrous outcome to the litigation in the courts would be a foregone conclusion. They were unwilling to rely upon the self-interest of the attorney-general to employ shippers' counsel as his assistants.

The motives which led to the recommendation of a Commerce Court were stated in the special message of the president on January 7, when he called attention to the delay now attending the adjudication of cases in the United States courts, the contrariety of opinion which issues from them, and the apparent inability of circuit judges to cope with the mass of conflicting and highly technical evidence. But the proposition met with surprisingly little cordial support. Its defense was perfunctory, the attack upon it was vigorous and pointed, and its adoption after significant amendment was apparently the result of a compromise with the radicals, who granted this pet project of the president's in return for provisions which they considered vital to the measure. The court was attacked, in the first place, as an unnecessary expense. In answer to the claim that delays would be avoided by a court which devoted its attention exclusively to railroad cases, it was contended that the delays arose in the preparation of cases, the taking of evidence, and in the presentation and adjudication of cases on appeal in the Supreme Court, and that none of these delays would be avoided under the new arrangement. Such uniformity as was desired from this court was now being secured on appeal to the Supreme Court, whose business it was to look at these national questions in a broad way, and harmonize conflicting judgments. Moreover, such a court, set apart to handle a specific kind of cases, in which corporations with enormous capital and great influence were interested, would become a special target for attack, and this would tend to lessen respect for our judiciary even if the attacks had no justification.

Even among those who favored the creation of the court, there were many, like the members of the Interstate Commerce Commission and prominent railway attorneys, who objected to its shifting character. If expert knowledge of railway questions was a desirable possession on the part of the judges in this court, then why should they not be made a permanent body instead of being transferred every five years, or even more frequently, if the supply of cases did not meet the demand? Is it probable that expert knowledge would be found in a court,

which, after five years, would be drafted from the general body of circuit judges?

MISCELLANEOUS PROVISIONS.

It has been made a misdemeanor, with a penalty of \$1,000, for any common carrier, or any agent or employee, to disclose any information concerning the nature, route or destination of any shipment, when such information may be used to the injury of the shipper in favor of a competitor. It is likewise made unlawful for any persons to solicit such information. Thus a tardy step has been taken to protect shippers against a most contemptible form of espionage practised by competitors, usually by those who are powerful and well organized, and who, through the pressure which they can bring to bear as large shippers, can secure from the railways information concerning the business of their rivals.

Section 20 relating to statistics and accounts is amended by permitting the commission to adopt for its statistical reports, the calendar year instead of the government fiscal year as at present, and by making more specific its power to call for periodical and special reports under oath.

A section was added at the end of the act, which has no direct relation to the problem of common carrier regulation, yet has been called forth mainly by the conflicts of jurisdiction in railway cases. It provides that any petition for an interlocutory injunction, suspending a state statute, shall be made before three judges, of whom one shall be a justice of the Supreme Court of the United States, or a circuit judge. The application shall be heard only after five days' notice, except when irreparable loss or damage would result, in which case any one of the judges may grant a restraining order, which, shall be effective only until the application for injunction can be heard. Appeal is direct to the Supreme Court.

PROJECTS WHICH FAILED OF ENACTMENT.

The projects which failed of incorporation in the act were quite as interesting and important as those which were adopted, and deserve a moment's consideration. It is significant that the two specific recommendations made in the Republican platform for amendment of the Interstate Commerce act both failed of passage. The amendment authorizing agreements between carriers as to rates failed to pass either house. Conflict arose over the question as to whether such agreements should be approved in advance by the commission and whether in fact it would be practicable to require such approval. It was contended that if such agreements contained all the rates involved, a submission of the agreements to the commission would mean a costly duplication of the present labor incurred in connection with the filing of tariffs. But the real cause for the defeat of this proposal was the conviction that this meant a repeal of the anti-trust law so far as railways were concerned. It is apparent that the people are not yet ready to accept the principle of combination as applied to these great aggregations of capital invested in the transportation industry. How long we shall continue fondly to hug this fallacy of competition no one knows. There is certainly no immediate prospect that it will be abandoned in favor of any other economic principle.

The elaborate provisions which, with certain important exceptions, forbade the purchase by one railway of the stock of another, and those which were intended to place the control of future capital issues in the hands of the commission, all went down in defeat. They were extensively amended in the House. They were thrown out in the Senate by an almost unanimous vote. Their opponents represented three points of view. There were those who opposed stock and bond regulation of any kind. There was the element which regarded this project of federal regulation as an invasion of the rights of the states. Finally there was the group which strongly favored the principle, but which felt that the specific plan of the administration was so cumbered with exceptions, and so guarded with provisions of one kind and another, that the net result was a legalization of

the present situation and a validation of a mass of worthless securities. The House section went to conference and would have been thrown out altogether, but for the president's insistent reminder of the platform pledges. However, the most he could secure was the right to appoint a commission with authority to investigate questions pertaining to the issuance of stocks and bonds by railway corporations, and the power of Congress to regulate such issues. While the desirability of control of capitalization is unquestioned, yet the plan as proposed was so complicated and the step after all so radical, in view of our previous policy, that it would seem wise to make haste slowly. If the commission does nothing else, it will at least give the public and its representatives in Congress an opportunity to gain a better acquaintance with the problem, and it may help to educate them along lines of wise regulation. It is to be hoped that the proposal of the administration bill will appear at the next session, shorn of a mass of the verbiage which now surrounds it.

The House sent to the conference committee an amendment directing the Interstate Commerce Commission immediately to ascertain the value in money of all railway property in the United States, and after the completion of this valuation, to ascertain periodically the value of extensions and improvements, such valuation to be received as prima facie evidence of the actual value of railway property in all proceedings before the commission and the courts. Those who passed this amendment in the House had no expectation that it could run the gauntlet of the Senate conferees. However, it is significant as a first attempt to respond to the urgent recommendation of the Interstate Commerce Commission.

Other proposals which passed one house, but failed in conference, included the House proposals to extend jurisdiction of the commission over water transportation in Hawaii and over transportation to Alaska, and to grant to the commission power to pass separately on terminal and switching charges that are a part of the through rate. From the Senate, there were instructions that the commission should every six months make an analysis of classifications and tariffs, showing changes in through rates on all staple commodities and report annually to Congress; and from the House, that the commission should investigate the facts and practices as to discrimination, should report concerning investigations heretofore made, and should recommend changes in existing law. The failure of these provisions in conference must have occasioned prayers of thanksgiving in the offices of the commission.

Finally, one or two matters should be mentioned which failed of action in either house, but which must sooner or later become subjects of serious consideration. It is difficult to understand why water carriers are still exempt from control. To be sure, they still proffer the old argument that they are a competitive industry, which by its very nature is so subject to competition that regulation is unnecessary. Divine Providence, they insist, may be trusted to care for the interests of shippers by water without any aid from the Interstate Commerce Commission. But any one who has given the situation a cursory examination knows how fallacious these contentions are, to what an extent the water lines are controlled by the railways, and how largely rates between points ostensibly competing are made by combinations between the two agencies. More power seems to be given the commission over water carriage than ever before by its authority to make through routes to which one of the parties may be a water line. Yet, in view of the fact that water carriers are by Section 1 placed under the jurisdiction of the act only when they are used under a "common control, management or arrangement for a continuous carriage or shipment," it is at least doubtful whether the commission can force a water carrier against its will to become a party to a through route or a joint rate. If a through route is made, and the water line becomes voluntarily a party to it and files its joint rates, the water carrier is under the jurisdiction of the commission only with respect to business carried on these joint rates. One further extension

of the jurisdiction of the commission should be made, and water carriers should be placed under the act along with other interstate carriers.

Lack of power on the part of the commission to prescribe minimum rates has proved, as was predicted in 1906, to be an obstacle to the promotion of exact justice between shipping communities and between markets. This power the commission should have.

The commodities clause stands unamended, notwithstanding the interpretation of the Supreme Court, which, while nominally sustaining its constitutionality, robbed it of all practical efficacy. The court held that the ownership of the stock of a coal company by a railway company did not give the latter an interest direct or indirect in the coal which was mined, neither was the carrier in violation of the clause, if, being the legal owner of the coal, it sold it before transportation began. Attempts were made, notably that of Senator Bailey, to modify the working so that the original intent of the clause might be restored, but neither house seemed disposed to make the simple verbal change necessary to give the clause the meaning which it was supposed to have when adopted four years ago.

REINFORCEMENT OF THE PECOS RIVER VIADUCT.

The Pecos river viaduct is on the Sunset Route of the Southern Pacific, where it crosses the Pecos river in Val Verde county, Texas. It was originally built and erected by the Phoenix Bridge Company in 1892. Complete descriptions of this bridge were published in the various engineering periodicals at that time.

The structure as originally built was 2,180 ft. long and 321 ft. high, with its girders and truss spans on 10-ft. centers. The river itself, a stream about 160 ft. wide, was spanned by two cantilevers projecting 52 ft. 6 in. from their supporting towers, and carrying an 80-ft. suspended span of the lattice girder type between them. The anchor arm was 85 ft. 6 in. long and the bents of the supporting towers were on 35-ft. centers. The remainder of the structure consisted of 35-ft. deck plate girder tower spans with 35-ft. and 45-ft. deck plate girders and 65-ft. deck lattice girder open spans. All of the deck structure was supported on the column caps of the tower bents.

The heavy engine loading of the present day made it necessary to strengthen this structure, and plans for its reinforcement were made in accordance with Harriman Lines bridge specifications C.S.1006, having a live loading equivalent to Cooper's E 55.

For all new material the unit stress formulae in these specifications were used without change, but for old material the numerical coefficients were reduced as follows:

Tension, plates and shapes.....	7,000	$\left\{ 1 - \frac{Min.}{Max.} \right\}$
Shear, webs of plate girders	5,000	$\left\{ 1 - \frac{Min.}{Max.} \right\}$
Compression	7,000	$\left\{ 1 - \frac{Min.}{Max.} \right\}$

The plan finally decided on for this reinforcement was the use of a line of new girders and trusses through the longitudinal center line, making three lines of girders on 5-ft. centers. Nineteen spans, or 665 ft., of the west end were removed, the track supported on falsework and replaced by fill. A new abutment was built of concrete, 55 ft. high and U-shaped in plan. The front wall is 20 ft. long and the wing walls 17 ft. long on top. The original steel bent supporting the last open span was imbedded in the concrete of the front wall of this abutment as a reinforcement.

The line of new center girders are supported on transverse girders riveted to the tops of the old columns, and these columns were reinforced to carry the additional loading. The new transverse girders were made with a double web section and straddled the old columns, to which hitch angles had been previously riveted. The old Z-bar columns were reinforced in some cases

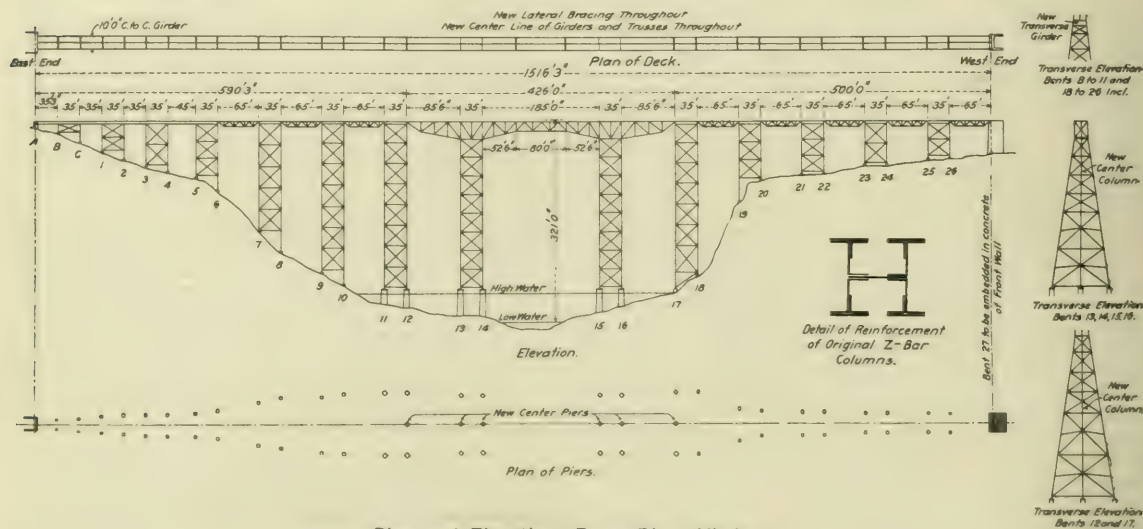
with four $3\frac{1}{2}$ -in. \times $3\frac{1}{2}$ -in. angles, field riveted to the back of the web of the Z-bar; and in the case of those columns carrying the reaction of a 65-ft. and 35-ft. span it was found necessary to add additional plates 6 in. wide, shop riveted to the new $3\frac{1}{2}$ -in. \times $3\frac{1}{2}$ -in. angles and field riveted to the outstanding leg of the Z-bars, as shown in the sketch which forms a detail of the accompanying drawing of the structure. At 3-ft. intervals along the length of the column, six-hole batten plates were field riveted to the outstanding legs of the new reinforcing angles, making a very rigid column section.

The new center cantilever truss and its anchor arm are supported on new center columns. The columns have a built-up channel section similar to that of the old columns. To avoid the necessity of cutting any of the bracing of the tower, the new center columns were shipped bolted up and were erected by straddling all struts and rod intersections, for which reason the lacing bars and batten plates were riveted on in the field. New concrete piers were built to carry the new columns. The main piers are 50 ft. high, 8 ft. square at the top, and about 16 ft. square at the bottom, and are founded on solid rock.

The eight new 65-ft. spans have plate webs instead of being

column. This stub column formed the cap of the main column and contained the pin for the link. When wedged up to its proper position, it was drilled and riveted to the new main column.

The erection of all material was handled from the deck of the bridge by a derrick car of 10 tons capacity. The new column reinforcing metal in 33-ft. lengths was boomed out over the side, lowered into place and clamped in position with horse-shoe clamps. The transverse girders were dropped over the side one section at a time, swung under the old outside girders and landed on wedges placed on shelf angles provided for that purpose. These wedges allowed accurate vertical adjustment of the girder. A diaphragm is field riveted to the center of each section of the transverse girders. All of the short girders, 35 ft. long, and weighing $7\frac{1}{2}$ tons each, were carried out from shore on the booms end of the derrick car and dropped into place, the deck and old bracing having been previously removed for that purpose; the whole operation required a force of eight men and a foreman about two hours and a half. The 65-ft. girders, weighing 18 tons each, were loaded on two flat cars, then hauled out to the site by a locomotive. A gallows bent



Plan and Elevation; Pecos River Viaduct.

of the lattice type like those of the old structure. They are made up of 83-in. \times $\frac{7}{8}$ -in. web plates, coped to 48 in. at each end, with flanges consisting of two angles 8 in. \times 6 in. \times $\frac{1}{4}$ in. and with three 17-in. cover plates $\frac{1}{4}$ in. thick.

The new cantilevers and anchor arm trusses have the same general outline dimensions as the old structure, but are riveted trusses instead of pin connected. The lateral bracing in the plane of the top and bottom chords is of the usual type, four angles laced together. In place of the single $1\frac{1}{4}$ -in. rod diagonal cross bracing used between the vertical posts a double diagonal cross bracing of rods was used, straddling the new post as well as the old.

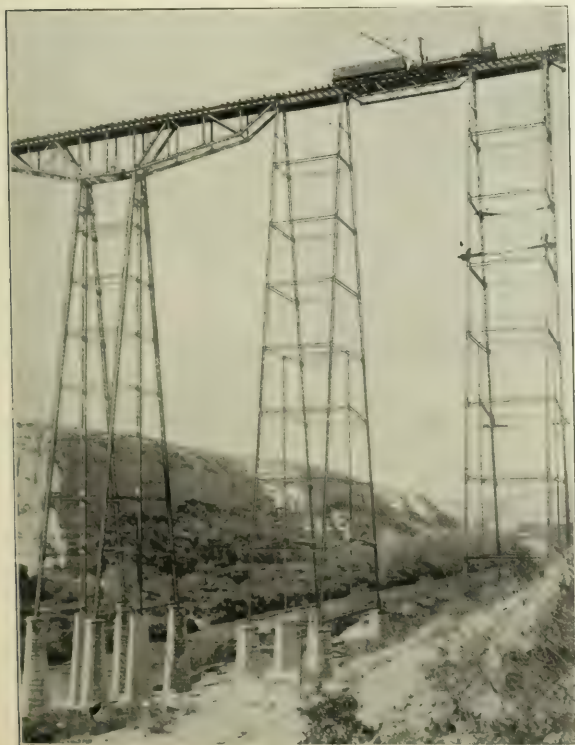
This method simplified the erection to a considerable extent, as the new rods were inserted before the old ones were taken out, and, as the new post slipped down between the two sets of rods, the lateral stiffness of the trusses was provided for at all times. But for a short wooden strut at each vertical post no temporary bracing was found necessary during the erection of these trusses, although regular traffic was maintained without interruption. The anchorage at the end of the anchor arm is a built-up link made in two parts, one on each side of the new column and connected to the column and the anchor arm by 7 in. pins. The adjustment of this anchorage was provided for by making a stub column telescope into the top of the main

column. This stub column formed the cap of the main column and contained the pin for the link. When wedged up to its proper position, it was drilled and riveted to the new main column. The erection of all material was handled from the deck of the bridge by a derrick car of 10 tons capacity. The new column reinforcing metal in 33-ft. lengths was boomed out over the side, lowered into place and clamped in position with horse-shoe clamps. The transverse girders were dropped over the side one section at a time, swung under the old outside girders and landed on wedges placed on shelf angles provided for that purpose. These wedges allowed accurate vertical adjustment of the girder. A diaphragm is field riveted to the center of each section of the transverse girders. All of the short girders, 35 ft. long, and weighing $7\frac{1}{2}$ tons each, were carried out from shore on the booms end of the derrick car and dropped into place, the deck and old bracing having been previously removed for that purpose; the whole operation required a force of eight men and a foreman about two hours and a half. The 65-ft. girders, weighing 18 tons each, were loaded on two flat cars, then hauled out to the site by a locomotive. A gallows bent

The lower chords of the cantilever trusses were placed by lowering each member over the side and swinging it between the web members of the old trusses to the center. Consider-



Placing a 65-Foot Girder; Looking West.



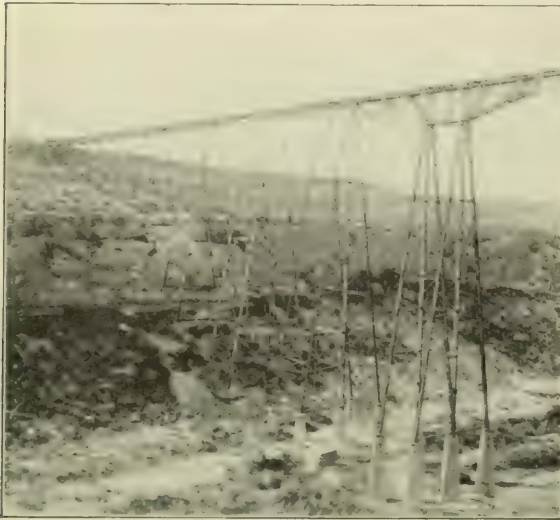
Reinforcing Center Towers.



New Piers in Center Towers.

able care was required, as these chord sections weighed about seven tons each and had to be boomed out 10 ft. from the center line of track in order to clear the 19-ft. sidewalk ties. The upper chord and web members were erected by removing the deck and dropping them directly into place.

In the 1,100 tons of metal erected there were about 80,000 bolts drilled and 135,000 field rivets driven. It required an aver-



Looking East; Pecos River Viaduct.

age of 7 air drills and 5 pneumatic hammers working 9 hours a day for 175 days to complete this work. All drilling and riveting work on the old columns was done from scaffolds. These scaffolds were made of one 4-in. x 6-in. needle beam about 44 ft. long, which, with a cross beam at each end, formed the supports for two working platforms of 2-in. x 12-in. planking, one at each end. Two gangs of men worked on the two columns on the same side of each tower at the same time. The



Method of Placing a 65-Foot Girder.

scaffold rested across the battered side of the columns. These scaffolds made very convenient and stable working platforms.

The design of this reinforcement was made by J. D. Isaacs, consulting engineer of the Harriman Lines. The shop work was done by the Pecos Bridge Company, and the steel was erected by W. O. Barker, superintendent of the Missouri Valley Bridge & Iron Company, under the supervision of D. E. Colburn, bridge engineer for the Galveston, Harrisburg & San Antonio.

NEW NATIONALISM AND NEW INDUSTRIALISM.

B. F. Yoakum, chairman of the board of the St. Louis & San Francisco, made an address on "Farmers' Day," October 5, at the Oklahoma state fair at Oklahoma City, in which he contended that Mr. Roosevelt's new nationalism is not needed to deal with the new industrialism of the country. Mr. Yoakum said in part:

But, after all, this thing called interstate commerce and these instrumentalities called railways represent the very vitals of our national progress, and the very health and wealth of our whole people; and the people of the country, instead of being aroused by inflammatory appeals to adopt measures to destroy them, should be taught by enlightened discussion to find some way to promote them and at the same time fairly regulate them.

The states and the people, under the resistless force of this development, uniting the states and the people of the states in one bond of mutual interest, have been welded into an industrial whole, and a crusade against one class is a crusade against all classes. This is the new industrialism, which has been mistaken by some as predatory wealth, by others as revolutionary plutocracy, and by still others as a cause for new nationalism.

That it must be subject to law and be obedient to government, no rational man will dispute; but that it should be made the sport of politics, the theme of demagogues or the plaything of socialists every good citizen fervently hopes to prevent. If, in order to properly regulate the growth of the new industrialism, it is necessary for the federal government to have more power than was originally granted, let that proposal of new power be drawn up and submitted and let the power of government, in keeping pace with the commerce of the soil, the merchant and the factory, increase in as orderly a manner as the agricultural and industrial development.

HAND SIGNALING AT INTERLOCKING PLANTS.

An axiom of engineering is that it is just as serious an error to use too much material in a structure as it is to use too little, and it behooves the signal engineer to look into the innermost recesses of his soul and ask himself whether he is not guilty of overdoing a good deal of his work. In earlier days when men looked practical questions squarely in the face, a great many plants were installed with a much simpler signaling arrangement than is the current practice of to-day. Many such plants are still in service and are doing just as good work as the much more elaborate signaling which the modern signal engineer feels bound to design.

Among other things which have become almost cardinal principles at interlocking plants is that we must have a fixed signal for each possible route. In other words, there should be no necessity whatever for the use of hand signals within the limits of an interlocking plant. This sounds well, and on the surface appears to have everything for it and nothing against it; but if the men who are sweating blood to raise the money for the many needed improvements on our railways really realized how much they were paying out for signals which may never be used during the entire life of an interlocking plant, it is doubtful if after mature consideration they would agree with their signal engineers as to the necessity for such signals.

Take for instance the case of an interlocked crossing of two double track lines. We have four "back-up" derails and usually four dwarf signals each connected to an independent lever in the interlocking machine. All told, the cost of each of these dwarf signals will no doubt average \$200 to \$250, or an addition to the cost of the plant of \$800 to \$1,000.

Now probably on 90 per cent. of the double-track mileage in this country such signals as those described often go for years without ever being cleared for the passage of a train.

Why, therefore, would it not be as well to provide simply a stationary marker for the derails, showing a blue or purple light at night, and in one of the rare cases when a train is being

run against the current, let the leverman give it a hand signal when he is ready for it to proceed? The old-fashioned revolving pot signal working with the derailed movement was faulty in principle, because it always showed "proceed" when the derailed was reversed, even though the leverman might not have wished the train to proceed at that time. Take again the case of an industry track connecting with a main track between facing point derailed and a crossing. Possibly this is not switched oftener than once every week or ten days. Strictly speaking, a train wishing to switch it must pull all the way across the crossing and past the back-up derailed on the other side so as to get the dwarf signal. In practice, however, this is rarely done except on roads ruled by some martinet who is willing to sacrifice economy of time to mere form. And is it necessary for these infrequent movements, usually made by a regular crew experienced in switching and in the use of hand signals, that it should be? Hundreds of thousands of movements are made every day in our yards with economy of time and with perfect safety which are controlled purely by hand signals.

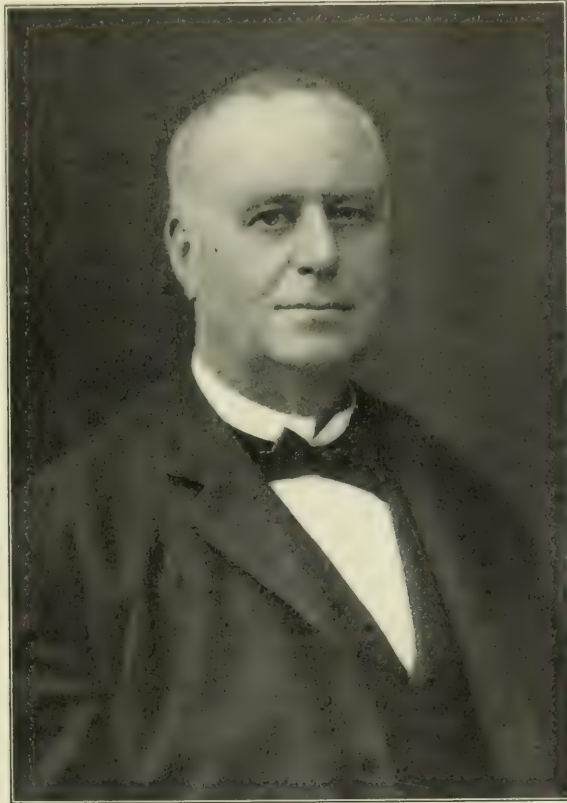
Of course if the principle suggested should be adopted, attention would have to be given to the use of hand signals, and a proper code decided on; and it would appear that the subject is one well worth the consideration of the Railway Signal Association, and possibly the American Railway Association.

A careful investigation of this subject will undoubtedly show a way by which the railways can save themselves thousands of dollars in the construction of their interlocking. Some signal engineers—not many—feel that the more they spend on their installations the more important their positions will appear to their managements and to the outsider; and some dealers and manufacturers feel that it is to their interest to encourage railways to spend as much money as possible on each installation. To such is recommended a study of the history of the printing press. Before its introduction books were written by skilled penmen by hand. The process was so slow and so laborious that books could be sold only at prices beyond the means of any but the most wealthy. When the printing press came in books were so cheapened that anyone could buy them, and the increased demand made work for thousands, where before but one writer could find employment. The writers at first opposed the introduction of printing, even to destroying some of the earlier presses, but results soon showed the fallacy of their opposition. So it will be with signaling. If signal engineers and signal manufacturers will look for ways and means of cheapening its cost they will soon find that the railways will demand more of it, and will in the long run spend more money for that purpose than they do at present when every managing officer feels at the bottom of his heart that he is paying for a great many things not really necessary to safety.—*J. B. Latimer in The Signal Engineer.*

LUCIUS TUTTLE.

The retirement of President Lucius Tuttle from the leadership of the Boston & Maine marks something more than what is the presumptive close of a railway career. It is also the terminal of a railway epoch in New England which opened in a drama with not a few elements of comedy. The dramatic event, or rather series of events, had just preceded what was named at the time "The Partition of Poland," in a New England sense. Briefly stated and with most of its scenic features omitted, the New York, New Haven & Hartford was engaged in a head-on contest with the agile but too radical McLeod, of the Reading system, who, in control of the old New York & New England line and most of the present Poughkeepsie Bridge group, sought alliance with the Boston & Maine and entry into northern New England. The New Haven had struck a treaty with the directors of the Connecticut River Railway, by which the property of the latter was to pass to the New Haven under lease, and a New Haven invasion of upper New England thus secure its aggressive base line. Just then came the sensational counterstroke. Boston & Maine interests, acting through a Boston broker, bought up a majority of Connecticut River stock at a great price per share. The lease was balked and the "Partition of Poland" followed, by which the New Haven and its foe agreed to cease firing and divide railway territory in New England, with the Boston & Albany as the geographical division.

It was at just that juncture, in 1893, that Mr. Tuttle gave up the vice-presidency of the New Haven, with a seat in the directorate, to take, at a salary of \$25,000, the presidential management of the Boston & Maine. His credentials for the place were of a high order. At the age of 47 he was in the full vigor of life; he had begun as ticket agent on the old Hartford, Providence & Fishkill—later a link of the New York & New England line, at \$40 a month; he had been general ticket agent



Lucius Tuttle.

on the same line, next general passenger agent on the Boston & Eastern and the Boston & Lowell. He then became passenger traffic manager of the Canadian Pacific, followed (1889-90) by a trunk line commissionership. Especially efficient had been his services for the Boston & Eastern, the stock of which, standing at 7 after the Revere disaster with its loss of 29 lives and injury of 57 persons, rose to par in the final merger with the Boston & Maine. There were flying reports at the time of Mr. Tuttle's acceptance of the Boston & Maine presidency of friction between him and President Clark, of the New Haven—not unlikely, with both a president and a vice-president in the directorate—and there is recalled the divergence of his views from those of President Clark as to the merits of the Baker heater in connection with the inquiry following the accident in the New York tunnel. It at least attested Mr. Tuttle's independence and moral courage.

What President Clark was to do in railway consolidation and

monopoly in southern New England, President Tuttle went on to do north of the "Treaty of Poland" dividing line. Railway followed railway in passing to Boston & Maine control. The list included within a comparatively few years the Boston & Lowell, the Connecticut River, the Boston, Concord & Montreal, the Somerset and the Washington County lines, the Fitchburg and, during the last year, the Worcester, Nashua & Rochester. The 25,160 shares of the Maine Central, secured at par, proved a lucrative investment, with its increase of dividends to 8 per cent. and a rise of its stock to 200. Except for Canadian Pacific and Grand Trunk tributaries the close of the Tuttle administration found the "Partition of Poland" a fact fulfilled, and control vested in the Boston & Maine of practically all the New England roads north of the Boston & Albany. With the consummation of these mergers and controls came also a considerable number of improvements of the general system in the way of automatic signals, relaying of tracks, elimination of crossings and elevators and dock properties at Boston that brought a large proportion of the trans-ocean business. For betterments and additions during President Tuttle's last year there was expended \$4,698,499.

There was, however, a negative side. Except in the consolidation of lines the Boston & Maine was not progressive, and the up-to-date theories of efficiency in plant and service were not adopted until President Tuttle's final twelve months. This is probably to be charged in part to his lack of early experience as an operating man, and, in part, to the peculiar conditions of business on the system that called for heavy service in summer, but left much of the equipment idle for the rest of the year. Also is to be noted the contracts and coalitions of the Boston & Maine in New Hampshire legislation and politics—embalmed in the novels of a local fiction writer, and with their present-day sequel in an "insurgent" movement in the state which is atop in politics and has a distinctly anti-railway cast.

In his personality President Tuttle united his long railway experience with attractive social traits. He was kindly, affable, approachable, with much of that pleasant off-handedness that characterized his colleague of the New Haven road, President Clark. Besides their personal traits in common there was also a railway analogy between the two. Both found comparatively simple groups of roads which they built up into systems. Both left to others the higher developments of efficient service on those systems. And now, in the progress of railway events, the two systems are one.

TERMINAL CONDITIONS IN CHICAGO.

Last winter the terminal, in Chicago became greatly congested. In consequence, it was impossible for some time for the various railways promptly to deliver and receive cars to and from their connections. It has been estimated that the losses sustained by the railways between December 1, 1909, and April 1, 1910, owing to these conditions, amounted to \$3,000,000. The operating executive of one large line estimated that the losses of the Chicago, Milwaukee & St. Paul, the Chicago & North Western, and the Chicago, Burlington & Quincy were \$500,000 each. The opinions of railway managers differ about the causes of this situation. Some of them say that the physical facilities for handling business in the Chicago terminal district would be adequate if they were economically and efficiently operated. Others say that not only are existing facilities not efficiently operated, but they are inadequate. They say that with one or two exceptions none of the railways whose lines enter Chicago had sufficient terminal yard facilities to take care of their own incoming trains and to receive promptly the freight which other roads desired to deliver to it, and that the belt railways had not sufficient yard facilities for receiving and classifying freight tendered by the trunk lines. As a result, the belt railways were congested, the terminal yards of the trunk lines were blocked and the blockades extended onward along the trunk lines for distances of hundreds of miles.

While differences of opinion exist as to the causes of the congestion, that something must be done to relieve it, all agree

That nothing has yet been done on a great enough scale is certain. It is highly probable, therefore, that there will be another bad congestion this winter if the movement of freight is approximately as heavy as it was last winter, and that it will be approximately as heavy seems probable. The coal movement during the spring and summer was unusually light, owing to the strike in the coal mines. In consequence, the coal traffic now being handled and that will be handled later is and will be larger than usual in the fall and winter.

The necessity for taking measures to keep down the trouble as much as possible by improvements in existing methods of operation until any radical changes in physical properties and in general methods of operation, which may be necessary, can be made, caused the Terminal Officials' Association of Chicago to appoint a committee to investigate and consider the situation and report their recommendations as to the general betterment of yard conditions in Chicago. The committee was composed of F. H. Rutherford (Chicago & Eastern Illinois), W. J. O'Brien (Chicago Junction), J. W. Callahan (Indiana Harbor Belt), D. J. Griffin (Chicago & North Western), C. E. Taylor (Atchison, Topeka & Santa Fe), J. Kirk (Elgin, Joliet & Eastern), and H. White (Pennsylvania Lines). This committee has made a report which has been adopted by the Terminal Officials' Association and referred to the General Superintendents' Association of Chicago with the recommendation that its suggestions be carried out.

The report of the committee throws light on the existing conditions. It found that few reciprocal interchange arrangements are in effect in Chicago. Instead of the engine of one road which has cars for another road taking them to the yards of that road, the usual practice is for the receiving line to designate where it will receive the cars. The engine of the delivering line leaves them there and they are taken from there to the yards of the receiving line. The consequence is that in many cases the engine of the delivering line returns light and the engine of the receiving line comes up for the cars light, the result being a great deal of waste, due to excessive and unnecessary light engine mileage. The committee says that reciprocal interchange arrangements have largely been abolished because they were unequal and also because the different lines felt that their engines did not receive fair treatment on foreign rails. Yardmasters did not give them the same supervision and consideration as they gave to the engines of their own lines. The consequence was that foreign engines were needlessly and unfairly delayed in order to give the right-of-way over them to engines belonging to the home line. The committee said on this question:

"The committee recommends that yardmasters be enjoined to give the same supervision and consideration to foreign engines upon their tracks that they give to their own engines, and that reciprocal interchange arrangements be worked out between the local officials of these lines interested. The committee feels that the advantages which may be gained by reciprocal interchange are more than enough to warrant the effort required in this direction and that material economy could be effected in this way. The committee also feels in making these arrangements that the practice of making a charge for the time of engines at a rate per hour to be determined by the interested lines, covering all time that a foreign engine is held on the receiving line's tracks, or at the junction point, will work out fairly to all concerned, and should be used whenever possible."

It looks as if very substantial economies could be effected by the various roads putting into a pool enough engines to handle all the business, and having them operated by some central authority, with a view to having the light engine mileage kept down to the reasonable minimum. Some engine pools on a small scale have been formed by roads using the same yards. For instance, the Baltimore & Ohio, Pere Marquette, Chicago Great Western, and Baltimore & Ohio Chicago Terminal began on May 1 to handle business with pooled engines in the Empire Slip yard, and the same plan has been tried satisfactorily in some other joint yards.

The need for a more economical use of power in the Chicago district is recognized by everyone. That the measures necessary to secure it are not adopted is due mainly to the competitive rebalances and rivalries between the roads, which are the main obstacle in the way of many needed economies in Chicago terminal operation. Regarding the causes of the congestion last winter, the committee says:

Your committee's investigation as to the cause of the general congestion which existed around Chicago last winter developed that it was primarily due to shortage of power on western lines, arising from the severe weather conditions, and which resulted in their yards becoming filled up with out-bound cars, making it impossible for them to accept deliveries freely from connecting lines. This congestion reacted in that it caused such severe delays to power that it resulted in business being delayed which was destined to lines that were open. We found a large amount of additional power is being provided by most of the western lines. We found that a number of lines are providing additions to their yards, which should materially help the situation. The belt lines are providing new engines and additional yard facilities which will improve the situation so far as those lines are concerned."

Continuing, the committee said that "every effort should be made by all lines to provide power enough to keep their Chicago terminals open for the receipt and movement of business." This remark recalls the story of the young preacher who, at a revival meeting, prayed loudly, "O Lord, give us power! O Lord, give us power!" Whereupon an old deacon spoke up and said, "Young man, 'tain't power you need; it's 'idees.'" The failure of the railways to make the best practicable use of their power indicates that if they need more of it they need still worse to employ better "idees" in the use of it.

The committee added:

"The congestion last winter, undoubtedly, caused a good deal of freight to be moved via other than the Chicago gateway, and this is a condition which should not be, on account of the loss in revenue and the fact that all Chicago lines have spent a great deal of money on their main lines leading to and from Chicago to enable a large traffic to be handled. It is exceedingly regrettable that any of the benefit of this expenditure should be lost by reason of shortage of power to handle the business in and out of Chicago.

"Belt lines should, at all times, keep their lines open for the free movement of business which can be accepted by trunk lines. When they are not able to make all deliveries promptly to any line they should notify that line and all other lines, advising how many cars they will receive from each trunk line for the congested line each twenty-four hours, and delivering lines should arrange their deliveries accordingly.

"In the event of lines becoming congested which have large local industry business in Chicago, they should advise all lines whether they are in position to receive local business freely, and, if so, it should be switched out and delivered in preference.

"Much can be done in the way of relieving congestion if delivering lines will acquaint themselves with the conditions on congested lines, and do all in their power to help out the situation by making direct deliveries or using alternate belt lines. The loss of traffic caused by congestion reacts as strongly upon delivering lines as it does upon receiving lines, and it is to their interests to do whatever is necessary to move their traffic. At interchange points, lines which are open should not compel congested lines to resort to the practice of trading trains, and every line which is open should keep its receiving tracks clear at all times. A greater spirit of harmony should prevail in such matters.

"It is our opinion that the suggestions made above, if put into effect, would materially improve interchange conditions as they exist with the present facilities."

Another recommendation made is that through business be separated from local business.

"The enormous increase in traffic has overtaxed the facilities. While the railways have added to their facilities, these improvements have not equaled the development of the traffic. In fact, the rapid building up of the city has made it impracticable in many instances for railways to extend their present terminals. Facilities in the elevated sections of Chicago, which were formerly available for freight traffic, are now needed urgently to take care of the immensely increased passenger and local freight business.

"The necessity for relieving the downtown facilities of freight traffic is beyond dispute. Certain of the traffic, such as freight-house business and carload business for patrons located in the downtown district, must necessarily use these overtaxed terminals and no relief can be looked for from this direction. Relief, therefore, must come from the shifting of the interchange traffic.

"Statistics show that there are now being received in Chicago approximately 4,000,000 loaded cars a year, of which about 775,000 loads is business to points beyond Chicago. About an equal amount is interchange business destined to points within Chicago. It is apparent that relief from the crowded conditions in Chicago, not only now, but in the future, must be obtained by separating the interchange business moving through Chicago from the interchange business destined to local points within the city.

"It is our judgment that the inside yards of the city can now take care properly of not more than the interchange business destined to Chicago proper, and that such yards should not be burdened with the business moving to points beyond Chicago. We recommend that all lines having interchange freight to deliver make a separation of through and local business and that they make their deliveries to connecting lines through channels that will keep these two classes of business separate.

"We feel that the interchange facilities around Chicago are sufficient, if supplemented by proper outside terminal yards, to handle the business for years to come, but that it will be necessary to use all of the facilities that now exist in order to prevent congestions and delays to freight with their attendant prejudice against the Chicago gateway."

The greater part of the transfer of freight cars at Chicago between railways which do not connect directly with each other is performed by the Belt Railway, whose line extends from Cragin to South Chicago; the Indiana Harbor Belt, whose principal line extends from Franklin Park to the shore of Lake Michigan, near Clark Junction; and the Baltimore & Ohio Chicago Terminal (formerly the Chicago Terminal Transfer), which extends from Mayfair to Clark Junction. Each of these belt railways connects with all the trunk lines entering Chicago, and the belt lines themselves are connected with each other by the transfer and clearing yard of the Chicago Union Transfer. There is no doubt that a better distribution of interchange traffic between these belt lines would relieve the situation very materially. The Belt Railway has in the past handled a very much larger business in proportion to its mileage than the other two lines. It operates but 26 miles, while the Indiana Harbor Belt has 103 miles and the Baltimore & Ohio Chicago Terminal has 101 miles. Yet the number of cars handled by the Belt Railway has exceeded a million a year, while the number handled by the Indiana Harbor Belt has been only about 260,000, and the number handled by the Baltimore & Ohio Chicago Terminal only about 175,000. The Indiana Harbor Belt and the Baltimore & Ohio Chicago Terminal, which are outside belt lines, have had so little business in proportion to their mileage that they have not been able to earn their operating expenses and fixed charges. The same thing, as a matter of fact, has been true of the Belt Railway, but that has been due, not to lack of business, for it has handled a heavy business, but to the fact that its rates have been too low. The Belt Railway recently substantially increased its rates for handling both empty and loaded cars, but probably on the higher basis of rates it will not be able to earn as much as it should. The revenue the belt lines get for switching cars is derived, of course, from the

trunk lines for which they render the service, and, therefore, does not directly affect the public, but it does increase the expenses the railways have to pay for the services. There is no doubt that if all of the interchange traffic were routed according to the lines of least resistance the situation would be much improved. The main obstacle in the way of getting this done is that each of the belt lines is owned by certain railways and that these railways prefer to give their business to the belt lines in which they are interested. It is largely owing to this fact that the folly continues of sending through the congested business district of Chicago cars which could be more economically transferred via the outer belt lines which are not congested, but whose facilities for handling business greatly exceed the amount that they have to handle.

As an ideal solution of the Chicago terminal problem, W. H. Lyford, general counsel of the Chicago & Eastern Illinois, some time ago laid before the executive officers of many of the Chicago lines a plan for the consolidation of the Chicago belt railways, including the Belt Railway, the Indiana Harbor Belt, the Baltimore & Ohio Chicago Terminal and the Chicago Union Transfer Railway. If these four properties were consolidated they would constitute a four-track railway from a point on the shore of Lake Michigan near Clarke Junction, west to Blue Island; a double-track railway from Blue Island to Franklin Park, and a single-track railway thence to Mayfair; a double-track railway from South Chicago to Cragin; a double-track railway from Blue Island to the Union Stock Yards and Sixteenth street; a double-track line from Chappel to the Union Stock Yards; and the clearing yard of the Chicago Union Transfer Railway, consisting of a tract of land more than three miles long and a half mile wide, containing 95 miles of tracks, with sufficient room for the addition of 300 miles of additional tracks.

Mr. Lyford suggested that there should be formed an owning and operating company, using one of the existing belt companies for that purpose, or that a new company should be organized under the general railway law of Illinois, the stock of which should be owned in equal amounts by 25 or more roads entering Chicago. It was estimated that the amount of stock to be subscribed for by each should be \$100,000. The board of directors would consist of one nominee of each of the stockholding companies. The method proposed for acquiring the property was to ascertain the present value of all the properties with reference to the cost of reproducing them in their present condition and with due consideration to their earning capacity. From the valuation thus obtained would be deducted the present mortgage debts, subject to which the property would be acquired, and the amount produced by capitalizing the rentals, if any, which the company must assume. The remainder, which would represent the equity of the present stockholders, should be paid to them in the bonds of the new company. He suggested the following operating agreement:

That each of the roads in the company should have the right for 100 years to use jointly with the new company, and with the other roads, the entire property of the new company, such joint use to include the movement of trains and cars by the locomotives and crews of the various roads, but not to include the right to do switching on the common property.

That the new belt company agree to furnish engines and crews for the handling of all freight transfers between the trunk lines, and to and from industries on the lines of the belt company, except such transfers as the trunk lines might severally desire to handle with their own engines and crews.

That the property of the new company be divided into such sections as would make possible the equitable distribution to each section of the expenses of maintenance, operation, repairs, renewals, depreciation, interest, taxes and management expenses.

That the trunk lines agree to pay, monthly, their several proportions of the working expenses, these to be determined by the ratio which the number of cars moved by or for each party should bear to the total number of cars moved over the several sections into which the property was divided.

That the belt company should establish regular tariffs for the transfer of loaded and empty cars between railways, and to and from industries located on its lines, the tariff rates for movements between railways to be identical, and the rates for all transfers between any railway and any industry reached by the belt lines to be the same, so that all railways would have access to each industry at the same rate; such tariff rates to be adjusted from time to time and to be sufficient to cover all the working expenses of the belt railway, the reasonable cost of service rendered by the trunk lines' engine and train service, and reasonable dividends on its stock.

That all intermediate switching between industries be done by the belt railway at uniform tariff rates.

That there be established at least two general interchange yards, one at Clearing and another at or near Hammond, each of these yards to constitute a separate section of the common property, and the working expenses thereof to be divided between the belt line and the proprietary trunk lines severally in the proportion of the number of cars moved by their respective engines into and out of such central yard; all switching in each yard to be done by the belt line, and the cost thereof to be included in the working expenses of the yard.

During the past three years the number of industries on each of the belt lines has largely increased, but the exact number now located on them is not known. An investigation made for 1907 furnished the following approximate results:

	No. of industries.	Traffic carloads.	
		Inbound.	Outbound.
Belt Railway	88	201,147	180,863
Chicago Terminal Transfer....	183	128,159	100,988
Indiana Harbor Belt	91	108,639	117,989
Total	362	437,945	399,790
Grand total of loaded cars in and out.....		837,735	

The acquisition of the Chicago Terminal Transfer by the Baltimore & Ohio has perhaps put an additional obstacle in the way of the carrying out of such a plan as this, and with the competitive interests of so many trunk lines to deal with such a plan would be hard enough to carry out under the most favorable conditions. It is generally recognized, however, that the consolidation of the various important switching terminal facilities at St. Louis in the Terminal Railroad Association of St. Louis has rendered it practicable to handle terminal business there with an efficiency and economy that perhaps have not been attained elsewhere. That the Terminal Association of St. Louis has practically acquired all of the terminal facilities there has laid it open to attack by politicians and newspapers as a monopoly, and has made it impossible in recent years for it to get ordinances from the municipal assembly to enable it adequately to enlarge its facilities. It is argued that a corporation holding all the belt lines in Chicago would be practically immune from attacks of that sort, because the various belt lines and the Chicago Union Transfer now have practically all the land and franchises that the new company would need for many years to come.

While the project of a single terminal company appeals to some Chicago railway executives, others think that instead of all interchange business being handled by one company it should be divided up among a larger number, so that three or four western lines would interchange with three or four eastern lines. One prominent operating executive estimated to the *Railway Age Gazette* that the existing belt facilities are only about one-third of what is needed. He said there ought to be built a belt line entirely outside the city limits with six or eight tracks, and that it should be used entirely for the switching of line cars, that is, cars moving through the Chicago terminal district.

The solution of the terminal problem at Chicago is receiving serious consideration from all operating executives, and the fact is daily becoming more clearly recognized that the main prerequisite to a satisfactory solution of it is better co-operation between the numerous interested railways.

General News Section.

The Postmaster General has ordered a reduction in the compensation allowed Land Grant railways from \$15.10 for each ton carried in excess of 24 tons to \$15.39.

The Grand Trunk Railway of Canada has introduced telephones for train despatching between North Parkdale junction, Ontario, and Burlington junction, 145 miles, and also on another line in that region, 165 miles long.

Forest fires which developed about October 7 wiped out several towns on the Canadian Northern near Rainy River, Ont. The greatest loss was in Minnesota east of Rainy River. At last reports the fires were still burning in a region about 85 miles long and 35 miles wide. Estimates as to the loss of life run from 75 to 400 people. The railway seems to have been kept open.

The Grand Trunk Pacific announces that passenger trains will not be run over the section built by the government (and to be leased by the G. T. P.) between Winnipeg and Superior Junction until next summer. The roadbed is said to be not of the same high quality as that on the portion of the transcontinental line built by the company. On October 6 no freight trains had been put on this section despite the many announcements made by the government.

Employees of the Northern Railway of France struck early in the morning on October 11. The strike seems to have been general and to have resulted in a tie-up of the system. The government had made preparations to preserve order and troops were held in readiness to guard the tracks, if necessary. The chief demand of the men, which was refused, was that the minimum daily wage be \$1. Employees of the Paris, Lyons & Mediterranean have declared themselves ready to strike also, and it is possible that it will spread to the state railways.

Carlisle Military Academy at Arlington, Texas, has opened a Department of Railroad and Commerce, for the purpose of teaching young men how to do freight office work and then later to train them as accountants for the general office of a railway. The instructor in this department is James H. Alderman, formerly assistant general freight and passenger agent of the Mineral Wells Railway; and it is under the supervision of H. G. Askew, who is statistician of prominent Texas railways at Austin and also secretary of the Association of Texas Railway Accounting Officers.

Wm. J. Cunningham, statistician of the Boston & Albany, has been appointed assistant professor of transportation, Harvard University, and will hereafter devote his time to the railway work of Harvard's graduate school of business administration. The appointment is in line with the policy of the school, now entering upon its third year, to appoint to its staff men who have practical as well as theoretical knowledge of the subjects covered by their courses. Mr. Cunningham was born at St. John, N. B., April 29, 1875, and he has had 18 years railway experience. In August, 1892, he was appointed a ticket clerk and stenographer on the Canadian Pacific. In 1896 he entered the operating department of the Boston & Albany and the New York, New Haven & Hartford, and was employed in various capacities until August, 1901, when he became statistical clerk to the general superintendent of the Delaware, Lackawanna & Western. In November, 1907, he was appointed statistician, Boston & Albany, on the staff of the assistant general manager.

Several general officers of the Santa Fe, with office at Topeka, Kan., started on October 10 on a very interesting itinerary through that state. The party included J. R. Koontz, general freight agent; E. L. Copeland, secretary and treasurer; J. D. M. Hamilton, claims attorney; H. A. Tice, superintendent Western division; John Purcell, superintendent Topeka shops, and J. F. Jarrell, publicity agent; and the purpose of the trip is to enable the officers of the road to get better acquainted with the people and the people to get better acquainted with them and to give them an opportunity to discuss various questions of mutual interest. Mr. Koontz, speaking of the trip, said: "Many questions about rates, service, physical valuation and capitalization have been brought to the attention of the public, and unintentionally and sometimes unknowingly these railway subjects

have been handled in a manner calculated to prepare the public against the railways. It is believed that by getting closer together a better understanding can be reached. The railways need, in addition to traffic, the good will of the people. This can be brought about if we can meet face to face those whom we serve and talk our side and hear from our patrons their side."

The Pennsylvania Railroad Telegraph School at Bedford, Pa., reports that up to September first of this year it had had 243 pupils, of which number 151 were graduated and are now employed as telegraphers. The students are taught practical station work. There is in the school an automatic sending machine, with a transmitter that can be set at any speed. The school has a library and a miniature railway with a manual block signal system. The students are taught all the duties of station agents, and as telephones are now used in train despatching on the Pennsylvania a course in despatching by telephone has been introduced. A pamphlet has just been issued giving a brief description of the work done at the school, and in it the company states that all graduates are given positions on the Pennsylvania, with the assurance that if they are faithful they will have steady employment. The tuition is \$2 a month and board can be had at from \$3.50 to \$4 a week. Any young man between 17 and 25 years of age is eligible, if he has good eye-sight, good hearing, good health and a fair knowledge of English, mathematics and geography. The school is in session the year round and the hours are 8:30 a.m. to 4 p.m. and 7 to 8 p.m.

Damages Awarded to Government for Destruction of Young Forest Growth.

In an action for fire trespass on the Black Hills National Forest brought by the United States against the Missouri River & Northwestern, the jury has awarded damages to the government not only for the loss of merchantable timber, but also for the destruction of unmerchantable young growth. So far as is known, this is the first time that any court has recognized what foresters call the "expectation value" of young growth as furnishing a basis for the award of damages. The difficulty in the way of such an award in the past has been that there was no way to prove to the satisfaction of the courts the money value of the loss suffered. The award in the South Dakota case followed the presentation of evidence as to the cost of work in reforesting which the government is actually doing in the Black Hills. The amount claimed for the young growth burned was \$12 an acre, and the claim under this item was allowed in full by the jury. The total amount of damages claimed was \$3,729, of which \$2,634 was for merchantable timber destroyed or injured by the fire.

Single-Phase Traction in France.

The electrification of steam railways is being pursued with activity in France. One of the latest electrifications is that which the Midi Railway of France will make in connection with the Montrejeau-Pau portion of the Toulouse-Bayonne line. The portion to be electrified is about 70 miles long. The country is very hilly, making a number of steep grades. This is the largest scale upon which electrification has been attempted in France, and the results will be watched throughout Europe with no little interest. Later the work is to be extended to the entire Toulouse-Bayonne line, a distance of 200 miles.

The Midi Railway Company has ordered from the French Westinghouse Company, Havre, the equipments for 30 double-truck electric motor coaches for the passenger service and one electric locomotive for the freight service of this line. The locomotive and motor car equipments will be built at the Havre Works of the French Westinghouse Company, while the mechanical part of the locomotive will be built by the Italian Westinghouse Works. The design and construction is based on the results obtained in connection with the very successful electrification, by the Italian Westinghouse Company, of the Giovi tunnel section of the Italian State Railways, on the dense traffic line between Genoa and Milan.

The motor coaches have a seating capacity for about 50 passengers, and will be equipped with four 125-h.p. Westinghouse singlephase motors, 16½ cycles, 285 volts, and with Westinghouse multiple control. These motor coaches will haul trains weighing 100 metric tons—including the motor itself—at a speed of 45 miles per hour on level track. The weight of a motor coach in running order will be about 56 metric tons.

The Midi locomotive will be provided with five axles, three of which will be driven by the motors through jack shafts and connecting rods. It will be equipped with two 600-h.p. single-phase motors, will weigh 80 metric tons and haul trains weighing 400 metric tons, inclusive of the locomotive. With a haulage load of 280 metric tons, the speed will be 25 miles per hour, and with 100 metric tons about 38 miles per hour.

The current will be supplied to the motors by a 12,000-volt overhead catenary line. The pantograph type of trolley will be used.

Automobiles at Crossings.

In a case involving a fatal accident to an automobile at a grade crossing the United States Circuit Court of Appeals (New York Central v. Maidment) has held that the rule requiring persons to stop, to look and listen before crossing the tracks is more imperative in the case of automobiles than horse-drawn vehicles. Collisions of trains with automobiles involve greater peril to the general public. Moreover, the automobilist can run his machine close to the track and there stop to look in each direction for trains; while if the driver of horses does that he risks the danger of accident from frightened horses.

In another case it is held that a person riding in an automobile by invitation and occupying a front seat, who, without protest, permits the driver to go upon the crossing without the prescribed care, "is also chargeable with contributory negligence and cannot recover." But a woman riding on the back seat, with two persons in front of her, was held not to be chargeable with negligence. * * *—*Pittsburgh Dispatch*.

Illinois Central Car Repair Fraud Case.

E. N. Harding, an expert accountant, in testifying in the Illinois Central car repair fraud case at Chicago, estimated that the road had been defrauded out of almost \$2,000,000 in connection with the repair of its cars. He showed that 18,016 bad order cars had been repaired by the various companies which are charged with having defrauded the Illinois Central, and estimated that the excess charges per car averaged about \$100, except in the case of those repaired by the Ostermann Manufacturing Company, where the excess charges averaged \$129 a car. The testimony developed that in some cases the Ostermann Manufacturing Company had actually charged the Illinois Central for putting pine roofs on coal cars. G. W. Oakes, a car inspector for the Illinois Central, testified that on one occasion when he had been checking over the car repair bills from the Ostermann company he protested against certain overcharges and took the matter up with Joseph E. Buker. The result was that he was told that no change in the charges would be made.

The Northwestern's New Method of Fighting Forest Fires.

Every fall there are numerous destructive fires in the forests of the Northwest. The indications are that these fires will be of unusual number and destructiveness this year, because it was so dry in the months of June, July and August. For the better protection of its own property, as well as that of persons living adjacent to its lines, the Chicago & North Western has adopted on its Adirondack division the use of a rather novel emergency fire fighting equipment, which has been described by the state fire inspector of Wisconsin as "A most interesting development in railway fire protection and one to be most highly recommended."

The equipment consists of three tank cars and a steam pump, with an ample supply of 2½ in. fire hose. The tank cars have a capacity of 71,000 gal. They are connected by 3-in. hose and stand ready filled to be hurried to any point on the division. An engine stands in the roundhouse fired up and ready to couple on to the equipment, and besides furnishing motive power for pulling the tank cars it supplies steam to operate the pump. A suction hose forms part of the equipment, so that water may be taken from any river, pond or tank.

The apparatus was tested recently for the Wisconsin state fire department, and the test is reported by the state fire inspector as being very successful. At 85 lbs. water pressure, an effective fire stream was thrown 100 ft. with such force as to require the best efforts of two men to control the nozzle.

Good Roads.

Wagon road transportation is now the least economically efficient form of transportation that we have. Figures compiled by the Office of Public Roads show that the cost of carrying one ton one mile on the country roads of the United States, good and bad, averages from 19 cents to 27 cents, while for the bad roads alone the average is probably something over 30 cents per ton per mile. * * * * * How it affects the marketing of specific crops may be illustrated by stating some figures compiled by the Office of Public Roads based on the crop year 1905 and 1906. These figures show that the average length of haul of the wheat crop of that year over the wagon roads was 9.4 miles, and that the average cost per ton per mile was 19 cents. The average length of haul of the corn crop of that year was 7.4 miles, and the average cost per ton per mile was 19 cents. The average length of haul of the cotton crop of that year was 11.8 miles and the average cost per ton per mile was 27 cents. It is estimated that the average cost per ton per mile of hauling each of these three crops to a market town or shipping station over good hard roads would have been 10 cents, and that good roads would have meant a saving of \$10,256,058 in the cost of marketing the wheat crop of that year; \$12,709,278 in the cost of marketing the corn crop of that year, and \$5,076,183 in the cost of marketing the cotton crop of that year.—*W. W. Finley*.

Illinois Roads and the University of Illinois.

Dr. W. F. M. Goss, dean of the engineering department of the University of Illinois, was the guest of honor at a luncheon given by F. A. Delano, president of the Wabash, at the Union League Club in Chicago on October 7. Mr. Delano invited officers of all the other Illinois lines to attend the luncheon, its object being to discuss what measures should be adopted to make the railway courses at the University of Illinois more practical and beneficial both to the roads and the university. Among those who attended were H. U. Mudge, president Rock Island Lines; W. A. Gardner, vice-president Chicago & North Western; Fairfax Harrison, president Monon; W. L. Park, vice-president Illinois Central; S. M. Felton, president Chicago Great Western; E. D. Sewall, assistant to the president, St. Paul; F. E. Ward, general manager Burlington; W. J. Jackson, vice-president and general manager Chicago & Eastern Illinois; C. E. Schaff, vice-president New York Central Lines; A. F. Banks, president Chicago, Lake Shore & Eastern, and Professors Schmidt and Abbott, of Dr. Goss's department. The result of the meeting was that Mr. Park tendered a special train for the purpose of taking officers of the Illinois lines to Urbana, where they will have a chance to investigate at first hand the kind of work that the University is doing. The train will leave Chicago on Wednesday, November 9, at 8:30 a. m., and each of the Illinois lines will be asked to send three or four of its officers. The end sought has been well stated to be the better co-ordination of the work at the University with the needs of the railways.

The North & South Railroad.

Messrs. Boog-Scott and W. H. Stephens, of Coleman, were at Albany, Tex., yesterday to meet Capt. Steber, chief engineer of North & South Railroad. Messrs. Boog-Scott and Stephens are at the head of this enterprise and have made a trip over the line from Coleman to Albany, as surveyed. They found everything most encouraging and one of the best routes in the state, traversing an undeveloped country, which only needs a railway to place it in farms. The engineers are now at Fort Griffin, 16 miles north of Albany, and are going up the Clear Fork to the mouth of Tecumseh creek, where there is a fine outlet across the Clear fork of the Brazos river. They expect to reach Throckmorton in a few days and from there they go to Seymour.

The foregoing is from the *Dallas News*. Car accountants, A. R. A. committees and others who operate the hypothetical "North & South R. R." should take notice. If they continue to make unauthorized use of that name they may have Colonel Boog-Scott after them.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION—F. M. Nellis, 53 State St., Boston, Mass.
AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS—A. C. Thompson, Scranton, Pa.; next meeting, June 22, 1911, Niagara Falls, N. Y.
AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS—C. M. Huff, Boston, Mass.; next meeting, St. Paul, Minn.
AMERICAN ASS'N OF LOCAL FREIGHT AGENTS' ASS'N—G. W. Dennison, Penn. Co., Toledo, Ohio.
AMERICAN ASS'N OF RAILROAD SUPERINTENDENTS—O. G. Fetter, Carew Bldg., Cincinnati, Ohio.
AMERICAN RAILWAY ASSOCIATION—W. F. Allen, 24 Park Place, New York; semi-annual, Nov. 16, St. Louis, Mo.
AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION—C. A. Lichty, C. & N. W., Chicago; Oct. 18-20, Denver, Colo.
AMERICAN RAILWAY ENGINEERING AND MAINT. OF WAY ASS'N—E. H. Fritch, Monmouth Bldg., Chicago; March 21-23, 1911, Chicago.
AMERICAN RAILWAY INDUSTRIAL ASSOCIATION—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; May 6, 1911, Detroit, Mich.
AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION—J. W. Taylor, Old Colony Building, Chicago.
AM. RAILWAY TOOL FOREMEN'S ASS'N—O. T. Harwood, Bloomington, Ill.
AM. SOC. FOR TESTING MATERIALS—Prof. E. Marburg, Univ. of Penn., Phila.
AM. SOC. OF CIVIL ENGS.—C. W. Hunt, 230 W. 57th St., N. Y.; 1st and 2d Wed., except July and Aug.; annual, Jan. 18-19, New York.
AM. SOCIETY OF ENGINEERING CONTRACTORS—D. J. Haner, 13 Park Row, New York.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Calvin W. Rice, 29 W. 29th St., New York; annual, Dec. 6-9, New York.
AMERICAN STREET AND INTERURBAN RAILWAY ASS'N—H. C. Donecker, 29 W. 59th St., New York; Oct. 10-14, Atlantic City.
ASSOCIATION OF R. Y. ACCOUNTING OFFICERS—C. G. Phillips, 143 Dearborn St., Chicago; April 26, 1911; New Orleans, La.
ASSOCIATION OF RAILWAY CLAIM AGENTS—J. R. McSherry, C. & E. I., Chicago; May, 1911; Montreal, Can.
ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS—G. B. Colegrove, I. C. R.R., Chicago.
ASSOCIATION OF RAILROAD TELEGRAPH SUPERINTENDENTS—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston.
ASS. OF TRANS. AND CAR ACC. OFFICERS—G. P. Conard, 24 Park Place, N. Y.; Dec. 13-14, Chicago; June 20-21, 1911, Cape May City, N. J.
CANADIAN RAILWAY CLUB—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
CANADIAN SOCIETY OF CIVIL ENGS.—Clément H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays; Montreal; annual, last week January.
CAR FOREMEN'S ASSOCIATION OF CHICAGO—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month; Chicago.
CENTRAL RAILWAY CLUB—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
ENGINEERS' SOCIETY OF PENN.—E. J. Dasher, Box 704, Harrisburg, Pa.
ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA—E. K. Hiles, 803 Fulton Bldg., Pittsburgh; 1st and 3d Tues.; annual, Jan. 17, 1911, Pittsburgh.
FREIGHT CLAIM ASSOCIATION—Warren P. Taylor, Rich., Fred. & Pot. R.R., Richmond, Va.; 20th annual, June 21, 1911; St. Paul, Minn.
GENERAL SUPERINTENDENTS' ASS'N OF CHICAGO—H. D. Judson, 209 Adams St., Chicago; Wednesday preceding 3d Thursday; Chicago.
INDIANAPOLIS RY. AND MECH. CLUB—B. S. Downey, C. & H. D., Indianapolis, Ind.
INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION—Harry D. Vought, 95 Liberty St., New York; next convention, Omaha, Neb.
INTERNAT'L RY. FUEL ASS'N—D. B. Sebastian, La Salle St. Station, Chicago; May 15-18; Chattanooga, Tenn.
INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION—L. H. Bryan, D. & L. Ry., New York Harbor, Minn.
INT. RY. MASTER BRICKSMITHS' ASS'N—A. L. Woodward, Lima, Ohio.
INTERNATIONAL RAILWAY CONGRESS—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.
IOWA RAILWAY CLUB—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
MASTER CAR BUILDERS' ASS'N—J. W. Taylor, Old Colony Bldg., Chicago.
MASTER CAR AND LOCOMOTIVE BUILDER'S ASS'N OF U. S. AND CANADA—A. P. Dane, R. & M., Reading, Mass.
NEW ENGLAND RAILROAD CLUB—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, ex. June, July, Aug. and Sept.; Boston.
NEW YORK RAILROAD CLUB—H. D. Vought, 95 Liberty St., New York; 2d Friday in month, except June, July and August; New York.
NORTH-WEST RAILWAY CLUB—W. W. Logan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
NORTHERN RAILWAY CLUB—L. K. Kennedy, C. M. & St. P., Duluth; 4th Saturday; annual, Nov. 26; Duluth, Minn.
OMAHA RAILWAY CLUB—A. H. Christiansen, Barker Bldg.; Second Wed.
RAILWAY CLUB OF KANSAS CITY—C. Manlove, 1008 Walnut St., Kansas City; 3d Friday in month; Kansas City.
RAILWAY CLUB OF PITTSBURGH—D. D. Coffey, Pittsburgh, Pa., 4th Friday in month, except June, July and August; Pittsburgh.
RAILWAY SIGNAL ASSOCIATION—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.
RAILWAY SKEEPERS' ASS'N—J. P. Murphy, Box C, Collinwood, O.; annual, May, 1911.
RICHMOND RAILROAD CLUB—F. O. Robinson; 2d Monday; Richmond.
ROADMASTERS' ASS'N OF MAINTENANCE OF WAY ASS'N—Walter E. Emery, F. & P. O. Ry., Peoria, Ill.; Oct., 1911; St. Louis.
ST. LOUIS RAILWAY CLUB—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
SOCIETY OF RAILWAY FINANCIAL OFFICERS—C. Nyquist, La Salle St. Station, Chicago; Oct. 25 and 26; Hotel Chamberlin, Old Point Comfort, Va.
SOUTHERN ASSOCIATION OF RAILWAY SERVICE OFFICERS—E. W. Sandwich, A. & W. R. Ry., Montgomery, Ala.; annual, Oct. 20; Atlanta.
SOUTHERN & SOUTHWESTERN R.R. CLUB—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., Mar., July, Sept. and Nov.; Atlanta.
TOLEDO TRANSPORTATION CLUB—L. G. Macomber, Woolson Spice Co., Toledo; 1st Sat.; annual, May 6, 1911; Toledo.
TRANSPORTATION CLUB OF BUFFALO—J. M. Sells, Buffalo; 1st Sat. after 1st Wed.; annual, Dec. 12; Buffalo.
TRAFFIC CLUB OF NEW YORK—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.
TRAFFIC CLUB OF PITTSBURGH—T. S. Walters, Oliver Building, Pittsburgh; meetings monthly, Pittsburgh.
TRAIN DESPATCHERS' ASS'N OF AMERICA—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 20, 1911; Baltimore.
TRAVELING ENGINEERS' ASSOCIATION—W. O. Thompson, N. Y. C. & H. R., East Buffalo.
WESTERN CANADA RAILWAY CLUB—W. H. Rosevear, P. O. Box 1707, Winnipeg; 2d Monday, except June, July and August; Winnipeg.

Traffic News.

At Birmingham, Ala., last week, James W. Hendricks was appointed on the charge of fraudulent use of the mails in sending false bills of lading of cotton.

The freight traffic departments of the Erie and the Delaware steamship companies have been consolidated and J. B. Denness, traffic manager, pier 36 N. E., New York, is at the head of both. The assistant traffic manager is H. E. Maynard.

It is announced in Mobile, Ala., that the banks of that city will guarantee bills of lading for shipments of cotton, thus meeting the objections of the English bankers to the customs heretofore in vogue which have impaired confidence in cotton bills.

The New York Public Service Commission, First district, has reported to the Board of Estimate, of New York City, that there have been 100 dismissals and resignations from its service since June 1, and that the request made by the Board of Estimate for a 1911 budget 10 per cent. under that of 1910 would be complied with.

To accommodate the traffic in dressed meats, provisions and other perishable freight, the Pennsylvania Railroad has established in New York harbor a refrigerator barge service. For much of this traffic it is impracticable to make delivery in the original car, because most of the steamships have no rail connections at their piers, and freight must be delivered by floats.

The Interstate Commerce Commission has announced that at the hearing on western freight rate advances, which is to be resumed at Chicago on October 25, shippers will be heard first and then the railways will be required to justify the specific advances proposed. The roads had heretofore proceeded on the theory that they would be required only to show that they needed more revenue.

The Merchants' Association of New York has been requested by some of its members to investigate the dispute between the railways and shippers as to whether the market value of goods lost or damaged in transit at point of shipment or point of delivery. The railways claim that the market price at the point of shipment should regulate the settlement of damage, and this contention would seem to be upheld by the wording of the uniform bill of lading now in use, but the commission merchants question the legality of the phrasing of the uniform bill of lading.

The Chicago Board of Trade has filed a complaint with the Interstate Commerce Commission about the new transit rules which have been adopted by the railways at Chicago. One of the rules objected to is that which limits the time during which grain can be held at Chicago under the transit rate to six months, or 30 days in case a rate is advanced meantime. The Chicago Board of Trade men want to be allowed to hold the grain nine months. Another rule objected to is that which imposes a charge of 10 cents a car for recording all grain shipped. It is asserted that not more than one-third of the grain is shipped on transit rates. The commission is asked to suspend the rules and make a thorough investigation of their reasonableness.

The Chicago Board of Trade, by its manager of transportation, W. M. Hopkins, has filed a complaint with the Interstate Commerce Commission regarding the so-called "ex-lake" grain rates east of Buffalo. The rates are declared unreasonably high in themselves, and it is also charged that the railways are applying a higher rate than is just for the haul from Buffalo east when the grain moves into Buffalo by water as compared with the proportional rate charged when the grain moves into Buffalo by rail. This, it is charged, is done to give the railways a monopoly of the traffic by equalizing the rail-and-water and the all-rail rates from Chicago to the seaboard. It is understood that similar complaints will be filed by the grain interests of Duluth, Milwaukee and Buffalo. The complaint of the Chicago Board of Trade was filed after about two years' negotiations to secure a readjustment of the rates. It is charged that the railways are able to make the lake rates high compared with the rail rates, owing to their control of most of the lake lines carrying grain. It is intimated that the government may be asked to proceed against the railways for having acquired control of the lake lines upon the ground that this is in violation of the Sherman anti-trust law.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 79-A, giving a summary of car shortages

were decreases in surplus in all territories, with the exception of group 1 (New England), which shows a slight increase. Attention is called to the fact that the increases in shortage occur in all portions of the country."

CAR SURPLUSES AND SHORTAGES.

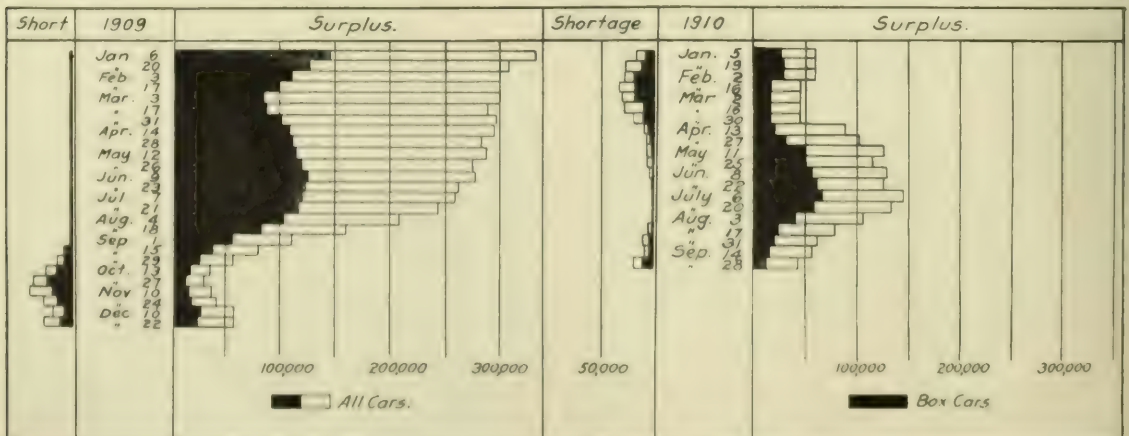
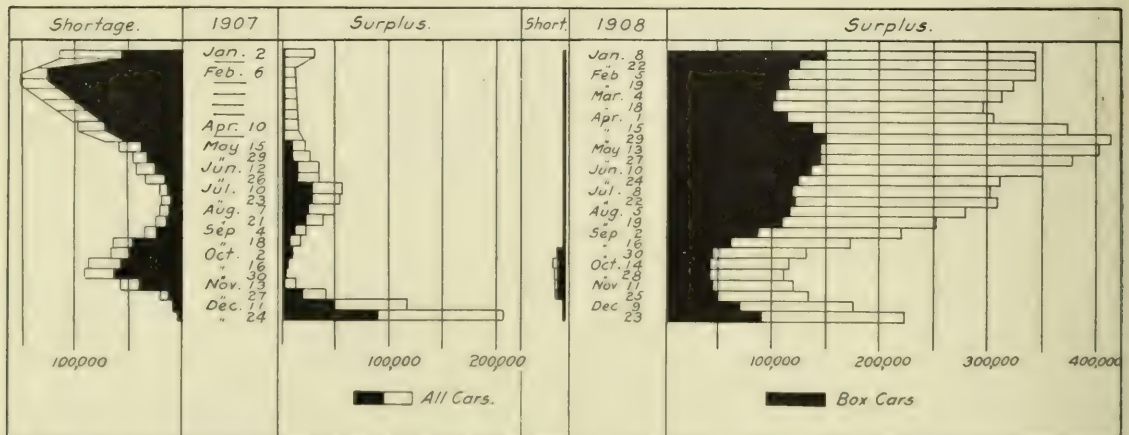
Date.	No. of roads.	Surpluses					Shortages				
		Box.	Flat. gondola.	and hopper.	Other kinds.	Total.	Box.	Flat. gondola.	and hopper.	Other kinds.	Total.
Group 1. September 28, 1910.	8	14	355	335	412	1,019	551	88	260	0	\$99
" 2 " 28, 1910.	28	1,700	143	1,681	7,482	11,006	459	0	612	117	1,188
" 4 " 28, 1910.	22	2,313	387	413	2,300	5,503	4	180	742	112	1,035
" 5 " 28, 1910.	10	80	0	315	399	794	2,173	541	1,675	500	4,889
" 6 " 28, 1910.	14	0	95	175	623	893	614	268	1,247	175	2,304
" 7 " 28, 1910.	21	5,336	536	1,999	1,702	9,973	409	9	203	13	634
" 8 " 28, 1910.	2	51	21	0	0	72	0	0	155	141	296
" 9 " 28, 1910.	13	579	10	1,060	1,422	3,071	1,052	114	17	7	1,190
" 10 " 28, 1910.	8	456	230	223	568	1,477	448	213	0	62	723
" 11 " 28, 1910.	20	1,008	463	1,744	3,744	6,940	2,011	215	133	208	2,567
" 11 " 28, 1910.	5	207	1,151	45	318	1,721	1,944	42	0	227	2,213
Total	143	12,144	3,394	7,871	19,060	42,469	9,665	1,670	5,044	1,562	17,941

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia, and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.

and surpluses by groups from May 26, 1909, to September 28, 1910, says:

"The surplus reported totals 42,469 cars, a decrease of 12,421. The shortage totals 17,941 cars, an increase of 10,127. There

The accompanying table gives surpluses and shortages by groups for the last period covered by the report, and the charts show total surpluses and shortages bi-weekly in 1907, 1908, 1909 and 1910.



Car Surpluses and Shortages in 1907, 1908, 1909 and 1910.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF AUGUST, 1910.
(See also issue of October 7.)

Name of road.	Mileage operated.	Operating revenues.			Total.		Operating expenses.		General.	Total.	Net operating revenues.	Outside operations.	Increase (or decrease) last year.
		Freight.	Passenger.	Inc. misc.	Way and equipment.	Maintenance of equipment.	Traffic.	Trans-shipment.					
Atchafalaya, Topsham & Santa Fe.....	7,434*	\$5,101,241	\$1,001,794	\$7,000,132	\$1,002,350	\$1,002,350	\$1,002,350	\$1,002,350	\$1,001,691	\$1,001,691	\$1,001,691	\$1,001,691	\$1,001,691
Atlantic Coast Line.....	4,491	1,843,940	583,826	2,069,749	177,843	177,843	177,843	177,843	177,843	177,843	177,843	177,843	177,843
Boston & Maine.....	1,147	99,000	17,500	116,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500
Central of Georgia.....	915	2,750,000	175,826	2,925,826	175,826	175,826	175,826	175,826	175,826	175,826	175,826	175,826	175,826
Central of Massachusetts.....	673	1,478,750	484,500	2,060,000	217,303	217,303	217,303	217,303	217,303	217,303	217,303	217,303	217,303
Chesapeake & Ohio.....	1,940	2,187,816	476,315	2,707,816	187,808	187,808	187,808	187,808	187,808	187,808	187,808	187,808	187,808
Chicago & Eastern Illinois.....	9,024	5,418,831	2,091,885	8,066,988	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458
Chicago, Burlington & Quincy.....	9,024	5,324,551	2,091,885	8,066,988	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458
Chicago Great Western.....	7,511	4,000,000	1,000,000	5,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Chicago, Milwaukee & St. Paul.....	7,511	4,000,000	1,000,000	5,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Cleveland, Cincinnati, Chicago & St. Louis.....	7,395	3,319,904	1,001,415	6,814,023	1,017,805	1,017,805	1,017,805	1,017,805	1,017,805	1,017,805	1,017,805	1,017,805	1,017,805
Cleveland, Rock Island & Pacific.....	1,982	1,756,663	854,767	2,814,753	411,366	411,366	411,366	411,366	411,366	411,366	411,366	411,366	411,366
Delaware & Hudson Co.....	8,819	1,427,105	1,000,000	1,895,000	186,995	186,995	186,995	186,995	186,995	186,995	186,995	186,995	186,995
Denver & Rio Grande.....	2,353	1,325,728	200,303	3,000,431	300,545	300,545	300,545	300,545	300,545	300,545	300,545	300,545	300,545
Great Northern.....	1,518	4,213,400	1,000,000	5,213,400	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Guif. Colorado & Pacific.....	1,663	2,003,827	1,206,242	3,209,242	1,206,242	1,206,242	1,206,242	1,206,242	1,206,242	1,206,242	1,206,242	1,206,242	1,206,242
Lake Shore & Michigan Southern.....	4,306*	3,320,242	1,071,318	4,391,560	439,156	439,156	439,156	439,156	439,156	439,156	439,156	439,156	439,156
Michigan Central.....	1,731	1,073,629	865,124	2,066,402	438,307	438,307	438,307	438,307	438,307	438,307	438,307	438,307	438,307
Missouri, Kansas & Texas.....	1,348	431,769	330,338	898,517	114,401	114,401	114,401	114,401	114,401	114,401	114,401	114,401	114,401
Mobile & Ohio.....	3,587	4,846,127	3,829,411	9,034,378	1,309,881	1,309,881	1,309,881	1,309,881	1,309,881	1,309,881	1,309,881	1,309,881	1,309,881
New York Central & Hudson River.....	5,546	6,111,968	1,817,978	8,257,741	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448
New York, Ontario & Western.....	5,546	6,111,968	1,817,978	8,257,741	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448
Northern Pacific.....	5,814*	4,024,447	1,824,225	6,257,741	1,094,899	1,094,899	1,094,899	1,094,899	1,094,899	1,094,899	1,094,899	1,094,899	1,094,899
Oregon R. R. & Navigation Co.....	1,490*	926,700	416,401	1,418,056	188,830	188,830	188,830	188,830	188,830	188,830	188,830	188,830	188,830
Oregon Short Line.....	1,394*	1,293,012	409,106	1,906,000	389,919	389,919	389,919	389,919	389,919	389,919	389,919	389,919	389,919
Philadelphia & Reading.....	1,723	400,565	124,648	610,194	107,320	107,320	107,320	107,320	107,320	107,320	107,320	107,320	107,320
St. Louis Southwestern of Texas.....	7,052	3,053,815	1,605,736	5,034,456	853,373	853,373	853,373	853,373	853,373	853,373	853,373	853,373	853,373
Southern Pacific Co.....	6,408*	4,823,421	2,043,212	8,308,941	1,042,869	1,042,869	1,042,869	1,042,869	1,042,869	1,042,869	1,042,869	1,042,869	1,042,869
Texas & Pacific.....	2,315	1,753,156	367,310	2,293,383	206,946	206,946	206,946	206,946	206,946	206,946	206,946	206,946	206,946
Wabash.....	2,315	1,753,156	367,310	2,293,383	206,946	206,946	206,946	206,946	206,946	206,946	206,946	206,946	206,946
Atchafalaya, Topsham & Santa Fe.....	7,434*	\$3,323,672	\$3,859,208	\$14,279,401	\$2,051,243	\$2,051,243	\$2,051,243	\$2,051,243	\$2,051,243	\$2,051,243	\$2,051,243	\$2,051,243	\$2,051,243
Atlantic Coast Line.....	4,491	2,768,733	1,147,550	3,916,283	1,077,780	1,077,780	1,077,780	1,077,780	1,077,780	1,077,780	1,077,780	1,077,780	1,077,780
Boston & Maine.....	1,147	99,000	17,500	116,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500	17,500
Central of Georgia.....	915	2,750,000	175,826	2,925,826	175,826	175,826	175,826	175,826	175,826	175,826	175,826	175,826	175,826
Central of Massachusetts.....	673	1,478,750	484,500	2,060,000	217,303	217,303	217,303	217,303	217,303	217,303	217,303	217,303	217,303
Chesapeake & Ohio.....	1,940	2,187,816	476,315	2,707,816	187,808	187,808	187,808	187,808	187,808	187,808	187,808	187,808	187,808
Chicago & Eastern Illinois.....	9,024	5,418,831	2,091,885	8,066,988	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458
Chicago, Burlington & Quincy.....	9,024	5,324,551	2,091,885	8,066,988	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458	1,475,458
Chicago Great Western.....	7,511	4,000,000	1,000,000	5,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Chicago, Milwaukee & St. Paul.....	7,511	4,000,000	1,000,000	5,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Cleveland, Cincinnati, Chicago & St. Louis.....	7,395	3,319,904	1,001,415	6,814,023	1,017,805	1,017,805	1,017,805	1,017,805	1,017,805	1,017,805	1,017,805	1,017,805	1,017,805
Cleveland, Rock Island & Pacific.....	1,982	1,756,663	854,767	2,814,753	411,366	411,366	411,366	411,366	411,366	411,366	411,366	411,366	411,366
Delaware & Hudson Co.....	8,819	1,427,105	1,000,000	1,895,000	186,995	186,995	186,995	186,995	186,995	186,995	186,995	186,995	186,995
Denver & Rio Grande.....	2,353	1,325,728	200,303	3,000,431	300,545	300,545	300,545	300,545	300,545	300,545	300,545	300,545	300,545
Great Northern.....	1,518	4,213,400	1,000,000	5,213,400	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Guif. Colorado & Pacific.....	1,663	2,003,827	1,206,242	3,209,242	1,206,242	1,206,242	1,206,242	1,206,242	1,206,242	1,206,242	1,206,242	1,206,242	1,206,242
Lake Shore & Michigan Southern.....	4,306*	3,320,242	1,071,318	4,391,560	439,156	439,156	439,156	439,156	439,156	439,156	439,156	439,156	439,156
Michigan Central.....	1,731	1,073,629	865,124	2,066,402	438,307	438,307	438,307	438,307	438,307	438,307	438,307	438,307	438,307
Missouri, Kansas & Texas.....	1,348	431,769	330,338	898,517	114,401	114,401	114,401	114,401	114,401	114,401	114,401	114,401	114,401
Mobile & Ohio.....	3,587	4,846,127	3,829,411	9,034,378	1,309,881	1,309,881	1,309,881	1,309,881	1,309,881	1,309,881	1,309,881	1,309,881	1,309,881
New York Central & Hudson River.....	5,546	6,111,968	1,817,978	8,257,741	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448
New York, Ontario & Western.....	5,546	6,111,968	1,817,978	8,257,741	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448	1,214,448
Northern Pacific.....	5,814*	4,024,447	1,824,225	6,257,741	1,094,899	1,094,899	1,094,899	1,094,899	1,094,899	1,094,899	1,094,899	1,094,899	1,094,899
Oregon R. R. & Navigation Co.....	1,490*	926,700	416,401	1,418,056	188,830	188,830	188,830	188,830	188,830	188,830	188,830	188,830	188,830
Oregon Short Line.....	1,394*	1,293,012	409,106	1,906,000	389,919	389,919	389,919	389,919	389,919	389,919	389,919	389,919	389,919
Philadelphia & Reading.....	1,723	400,565	124,648	610,194	107,320	107,320	107,320	107,320	107,320	107,320	107,320	107,320	107,320
St. Louis Southwestern of Texas.....	7,052	3,053,815	1,605,736	5,034,456	853,373	853,373	853,373	853,373	853,373	853,373	853,373	853,373	853,373
Southern Pacific Co.....	6,408*	4,823,421	2,043,212	8,308,941	1,042,869	1,042,869	1,042,869	1,042,869	1,042,869	1,042,869	1,042,869	1,042,869	1,042,869
Texas & Pacific.....	2,315	1,753,156	367,310	2,293,383	206,946	206,946	206,946	206,946	206,946	206,946	206,946	206,946	206,946
Wabash.....	2,315	1,753,156	367,310	2,293,383	206,946	206,946	206,946	206,946	206,946	206,946	206,946	206,946	206,946

Mileage operated on August 31, 1909: * 7,468 miles; † 1,400 miles; ‡ 1,511 miles; § 1,498 miles; ¶ 5,692 miles; † 1,437 miles; ‡ 1,408 miles; § 6,642 miles. — Indicates Deficits, Losses and De-

creases.

Freight Car Balance and Performance.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 82, covering car balance and performance for June, 1910, says:

"Although the car situation reports (Bulletins Nos. 73 and 73-A) shows that there was more idle equipment in June than in May, the performance figures, as well as the Interstate Commerce Commission reports of freight earnings, show increases in tonnage and earnings per car as well as gross earnings per mile of road. This would seem to be explained by the improvement in the performance of the cars in service, as reflected in the averages shown in this bulletin.

"The tonnage per loaded car increased to 21.7, the loaded mileage averaged 68.4 per cent. and the miles per car per day 24.5. The ton miles per car per day increased from 349 in May to 362 in June. Earnings per freight car show a corresponding increase, averaging \$2.40 per day as against \$2.34 in May. Cars in shop increased from 5.99 per cent. to 6.63 per cent.

"The car balance figures denote a continuation of the home-ward movement, and the cars on their owners' lines increased to 62 per cent. compared with 58 per cent. in May. The number of cars in service in the various groups in excess of ownership is materially decreased."

The accompanying table gives car balance and performance in June.

Railways and Water Terminals.

President Delano, of the Wabash, gave the following statement to the press last week:

"The recent report of Herbert Knox Smith, commissioner of corporations, on 'Water Terminals,' has caused a good deal of criticism of the railways in the press which I believe is unfair. The report is a fine piece of thorough investigation; but some of its statements give the impression that Mr. Smith thinks the railways have been at fault in getting so much water frontage in cities. Most of the railways were built into our cities when the cities were much smaller than they are now. They naturally extended their lines to those parts of the city where they could conveniently deliver traffic to, and receive it from, both the boats and the local industries, which latter were mainly on the water front. Is it fair to blame the railways for having been enterprising enough to extend their tracks to places where they could get traffic? Much of the water frontage owned by the railways was comparatively valueless when acquired. The boat lines could have acquired it just as easily as the railways. It has been greatly increased in value by the city's growing out along the railways' tracks. Do the railways deserve reprobation for having kept it and acquired more as they needed it? In retaining it and using it for the purposes which make it most valuable to them, they have done merely what other business concerns have done with water frontage property. If the public desires to acquire the land for wharfs in the usual way it can do so. As long as it does not take the proper steps to acquire it, public officers and the press hardly can blame the railways for keeping and using it.

"Mr. Smith says: 'There is a surprising lack of co-ordination between rail lines and water lines for water traffic * * * Often, indeed, rail lines are a positive obstacle to the handling of water traffic instead of a benefit.' The water lines are competitors of the rail lines. These statements illustrate the fact that, while the government itself subsidizes water transportation in order to enable it to compete effectively with rail transportation, it is not considered right for the railways to use effective methods in competing with the water lines. In this connection it should not be overlooked that practically all the important boat lines on the great lakes, which handle most of the inland water traffic of the country, are owned either by railways or by large industrial corporations. For a railway to give the use of its facilities to water lines owned by its rail way competitors would be simply to give their use to its railway competitors themselves. As to the lake lines owned by industrial corporations, they are not common carriers, but private carriers; they handle traffic only for their owners, and so long as they are not common carriers, serving the public, the railways cannot be blamed if they do not treat them as such. As a matter of fact, however, even private water carriers are

CAR BALANCE AND PERFORMANCE IN JUNE, 1910.														
	New England.	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Pa., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Ill., Wis., Minn.	Mont., Wyo., Dakotas.	Kan., Colo., Mo., Ark.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.		
Revenue freight cars owned	51,431	688,165	210,649	172,840	173,208	372,368	17,113	114,881	28,090	130,819	102,393	2,051,987		
Average number of system cars on line	25,625	416,628	134,239	98,464	96,628	273,963	5,854	70,715	17,129	61,369	71,048	1,371,692		
Railway-owned cars	22,604	292,247	99,421	55,175	43,260	116,766	11,748	46,050	18,633	51,709	26,541	751,517		
Total cars on line	48,229	678,875	229,660	153,639	144,888	390,729	17,632	116,765	35,762	113,078	97,592	2,023,309		
Excess	1,458	32,542	9,984	3,578	84	105	1,288	7,026	2,470	10,680	2,444	97,306		
Per cent. of cars on line to total owned:														
Home	50	61	64	57	56	74	34	62	61	51	69	62		
Foreign	44	38	44	32	28	31	69	39	66	43	26	37		
All railways	94	99	108	89	84	105	103	101	125	94	95	99		
Private cars on line	1,458	32,542	9,984	3,578	84	105	1,288	7,026	2,470	10,680	2,444	97,306		
Total, all cars in line	50,047	714,417	239,644	157,217	151,672	400,775	18,920	123,791	38,238	123,758	100,036	2,120,215		
Per cent. of cars in shop	5.52	5.84	7.79	6.63	8.91	6.33	5.74	9.26	6.19	6.24	6.37	6.63		
No. of freight engines owned	684	10,203	2,841	2,987	2,571	6,986	463	2,263	795	2,353	2,167	83,343		
Average cars on line per freight engine owned	73	70	83	53	59	42	42	56	67	53	46	64		
Total freight car mileage	45,206,135	511,327,789	163,313,077	120,020,678	120,479,518	286,452,174	38,589,340	79,156,366	29,759,068	109,918,402	84,375,638	1,553,628,393		
Average miles per car per day	16.8	33.9	23.0	25.4	26.5	23.5	41.6	22.8	25.9	29.6	28.1	24.5		
Per cent. loaded mileage	72.4	66.1	65.0	65.1	68.9	70.8	76.4	68.7	66.9	72.7	75.2	68.4		
Tonmiles of freight, including Company freight	275,182,753	7,797,493,406	2,443,657,441	1,813,395,311	1,614,069,159	2,754,051,184	373,082,887	1,142,393,124	354,078,979	1,021,992,365	1,163,110,114	21,262,476,083		
Average ton-miles, including Company freight:														
Per car-mile	10.9	15.9	15.9	15.1	13.5	12.8	15.8	14.4	11.9	15.0	13.8	14.7		
Per loaded car-mile	15.1	24.1	24.2	23.2	18.8	18.5	20.7	21.2	17.8	20.7	18.3	21.7		
Per car per day	183	382	305	365	357	297	685	359	300	415	388	362		
Gross freight earnings	\$3,459,513	\$47,692,504	\$14,091,292	\$10,476,086	\$10,371,011	\$29,171,042	\$3,005,672	\$8,904,047	\$2,757,324	\$14,438,449	\$7,946,049	\$152,358,009		
Average daily earnings	\$2.22	\$2.31	\$2.23	\$2.00	\$2.00	\$2.61	\$6.03	\$2.60	\$3.27	\$3.99	\$2.63	\$2.48		
Per railroad-owned car on line	2.65	2.34	2.07	2.27	2.39	2.49	5.85	2.56	2.57	4.27	2.72	2.51		
All cars on line	2.28	2.22	1.99	2.22	2.28	2.29	5.45	2.42	2.40	3.90	2.66	2.40		

given the use of railway water frontage in Chicago and many other cities all over the country. That the railways have not made traffic arrangements at many points with water lines, such as those on the Mississippi river, is because the water lines have not been able to transfer and handle the traffic delivered to them by the railways at such points economically and expeditiously or to give the railways any substantial traffic in return. Where the conditions have been favorable for an interchange of traffic the railways have made favorable rates in connection with the boat lines. For example, at the present moment, on trains moving from the East to Chicago by boat, and thence to St. Louis by rail, the railways give the boat lines divisions of the through rates which actually make the earnings of the railways from the traffic unremunerative. Wherever the water lines are or shall become able satisfactorily to handle through traffic the government will be justified in compelling the railways to establish reasonable through rates and through routes in connection with them.

"Many of the criticisms of the railways for having hampered and destroyed water transportation are really merely criticisms of the railways for having given a superior service with which the water lines have been unable to compete. For example, the water lines have no soliciting staffs to seek traffic; no bills of lading are issued except by a few which are common carriers; and they do not give continuous, all the year round service. The consequence is, they do not—and, so long as they are thus operated, cannot—effectively compete with the railways, no matter what rates they make; for service is just as important in getting traffic as rates are."

Crop Conditions.

The United States department of agriculture estimates crop conditions as follows:

Crops.	Condition compared with normal.				
	Oct. 1, 1910.	Sept. 1, 1910.	Oct. 1, 1909.	Oct. 1, 1908.	Oct. 1, 1907.
	Per ct.	Per ct.	Per ct.	Per ct.	Per ct.
Corn	80.3	78.2	73.8	77.8	78.4
Buckwheat	81.7	82.3	79.5	81.6	83.3
Potatoes	71.8	70.5	73.8	68.7	75.6
Tobacco	80.2	77.7	81.3	84.1	83.0
Flaxseed	47.2	48.3	84.9	81.2	*86.4
Rice	88.1	88.8	81.2	87.7	86.1
Apples	46.4	46.8	43.9	48.4	55.8

*Seven-year.

Crops.	Yield per acre.			Production		Quality.	
	1910.	1909.	10 yr. av.	1910.	1909.	1910.	10-year av.
	Bush.	Bush.	Bush.	(000 omitted).	Bush.	Per ct.	Per ct.
Spring wheat.	11.8	15.8	13.7	233,475	290,823	94.1	86.2
All wheat.	14.2	15.8	14.1	691,269	737,189	93.1	...
Oats	31.9	30.3	29.5	1,096,398	1,007,353	92.8	86.1
Barley	22.4	24.3	25.7	158,138	170,284	88.1	86.9

INTERSTATE COMMERCE COMMISSION.

Advances Suspended.

The Interstate Commerce Commission has suspended until February 6, 1911, tariffs filed by the agents of the Transcontinental Freight Bureau, the Central Freight Association, and the Trunk Line Association increasing rates on lumber, staves, cement and other commodities, westbound from Mississippi river points to northern Pacific coast points in Oregon and Washington.

Advances in freight rates between New Orleans and points north, west and east, which were to have become effective on November 1, have been suspended, pending an inquiry into their reasonableness. The tariffs are suspended for 120 days from November 1.

STATE COMMISSIONS.

The Railroad Commission of Louisiana has given permission to the railways to run trains over crossings with logging roads and short railways without stopping, when the crossings have been provided with gates which are set normally against the logging or short line roads.

The Arkansas Railway Commission having refused to give its permission to the Chicago, Rock Island & Pacific to raise passenger rates to 3 cents a mile, counsel for the road announced that it would raise the rate anyway. The commission originally fixed a rate of 2 cents for all trunk lines in the state. The federal court issued an injunction restraining it from enforcing the order. The Rock Island, in common with other lines,

then put in a new rate. It cited the permission of the commission to raise the rate as a precedent that it was not compensatory.

COURT NEWS.

The Ralston (Neb.) Townsite Co. has filed a complaint with the Interstate Commerce Commission against the Missouri Pacific for its refusal to build a switch connecting the side track of the Ralston company with its line, in accordance with a verbal agreement.

Counsel for the Chicago, Burlington & Quincy have filed a motion with the Supreme Court asking for the postponement of the argument of the Missouri River rate case until the case can be heard by nine judges. At the opening of the Supreme Court Governor Hughes, of New York, was sworn in as an associate justice.

An indictment brought under the Sherman Anti-Trust law against the Imperial Glass Co., a West Virginia corporation, has been sustained in an opinion by the Circuit Court. The defendant had entered a demur to an indictment of the Federal grand jury, charging conspiracy in restraint of interstate trade in hand-blown glass.

Suit has been brought against 12 bituminous coal shippers in the Clearfield district of Pennsylvania against the Pennsylvania Railroad to recover \$1,000,000 damages, due to alleged discrimination in that the railway company delivered coal for the Berwind-White Co. at a pier in New York harbor and delivers coal for complainants at Perth Amboy, 25 miles from New York.

The Oregon Railroad & Navigation Company secured an injunction from the Thurston county (Washington) superior court, restraining the Washington board of equalization from certifying the assessment of this railway to the various counties of the state at an aggregate of \$27,000,000. The company calls attention to the fact that the Washington railway commission, after a long and exhaustive investigation, placed a valuation on the property of the Oregon Railroad & Navigation Company in Washington of only \$19,500,000. This being the basis fixed by the commission on which the road should be allowed to earn revenues, it is contended that no higher basis should be fixed on which it shall be required to pay taxes. One of the interesting features of this situation is that when the railway commission was making its valuation, it was announced that it probably would be taken as a basis both for regulation of rates and for taxation.

Hearing Resumed in Union Pacific Merger Suit.

C. A. Severance, special assistant to the attorney-general, opened argument for the government in the case of U. S. A. v. Union Pacific before the U. S. Circuit Court. He said in part as follows:

"This suit was brought by the United States of America for the purpose of dissolving a railway combination originating with the defendants, Harriman, Schiff, Kahn, Stillman, Rogers and their associates, including the Union Pacific, under which combination a common control has been established over the Union Pacific, the Southern Pacific, the San Pedro, Los Angeles & Salt Lake, and then to some extent over the Atchison, Topeka & Santa Fe.

"Perhaps the most prominent issue is as to the relations between the Union Pacific and the Southern Pacific. It is averred that the rail lines of the Southern Pacific from the Mississippi river to Portland were in active competition with the lines of the Union Pacific for the transportation of vast quantities of freight from points in the Mississippi Valley and in eastern states; that the steamship line of the Southern Pacific from New York to New Orleans and Galveston, together with its rail lines, was in active competition with the lines of the Union Pacific for a large amount of traffic originating in the Atlantic coast and central states; that the rail line of the Southern Pacific from San Francisco to Portland was in active competition with the ships of the Oregon Railroad & Navigation Co. plying between those points.

"Edwin Hawley testified that up to the spring of 1901 Union Pacific maintained agencies in the East, working in competition with the Southern Pacific for all business originating in this

territory; that this competition for transcontinental business originating on the Atlantic seaboard between the Union and Southern Pacific extended as far north as Portland, but to a lesser degree than to California common points.

"The effort of the Southern Pacific was to move all traffic to the coast by New Orleans, while the Union Pacific worked for the only route affording it any revenue, via Omaha or Kansas City to Ogden. On the basis of a dollar rate the Southern Pacific from Ogden to San Francisco would receive 30.1 cents. Where the traffic moved via New Orleans the Southern Pacific would receive all the revenue. On the other hand, if traffic moved via New Orleans the Union Pacific would get nothing. Therefore there was the same incentive to active, energetic competition between these lines that there would have been had the Southern Pacific not owned the line between Ogden and San Francisco.

"The Southern Pacific and Union Pacific were both connecting and competing lines. Paul Morton, from 1895 to 1904 vice-president of the Atchison, testified: Q. Taking into consideration the situation of all those railways, will you state whether in your opinion in the spring of 1901 prior to the time when the Union Pacific purchased a large amount of stock in the Southern Pacific, these lines were competitors for transcontinental business? A. They were both competitors and connections. Q. They were competitors, were they? A. Yes.

"Testimony shows that in traffic meetings where questions of policy or rates arose Union Pacific and the Sunset route were frequently competing; that agents of the Union Pacific were endeavoring to route traffic over their line and thence to the coast and agents of the Southern Pacific to route it via New Orleans. J. C. Stubbs, traffic director of the Union-Southern Pacific system, speaking of competition from Atlantic seaboard points to California points, testified that prior to 1901 and for many years the line via New Orleans was an important factor in that competition; further, that 'conditions to-day with respect to two representatives in Atlantic seaboard are the same as before 1901. The Union Pacific has its general agents there and the Southern Pacific has its agents, but all the endeavor the Union Pacific agencies must contribute to the Southern Pacific because they cannot get into California otherwise, and really you must say the agencies are practically joint.'

"This answer of Mr. Stubbs really sums up the defense in this case. Defendants cannot deny that for years the Southern Pacific actively worked business out of New York by way of New Orleans; that the Union Pacific actively worked to secure that same business, via Omaha or Kansas City; but although this competition was most active, Mr. Stubbs' answer implies that there was really no competition because for a portion of the way the traffic secured by the Union Pacific was hauled by a line of the Southern Pacific.

"On occasion of the arbitration of the Canadian Pacific differential, Mr. Stubbs demolished this theory by arguing that 'if the Oregon Short Line were deprived of connection with the Union Pacific, making a through line to San Francisco via Portland, the Short Line would be deprived of all opportunity to compete for a share of the San Francisco trade; therefore, that a through line is to be regarded as a unit regardless of whether part of it may be used for forming another through line even though it may be a rival through line.' Mr. Stubbs thus thoroughly answered the entire technical argument that is advanced to show that a railway company cannot compete for business when, as a matter of fact, it is competing for business.

"J. A. Munroe, freight traffic manager for the Union Pacific, testified: Q. What roads do you mean by your competitors? A. Speaking of San Francisco business, all lines east of Ogden other than Union Pacific, all lines east of El Paso, including the through route of the Sunset Line from New York to San Francisco.

"Other witnesses testified that from 1888 to 1891 competition for coast business out of Philadelphia between Union and Southern Pacific was very strong. That prior to 1901 Portland business was conducted by Union and Southern Pacific agents separately, that approximately most of the business was routed to Ogden and thence by Southern Pacific via Sacramento to Portland. Branching of the Union Pacific between the east and Portland moved over the Short Line and O. R. & N. The Southern Pacific sought this traffic over their own rails from Ogden to Portland via Sacramento. This Sacramento route has been closed to traffic since the route management."

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

J. B. Tartt, auditor of the Texas City Terminal, with office at Texas City, Tex., has resigned.

C. M. Malone, secretary and auditor of the Houston Belt & Terminal Railway, with office at Houston, Tex., has resigned to engage in other business.

R. E. Clark, assistant secretary of the New York, New Haven & Hartford at New Haven, Conn., has been appointed secretary, succeeding J. G. Parker, deceased.

The Texas Southern, a projected line in Texas, has elected the following officers: F. T. Parks, San Antonio, Tex., president; H. G. Martin, Pleasanton, Tex., vice-president and treasurer, and Frank Burmeister, Tilden, Tex., secretary.

F. O. Waldo, secretary of the Detroit & Charlevoix at Detroit, Mich., has been appointed auditor; N. B. Ackley has been appointed assistant auditor; E. A. Wigren has been appointed auditor of disbursements, and Henry Russell has been appointed general counsel, all with offices at Detroit.

Operating Officers.

H. H. Adams, general superintendent of the Toronto, Hamilton & Buffalo, has been promoted to general manager, with office at Hamilton, Ont.

W. E. Miller has been appointed superintendent of the First division of the Denver & Rio Grande. He is to have his office at Pueblo, Colo. Mr. Miller succeeds I. H. Luke, resigned to accept service elsewhere.

W. C. Heth, chief despatcher of the Wabash at Montpelier, Ohio, has been appointed acting superintendent, with office at Detroit, Mich., succeeding J. J. Sim, given an extended leave of absence on account of ill health.

C. H. Biever has been appointed superintendent of car service of the Detroit & Charlevoix; A. C. Thomas has been appointed car accountant, and J. J. Ross has been appointed superintendent of telegraph, all with offices at Detroit, Mich.

Michael C. Roach, assistant superintendent of the New York division of the Erie, with office at Jersey City, N. J., having resigned, that position is abolished. William J. English, trainmaster at Port Jervis, N. Y., has been transferred to Jersey City, N. J. Michael Nolan, trainmaster at Jersey City, has been transferred to Port Jervis, succeeding Mr. English; Thomas O'Donnell, chief despatcher, has been appointed a trainmaster, succeeding Mr. Nolan; H. R. Cole, night chief despatcher, has been appointed chief despatcher, succeeding Mr. O'Donnell, and Albert M. Kelly, station supervisor, has been appointed night chief despatcher, succeeding Mr. Cole, all with offices at Jersey City.

Cornelius J. Shea, whose appointment as superintendent of the Wyoming division of the Lehigh Valley, with office at Wilkesbarre, Pa., was recently announced in these columns, began railway work in 1891 on the Erie Railroad as a telegraph operator. He then went to the Lehigh Valley in the same capacity. From 1892 to 1908 he has been consecutively despatcher, chief despatcher and trainmaster on the same road, at Buffalo, N. Y. He was appointed assistant superintendent of the Buffalo division of the Lehigh Valley at Sayre, Pa., in October, 1908, and was promoted to superintendent of the Auburn division on January 1, 1910, which position he held at the time of his recent appointment as superintendent of the Wyoming division.

Edward F. Blomeyer, whose appointment as general manager of the Chattanooga Southern, with office at Chattanooga, Tenn., has been announced in these columns, during the past 29 years has served in nearly every department, but his work has been chiefly in the construction and operation of various small rail-

ways in Missouri and Arkansas, which are now a part of the Union system. In October, 1903, he was made president and manager of the Pere Marquette Steamship Co., remaining in that position until May, 1906, when he was appointed assistant general freight agent of the Pere Marquette Railroad at Milwaukee, Wis., which position he held at the time of his recent appointment. Mr. Blomeyer was also president and manager of the Marquette, Marquette & Northern, now a part of the Main & Lake Superior, from March, 1904, to October, 1905.

Traffic Officers.

S. A. Seawright has been appointed traveling freight agent of the Southwestern Railway, with office at Henrietta, Tex.

H. S. Gray, traveling passenger agent of the Illinois Central at St. Paul, Minn., has been appointed a district passenger agent, with office at St. Paul.

J. T. Livsey has been appointed a soliciting freight agent of the Georgia Southern & Florida, with office at Macon, Ga., succeeding L. C. Shirah, resigned.

W. F. Bellairs has been appointed a traveling freight agent of the St. Louis, Iron Mountain & Southern at Houston, Tex., succeeding C. W. Andrews, resigned.

George B. Hild has been appointed general agent of the Union Pacific and the Southern Pacific, with office at Cleveland, Ohio, succeeding Donald P. Stubbs, deceased.

B. F. Longley, contracting freight agent of the Missouri, Kansas & Texas at St. Louis, Mo., has been appointed a traveling freight agent, with office at Kansas City, Mo.

R. S. Fife, commercial agent of the Missouri, Kansas & Texas at St. Louis, Mo., has been appointed general eastern agent, with office at New York, succeeding C. C. Hopper, resigned.

Frank O'Connor has been appointed traveling agent of the Chicago & North Western, with office at Buffalo, N. Y., succeeding F. M. Archdeacon, resigned to engage in other business.

C. W. Andrews, traveling freight agent of the St. Louis, Iron Mountain & Southern at Houston, Tex., has been appointed a commercial agent of the Missouri, Oklahoma & Gulf, with office at Dallas, Tex.

C. M. Kittle, statistician in the office of the vice-president of the Illinois Central at Chicago, has been appointed freight claim agent, with office at Chicago, succeeding R. Kirkland, assigned to duties in the purchasing department.

W. E. Coman, general freight and passenger agent of the Spokane, Portland & Seattle and the Astoria & Columbia River at Portland, Ore., has been appointed also general freight and passenger agent of the United Railways and the Oregon Electric Railway.

A. P. Massey, New England passenger agent of the Missouri Pacific and the St. Louis, Iron Mountain & Southern at Boston, Mass., having resigned, the duties of that position have been assumed by William E. Hoyt, general eastern passenger agent at New York.

W. C. Rowley has been appointed general freight agent of the Detroit & Charlevoix, and Joseph S. Hall has been appointed assistant general passenger agent, both with offices at Detroit, Mich. H. P. Dearing has been appointed general baggage agent, with office at Chicago.

Charles A. Florence, whose appointment as assistant general freight agent of the Illinois Central, in charge of exports and imports, has been announced in these columns, was born June 8, 1857, in Chicago. He received his education in the public schools and in January, 1877, began railway work in connection with land grants in Iowa along the Illinois Central and the Chicago & Northwestern. In 1887 he was made traveling passenger agent, and three years later northeastern passenger agent of the Illinois Central. For six years from 1891 he was general agent in charge of freight and passenger traffic in northeastern territory for the same road, and from 1897 until his recent promotion he was general eastern agent in New York City.

J. W. Garding, whose appointment as assistant general freight agent of the Toledo, St. Louis & Western, the Chicago & Alton, the Minneapolis & St. Louis and the Iowa Central, with office at Chicago, has been announced in these columns, was born March 21, 1879, at Toledo, Ohio. He attended the common schools and night school until May, 1894, when he began railway work with the Toledo, St. Louis & Kansas City, now the Toledo, St. Louis & Western, as an office boy. Later in the same year he was made mailing clerk in the general freight department and held various other clerkships until August, 1900, when he was made rate clerk, which position he held for four years. He was then made contracting freight agent at Toledo, and in September, 1905, was made chief rate clerk. When the general offices of the Toledo, St. Louis & Western and the Chicago & Alton were removed to Chicago in January, 1908, he was appointed chief clerk in the tariff department. When the four roads mentioned above were consolidated in December, 1909, he was made chief clerk to the freight traffic manager and assistant freight traffic manager, and in February, 1910, was appointed chief of the tariff bureau of the four roads, from which position he has just been promoted to assistant general freight agent.

Engineering and Rolling Stock Officers.

E. L. Burdick has been appointed assistant engineer of tests of the Atchison, Topeka & Santa Fe, with office at Topeka, Kan.

Ralph Budd has been appointed chief engineer of the Spokane, Portland & Seattle, with office at Portland, Ore., succeeding T. H. Croswell, resigned.

J. Coughlin, roadmaster of the St. Louis & San Francisco at Ft. Scott, Kan., has been appointed roadmaster of the Kansas City Southern, with office at Neosha, Mo.

George H. Webb has been appointed chief engineer of the Detroit & Charlevoix, and E. D. Bronner has been appointed superintendent of motive power, both with offices at Detroit, Mich.

F. A. Chase, formerly general mechanical inspector of the Chicago, Burlington & Quincy, has retired from active service after almost 61 years of railway and mechanical work; yet he

does not regard himself as a very old man and his portrait does not indicate old age. Mr. Chase was born August 18, 1836, at Monroe, Ashtabula county, Ohio. Two years later his parents moved to Windsor, Vt., and in 1849, when he was 13 years old, young Chase commenced railway work as a train boy on the Sullivan Railroad in New Hampshire, now a part of the Boston & Maine, and the next year he was made an apprentice in the machine shop of the same road. Four years later he went south as a machinist in the shops of the South Carolina Railroad, now



F. A. Chase.

a part of the Southern Railway, at Charleston, and in 1855 he worked in the machine shops of the Georgia State road. Two years later he went with the Detroit Locomotive Works, and was then consecutively in the Lake Shore shops at Adrian, Mich.; in railway shops at Ft. Wayne, Ind.; with the New Albany & Salem, now the Chicago, Indianapolis & Louisville, at Michigan City, Ind.; roundhouse foreman with the Marietta & Cincinnati, now a part of the Baltimore & Ohio Southwestern, at Chillicothe, Ohio. In January, 1866, he began work with the Burlington, with which road he was in continuous service for 44 years. He worked in the Aurora shops for two years and was later fireman and then locomotive engineer. In 1878 he was made roundhouse foreman at Aurora, and two years

later was appointed master mechanic of the Kansas City, St. Joseph & Council Bluffs at St. Joseph, Mo.; in 1891 he was given additional territory, including the Hannibal & St. Joseph, and five years later was appointed general master mechanic of the Missouri lines of the Burlington. In 1904 he was made general mechanical inspector of the Burlington lines east of the Missouri river, which position he recently resigned. He has moved to California, and, with his wife and daughter, will reside in Los Angeles.

O. S. Jackson, master mechanic of the Chicago, Indianapolis & Louisville at Lafayette, Ind., has been appointed superintendent of motive power, with office at Lafayette, succeeding John Gill, resigned.

W. A. Yanda has been appointed machine foreman on the Northern district of the Rock Island Lines, with office at Cedar Rapids, Iowa, succeeding P. F. Low, resigned. C. M. Stone has been appointed machine foreman on the Terminal and Illinois divisions, with office at Chicago, succeeding W. Marks, assigned to other duties.

Garrett Vliet, assistant master mechanic of the Grand Trunk at Portland, Me., has been appointed master mechanic of the Western division, with office at Battle Creek, Mich., succeeding W. Hamilton, resigned. Mr. Vliet was born in 1856 at Milwaukee, Wis., and was educated in the schools of Wisconsin. He began railway work as a draftsman with the St. Louis & San Francisco at Kansas City, Mo., in 1877, and in February, 1879, went to the Wabash Railroad in the same capacity, which position he held for 10 years, when he was appointed general foreman, remaining in that position until July, 1898. From October, 1898, to April of the following year, he was general foreman of the Grand Trunk at Battle Creek, and was appointed assistant master mechanic of the First district of the Grand Trunk in April, 1899, at Portland, Me., which position he held at the time of his recent appointment as master mechanic. Mr. Vliet's entire service has been in the locomotive departments of the railways.

Purchasing Officers.

J. F. Farrell has been appointed purchasing agent of the Detroit & Charlevoix, with office at Detroit, Mich.

OBITUARY.

M. I. Marlow, superintendent of bridges and buildings of the Mexico Northwestern, died at Ciudad Juarez, Chihuahua, Mexico, on October 1.

James Archbald, of Scranton, Pa., formerly chief engineer of the Delaware, Lackawanna & Western, died at Venice, Italy, on October 6 of heart disease. Mr. Archbald was born February 13, 1838, at Sand Lake, N. Y., and began railway work in 1860 as assistant engineer of the Delaware, Lackawanna & Western. From 1870 to 1883 he was chief engineer and was then made consulting engineer of that road.

Archibald C. Robson, formerly master car builder of the Lake Shore & Michigan Southern at Buffalo, N. Y., died at his home in Buffalo on October 6. Mr. Robson was born on February 19, 1830, at Langholm, Dumfriesshire, Scotland. He began railway work in December, 1854, as a carpenter on the Buffalo & State Line, remaining in that position until the road became a part of the Lake Shore & Michigan Southern. From May, 1868, to June, 1872, he was foreman of the passenger car department. On June 1, 1872, he was appointed division master car builder of the same road and was later promoted to master car builder. He was the founder and for many years president and vice-president of the Erie Savings & Loan Association of Buffalo, and was one of the organizers of the Central Railway Club, and after he gave up active railway work he was made an honorary member of it.

Nicholas Monmarat, president of the Kanawha & Michigan and president of the Wellston & Jackson Belt Line, with office at Columbus, Ohio, who died on September 30 in New York City, as previously announced in these columns, was born in March, 1829, at London, Canada, and began railway work in 1877 as secretary of the Paducah & Memphis. He held various positions with that road until July, 1881, when he was made

general superintendent of the Chesapeake & Ohio Southwestern; in December of that year he was appointed general superintendent of the Cleveland, Mt. Vernon & Delaware, and was later president and general manager and vice-president and general manager of its successor, the Cleveland, Akron & Columbus. He was made receiver of the Valley Railway in 1894 and of the Columbus, Sandusky & Hocking in 1895, and in 1896 was made president and general manager of the latter road. He was made vice-president of the Columbus, Hocking Valley & Toledo in 1897 and was later made receiver of the same road; in 1899 it was reorganized as the Hocking Valley, when he was made president. Until September, 1901, he was vice-president of the Toledo & Ohio Central, when he was made president of that road and the Kanawha & Michigan. He was president of the latter road until his death, of the Zanesville & Western and the Toledo & Ohio Central until 1909 and of the Hocking Valley until early in the present year.

William B. Dana, founder and publisher of the *Commercial and Financial Chronicle*, died Oct. 10 at Mastic, Long Island. He was 81 years old, and his suffering from debility, due to age, was recently aggravated by a fall which broke his thigh.

Mr. Dana was born at Utica, N. Y., Aug. 26, 1829, and was graduated from Yale University in 1851, and was a practicing lawyer at Utica from 1853 to 1859. He moved to New York and bought *Hunt's Merchants' Magazine*. Some years later he brought out the first number of the *Commercial and Financial Chronicle*.

A year ago the *Chronicle*, in celebrating Mr. Dana's 80th birthday, printed a sketch of his life. "A severe and unexpected disaster threatened the very beginnings of his new enterprise, arising from and attendant upon the warlike attitude of the Northern and Southern States and the approaching rupture between them, a disaster which was only too speedily realized," said the *Chronicle*, concerning Mr. Dana's assuming control of the *Hunt's Merchants' Magazine* in 1859.

"As the tendency of the magazine was toward a moderate form of free trade, it was natural that a large number of subscribers should be found south of the Mason and Dixon line, and the sudden embargo and cessation of friendly intercourse between the North and South, followed shortly thereafter by the interruption of all postal service, caused the loss of more than half of the subscribers in the United States, with a corresponding decrease of income.

"The new management had, however, anticipated this setback and provided abundant reserve to meet the emergency. It is sufficient to call attention here to only one of these contributing forces of recovery, namely, a series of highly interesting biographical sketches of celebrated living merchants, each sketch being accompanied by a superior steel plate engraving, attracting wide attention in business circles.

"Important facts in the lives of Cornelius Vanderbilt, Thomas Tileston, Moses Taylor and others were carefully obtained and presented, and even to-day reference is frequently made to these articles in considering the business history of that period."

In developing his plan for the *Chronicle* Mr. Dana took as his model, for form, the London *Economist*, bearing constantly in mind the need of giving to his periodical a very practical side, an everyday application, suited to a conservative, high-class clientele, and able to maintain a foremost place in the rapidly moving march of events. It is worthy of note that the first issue of the *Chronicle* contained in embryo form a suggestion of every one of the subsequent developments which have from time to time been made in the form of additional supplements or sections.

Railway Building in Japan.

The road link of 28 miles, connecting the main line of the Imperial Kanto Railways in the mountain section between Hitoyoshi and Kagoshima in the southern part of the island, was completed toward the close of the year and was opened to through traffic from Moji in the north to Kagoshima in the south on December 1, 1909, with appropriate ceremonies. This final section of 28 miles is in the high mountainous region a short distance north of Kagoshima (about 30 miles), and was one of the most difficult problems the railway engineers had to contend with in Japan. The line is a succession of tunnels, cuts and fills, with one loop.

Railway Construction.

New Incorporations, Surveys, Etc.

LOUIS & MAINE.—According to press reports, part of the proceeds of the \$10,000,000 lately voted by the directors will be used for relaying a large part of the system with new rail, and the electrification of the line through the Hoosac tunnel. It will take several years to carry out the work. (See report of this company elsewhere in these columns.)

CANADIAN NORTHERN.—Plans have been filed for a branch from Springfield, Man., north to East Selkirk, 11.4 miles.

CANADIAN PACIFIC.—Bids are wanted up to November 1, it is said, by R. A. Bambridge, division engineer of the Esquimalt & Nanaimo, at Victoria, B. C., for clearing the right-of-way on the Comox extension between Parksville and Union bay, Vancouver island.

Double-tracking work from Winnipeg, Man., west to Portage la Prairie, 55 miles, has been finished, and was turned over to the operating department on October 3.

Plans have been made, it is said, to start work at once on a line from Pincher creek, Alberta, to the mines of the Western Coal & Coke Co. at Beaver creek. The line will probably be further extended to other coal and timber fields.

ESQUIMALT & NANAIMO.—See Canadian Pacific.

CHICAGO, BURLINGTON & QUINCY.—An officer writes that this company is making some surveys between Mexico, Mo., and St. Joseph, but that no plans for building a line between these places has yet been made.

CHICAGO, ROCK ISLAND & PACIFIC.—According to press reports, this company is planning to build a short line from a connection with the lines west of Hopefield, Ark., to a point in Memphis, Tenn., north of the mouth of Wolf river. It is said the plans include building a new bridge at Memphis, over the Mississippi river, to cost about \$3,000,000.

FORT WORTH & RIO GRANDE.—An officer writes that work is now under way by the C. H. Sharp Contracting Co., Kansas City, Mo., on a branch from Brady, Tex., southwest to Menardville, 40 miles. Track has been laid on 12 miles. The line will carry live stock, cotton and merchandise. (Oct. 22, p. 777.)

HOCKING VALLEY.—Plans are to be carried out for providing a direct physical connection between this road and the Chesapeake & Ohio. This is to be accomplished either by the extension of the present 18-mile Wellston & Jackson belt branch of the Hocking Valley, from Jackson, Ohio, southwest to a point about six miles east of South Portsmouth, Ky., on the Chesapeake & Ohio, 30 miles, or by the use of trackage rights on the Cincinnati, Hamilton & Dayton for 20 miles from Wellston, on the same branch of the Hocking Valley, to Gallia, and the construction from that place of 40 miles of line south to the Chesapeake & Ohio at Huntington, W. Va. In both cases a bridge will have to be built over the Ohio river. Construction work is to be started as soon as the company is able to finance the project. The new line will shorten the distance for the Chesapeake & Ohio about 70 miles on eastbound freight from the coal fields in Kentucky and West Virginia.

HUDSON & MANHATTAN.—The New York Public Service Commission, First district, has extended the time to April 28, 1911, for beginning work on the extension of the Hudson & Manhattan subway from Thirty-third street and Sixth avenue to Forty-second street and Lexington avenue, in the borough of Manhattan, New York.

LITTLE KANAWHA.—See West Virginia Roads.

MONONGAHELA RAILROAD.—See West Virginia Roads.

NATIONAL RAILWAYS OF MEXICO.—According to press reports G. Palmer, representing the National Railways of Mexico, has entered into a contract with officials of the state of Durango to build from Gutierrez, Zacatecas, northwest to Durango, in the state of the same name, about 175 miles. The line will pass through the mining districts of Sombrerete and Chalcihuites.

NEW YORK, NEW HAVEN & HARTFORD.—The report of this company for the year ended June 30, 1910, shows that the six-track construction on the Harlem River & Port Chester has been

completed. The construction of a double-track between New York City, Conn., and Medford is under way on the section between New York City and Stamford. The construction of grade crossings and change of line on about one mile at Brookfield Junction is under construction, and it is expected will be finished before the end of the year. All work on connection with the New Haven cut and trolley viaduct has been finished, and the new facilities are in operation. A new highway bridge is under construction at Humphrey street which should be finished during the year. Improvements in and near Waterbury, including new main line tracks, new passenger station and freight facilities, also new engine and coaling facilities and a machine shop have been finished and are now in service. Double-track work is under way from Waterbury to Bristol, and this work will probably be finished before the end of the year. About 75 per cent. of the work on the tunnel at Terryville is finished. Stone ballasting on the main line between Niantic, Conn., and Back Bay, Mass., has been finished on about 15 miles, and the work is progressing satisfactorily. The company's part of the work in connection with the elimination of grade crossings in Worcester, Mass., is under contract; the amount of work yet to be done will be finished in about six months. The improvements include an express building and the reconstruction of the viaduct connecting the N. Y., N. H. & H. and Boston & Maine railways; about 60 per cent. of the work in connection with the elimination of grade crossings has been finished. Second-track from Walpole to South Framingham, including double-track Y at Medford Junction, and automatic signals, is under construction. Satisfactory progress is being made on the elimination of grade crossings in Boston from Harrison square to Neponset, and the company's part of the work in connection with the extensive changes made by the city of Boston in extending Northern avenue has been completed. Work is under way on the elimination of grade crossings in Lowell at Lincoln and Plain streets. Work has been finished on the elimination of grade crossings at Fairmont. The number of grade crossings eliminated during the year was 32, of which 30 were in Connecticut and two in Massachusetts. Single-phase electrification in the vicinity of Glenbrook, Conn., has been finished on 6,000 ft. of four and six tracks, and similar work is to be carried out on the Harlem River branch and the line from Stamford, Conn., to New Haven. Surveys have been made for the electrification of the main line and yards on the Harlem River branch, and for the electrification of the main line between Stamford and New Haven. New passenger stations, freight houses and increased facilities have been carried out during the year at various places and similar work is under way at a number of other places. Bridge repairs, renewals and strengthening of bridges to permit the operation of heavier rolling stock was also carried out. (See report of this company elsewhere in these columns.)

NUECES RIVER VALLEY.—An officer writes that contracts are to be let at once to build from Beeville, Tex., west via Clareville, Simmons City, Tilden, Cotulla and Carrizo Springs to Eagle Pass, about 180 miles. Maximum grades will be 1 per cent., maximum curvature 2 degs. The plans call for building three steel bridges, a roundhouse, turntable, machine shops and buildings for general offices. The line will carry coal, live stock, wood, quarry products, cotton and grain. W. A. Frisby, president; G. A. Hull, consulting engineer, Beeville. (Oct. 7, p. 671.)

OREGON & WASHINGTON.—The last wall of earth separating the two forces of men working toward the center from the north and south ends of the 5,425-ft. tunnel at Portland, Ore., was broken through recently. The work has been under way since August, 1909.

OTTAWA, RIDEAU VALLEY & BROCKVILLE.—This company is said to have started construction work from a point near Ottawa, Ont., south to Brockville, about 60 miles. A. Haydon, president; D. H. MacLean, vice-president, Ottawa. (June 24, p. 1813.)

PENSACOLA, MOBILE & NEW ORLEANS.—An officer writes that the company will carry out with its own men the work on the trestle over the Apalachee river on the line under construction from Pensacola, Fla., northwest to Mobile, Ala., 60 miles. Contracts will be let in about six months for the draw and fixed spans of the bridge to be built in connection with the trestle. Grading work is now under way and it is expected will be finished by the end of 1910. (Sept. 2, p. 440.)

PENNSYLVANIA RAILROAD.—See West Virginia Roads.

PHOENIX & EASTERN.—See Southern Pacific.

ROANOKE & MT. AIRY SOUTHERN.—An officer writes that it has not yet been decided when contracts are to be let for building from Roanoke, Va., southwest via Airpoint and Floyd to Mt. Airy, N. C., about 90 miles. The proposed line will cross the mountains on an easy grade. A. L. Siebert, president, Roanoke.

ST. PAUL RAILWAY PROMOTION Co.—Organized in Minnesota to build an electric line from St. Paul, Minn., south via Northfield to Fairbault, thence west to Mankato, 90 miles. The work is to be carried out during 1911. Engineers are now at work on the location. Kay Alexander, Merchants hotel, St. Paul, is back of the project. W. L. Sountag, general manager, St. Paul.

ST. LOUIS SOUTHWESTERN.—The report of this company for the year ended June 30, 1910, shows that a number of additions and betterments were carried out during the year, including increased terminal facilities, new freight and passenger stations, also team and yard tracks at Argenta, Ark., and plans have been made for additional terminal facilities at that place, for which grading work is now under way. The bank protection work at the Red river, where a bridge crosses at Garland City, Ark., has been finished, and the work of renewing the bridge over the Arkansas river at Rob Roy is in progress. The piers and abutments have been completed and material for the superstructure received. This will be erected as soon as possible. The work of ditching and widening embankments on the Little Rock and Shreveport branches, which was temporarily suspended during the current year, has since the close of the year been resumed. Improvements between Mount Pleasant, Tex., and Fort Worth have been continued during the year, summits have been cut and the material thus secured was used to raise and widen embankments in overflow bottoms. Surveys and plans have been made in connection with improvements as follows: Passenger and freight stations at Texarkana, Tex.; motive power yard at Tyler and coaling stations at Lufkin and Addison. Subject to ratification by the stockholders, the company has secured control of the Central Arkansas & Eastern, now in operation for 9.5 miles from England, Lonoke county, Ark., to McGregor. An extension is being built from McGregor to Stuttgart, 13.5 miles, and a further extension is to be built from a point near Stuttgart in a northerly direction, about 17 miles. The line and extensions will pass through a virgin forest of fine timber, and a good agricultural country, producing cotton and rice in abundance. Similar control has been secured of the Stephenville North & South Texas, which operates a line from Stephenville, Erath county, Tex., to Hamilton, 42.61 miles. An extension of this line is being built from Hamilton to Gatesville, in Coryell county, about 32 miles, where connection is to be made with the St. Louis Southwestern of Texas. Another extension is also under construction from Hamilton to Comanche, Comanche county, about 35 miles, and a third extension is contemplated from Stephenville to Thurber, Erath county, about 26 miles, which will afford access to the coal fields in that vicinity. The Stephenville line traverses a fertile country producing cotton and grain.

SOUTHERN PACIFIC.—Track is now being laid on a section of nine miles of the completed roadbed of the Phoenix & Eastern from Winkelman, Ariz., northeast to Christmas. This forms the first link of the proposed connecting line between Winkelman, on the Phoenix & Eastern, and San Carlos, on the Gila Valley, Globe & Northern.

Work will soon be started on a line, it is said, from Marshfield, Ore., south to Eureka, Cal.

WEST VIRGINIA ROADS.—The large coal fields in West Virginia, controlled by the Little Kanawha syndicate are to be developed. The plans call for building a line from Fairmont, W. Va., southeast along the Mingo-hale river to the Pennsylvania state line, where the new line is to meet a projected extension of the Monongahela Railroad. The Monongahela Railroad is controlled by the Pittsburgh & Lake Erie and the Pennsylvania Railroad. In advance to the completion of new lines a bridge will have to be built over the Monongahela river.

Railway Financial News.

DELAWARE, LACKAWANNA & WESTERN.—The New Jersey Public Utility Commission has refused permission to the Newark & Bloomfield, a subsidiary of the Lackawanna, to increase its capital stock from \$30,000 to \$160,000. The refusal is based on the allegation that the company between September 6 and September 20 issued seven shares of stock without making the proper application or obtaining the approval of the commission.

DENVER, NORTHWESTERN & PACIFIC.—O'Connor & Kahler, New York, are offering \$140,000 5 per cent. locomotive equipment trust notes, guaranteed by the American Locomotive Co., dated August 1, 1910, and maturing \$10,000 quarterly beginning 1912 at par. These notes are part of an issue of \$348,609 secured on 20 locomotives.

DULUTH & NORTH MINNESOTA.—See Manistique Railway.

DUNKIRK, ALLEGHENY VALLEY & PITTSBURGH.—This company has asked permission of the New York Public Service Commission, Second district, to make a mortgage securing \$5,000,000 4½ per cent. 50-year bonds, and has asked permission to modify its lease to the New York Central & Hudson River.

LANCASTER, OXFORD & SOUTHERN.—The company is unable to pay the semi-annual interest due October 1 on \$200,000 5 per cent. bonds. The road is a narrow-gauge line running from Quarryville, Pa., to Peach Bottom, 28 miles.

MANISTIQUE RAILWAY.—The road which runs from Grand Marass, Mich., to Seney, 54 miles, has been sold under foreclosure to John Millen, vice-president and general manager of the Duluth & North Minnesota, who is said to represent the bondholders.

MINNEAPOLIS & ST. LOUIS.—F. M. Tompkins and A. C. Doan have been elected directors, succeeding F. E. Palmer, resigned, and L. C. Weir, deceased.

NATIONAL RAILWAYS OF MEXICO.—The stockholders have authorized the directors to declare an extra dividend of 1 per cent. on the \$28,830,200 non-cumulative 4 per cent. preferred stock, payable at their option. This is done to bring the dividend payable out of the earnings of the fiscal year ended June 30, 1910, up to 4 per cent., the previous dividends being 2 per cent. in August and 1 per cent. in February. From 1908 to August, 1909, dividends were paid at the rate of 2 per cent. annually.

NEWPORT & RICHFORD.—The company has sold to Lee, Higginson & Co., Boston, a new issue of \$350,000 first mortgage 5 per cent. bonds of 1911-1941. The proceeds of these bonds are to be used to refund \$350,000 first mortgage 5 per cent. bonds due January 1, 1911. The road is part of the Canadian Pacific system and runs from Newport, Vt., to the Canadian line, 21 miles, and has been operated under lease by the Montreal & Atlantic, which in turn is operated by the Canadian Pacific.

PACIFIC & EASTERN.—It is said that holders of \$300,000 first mortgage 6 per cent. bonds outstanding have received offers recently for their bonds at 80, the offers being made by Hill interests.

PENNSYLVANIA COMPANY.—There have been called for redemption on Nov. 1, 1910, \$1,334,000 certificates of the 3½ per cent. loan of 1901, maturing November 1, 1916, but callable at the option of the railway company in 1910.

See Pittsburgh, Wheeling & Kentucky.

PITTSBURGH, WHEELING & KENTUCKY.—The directors have declared a dividend of 3 per cent. out of profits and a special dividend of 3 per cent. out of accumulated surplus. The road runs from Wheeling Junction, W. Va., to Benwood, 28 miles, and is operated by the Pittsburgh, Cincinnati, Chicago & St. Louis. Of the \$501,250 stock issued, \$255,300 is owned by the Pennsylvania Company.

TENNESSEE CENTRAL.—Eben Richards has been elected chairman of the board of directors, succeeding S. M. Felton; and H. B. Chamberlain has been elected a director.

YOUNGSTOWN & OHIO RIVER.—An initial dividend of three-quarters of 1 per cent. has been declared, payable October 1, on the \$1,000,000 preferred stock, cumulative after July 1, 1913.

Supply Trade Section.

The Union Canal Company will receive bids until October 31 for reinforcing steel bars. (See page 699.)

F. E. Minger, assistant purchasing agent of the Hicks Car & Lumber Works, Chicago, has taken a position with the Hall & Saxon Lumber Company, Chicago.

James W. Mudge & Company, Chicago, announce the election of Robert D. Sinclair as secretary and treasurer. Mr. Sinclair has held a responsible position with the First National Bank of Chicago for a number of years.

The United Electric Apparatus Company, formerly at 200 Summer street, Boston, Mass., has secured new quarters at 1529-1533 Columbus avenue and 200-204 Center street, occupying the entire building. In March last this company suffered a serious fire, so much so that an entire new equipment and location was necessary. The new building is equipped with modern machinery for manufacturing the different forms of electric apparatus with which the name of A. A. Ziegler has long been associated.

The Strauss Bascul & Concrete Bridge Company, Chicago, announces that it has abandoned concrete work and that the company's name has been changed accordingly to the Strauss Bascul Bridge Company. The bascul bridge department has grown to such an extent that it not only requires the entire organization of the company to handle it, but it has been found necessary to enlarge the force in order to serve its clients. Railway bridges are now under way for the Peoria & Pekin Union, the Chicago & Western Indiana, the National Transcontinental, the Northern Pacific, three for the Erie, four for the Department of Railways and Canals of Canada, two for the Canadian Northern, the Baltimore & Ohio, the New York Central Lines, the New York, New Haven & Hartford, the Canadian Pacific, the Grand Trunk Pacific and others, making a total of 20. The company is now issuing its third bulletin, which will be sent on application.

James E. Minor, whose death was noticed in these columns last week, was born October 12, 1843, in New York City. At eleven years of age he went to work in a screw shop of Russell, Birdsall & Ward, Pembroke, Mass., where he remained until the hard times of 1857, when he was one of the many who were dropped at that time. The necessities of his family were such that during the winter he took the only obtainable work, general clerking in the village tavern, at 50 cents a day. He was thus employed for six months, and then obtained a position in a hat and tailoring store. Shortly before his sixteenth birthday, he went to firing on the old New York & New Raven road from Port Chester to New York. He remained with this road and its successors as fireman and engineer until April, 1881, when he resigned to take the position of chief engineer for Bradley & Hubbard Company, Meriden, Conn., remaining with them about 15 months and leaving to go to the Nathan Manufacturing Company early in the year 1883, where he remained actively engaged in business up to the time of his death.

At the first call for troops by President Lincoln, he enlisted in a Rochester company and was appointed second lieutenant. His mother was informed of the fact and went before the re-

cruiting officer at the first meeting, and he was appointed in view of his being her sole support.

The stockholders of the Union Switch & Signal Company, Swissvale, Pa., have been notified of a special meeting to be held December 14 to vote on increasing the capital stock of the corporation from \$2,500,000 to \$5,000,000. Approval of the proposed increase will be followed by the declaration of a 60 per cent. stock dividend out of the new stock, which will be distributed to stockholders, both common and preferred, pro rata, and out of the remaining 40 per cent. of the new increase, the directors will issue from time to time for sale sufficient to increase the working capital to meet the increased demands of the company. The present capital is divided into \$500,000 preferred and \$2,000,000 common, on both of which there has been regularly paid 12 per cent. dividends each year. The new issue of stock proposed will be all common, and will be paid out alike to stockholders of both preferred and common. The proposed stock dividend is based on the actual gain in business of the company, and has more than been earned.

Following is a comparative statement of the income account of the Lackawanna Steel Company, New York, for the quarter ended September 30:

	1910.	Changes.
Income from mfg. and oper.	\$1,351,150	Dec. \$167,541
Income from invests, etc.	189,000	Inc. 108,540
Total income	\$1,440,150	Dec. \$1,002
Interest on bonds and notes	137,500	Inc. 39,625
Balance	\$1,002,650	Dec. \$21,627
Sinking funds	191,356	Inc. 7,562
Deprec. and renewals	308,636	Dec. 39,946
Total deductions	\$410,294	Dec. \$37,383
Surplus	\$592,356	Inc. \$5,757
Unfilled orders (gr. tons)	261,931	Dec. 144,931
From Jan. 1 to Sept. 30:		
Income from mfg. and oper.	\$4,021,493	Inc. \$1,895,269
Income from invests, etc.	867,000	Inc. 625,619
Total income	\$4,888,493	Inc. \$2,520,887
Interest on bonds and notes	1,292,083	Inc. 92,708
Balance	\$3,596,410	Inc. \$2,428,179
Sinking funds	293,270	Inc. 52,954
Deprec. and renewals	1,016,804	Inc. 184,860
Total deductions	\$1,310,074	Inc. \$337,814
Surplus	\$2,286,335	Inc. \$2,190,365
Unfilled orders (gr. tons)	261,931	Dec. 144,931

TRADE PUBLICATIONS.

Denver & Rio Grande.—The latest publication of the passenger department of the Denver & Rio Grande is a folder on "The Lands of Utah." It contains 24 pages of interesting descriptive matter, two full-page maps and numerous photographs.

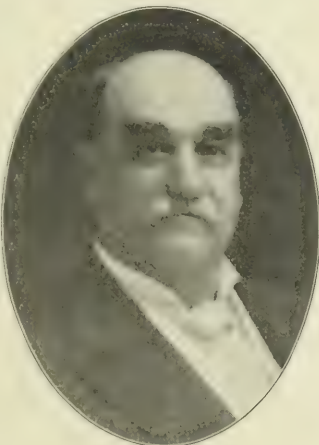
Locomotive Superheaters.—"The Generation and Use of Superheated Steam in Locomotives" is the subject of a catalogue just issued by the Locomotive Superheater Company, New York. Illustrations of several well-known types of superheaters are given, along with complete descriptions.

Mississippi Central.—A folder issued by the Mississippi Central gives considerable information about the new railway which has been built from Natchez, Miss., to Hattiesburg. Data concerning the principal towns, the climate and the industrial conditions is given, in addition to timetables and rates.

Denver & Rio Grande.—This road has issued a new timetable giving descriptive notes regarding points of interest, scenery, cities, etc., on its lines. The new folder is an improvement over previous ones, in that it contains a new coast to coast map of the Gould system, and also in the simple folding arrangement.

RAILWAY STRUCTURES.

BEEVILLE, TEX.—See Nueces River Valley under Railway Construction.



James E. Minor.

ERIE, PA.—The preliminary report submitted by the consulting engineer for the city of Erie recommends that the proposed new union station be built on either Peach or State streets in Erie. Also that the tracks be elevated to a greater height than called for in the plans submitted by the railway companies interested. Detailed plans have not yet been prepared by the city authorities and no agreement has yet been reached with the railway companies.

FAIRMONT, W. VA.—See Little Kanawha under Railway Construction.

HUNTINGTON, W. VA.—See Hocking Valley under Railway Construction.

LAREDO, TEX.—The concrete foundations for the piers of the new bridge which the National Railways of Mexico is building over the Rio Grande at Laredo are now being put in. It will be several months before the bridge is finished and ready for use. The new structure will be stronger than the existing one. (Feb. 11, p. 332.)

LOS ANGELES, CAL.—The San Pedro, Los Angeles & Salt Lake is adding 600 ft. of new docks, 30 ft. wide, at San Pedro harbor, to accommodate its freight traffic.

MEMPHIS, TENN.—See Chicago, Rock Island & Pacific under Railway Construction.

MOBILE, ALA.—See Pensacola, Mobile & New Orleans under Railway Construction.

PRINCE RUPERT, B. C.—An officer of the Grand Trunk Pacific writes that in addition to the contract which was given to Foley, Welch & Stewart for grading the G. T. P. from Prince Rupert, B. C., east to Alderemere, the same firm has a contract for the construction of the substructures of all permanent bridges between these places. Work will be started this winter on the substructure of the bridge crossing the Skeena river.

PRINCETON, IND.—The Southern Railway machine shop, engine and boiler houses were burned October 8, the total loss being estimated at \$200,000.

SACRAMENTO, CAL.—Work has been started by the Missouri Valley Bridge Co. on the concrete piers for the drawbridge to be built over the Sacramento river for the Northern Electric (Aug. 5, p. 263.)

ST. LOUIS, MO.—The Terminal Association has let the contract for building a new passenger station at Washington avenue to the Fruin-Colman Construction Co. The station will be located at the end of the Eads bridge and will serve many passengers who desire to leave the train in the downtown district. The building will be of brick, terra cotta, steel and concrete. It will be 46 ft. x 66 ft., and will be five stories high.

SUNBURY, PA.—The Sunbury & Selingsgrove has plans made for putting up a bridge over the north branch of the Susquehanna river on an extension to be built to Northumberland.

FOREIGN RAILWAY NOTES.

A railway concession has been granted to a Sonora, Mex., banking association for a line from Kino bay, on the Gulf of California, through Hermosillo, to Ures. The concession is for 99 years, and calls for the completion of 25 miles of the railway within 18 months, and the remainder within four years. The same concessionaires have asked for a supplementary concession to extend this line north from Ures, Sonora, through Arizpe, to Agua Prieta on the international line.

The receipts and expenses of the Paraguay Central Railway for the last six months of 1909 were as follows: Gross receipts, \$222,818; operating expenses, \$112,655; net receipts, \$110,163, against \$84,049 net receipts for the same half year in 1908. The passengers carried over the line and the receipts therefrom, 2,8979 and 271,792, respectively, were somewhat less than in 1908. The freight receipts, however, \$441,844, were much larger than in 1908. The main cause of the increase in freight receipts was in the freight on timber in logs, which showed an increase of more than 100 per cent. Other satisfactory increases were in sleepers, oranges, yerba maté and tobacco. Live-stock traffic, though still small in amount, continues to advance and shows 160 per cent. increase.

Late News.

The items in this column were received after the classified departments were closed.

R. D. Williams has been appointed general agent of the Erie Despatch, with office at Los Angeles, Cal., succeeding C. E. Smith, resigned.

Mortimer L. Schiff, of Kuhn, Loeb & Co., New York, has been elected a director of the Union Pacific, succeeding P. A. Valentine, resigned.

Argument for the defense in the Harriman merger case was opened by Peter F. Dunne, of Harriman counsel, with a condensed view of the whole case.

I. H. Luke, superintendent of the First division of the Denver & Rio Grande at Pueblo, Colo., has been appointed general manager of the Missouri, Oklahoma & Gulf, with office at Muskogee, Okla.

Announcement has been made that an increase of wages for locomotive enginemen and firemen on the Pennsylvania lines in Pennsylvania had been granted. The increase will be about 10 per cent., not including the increase of 6 per cent. announced in April. It is understood that it will date from June 1.

Despatches from Japan say that the Toyo Kisen Kaisha, under an agreement with the Western Pacific, has contracted to start soon a direct steamship line from Yokohama to San Francisco, omitting the call at Honolulu. It is expected that an 11-day trip will be the result. It is purposed to put two new boats in this service.

Counsel for the Interstate Commerce Commission has announced that an immediate appeal will be taken to the United States Supreme Court in the Pacific coast lumber rate cases, decided Monday by the United States Circuit Court at St. Paul in favor of the railways. A motion to advance for early argument will be made as soon as the case is docketed.

The Florida Citrus Exchange, representing the orange growers of Florida, has brought suit against the Atlantic Coast Line to compel the enforcement of that section of the Interstate Commerce act which makes it the absolute duty of the initial carrier to be responsible to the shipper for any damage to goods in transit, whether such damage occurred on the lines of the initial carrier or those of a subsequent one.

The general strike of railway employees on the French railways mentioned elsewhere was voted for on October 12 and 13, and the first day of the strike ended without either side giving way. The government after considering the question of indicting the leaders of the strike for plotting against the internal safety of the state abandoned the idea as too complicated. It would involve the Senate's sitting as a high court of justice. It is considered that the common law is sufficient to punish with penal servitude or even death those guilty of rendering railway traffic dangerous to life. Fifty warrants have been issued, 22 in Paris and the rest in the provinces, against the chief instigators of the movement. The official journal publishes a decree calling by name for military service with the colors for 21 days the officials of the employees' unions for the Western, Eastern, Paris, Lyons & Mediterranean and Paris-Orleans railway.

The annual meeting of the Railway Signal Association began October 11. The attendance was one of the largest in the history of the association, amounting to about 400, including women. At the end of the second day the committee reports had been discussed according to the program, but all action dealt with details only. The proposed amendments to the constitution were discussed but not voted on; decision must be by ballot. A proposal to have annual meetings henceforth in March and always in Chicago informally presented by the executive committee without recommendations was unanimously rejected. Officers elected for the ensuing year are: President, C. E. Denny (Lake Shore); second vice-president, B. H. Mann (Missouri Pacific); secretary, C. C. Rosenberg; eastern member executive committee, F. P. Patemall (Baltimore & Ohio), and western member executive committee, A. G. Shaver. The meeting next year will probably be at Colorado Springs, that being the first choice of the nominating committee and being generally favored.

A. Hale addressed the monthly meeting of the Trade Club of Chicago, on October 11, on the car situation. He said that statistics show a car shortage now larger than last year. The surplus is smaller and the only reason that there is not now a big car shortage is that now the railways are handling cars better than last year. The situation may get much worse, but figures show that better use will be made this fall of the available car supply than ever before. This is due to increased terminal and other facilities and to the raise in the per diem rate. The average movement of cars is two or three miles per day more than last year. Uniform demurrage rules and co-operation between industries have helped to improve conditions. Mr. Hale said that the present arrangement is not fair to car owner and some better method must be devised to protect him. Uniform rules are not perfect. To allow each shipper 48 hours or more is to give him no incentive to unload in less time. Mr. Hale thinks some arrangement should be made by which an industry that releases cars in less than 24 hours should be rewarded in some form of money payment. He expressed fear that sooner or later a general shortage would be brought about owing to present public policy regarding railways.

President James McCrea, of the Pennsylvania Railroad, on examination before the Interstate Commerce Commission, presented a prepared argument on the application of eastern railways for higher freight rates. Mr. McCrea showed that the Pennsylvania has spent more than \$500,000,000 in improvements and new construction in the last ten years, and that on the money invested in these improvements a very small return is possible under existing conditions. Mr. McCrea said in part:

The Pennsylvania Lines East of Pittsburgh have cost very much more than the capitalization represents. On that capitalization it has never paid more than a fair return; less, in fact, than most other characters of investment, such as manufacturing, mining and agriculture. The results of constant increases in its business have been distributed either through reductions in rates, increases in amounts paid for wages and material, or by reinvestments in the property not capitalized. It has always been typical of good and constantly improved service—in fact, the character of service which, if I understand the American people, they desire perpetuated and improved. A railway system of this character so capitalized and rendering a service which is not only of the highest character, but satisfactory to the public and to its patrons, deriving as it did in the year 1909 net earnings to the amount of but 5.01 per cent. of the amount actually invested in the property, it is difficult for me to understand how a system of rates which secures such results can be regarded as on too high a basis.

Earnings after the payment of interest and dividends, Mr. McCrea continued, have been put back into the property to the amount of \$12,000,000 a year on the average for the last ten years. Since the passage of the Interstate Commerce law in 1887, \$262,000,000 had been thus expended. The necessity of such expenditures as well as the ability of the company to make them Mr. McCrea explained as follows:

In my judgment it would be wholly unsafe to assume that the company will as the result of the growth of its business be enabled to recoup itself for the depletion in its surplus revenue which is certain to result from a continuance of the present operating cost. Under these conditions I feel that it is essential in the interest of the public and of shippers, as well as of the railway company itself, that it should be permitted to secure through an advance in rates the amount which represents its additional outlay on account of the advance in wages in order that its surplus earnings may continue at approximately the rate at which they have been running in the past. It will require the expenditure of more than these surplus earnings to enable the company to keep pace with the demands of the public and of its shippers and unquestionably additional capital must be secured in the future. If we are to obtain this we must not only be in a position to make a fair return on it, but we must be able to show a margin of safety in our earnings.

Based on my railway knowledge and experience I believe that, generally speaking, that which I have said in regard to the Pennsylvania Railroad as to the necessity for the rate advance is equally true of almost all railways in the United States—certainly those which are conservatively managed and which are endeavoring to give the public such a service as they have a right to expect.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Chesapeake & Ohio has ordered 24 Mallet locomotives from the American Locomotive Company.

The Midi Railway, France, has ordered one electric freight locomotive from the French Westinghouse Company, for freight service.

The Belt Line of Chicago is considering ordering 10 switching locomotives, but the details and specifications have not as yet been issued.

CAR BUILDING.

The Canadian Pacific is in the market for 50 tank cars.

The Boston Elevated is in the market for 100 passenger cars.

The Norfolk & Western is in the market for 500 fifty-ton hopper cars.

The Petroleum Iron Works Company, Sharon, Pa., is in the market for 50 tank cars.

The Delaware, Lackawanna & Western is in the market for 500 box and 500 hopper cars.

The Cold Blast Transportation Company has ordered 400 steel underframe, 25-ton, beef cars from Haskell & Barker.

The Midi Railway, France, has ordered 30 double-truck electric motor coaches from the French Westinghouse Company.

The San Antonio & Aransas Pass, as reported in the *Railway Age Gazette* of September 23, has ordered four combination mail and passenger cars, two each from the Hicks Locomotive & Car Works and the American Car & Foundry Company. These cars will be 69 ft. 4 in. long, 9 ft. 3½ in. wide and 6 ft. 9½ in. high, inside measurements; and 75 ft. 6 in. long, 10 ft. 4¼ in. wide and 14 ft. 2 in. high, over all. The bodies will be of wood and the underframes of steel. The special equipment will include:

Bolsters, body	Steel
Bolsters, truck	Cast steel
Brakes	Westinghouse
Brake-beams	Diamond special
Brake-shoes	20-lb. steel back
Brasses	Chicago diagonal
Couplers	Simplex
Curtain fixtures	Curtain Supply Co.
Curtain material	Pantasote
Draft gear	Miner friction
Dust guards	Security
Heating system	Safety Car Heating & Lighting Co.
Journal boxes	Symington
Lighting system	Prutsche mantle lamps
Paint	Murphy Varnish Co.
Platforms	Steel for wide vestibules
Roofs	Canvas covered
Side bearings	Miner gravity
Steps	Four-tread malleable iron
Trucks	Six-wheel
Vestibules	Pullman type
Vestibule diaphragms	Ajax
Vestibule trap doors	Natl steel drop door and lifting device
Wheels	38-in. steel-tired, Standard Steel Works Co.
Window fixtures	O. M. Edwards

MACHINERY AND TOOLS.

The Lake Shore & Michigan Southern is in the market for a 6-ft. plain radial drill.

The Commissioners of the Transcontinental Railway, P. E. Ryan, secretary, Ottawa, Can., will receive bids, until October 18, for machinery required for the equipment of a roundhouse at Lake Superior Junction, Ont. Plans and specifications may be seen at the office of G. Grant, chief engineer, Ottawa, and of S. R. Paulin, district engineer, St. Boniface, Man.

The Delaware, Lackawanna & Western has recently purchased the following machine tools for its mines department shop:

- 1 Prentice 14-in. x 6-ft. lathe, Fairbanks, Morse & Co., New York.
- 1 Prentice, 16-in. x 14-ft. lathe, Fairbanks, Morse & Co., New York.
- 1 Prentice 18-in. x 16-ft. lathe, Fairbanks, Morse & Co., New York.
- 1 25-in. x 18-ft. lathe, Niles-Bement-Pond Co., New York.
- 1 27-in. x 16-ft. lathe, Niles-Bement-Pond Co., New York.
- 1 Le Blond 33-in. x 16-ft. lathe, Niles-Bement-Pond Co., New York.
- 1 30-in. x 25-ft. shafting lathe, Niles-Bement-Pond Co., New York.
- 1 54-in. x 54-in. x 16-ft. planer, Niles-Bement-Pond Co., New York.
- 1 35-in. x 35-in. x 12-ft. heavy planer, Niles-Bement-Pond Co., New York.
- 1 26-in. x 12-ft. double head shaper, Manning, Maxwell & Moore, New York.
- 1 20-in. Gould & Eberhardt shaper, W. E. Shipley Mch. Co., Philadelphia.
- 1 36-in. Bullard vertical turret lathe, Bullard M. T. Works, Bridgeport, Conn.
- 1 No. 3A universal miller, Brown & Sharpe Mfg. Co.
- 1 24-in. slotter, T. C. Dill Co., Philadelphia, Pa.
- 1 standard boring mill, Bullard Machine Tool Works.
- 1 60-in. vertical boring mill, Niles-Bement-Pond Co., New York.
- 1 40-in. Bement drilling machine, Niles-Bement-Pond Co., New York.
- 1 3-ft. Western radial drill, Hill, Clarke & Co., Boston, Mass.
- 1 66-in. horizontal boring and drilling machine, Niles-Bement-Pond Co., New York.
- 1 2-in. double head bolt cutter, Acme Machinery Co.
- 1 48-in. radial drill, Hill, Clarke & Co.
- 1 62-in. radial drill, Niles-Bement-Pond Co.
- 1 No. 3 Rochester boring machine, W. E. Shipley Machinery Co.
- 1 hydraulic shaft straightener, Logeman Bros., Milwaukee, Wis.
- 1 Blount wet tool grinders, Manning, Maxwell & Moore.
- 1 6-in. Pratt & Whitney centering machine, Niles-Bement-Pond Co.

IRON AND STEEL.

The Cuba Railroad has ordered 1,000 tons of rails from the Pennsylvania Steel Company.

The Atlantic Coast Line has ordered 15,000 tons of O. H. rails from the Tennessee Coal, Iron & Railroad Company.

General Conditions in Steel.—The unfilled tonnage of the United States Steel Corporation on September 30 was 3,158,106 tons, which is a decrease of 379,022 tons. On August 31 it was 2,537,128 tons; on July 31, 3,970,931; on June 30, 4,257,794 tons, and on March 31, 5,402,514 tons. This unfilled business reflects the depression that has existed in the steel industry since the first of the year. Unless there is a resumption of buying during October, the unfilled tonnage will establish a new low record. The largest amount ever reported was on December 31, 1906, when 8,489,718 tons were on the books.

SIGNALING.

The Pennsylvania Railroad has installed an electro pneumatic interlocking plant at Conemaugh, Pa., 35 miles west of Altoona, to take the place of mechanical interlocking. The air pump is in the roundhouse.

The Union Switch & Signal Company, Swissvale, Pa., and the General Railway Signal Company, Rochester, N. Y., have settled their patent litigation in such way that their respective customers shall be entirely exempt from danger of patent litigation for the automatic block signaling systems involving the distinctive current, on which the Struble patent has recently been broadly sustained in court. By the agreement entered into between these companies, their customers may have the benefit not only of this broad principle in its original form, but in any of the forms represented by the numerous improvement patents up to the present time, including the Young patents.

New Oil for Locomotive Headlights.

To meet the increasing demand for a headlight that would produce better illumination than the oil lamp at present in general use, the Galena-Signal Oil Company, Franklin, Pa., has introduced an improved headlight oil. This oil is known as Galena Railway Safety Oil "B."

Recent government tests made by the Bureau of Standards at Washington, D. C., show this oil to produce, with headlight of ordinary construction, a minimum of 1,800 c.p. and with a headlight equipped with 10 in. optical lens—showing no more internally than the ordinary reflector—and much less than the maximum—a minimum of 2,400 c.p. Exhaustive service tests were made on a large railway to prove its adaptation to this use. The high fire test of this oil enables it to withstand the great heat gen-

erated by headlight burners without becoming gaseous. When an oil does become gaseous, it results in the consumption of much more oil than is necessary.

The use of this oil should therefore eliminate the danger resulting from smoked chimneys, damaged reflectors and the frequent burning up of headlamps, and reduce to a great extent the labor of caring for them.

The Cochran Pipe Wrench.

The Cochran Pipe Wrench Mfg. Company, Chicago, is building a new plant at 78th street and Woodlawn avenue to make Cochran pipe wrenches, which, for about two years, have been made by the Kilborn & Bishop Company, New Haven, Conn. That company will continue to make the wrenches but, as it is unable to meet the demand, the new plant in Chicago is being built to increase the output. The strength of this wrench is obtained by using crucible and drop forged steel, the composition of which is varied to give the greatest possible strength and wearing power in each part. The parts are designed to eliminate the usual unsatisfactory features of pipe wrenches. The weakest point in a pipe wrench is usually the connection



Cochran Pipe Wrench.

between the frame and handle. The Cochran wrench has a single casting serving the purpose of frame and handle, and a rocker set in the heavy guard of this casting forms a very strong pivot. The guard is made particularly heavy so that excessive strain on the handle cannot bend the parts and change the angle of the jaws and crush the pipe. This construction enables the wrench to stand a strong side pull, which is a severe test for the average wrench. The bend of the hook jaw, another common point for failure, has been strengthened by the addition of metal. An inserted jaw, made of special steel, is used, which allows removals of this wearing part. This piece is grooved into the main casting and is held in place by a pinion. The wrench cannot lock on the pipe and a reverse pull does no harm. The rocker casting has a tang which bears on a spring attached to the frame which furnishes the grip and release. Another commendable feature is the opening in the handle below the inserted jaw, to allow dirt and scale to fall out.

The Paraguay Central.

Work on the extension of the Paraguay Central from Pirapo to Encarnacion, to connect with the Argentine railway system running to Buenos Aires, is progressing satisfactorily. Up to the end of December, 1909, 61 miles of earthworks had been completed and 39 miles of rails laid. The whole length of the extension is 77 miles. The only important item of work remaining to be done on this section is the erection of a 180-ft. steel span over the Tebicuari river and the completion of two station buildings, both of which are well advanced. It is expected that the extension will be finished before July, 1911. The investigations of the general manager of the railway for determining the quantity and character of the new rolling stock required for the road included a special mission to the United States. The result, however, was that orders for the whole new rolling stock, locomotives, passenger and freight cars, were placed in England. Special inquiry upon this point in the directors' report brought out the fact that American freight cars are not considered suited to the requirements of service in a remote country like Paraguay, where facilities for repair are not complete. The criticism of American cars is that they are not of sufficiently solid construction to go through accidents without having to be taken to the well-equipped repair shops so accessible to the American railway system. Another reason why the orders for new equipment were placed in England was that the English shops were short of work and were willing to make better terms of payment than could be obtained in the United States.

ANNUAL REPORTS.

PERE MARQUETTE RAILWAY CO.

Detroit, Mich., Sept. 14, 1910.

The Board of Directors of the Pere Marquette Railway Company, do hereby submit herewith their Report of the operations and affairs of the Pere Marquette Railroad Company for the fiscal year ended June 30, 1910.

MILEAGE			
	1909	1909	Inc. +,
	1909	1909	Dec. —
Mileage of Road Operated	1,899.56	1,814.49	1.93
Mileage of Road Closed	2.00	2.00	—
Lease and Trucking Rights	304.02	304.53	+ .09
Lease of Heavy Equipment	304.88	2,369.72	1.84
Lease of Heavy Equipment	304.88	304.88	—
Lease of Heavy Equipment	304.88	304.88	—
Harbor & St. Joe Railway and Light Co.	2.72	—	—2.72
Mileage Operated	2,305.24	2,335.00	—2.76

The decrease of 7.56 miles as compared with June 30, 1909, is made up as follows:

Decrease.			
10th St. Chicago, Ill., to Illinois-Indiana State Line, P. F. W. & C. Ry., corrected	—	—	.03
Coloma to Paw Paw Lake, Leased to B. H. & St. J. Ry. & L. Co.	—	—	2.72
Green Bay Branch track taken up	—	—	4.93
			7.68

Increase.			
10th St. Chicago, Ill., to Illinois-Indiana State Line, P. F. W. & C. Ry., corrected	—	—	.12

Total Decrease in Mileage operated..... 7.56

The statistics and tables shown throughout this report include the operations of

Pere Marquette Railroad Company.

The Lake Erie and Detroit River Railway Company.

REVENUES AND EXPENSES.

Operating Revenues		\$16,542,271.49
Operating Expenses	\$11,698,842.16	
	755,641.37	
		12,454,483.53
		\$4,087,787.96
Interest	\$2,924,665.06	
Rentals	676,588.89	
		3,601,253.95
		\$486,534.01
Other Income	\$126,393.08	
Hire of Equipment (Debit)	143,213.40	
		*16,820.32
		Surplus.... \$469,713.69

*Decrease.

COMPARATIVE STATEMENT OF REVENUES AND EXPENSES
For the Fiscal Year Ended June 30, 1910, and June 30, 1909.

	1910.	1909.	Inc. +, Dec. —
Operating Revenues	\$16,542,271.49	\$14,629,827.31	+ \$1,912,444.18
Operating Expenses	11,698,842.16	10,581,580.14	+ 1,117,262.02
		755,641.37	
Net Operating Revenues	4,843,429.33	4,048,247.17	+ 795,182.16
Interest	2,924,665.06	2,969,846.51	— 45,181.45
Rentals	676,588.89	699,065.90	— 22,477.01
Total Interest and Rentals	3,601,253.95	3,668,912.41	— 67,658.46
Surplus	\$469,713.69	\$40,650.93	+ \$429,062.76

	1910.	1909.	Inc. +, Dec. —
Percentage of Expenses to Operating Revenues	70.72	72.33	.. 1.61
Percentage of Taxes to Operating Revenues	4.57	3.94	.. .63
Total	75.29	76.27	.. .98

NOTE.—The Revenues and Expenses covering Outside Operations are included in the figures shown above.

CAPITAL STOCK AND BONDED DEBT.

During the fiscal year ended June 30, 1910, there was no increase in the

capital stock of the Pere Marquette Railroad Company, but the bonded debt was increased \$141,183.00, as follows:

Bonds Issued:

Pere Marquette 4% Refunding Bonds were issued, as follows:	
In exchange for Robt. W. & Co. 5% Equipment Notes retired in April, 1909, and October, 1909	\$152,000.00
In exchange for Lake Erie & Detroit River Ry. 5% Equipment Bonds retired in March and September, 1909, and March, 1910	24,000.00
In exchange for Western Equipment Co., Ltd., 6% Bonds, retired in April, 1909	1,000.00
In exchange for Marquette Equipment Co., Ltd., 5% Bonds retired in October, 1909	9,000.00
In exchange for Eastern Equipment Co. 5% Bonds retired in March, 1910	650,000.00
Account of Additions and Betterments	200,000.00

Total Pere Marquette Refunding Bonds Issued.....\$1,184,000.00

Equipment Notes were issued in favor of the American Locomotive Company and the Pullman Company as follows:

5% Equipment Notes were issued in favor of the American Locomotive Co. for 12 locomotives received December, 1909	\$125,955.00
5% Equipment Notes, Series C, were issued in favor of the Pullman Co. for 20 coaches, 10 baggage, mail and express cars purchased under car lease agreement dated June 15, 1910	232,752.00
	\$388,707.00

Total Bonds issued\$1,492,707.00

Bonds Retired:

Lake Erie & Detroit River Ry. 5% Equipment Bonds retired September 1, 1909, and March 1, 1910	\$16,000.00
Marquette Equipment Co. 5% Bonds retired October 1, 1909	100,000.00
Robt. Winthrop & Co. 4½% Equipment Notes retired October 1, 1909, and April 1, 1910	152,000.00
American Car & Foundry Co. 6% Equipment Notes retired October 1, 1909, and April 1, 1910	80,000.00
Pere Marquette 6% Equipment Gold Notes (Eastern Equipment Co. extension) retired March 1, 1910	650,000.00
American Locomotive Co. 5% Equipment Notes retired April 3, 1910	10,955.00
Pullman Co. 5% Equipment Notes (Series A and B) retired by monthly payments during this fiscal year	556,191.46
Kleybolte 4½% Equipment Trust Agreement; payments made October 1, 1910, and April 1, 1910	68,743.54

Total Bonds retired.\$1,633,890.00

Decrease in Bonded Debt.\$141,183.00

CAPITAL EXPENDITURES.

Payments have been made out of current cash for sundry equipment obligations, for the purchase of new equipment and for receiver's certificates, as follows:

Paid Pullman Company for notes maturing during this fiscal year and issued during the Receivership period for the purchase of 4,000 Box Cars	\$594,152.39
Paid the Cincinnati, Hamilton & Dayton Railway Company on account of equipment purchased under what is known as the Kleybolte Equipment Trust Agreement in 1905, and turned over to the Pere Marquette while that property was under lease to the C. H. & D. This payment was made in accordance with the award of arbitrators	68,743.54
Paid holders of Marquette Equipment Co., Ltd., 5% Bonds, issued October 1, 1900, for the purchase of 17 locomotives and 1,110 Freight Cars and called for payment October 1, 1909	100,000.00
Paid holders of Lake Erie & Detroit River Ry. 5% Equipment Bonds, issued March 1, 1904, for the purchase of 3 Locomotives and 210 Coal Cars and maturing September 1, 1909, and March 1, 1910	16,000.00
Paid Robert Winthrop & Co. for notes maturing October 1, 1909, and April 1, 1910, and issued October 1, 1904, for the purchase of 20 Locomotives and 2,350 Freight Cars	152,000.00
Paid holders of Pere Marquette 6% Equipment Gold Notes, maturing March 1, 1910, which were issued for extension of Eastern Equipment Co. 5% Bonds for like amount covering 65 Locomotives, 4,833 Freight Cars, 1 Wrecking Crane and 8 Car Ferries	650,000.00
Paid American Car & Foundry Co. 6% Notes, maturing October 1, 1909, and April 1, 1910, issued August 1, 1908, for the purchase of 750 Gondola Cars	80,000.00
Paid American Locomotive Co. for 25% of total cost of 12 Locomotives purchased during this fiscal year	\$41,955.00
For notes issued Jan. 3, 1910, for balance of purchase price of said Locomotives and maturing April 3, 1910	10,955.00
Paid Industrial Iron Works, Bay City, Mich., for 2 Locomotive Cranes	52,940.00
For Receiver's Certificates issued May 5, 1906, and retired August 1, 1909	10,919.06
	180,000.00
	\$1,904,754.99

Refunding Bonds to the amount of \$837,000.00 were issued to reimburse the Treasury account of payments as above, but these bonds have not been sold and are at present under pledge for short-term loans. The necessary cash to meet these payments was derived from the following sources:

Proceeds from sale of \$635,000 par value Pere Marquette 4% Refunding Bonds at 75.....	\$476,250.00
Cash borrowed on short-term notes.....	685,700.00
Surplus for year ended June 30, 1910.....	469,713.69
Decrease in Assets account collections made on outstanding bills and from agents and conductors.....	248,929.85
Increase in sundry liabilities.....	24,161.45
	\$1,904,754.99

ROADWAY AND TRACK.

During the year there were 15.15 miles of side and yard tracks built and 16.18 miles taken up. A net decrease of 1.03 miles.

There were 519,314 cross ties used during the year, 370,613 being put in main track renewals, 97,719 in side track renewals and 50,982 used for new work.

329,456 tie plates were put in.

713 sets of switch ties were used, 197 sets being placed in main line renewals, 73 sets in side track renewals and 443 sets in new work.

At Flint extensive changes and additions were made to our yard facilities which cost \$100,000 to accommodate 500 additional cars.

At Rose Center the alignment of 1 1/4 miles of main line is being changed to reduce curvature and to avoid the rebuilding of one bridge. A considerable portion of this work was done during the present fiscal year and the remainder will be completed shortly.

STEEL RAIL.

During the year there were 149,729 track feet of 75-lb. rail and 2,342 track feet of 70-lb. rail laid on Main Line, as follows:

75-lb. rail:	
Chicago Division.....	76,237 track feet.
Grand Rapids Division.....	23,001 " "
Petoskey Division.....	20,370 " "
Ludington Division.....	17,365 " "
Toledo Division.....	7,480 " "
Saginaw Division.....	5,376 " "
	149,729 " "
70-lb. rail	
Buffalo Division.....	2,342 " "
Total.....	152,071 track feet.

The relaying of the above mileage with 75-lb. and 70-lb. rail released 85-lb., 75-lb., 70-lb., 67-lb. and 56-lb. rail, which was used as follows:

Relaid on Main Line:	
Petoskey Division.....	38,857 track feet.
Saginaw Division.....	22,775 " "
Toledo Division.....	7,480 " "
Harbor Beach Branch.....	17,333 " "
Kalkaska Branch.....	6,000 " "
	92,445 " "
Used in side tracks.....	34,283 " "

BRIDGES AND CULVERTS.

New steel bridges on concrete abutments and piers, replacing wooden structures, have been constructed at Sombra, Williamson, Holland and Milford. Wooden bridges were constructed at Crosswell, Deckerville, Memphis, Berkshire and Saginaw, replacing open culverts.

A new 60-ft. deck girder and a locking device were installed at Benton Harbor drawbridge.

Concrete box culverts, replacing wooden culverts, were built as follows: Alpine, Little Manistee, Yale, Novi (2), Lowell (3), Gera, Erie, Raisin, Fremont, Merrill, Ennet, W., Wilkie, Arner, Leamington and McGregor. Extensive repairs were made to bridges at St. Thomas (2), Portland, New Buffalo and three on the Manistee Branch.

108 cast iron pipe culverts were put in during the year.

BUILDINGS, FUEL AND WATER STATIONS.

A new station building was erected at New Buffalo, and additions made to those at Merrill and Uby.

A new out-bound freight station was built at Flint and a new freight house was constructed at North Flint.

128 feet of new dock at Sarnia, referred to in our last annual report, was completed during the year.

New coal chutes were erected at St. Thomas and new and improved coal-machinery was installed at Detroit.

An extensive addition was made to Wyoming shops.

FENCES.

During the year there were 274 miles of new fence built, 82.17 miles rebuilt and 60.51 miles repaired.

INTERLOCKING AND SIGNALS.

Electrically operated block signals were installed at Flint Yard and at Milland.

Signal equipment and supplies were installed at stations on Saginaw Division and also on the Detroit Division.

TELEGRAPH.

During the year 140.06 miles of telegraph line were constructed.

EQUIPMENT.

During the year contracts were made for the purchase of twenty first-class coaches, eight baggage cars and two baggage and mail cars. Of this equipment, prior to June 30th, thirteen first-class coaches were received and put in service.

Twelve cars also constructed during the year, seventeen consolidated freight coaches, four freight baggage and mail cars, one large switch engine and one large passenger engine.

One passenger coach engine was used and one small second and free engine, which engine was damaged during the year on account of their age and being too light for the extra heavy passenger.

Three and a half new passenger cars were received from Canadian manufacturers, one on May 1, 1910, and the others in June and July. Also received one baggage car, two narrow-gauge second-class coaches (smokers) and one second-class passenger car. These cars were received from the Canadian Pacific and one passenger car, one baggage and mail car and one passenger car were also received from the Canadian Pacific.

Three new passenger cars, one first-class and one second-class were rebuilt. Thirteen new baggage cars were built into work service cars and four box cars were converted into passenger cars.

Seventy-one box cars, two stock cars, thirty coal cars, seventeen flat cars, twelve caboose cars and ten work cars were destroyed by fire or accident on lines of this company and on foreign lines.

Twenty-eight box, ten flat, two coal and nine work cars were retired from service during the year on account of age and of too small capacity to justify extensive repairs necessary to put them into serviceable condition.

SUMMARY OF CHARGES AND CREDITS TO ADDITIONS AND BETTERMENTS DURING FISCAL YEAR ENDED JUNE 30, 1910.

Description.	Debits.	Credits.	Net.
Right of Way and Station Grounds.....	\$2,028.95	\$1,275.00	\$753.95
Real Estate.....	1,369.89	4,525.00	3,155.11Cr.
Waterways.....	5,481.12	.....	5,481.12
Grade Revision and Changes of.....	28,734.17	.....	28,734.17
Bridges, Trestles and Culverts.....	67,598.96	39,428.94	28,170.02
Increase in Weight of Rail.....	15,114.11	.....	15,114.11
Improved Frogs and Switches.....	167.87	.....	167.87
Track Fastenings and Other Materials.....	35,140.85	.....	35,140.85
Sidings and Spur Tracks.....	79,402.89	70,035.96	9,366.93
Terminal Yards.....	69,979.54	12,146.83	57,832.71
Fencing Right of Way.....	2,540.01	.....	2,540.01
Improvement of Over and Under Grade Crossings.....	288.79Cr.	.....	288.79Cr.
Interlocking Apparatus.....	1,044.35	2,650.00	1,605.65Cr.
Block and Other Signal Apparatus.....	3,641.67	.....	3,641.67
Station Buildings and Fixtures.....	28,593.19	4,085.99	24,507.20
Shops, Engine Houses and Turn-tables.....	23,825.52	46,403.71	22,578.19Cr.
Shop Machinery and Tools.....	33,074.46	13,937.20	19,137.26
Water and Fuel Stations.....	4,703.99	14,794.50	10,090.51Cr.
Grain Elevators and Storage Warehouses.....	108.83	13,072.41	12,963.58Cr.
Dock and Wharf Property.....	1,797.07	833.28	963.79
Miscellaneous Structures.....	16,465.37	10,716.75	5,748.62
Equipment.....	710,590.15	182,796.32	527,793.83
*Equipment Replacement.....	.....	498,434.54	498,434.54Cr.
Total.....	\$1,131,114.17	\$915,155.43	\$215,958.74

*This \$498,434.54 represents the balance in Equipment Replacement account for equipment taken out of service prior to July 1st, 1909, and has been credited to Additions and Betterments in accordance with recent ruling of the Interstate Commerce Commission.

The gross revenues of the Pere Marquette Railroad Company for the fiscal year ended June 30, 1910, were \$16,542,271.49, an increase over those of the preceding year of \$1,912,444.13.

Of the gain in revenues during the year, \$1,435,510.01 was in freight traffic, with an increased tonnage carried of 1,210,535 tons, and of 203,575,563 tons carried one mile. The average rate per ton per mile was .591 cents, as compared with .577 cents in 1909. The most important gains in the freight traffic can be accounted for by increased shipments of the following commodities: Coal and Coke, 391,379 tons; Stone, Sand, etc., 170,224 tons; Lumber, Lath and Shingles, 178,406 tons; Other Products of Forest, 102,787 tons; Miscellaneous Carload Shipments, 130,598 tons. The principal decrease in the tonnage carried was as follows: Logs, 144,888 tons; Ice, 101,840 tons.

The passenger revenues show an increase of \$340,844.67, with an average rate per passenger per mile of 1.770 cents, as against 1.774 cents in 1909. The number of passengers carried increased 365,581. The increase in the number of passengers carried one mile was 19,773,052. This represents an increase in passengers carried one mile over the preceding year of 10.43%, which is slightly over the normal increase per year. This is largely accounted for by the fact that additional passenger trains were placed in service and our passenger train mileage increased thereby 117,303 miles or 2.96%.

The revenues from outside operations increased \$83,861.10, and from express traffic the increase was \$24,792.75. The mail revenues increased \$2,176.12.

The expenses of operation show increases aggregating \$1,117,262.02, of which amount \$263,217.04 was in maintenance of way and structures; \$699,205.96 in maintenance of equipment; \$70,326.77 in traffic expenses; \$558,189.29 in transportation expenses; \$5,155.94 in general expenses, and \$21,217.02 in outside operations. The percentage of expenses to gross revenues was 70.72%, as against 72.33% in 1909, a decrease of 1.61%.

The taxes for the year were \$755,641.37, as compared with \$576,892.97 paid in 1909—an increase of 30.98%, or \$178,748.40.

The general income account of the company shows the net income of the year, after payment of interest on the funded debt, taxes and all other fixed charges, to have been \$460,713.69, which is an increase over that for the preceding year of \$429,062.76.

The charges to operating expenses as per tabulated statements have been made in accordance with classification of expenses adopted by Interstate Commerce Commission, which provides for maintenance and operation only, and does not permit of any charge that is in the nature of an addition or betterment to the property—such charges being provided for under their classification of additions and betterments, as shown on page 5 of this report. The general balance sheet on page 15 is also in the form furnished by the Commission.

The Profit and Loss debit as of June 30, 1909, was \$1,004,428.05. This account was debited during the year with \$405,972.44 account of charges for discounts on bonds sold; legal and other expenses in connection with the reorganization of the Pere Marquette Railroad, depreciation prior to July 1, 1909, on equipment, real estate and structures destroyed, removed or sold; and other sundry adjustments during the year. The account was credited during the year with \$1,405,972.44 account of charges for discounts on bonds sold; legal and other expenses in connection with the reorganization of the Pere Marquette Railroad, depreciation prior to July 1, 1909, on equipment, real estate and structures destroyed, removed or sold; and other sundry adjustments during the year. The account was credited during the year with \$1,405,972.44 account of charges for discounts on bonds sold; legal and other expenses in connection with the reorganization of the Pere Marquette Railroad, depreciation prior to July 1, 1909, on equipment, real estate and structures destroyed, removed or sold; and other sundry adjustments during the year. The account was credited during the year with \$1,405,972.44 account of charges for discounts on bonds sold; legal and other expenses in connection with the reorganization of the Pere Marquette Railroad, depreciation prior to July 1, 1909, on equipment, real estate and structures destroyed, removed or sold; and other sundry adjustments during the year.

Notwithstanding the gross revenues of the Company exceed those of any previous year, the Company is not able to meet its needs without increased expenditures. The Company is indebted to various companies in wages, the higher prices for material and the loss in net revenues through the continued operation of the freight rate line to the sparsely settled communities in Michigan, have made this impossible.

By order of the Board of Directors,

WILLIAM COLTHER, President.

PINE BARRENTON RAILROAD COMPANY - GENERAL RELEASE SHEET - YEAR 1970 (1970-01-01)

[illegible]

INCOME ACCOUNT FOR FISCAL YEAR ENDED JUNE 30, 1910, AS COMPARED WITH PREVIOUS FISCAL YEAR.

	1910.	1909.	Increase or (—) decrease.		1910.	1909.	Increase or (—) decrease.
<i>Operating Revenues:</i>				<i>Net Operating Revenues</i>	\$4,843,429.33	\$4,048,247.17	\$795,182.16
Freight Revenue	\$11,131,075.55	\$9,705,564.64	\$1,425,510.91	Taxes Accrued	755,641.87	576,892.97	178,748.40
Passenger Revenue	3,707,311.04	3,866,466.37	340,844.67	Operating Income	\$4,087,787.96	\$3,471,354.20	\$616,433.76
Mail Revenue	254,047.41	251,871.29	2,176.12				
Express Revenue	351,426.56	326,638.81	24,787.75	<i>Other Income:</i>			
Other Revenue from Transportation	394,570.63	359,767.76	34,802.87	Dividends on Stocks Owned	\$78,369.00	\$185,646.06	—\$107,277.06
Revenue from Operation other than Transportation	157,191.70	159,260.94	—2,069.24	Interest on Securities Owned		9,049.50	—9,049.50
Revenue from Outside Operations	546,645.60	460,262.50	86,383.10	Other Interest	11,934.96	15,767.30	—3,832.34
Total Operating Revenues	\$16,542,271.49	\$14,629,827.31	\$1,912,444.18	Miscellaneous Rentals Rec'd	35,952.10	37,895.94	—1,943.84
				Sundry Small Items	137.02	2,178.06	—2,041.04
				Hire of Equipment	Dr. 143,213.40	Dr. 104,667.72	—\$132,748.65
				Total Income	\$4,070,967.64	\$3,709,563.34	\$361,404.30
<i>Operating Expenses:</i>				<i>Deductions from Income:</i>			
Maint. of Way and Structures	\$1,932,437.39	\$1,609,220.35	\$263,217.04	Interest on Fixed Debt	\$2,898,792.88	\$2,941,150.66	—\$42,357.78
Maintenance of Equipment	2,117,699.85	2,018,492.89	99,206.96	On Bills Payable	25,047.11	11,690.15	13,357.03
Traffic Expenses	420,298.02	349,971.25	70,326.77	On Receiver's Certificates	825.00	17,005.70	—16,180.70
Transportation Expenses	6,370,681.98	5,712,492.69	658,189.29	Rentals Paid	676,588.89	699,065.90	—22,477.01
Operating Expenses	362,173.43	357,015.43	5,158.00	Total Deductions from Income	\$3,601,253.95	\$3,668,912.41	—\$67,658.46
Outside Operations	495,601.55	474,884.58	21,717.02				
Total Operating Expenses	\$11,698,842.16	\$10,581,580.14	\$1,117,262.02	Surplus	\$469,713.69	\$406,650.93	\$429,062.76

THE NEW YORK, NEW HAVEN AND HARTFORD RAILROAD COMPANY.—THIRTY-NINTH YEAR.

In accordance with the By-Laws of The New York, New Haven & Hartford Railroad Company, the Board of Directors have caused to be prepared a general statement of its affairs for the year ending June 30, 1910, as follows:

FOR TWELVE MONTHS, JULY 1, 1909, TO JUNE 30, 1910, INCLUSIVE.

Operating Revenue:	
Freight Revenue.....	\$30,110,588.30
Passenger Revenue.....	24,885,864.74
All other Revenue from Transportation.....	4,392,643.04
Revenue from Operations other than Transportation.....	1,304,571.47
Total Operating Revenue.....	\$60,693,667.55
Operating Expenses:	
Maintenance of Way and Structures.....	7,132,375.64
Maintenance of Equipment.....	6,461,772.23
Traffic Expenses.....	\$50,943.03
Transportation Expenses.....	22,942,674.94
General Expenses.....	1,801,143.94
*Total Operating Expenses.....	38,689,215.76
Net Operating Revenue.....	22,004,451.79
Net Revenue from Outside Operations.....	1,308,470.01
Net Earnings To Connectors Company, July 1, 1909, to February 28, 1910.....	2,254,278.58
Total.....	25,567,200.38
Taxes.....	3,983,377.01
Total.....	21,583,823.37
Income from Other Sources:	
Dividends on Stocks.....	3,504,568.52
Interest on Bonds.....	887,103.94
Miscellaneous Income.....	2,012,293.50
Rents Received.....	332,123.23
Hire of Equipment.....	4,553.42
Total Income from Other Sources.....	6,737,146.61
Total Income.....	28,320,969.98
Deductions from Income:	
Interest on Bonds, Debentures and Other Liabilities.....	19,677,158.15
Rentals of Leased Lines.....	5,133,717.31
Rentals other than above.....	1,702,429.76
Miscellaneous.....	10,180.81
Total Deductions from Income.....	17,524,095.63
Net Income.....	10,796,874.35
Dividends Nos. 120 to 123 inclusive, 2% each.....	9,812,686.00
Dividends Nos. 1 and 2 on part paid stock.....	446,395.00
Surplus.....	\$1,037,793.35

*The Operating Expenses and Taxes were 70.30 per cent. of the Total Operating Revenue.

In accordance with the requirements of the Interstate Commerce Commission, "Rentals of Leased Lines" under the heading "Deductions from Income" are the gross amounts including the income accruing to The New York, New Haven and Hartford Railroad Company by reason of its ownership of stocks and bonds of leased lines, and such income is included in the appropriate items under the heading "Income from Other Sources." The practice of previous years was to show the net amount as "Rentals."

The total operating revenue for the year is the largest in the history of the Company, exceeding that of 1909, \$6,346,036.58, or 11½ per cent.; the operating expenses increased \$2,608,909.22, or 7½ per cent., and taxes increased \$537,251.03, or 15.3 per cent., of which the Federal Corporation Tax contributed \$132,370.25.

The construction of six tracks on the Harlem River and Port Chester Railroad is completed. The installation of an automatic signal system is in progress and partly in service, and will be completed on or about November 1, 1910. The construction of the new passenger station at Bartow is progressing and it will be ready for service on or about October 1, 1910.

The reconstruction of piers (new Nos.) 39, 40 and 41, East River, is in progress.

At Oak Point, New York, eight float bridges of modern type have been completed during the year, and are now in service, and the general yard work in connection with the bridges is progressing satisfactorily. The bridges are found to be very effective in handling the large volume of freight handled by the New York, New Haven and Hartford Railroad.

A new concrete signal tower is under construction at Bridgeport, Connecticut, and will be put in service during the present year.

The reconstruction of the old Naugatuck Dock at Popponesset Dock, Bridgeport, Connecticut, and other changes at Docks Nos. 3 and 4 are under way. The old Naugatuck Dock is being removed to conform to the new plan.

The construction of double tracks between Hawleyville and Shelton is in progress, and will be completed during the coming year.

The reconstruction of the old New Haven and Hartford Railroad at Brookfield Junction are under construction, and should be completed by the end of the year.

At New Haven, the reconstruction of the old New Haven and Hartford Railroad at New Haven and Hartford is in progress, and will be completed during the coming year.

The reconstruction of the old New Haven and Hartford Railroad at New Haven and Hartford is in progress, and will be completed during the coming year.

The reconstruction of the old New Haven and Hartford Railroad at New Haven and Hartford is in progress, and will be completed during the coming year.

The reconstruction of the old New Haven and Hartford Railroad at New Haven and Hartford is in progress, and will be completed during the coming year.

Stone ballasting main line, Niantic, Conn., to Back Bay, is progressing satisfactorily, about fifteen miles have been completed.

That portion of this Company's work in connection with the elimination of grade crossings in Worcester, Massachusetts, is under contract, and satisfactory progress is being made. The amount of work still to be done by this Company will require about six months to complete, and includes an express building and the reconstruction of the viaduct connecting the New Haven and Boston and Maine Railroads. The work in connection with elimination of grade crossings is 60 per cent. complete.

There is under construction at Readville, Massachusetts, a new storehouse for Storekeeper's supplies; the building will be finished about October 15, 1910.

Second track, Walpole to South Framingham, including double track wye at Medfield Junction and automatic signals, is under construction, and will be completed by the end of the present year.

Elimination of grade crossings, Harrison Square to Neponset, Boston, Massachusetts, is under way and progressing satisfactorily.

The Company's portion of the work in connection with extensive changes made by the City of Boston in extending Northern Avenue has been completed.

Elimination of grade crossings at Lincoln and Plain Streets, Lowell, Massachusetts, is under way, and it is expected that the work will be completed by the end of the year.

Elimination of grade crossings at Fairmont, Massachusetts, has been completed.

NUMBER OF GRADE CROSSINGS ELIMINATED.

State of Connecticut.....	30
State of Massachusetts.....	2
Total.....	32

There has been completed six thousand feet of four and six track single phase electrification in the vicinity of Glenbrook, Connecticut, which construction is to be a typical form to be generally used in the electrification of the Harlem River Branch and the line from Stamford to New Haven. We have received one of the two electric freight locomotives, both of which were designed to handle freight trains operating between Harlem River and New Haven, or heavy passenger trains between Grand Central Station and New Haven. The one received has proved more than adequate in the tests of both of these services. It is expected that the second locomotive ordered will be received before this report is printed. Surveys have been completed for the electrification of the main line and yards on the Harlem River Branch, and general designs for electrical catenary superstructures have been completed for this electrification. Surveys have also been completed for the electrification of the main line between Stamford and New Haven.

Plans for the rehabilitation of the Warren power station are practically complete. The rearrangement will eliminate the present direct current machinery, thus converting the station into a straight A. C. plant. Bids are now being obtained for the purchase of the necessary apparatus. Requisitions have been placed for material to cover the multiple unit equipment necessary to better the control of cars now operating between Providence, Fall River and Bristol, which arrangement will produce a more flexible and reliable system of train operation.

New passenger stations or increased facilities have been provided during the year at the following points:

Berlin, Conn.,	Egypt.	Hawleyville,
Crescent Park,	Fall River,	Highland,
Dudley Street,	Farmusville,	Hingham,
East Hampton, Conn.,	Forestville,	North Scituate,
East Milton,	Harvard Street,	Sagamore,

Work is in progress and will be completed during the coming year on new passenger stations or increased facilities at the following points:

Bartow,	Esmond,	Pemberton,
Bethel,	Fairhaven, Mass.,	Port Chester,
Bristol, Conn.,	Hartford,	Providence,
Canaan,	Leominster,	Rowayton,
Cedar Hill,	Litchfield,	Sheffield,
Charles River,	Norwiche,	Southbridge,
East Greenwich,	Norwalk,	South Windsor,
East Providence,	Pelham,	Stockbridge,

New freight houses or increased freight facilities have been provided during the year at the following points:

Auburn, R. I.,	Franklin,	Rowayton,
Bartam,	Guilford,	Rye,
Bethel,	Higginum,	Sheffield,
Boston, No. 8 house,	Hyannis,	Springfield,
Bridgewater,	Lonsdale,	Torrington,
Coventry,	Middlefield,	Van Nest,
Centerville,	Middletown,	Webster,
East Taunton,	New Bedford,	West Barnstable,
Esmond,	New Canaan,	Westchester, N. Y.,
Fall River,	New Milford,	Worcester,
	Pondfield,	

Work is in progress, and will be completed during the coming year, on new freight houses or increased facilities at the following points:

Andover,	South Windsor,
Milford, Mass.,	Sterling,
North Scituate,	Wallingford,
Pratt's Junction,	West Haverhill,

A large amount of minor work has been done on our station structures, including water supply, electric lights, extensions of platforms for longer trains, painting, etc.

Improvements have been provided at the following points:

Litchfield,	Providence,
South Framingham,	

Improvements and additions to signaling and interlocking have been made at the following points:

Andover,	Hawleyville Junction,
Centerville,	Kentville,
Coventry,	Medford Junction,
Crescent Park,	New Bedford Junction,
Dudley Street,	New Britain Junction,
East Hampton, Conn.,	North Scituate,
East Milton,	Port Chester,
Forestville,	Providence,
Harvard Street,	Shelton Ferry,
Highland,	South Framingham,
Hingham,	Stamford to Mount Vernon,
North Scituate,	Worcester to Boston,
Stockbridge,	
Wallingford,	
West Haverhill,	

© 2004 Blackwell Publishing Ltd, *Journal of Internal Medicine* 255: 103–110

but the amount of stock outstanding in the hands of others than companies controlled by General Motors was 174,426 shares, the proceeds of which were used to acquire other property. There still remain in the treasuries of subordinate companies 174,426 shares.

$$0 \leq t \leq T, \quad \forall x \in \mathbb{R}^n.$$
INCREASES.

Net decrease N. Y., N. H. and H. R. R. Company.....	\$2,283,327.33
5% 1st Mortgage Bonds Boston, Clinton, Fitchburg and New Bedford (Old Colony Railroad) paid.....	1,912,000.00
Total decrease.....	\$4,195,327.33

The \$60,000.00 First Mortgage 5% bonds of the Milford and Woonsocket Railroad Company, which matured December 1, 1908, and the \$10,000.00 First Mortgage 6% bonds of the Milford, Franklin and Providence Railroad Company, which matured January 1, 1909, have been replaced by new bonds bearing 4% interest. These bonds are held in the Company's treasury.

In the General Statement for the year ending June 30, 1909, reference was made to the organization of the Boston Railroad Holding Company under the authority of the General Court of the Commonwealth of Massachusetts, at its 1909 session, and to the agreements by your Company to purchase all the stock and bonds of the Holding Company that will be issued for payment of Boston and Maine Railroad stock.

Pursuant to such agreements this Company has purchased and now holds 31,065 shares of stock (the entire capital) and \$20,012,000.00 face value of 4 per cent., Fifty Year Debentures of the Holding Company (the entire indebtedness).

The Boston Railroad Holding Company owns 6,543 preferred shares out of a total of 31,498 and 153,571 common shares out of a total of 288,413 of the capital stock of the Boston & Maine Railroad.

A conveyance has been made of the Park Square Station property in the City of Boston to the Park Square Real Estate Trust for fifty-two thousand (52,000) shares of its capital stock.

The capital stock of the Old Colony Railroad Company has been increased during the year by the sale of nine thousand eight hundred and fifty (9,850) shares, the proceeds of which were used to pay on January 1, 1910, the maturing 5 per cent. First Mortgage Bonds of the Boston, Clinton, Fitchburg and New Bedford Railroad Company.

There will mature between October 1, 1910, and October 1, 1911, the following obligations for which this Company is responsible:

On January 1, 1911, there will become effective the right of the holders of the 3% Convertible Debenture Certificates of the issue of January 1, 1906, to exchange such certificates for capital stock of the Company in the proportion of one hundred and fifty dollars face value of certificates for one share of stock. The total amount of certificates is \$30,000,000.00 so that if exchange is made of the entire issue \$20,000,000.00 of additional capital stock will be substituted therefor.

At the special meeting of the Stockholders held October 27, 1909, authority was given to increase the capital stock of the Company by the addition of five hundred thousand shares of one hundred dollars each. Under this authority your Board of Directors voted to issue four hundred fifty-four thousand, six hundred and ninety-five (454,695) additional shares and to offer to Stockholders the right to subscribe at one hundred and twenty-five dollars a share for one share of new stock for each four shares of old; to holders of 3/4% Convertible Debenture Certificates the right to subscribe at the rate of one share of new stock for each five hundred dollars of the principal amount of such certificates; to holders of 6% Convertible Debentures the right to subscribe at the rate of one share of new stock for each four hundred dollars of the principal amount of such Debentures. Provision was made for the payment of these subscriptions in four equal instalments, due, respectively, on December 20, 1909, June 20, 1910, December 20, 1910, and June 20, 1911. In accordance with this offer subscriptions were received to four hundred forty-six thousand, four hundred and thirty-eight (446,438) new shares, and there has been paid into the Company's treasury to June 30, 1910: On the first instalment, \$13,951,187.50; on the second instalment, \$13,722,968.75; in advance on account of the third instalment, \$3,784,093.75; in advance on account of the fourth instalment, \$3,282,968.75, a total of \$34,741,218.75.

When the final instalment is paid, June 20, 1911, the Company's capital stock will be increased by the addition of these new shares. The form of General Balance Sheet, and exhibits supporting same, has been changed from that of previous years to harmonize with that prescribed by the Interstate Commerce Commission.

Mr. H. McK. Twombly died at Madison, New Jersey, January 11, 1910, and the following minute was entered upon the records of the Board:

"Mr. H. McK. Twombly died January 11, 1910.

"A Director since 1903, and a representative of large interests in the property, he was always a cautious, conservative and able adviser in its councils.

"His personal relations with his associates were of the most pleasant character, and they one and all desire to place upon record their sense of loss through his death, and to extend their sympathy and condolences to his family.

"Resolved, That the Secretary be instructed to send an engrossed copy of this minute to his family."

The vacancy was filled by the election of Mr. George F. Baker, of New York City.

Mr. John H. Whittemore died at Naugatuck, Connecticut, May 28, 1910, and the following minute was entered upon the records of the Board:

"John Howard Whittemore, a valued and highly esteemed Director of this Company since February 11, 1905, having been taken from us by death at his residence in Naugatuck, Connecticut, on May 28, 1910, this Board, assembled for the first time since the sad event, desires to place upon its records an expression of their deep sense of loss and their high appreciation of the character of their late associate. His presence was always welcomed and his counsel of value to the Board and this Company.

"We deplore the dispensation which has taken him from us and extend to his bereaved family our sincere sympathy in their great affliction.

"The Secretary is directed to transmit a copy of this minute to the family of Mr. Whittemore."

Mr. John L. Billard, of Meriden, Connecticut, was elected a member of the Board to fill the vacancy created by the death of Colonel Frank W. Cheney.

The faithful and efficient services of the officers and employees are hereby acknowledged.

By order of the Board of Directors,
New Haven, Connecticut,
September 16, 1910.

CHARLES S. MELLE,
President.

THE NEW ENGLAND NAVIGATION COMPANY Income Account for the Year Ending June 30, 1910.

Gross Earnings from Operations	\$5,014,736.82
*Operating Expenses	4,221,991.95
Net Earnings	\$822,744.86
Income from Other Sources	2,430,699.28
Total Income	\$3,253,444.14
Deductions from Income:	
Taxes	\$95,104.72
Interest on bonds, debentures and other	1,539,565.80
Total Deductions from Income	1,634,670.52
Net Income	\$1,618,773.62

*The Operating Expenses and Taxes were 85.57 per cent of the Gross Earnings from Operations.

CENTRAL NEW ENGLAND RAILWAY COMPANY Income Account for the Year Ending June 30, 1910.

Operating Revenue	\$3,032,390.10
*Operating Expenses	1,332,232.66
Net Operating Revenue	\$1,700,157.44
Taxes	104.88.02
Income from Other Sources	\$1,184,012.61
Total Income	\$1,974,198.77
Deductions from Income:	
Interest on Bonds and other liabilities	\$114,322.65
Interest on bonds and other liabilities	616,422.32
Cost of Equipment	104,973.04
Total Deductions from Income	835,718.01
Net Income	\$1,138,480.76

*The Operating Expenses and Taxes were 60.80 per cent of the Operating Revenue.

The earnings of the Company have been sufficient during the year to fully pay the interest of the maximum interest (five per cent) on the General Mortgage Income Bonds.

STATEMENT OF EARNINGS AND OPERATING EXPENSES OF THE STEAM RAILROAD IN DETAIL. For the Twelve Months Ending June 30, 1910.

REVENUE.	
Freight Revenue	\$30,110,588.30
Passenger Revenue	\$24,885,864.74
Excess Baggage Revenue	190,882.01
Mail Revenue	645,571.89
Express Revenue	3,029,967.47
Milk Revenue	131,748.96
Other Passenger Train Revenue	121,584.99
	29,005,890.06
All Other Revenue from Transportation	272,017.72
Revenue from Operations other than Transportation	1,304,571.47
Total	\$60,693,667.55

OPERATING EXPENSES.	
Maintenance of Way and Structures	
Superintendence	\$211,929.64
Ballast	40,851.14
Ties	1,004,444.71
Rails	813.88
Other Track Material	304,196.24
Roadway and Tracks	2,151,408.35
Removal of Snow, Sand and Ice	1,517.04
Tunnels	1,943.07
Bridges, Trestles and Culverts	322,034.33
Over and Under Grade Crossings	91,229.09
Grade Crossings, Fences, Cattle Guards and Signs	132,757.67
Snow, Sand Fences and Snow Sheds	94.10
Signal and Interlocking Plants	852,793.29
Telegraph and Telephone Lines	92,176.74
Electric Power Transmission	132,297.71
Buildings, Fixtures and Grounds	834,361.66
Docks and Wharves	184,395.07
Roadway Tools and Supplies	62,658.42
Injuries to Persons	42,633.36
Stationery and Printing	1,114.74
Other Expenses	95,988.82
Maintaining Joint Tracks, Yards, etc.	Dr. 593,000.01
Maintaining Joint Tracks, Yards, etc.	Cr. 2,230.49
Total Maintenance of Way and Structures	7,132,375.64

Maintenance of Equipment	
Superintendence	\$180,758.13
Steam Locomotives—Repairs	2,209,883.14
Steam Locomotives—Renewals	8,063.33
Steam Locomotives—Depreciation	59,956.58
Electric Locomotives—Repairs	140,983.20
Passenger Train Cars—Repairs	893,110.70
Passenger Train Cars—Renewals	48,327.65
Passenger Train Cars—Depreciation	139,568.07
Freight Train Cars—Repairs	1,815,842.99
Freight Train Cars—Renewals	66,733.38
Freight Train Cars—Depreciation	400,987.03
Electric Equipment of Cars—Repairs	41,635.24
Floating Equipment—Repairs	265,680.56
Floating Equipment—Depreciation	8,099.59
Work Equipment—Repairs	55,449.25
Work Equipment—Renewals	10,104.98
Work Equipment—Depreciation	6,388.92
Shop Machinery and Tools	265,258.82
Power Plant Equipment	36,748.00
Injuries to Persons	16,895.10
Stationery and Printing	232,247.29
Other Expenses	1,178.79
Maintaining Joint Equipment at Terminals	Dr. 1,878.79
Maintaining Joint Equipment at Terminals	Cr. 3,662.53
Total Maintenance of Equipment	6,461,772.22

Traffic Expenses:	
Superintendence	\$146,876.69
Outside Agencies	60,598.90
Advertising	89,202.59
Traffic Associations	10,125.94
Stationery and Printing	43,559.83
Other Expenses	579.10
Total Traffic Expenses	\$30,943.05

Depreciation Expense	
Superintendence	\$200,433.34
Dispatching Trains	1,133.75
Station	14,882.64
Station Supplies and Expenses	3,260.30
Yard Masters and their Clerks	3,948.79
Yard Conductors and Brakemen	96,416.26
Yard Switch and Signal Tenders	19,531.38
Yard Supplies and Expenses	30,645.36
Yard Equipment	300,840.63
Yard Buildings	12,449.40
Cost of Yard Locomotives	22,280.22
Water for Yard Locomotives	2,101.13
Lubrication for Yard Locomotives	13,614.11
Other Supplies for Yard Locomotives	10,314.94
Operating Joint Yards and Terminals	Dr. 778,800.63
Operating Joint Yards and Terminals	Cr. 4,141.28
Maintenance of Road and Terminals	111,890.29
Road Equipment	1,786,881.60
Engineering Expenses—Road	604,952.83
Cost of Road Locomotives	1,230,001.21
Water for Road Locomotives	284,436.33
Lubrication for Road Locomotives	7,429.01
Other Supplies for Road Locomotives	1,806.33
Operating Power Plants	230,076.71
Purchased Power	97,280.57
Road Locomotives	2,452,010.31
Train Supplies and Expenses	686,279.39
Interlocking Block and Other Signal Expenses	506,172.54

Crossing Flagmen and Gatekeepers	\$370,022.61
Traveling Expenses	1,000.00
Operating Wages	241,000.78
Traveling and Transportation Expenses	14,000.00
Operating Fuel and Expenses	653,339.92
Stationery and Printing	240,291.29
Other Labor and Expenses	11,000.00
Labor and Expenses, Freight	334,000.87
Labor and Expenses, Motives	2,961.05
Damages to Property	116,800.10
Damages to Road and Right of Way	385.67
Freight to Point of Receipt	248,001.12
Operating Joint Tracks	19,393.10
Operating Joint Tracks	1,633.41
Total Transportation Expenses	\$2,947,661.94
General Expenses	
Salaries and Expenses of General Offices	\$181,683.06
Salaries and Expenses of Clerks and Attendants	510,382.81
General Office Supplies and Expenses	38,441.11
Law Expenses	254,362.23
Insurance	336,220.32
Provisions	100,048.34
Stationery and Printing	5,873.60
General Expenses	308,661.43
Gen. Adm. Joint Tracks, Yards and Terminals	18,786.75
Total General Expenses	1,801,440.91
Total Operating Expenses	\$38,689,216.76
Net Operating Revenue	\$22,004,451.79

*Includes the cost of the appraisal of the Company's property which has been completed during the year.

STATISTICS.

Passenger Traffic:	
Number of passengers carried earning revenue	82,905,137
Number of passengers carried one mile	1,506,907,990
Average distance carried	18.18 Miles
Total passenger revenue (excluding mails, express, etc.)	\$24,885,804.74
Average amount received from each passenger	.30017
Average receipts per passenger per mile	.01651
Total passenger service train revenue	\$29,005,890.06
Passenger service train revenue per mile of road	14,538.35
Passenger service train revenue per train mile	1.85231
Freight Traffic:	
Number of tons carried of freight earning revenue	22,738,981
Number of tons carried one mile	2,124,680,965
Average distance haul of one ton	93.44 Miles
Total freight revenue (excluding miscellaneous)	\$30,110,588.30
Average amount received for each ton of freight	1.32418
Average receipts per ton per mile	.01417
Freight revenue per mile of road	\$14,987.55
Freight revenue per train mile	4.15518
Total Traffic:	
Operating revenues	\$60,693,667.55
Operating revenues per mile of road	29,709.70
Operating revenues per train mile	2.66564
Operating expenses, including Taxes	\$42,672,592.77
Operating expenses, including Taxes, per mile of road	20,888.34
Operating expenses, including Taxes, per train mile	1.87416
Net operating revenue, less Taxes	\$18,021,074.78
Net operating revenue, less Taxes per mile of road	\$8,821.36

Revenue from Freight	\$1,000,000.00
Mileage revenue by freight train	1,000,000.00
Mileage revenue by passenger train	1,000,000.00
Mileage revenue by freight train	1,000,000.00
Non-revenue service train miles	814,379
Grand total (1919)	\$2,000,000.00
Car Mileage:	
Mileage of passenger cars	11,000,000.00
Mileage of loaded freight cars—South or West	57,021,594
Mileage of empty freight cars—South or West	16,772,592
Average number of passenger cars per train mile	96.23
Average number of passenger cars per train mile	4.64
Average number of tons of freight per train mile	14.65
Average number of freight cars per train mile	29.20
Average number of loaded cars per train mile	20.61
Average number of empty cars per train mile	8.04
Average mileage operated during year	1,092.49
ADDITIONS AND BETTERMENTS	
Real Estate	\$2,640.44
New Bridges	
Westerly, R. I.	\$15,817.88
Providence and Willimantic Branch	7,975.87
Hartford, Conn.	7,024.17
Hartford and Saybrook Branch	4,450.38
Lyme, Conn.	8,169.05
Sandy Hook, Conn.	8,111.51
Sundry places	13,046.13
Second Track, Western Division	65,194.49
Providence Improvements	624,330.46
Woonsocket Improvements	84,405.87
New Haven Improvements	74,873.11
Watbury Improvements	65,210.79
Wallingford Improvements	62,670.53
Electrification Woodlawn-Stamford	47,411.64
Power Plants and Power Transmission	85,278.84
Niantic, Conn.-Boston, Ballasting	40,075.56
Elimination Grade Crossings	159,372.79
New Solings	232,310.48
Sundry Additions and Betterments	25,348.35
	390,840.63
Less:	
Real Estate and Other Property Sold	\$2,012,907.98
	835,948.59
	\$1,177,264.34
New Equipment, consisting of 1 steam locomotive, 1 electric freight locomotive, 4 coaches, 4 composite cars, 1 baggage car, 4 steel motor cars, 6 trailer cars, 10 milk cars, 2,408 box cars, 2 electric wrecking cranes, 4 parlor cars converted into baggage cars and 20 box cars converted into cabooses	3,019,806.85
Total	\$4,197,070.69

These expenditures have been charged to:	
Cost of Property	\$1,177,264.34
Equipment	1,953,476.20
Replacement Fund	1,066,330.15
	\$4,197,070.69

GENERAL BALANCE SHEET, JUNE 30, 1910

ASSETS.	LIABILITIES.
Property Investment:	Stock:
Road and Equipment.....\$170,222,450.56	Capital Stock.....\$121,878,100.00
Floating Equipment, Street	Receipts Outstanding for Installments paid.....22,139,325.00
Railways and other property.....6,346,362.90	
	\$144,017,425.00
\$176,568,813.46	Premiums realized on Capital Stock Sold (Since July 1, 1909).....20,630,720.25
Less, Reserve for Accrued Depreciation of Equipment.....1,872,720.54	
	Total Stock and Premium realized since July 1, 1909.....\$164,648,145.25
\$174,696,092.92	Mortgage, Bonded and Secured Debt
Securities:	Mortgage Bonds, including Bonds of Merged Roads assumed (Exhibit V).....\$58,661,000.00
Securities of Proprietary, Affiliated and Controlled Companies	Plain Bonds, Debentures and Notes, including Debentures of Merged Roads assumed (Exhibit VI).....173,380,000.00
Stocks (Exhibit I).....\$105,651,624.78	Miscellaneous Funded Obligations (Real Estate Mortgage).....11,500.00
Funded Debt (Exhibit I).....15,100,000.00	
Miscellaneous (Exhibit I).....25,394,996.35	\$232,032,500.00
	146,146,621.13
Other Investments:	Obligations for Advances received for Construction, Equipment and Betterments.....474,803.98
Advances to Proprietary, Affiliated and Controlled Companies for Construction, Equipment and Betterments.....\$1,161,671.82	
Miscellaneous Investments:	Total Mortgage, Bonded and Secured Debt.....\$232,527,303.98
Securities (Exhibit II).....63,504,856.83	
	Carried forward.....\$232,527,303.98
\$4,666,328.65	
Total Property Investment.....\$385,509,242.70	
Carried forward.....\$385,509,242.70	

Working Assets:	
Cash	\$18,099,040.97
Securities Issued or Assumed—Held in Treasury (Exhibit II)	211,715.50
Marketable Securities (Exhibit IV)	29,565,205.50
Loans and Bills Receivable	10,797.96
Net Balance due from Agents and Conductors	2,248,770.27
Miscellaneous Accounts Receivable	4,206,251.21
Materials and Supplies	3,461,208.42
Other Working Assets	882,266.67
Total Working Assets	58,185,256.00
Accrued Income Not Due:	
Unmatured Interest, Dividends and Rents Receivable	970,848.49
Deferred Debit Items:	
Temporary Advances to Proprietary, Affiliated and Controlled Companies	\$1,218,315.61
Working Funds	144,426.82
	\$1,362,742.43
Rents and Insurance paid in advance	87,991.66
Cash and Securities in Sinking and Redemption Funds:	
Harlem River & Port Chester R.R. Bonds, Special Deposit	\$229,840.00
Connecticut Railway and Lighting Co. Sinking Fund	403,509.48
Worcester & Connecticut Eastern Railway Sinking Fund	38,000.00
	671,349.48
Cash and Securities in Insurance and Other Reserve Funds:	
Accident and Casualty Fund	\$1,435,758.30
Coal Insurance Fund	523,118.75
	19,654.92
	1,978,526.97
Other Deferred Debit Items	2,008,424.20
Total Deferred Debit Items	6,099,034.74

Brought Forward:		\$292,527,303.98
Adding:		
Loans and Bills Payable	\$5,780,364.28	
Traffic and Car Service Balances due other Companies	1,387,085.06	
Audited Vouchers and Wages Unpaid	4,124,853.02	
Miscellaneous Accounts Payable	86,000.00	
Matured Interest, Dividends and Rents Unpaid	4,481,063.20	
Matured Mortgage, Bonded and Secured Debt Unpaid	19,621.41	
Other Working Liabilities	49,755.26	
Total Working Liabilities	15,928,773.23	
Accrued Liabilities Not Due:		
Unmatured Interest, Dividends and Rents Payable	2,885,825.89	
Deferred Credit Items:		
Advanced payments of third and fourth installments of Subscriptions to New Capital Stock	\$7,067,062.50	
Other Deferred Credit Items	1,289,268.32	
Total Deferred Credit Items	8,356,330.82	
Appropriated Surplus:		
Reserves from Income or Surplus:		
Invested in Sinking and Redemption Funds:		
Connecticut Railway & Lighting Co. Sinking Fund	\$284,545.91	
Invested in Other Reserve Funds:		
Insurance Fund	\$1,435,758.30	
Accident and Casualty Fund	523,118.75	
Coal Insurance Fund	19,654.92	
	1,978,526.97	
Total Appropriated Surplus	2,263,072.88	
Equipment and Personal Property Leased	9,958,672.41	
Profit and Loss Account	14,196,253.47	
Contingent Liabilities:		

The New York, New Haven & Hartford Railroad Company is liable jointly with other roads for any deficiency on foreclosure of bonds of The Boston Terminal Company. The New York, New Haven & Hartford Railroad Company guarantees four per cent. dividends on preferred stock of the Springfield Railway Companies, \$3,387,950, and payment of principal at one hundred five per cent. on liquidation.

The New York, New Haven & Hartford Railroad Company guarantees four per cent. dividends on preferred stock of the New England Investment and Security Company, \$4,000,000, and payment of principal at one hundred five per cent. on liquidation; also guarantees the payment of principal, \$3,000,000, and interest of the New England Investment and Security Company fifteen-year Funding Gold Notes dated April 1st, 1909; also guarantees the payment of an additional \$13,250,000, and interest of New England Investment and Security Company fifteen-year Funding Gold Notes dated April 1st, 1909, when requested to do so by John L. Buiard, as per contract.

The New York, New Haven & Hartford Railroad Company is the guarantor by endorsement of the four per cent. fifty-year Gold Debentures of the Providence Securities Company, dated May 1, 1907, to the amount of \$19,899,000.

The New York, New Haven & Hartford Railroad Company guarantees the payment of principal and interest of the Gold Debentures of the New England Navigation Company in case of termination of lease of the Old Colony Railroad Company, \$3,600,000.

The New York, New Haven & Hartford Railroad Company is the guarantor by endorsement of the four per cent. fifty-year Refunding Consolidated Mortgage Gold Bonds of the New Haven and Northampton Company, dated June 1st, 1906, to the amount of \$2,400,000.

The New York, New Haven & Hartford Railroad Company guarantees the payment of principal and interest of the four per cent. fifty-year First and Refunding Mortgage Gold Bonds of the New York and Stamford Railway Company, dated November 1st, 1908, to the amount of \$274,000.

The New York, New Haven & Hartford Railroad Company guarantees the payment of principal and interest of the four per cent. thirty-year Second Mortgage Bonds of the Harlem River and Port Chester Railroad Company, dated June 1st, 1881. The principal of these bonds, together with interest to maturity, has been deposited by the New York, New Haven & Hartford Railroad Company with the Farmers' Loan and Trust Company, Trustee.

Under the provisions of Section 4, Chapter 519, of the Acts of the General Court of the Commonwealth of Massachusetts passed in its 1909 Session, the New York, New Haven & Hartford Railroad Company promises when they shall be sold to guarantee the principal of, and the dividends, and interest upon the capital stock, bonds, notes, and other securities of indebtedness of Boston Railroad Holding Company, created by it. On June 30th, 1910, the New York, New Haven & Hartford Railroad Company held the following stock and bonds of Boston Railroad Holding Company:

21,000 shares of stock of par value, \$3,100,500.00	
4 per cent. debenture bonds dated November 1st, 1909, maturing November 1st, 1920, of face value	\$9,012,000.00

\$450,704,876.93

\$450,704,876.93

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY LIGHT TIMES IN JUNE, BY
THE RAILROAD GAZETTE (INC.), 81 FULTON ST., NEW YORK.

CHICAGO: Plymouth Bldg. CLEVELAND: Williamson Bldg.
LONDON: Queen Anne's Chambers, Westminster

W. H. BOARDMAN, *President*, HENRY LEE, *Secretary*
E. A. SIMMONS, *Exec. Pres. & Treas.*
The address of the company is the address of the officers.

EDITORS

W. H. BOARDMAN, <i>Editor</i>	ROY V. WRIGHT	B. B. ADAMS
SAUNDERS O. DUNN,	G. L. FOWLER	W. E. HODDER
<i>Editor of the Mar.</i>	WILLIAM FORESITH	F. E. LISTER
ROBERT B. BOARDMAN,	S. W. DENNING	F. W. KRAEGER
<i>Editor of the Eng.</i>	CLARENCE DEMING	H. H. SIMMONS

SUBSCRIPTIONS, including regular weekly issues and special daily editions, sent from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada.....	\$6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies.....	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.60; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 19. FRIDAY, OCTOBER 21, 1910. NUMBER 17.

CONTENTS

EDITORIAL:

Editorial Notes.....	725
Steam Auxiliaries for Passenger Service.....	726
The Street Railway Convention.....	727
Harmonious Railway Action Regarding Safety Appliances.....	728
New York, Ontario & Western.....	728
Southern Railway.....	729

NEW BOOKS.....	731, 766
----------------	----------

ILLUSTRATED:

Railway Signal Association.....	734
Car-Traversing Ballast Loader.....	743
Double-Track Railways in Tennessee.....	747

MISCELLANEOUS:

Railway Capital and Capitalization.....	732
Mr. McCrea on Railway Finances.....	739
The Street Railway Exhibit.....	741
The Railway Owner, Railway Employee and Railway User.....	744
Early Days of the Railway Signal Association.....	746
Double-Track Lines in Kentucky.....	747
Foreign Railway Notes.....	744, 747

GENERAL NEWS SECTION.....	748
---------------------------	-----

SUPPLY TRADE SECTION.....	762
---------------------------	-----

A RECENT note in this column criticizing a convention practice of the Railway Signal Association has brought replies. One is from a manufacturer, distinguished for his knowledge of the science and art of signaling; one who did as much as any, possibly more, to organize the association and guide it to channels of usefulness. Apparently he thinks we are wrong in objecting to reading at conventions, discussing and printing in the formal report proprietors' descriptions of proprietary signal devices—this to the necessary expulsion of discussions of important topics in the programme. Aside from the question of right or wrong, he thinks we were savage in expression of disapproval, in which he is quite right. The association's past

president writes that, prompted by our editorial, he put in his annual address, last week, the following paragraph:

"This association membership is entitled to a special and complete session of a proprietary nature, and this association, by discussion, considering all its questionable, obsolete, former statements, wishes to put by reasoning and discussing proprietary articles, thereby hastening the development of some new plan or scheme."

He has excellent support in this idea. Mr. Vaughan, president of the Master Car Builders' Association, told the convention a year ago to use the well known names in all the discussion. He set the example and it was followed. Members have nothing to fear in this or in proper relations with designers and makers whose broad knowledge of the requirements under varying conditions qualifies many of them as expert advisers. It is objectionable, however, as we have pointed out, to read at convention and print in the proceedings proprietors' descriptions. They are out of place. It wastes the convention's precious time. The officers of this spirited young association can learn much by observing the methods and practices finally arrived at by the older engineering organizations.

THE annual convention of the Railway Signal Association at Richmond, Va., last week, was highly successful. No exciting topics were up for discussion, but there were plenty which were important, though not exciting. Dealing with the minute details of a half-dozen codes of specifications is no easy matter in a large meeting, as has been shown in past years; but in this case President Balliet kept the speakers within bounds and the time schedule was closely adhered to. The old mistake of letting a hundred men spend hours on committee work, which could be better done by a half-dozen, was not repeated. The successive years' work have brought the several codes of specifications into better shape and there is not so much temptation to pick them to pieces. The specifications reported this year are so voluminous that we are unable to reprint them, and we must ask those who read our report of the meeting to do so with the committee reports before them. The most notable committee reports being those on electric railway signaling and on signal literature, were not discussed, and under the circumstances were not susceptible of discussion. The first makes a valuable chapter of history, such recent history that we are liable not to realize its importance; and the second is a most useful work which has long waited to be done. The association is not rich, and the workers who got up this valuable index will have their recompense in the thanks of the railway world.

IN the October 13 issue of the *Independent* there is an article by Harrison S. Smalley on the question of "Should Railway Rates be Increased?" Mr. Smalley is assistant professor of political economy in the University of Michigan, in which university Henry C. Adams is professor of political economy. Unlike so many theoretical discussions of the rate question, the errors in this article are so definite that it is possible to definitely correct them. Mr. Smalley says: "The conclusion reached by railway advocates [that since within the last 10 years or so wages, prices and the like have advanced, the cost to a railway of furnishing its services has also increased] is altogether erroneous. It is erroneous because it is reached only by ignoring an element which is vital in the case. * * * This element in determining the cost of railway services * * * is the volume or density of traffic. While expenses have decidedly increased, traffic has also increased in even greater proportion, with the result that the expense of furnishing railway services has actually diminished." The italics are Mr. Smalley's own. To prove this, Mr. Smalley compares the years 1897 and 1907. He says that he uses these two years because railway men themselves, meaning, apparently, C. C. McCain in his pamphlet on "The Diminished Purchasing Power of Railway Earnings," have taken these years. It is entirely improper to take 1907 into consideration at all. The question is a question of earnings and expenses in 1910; moreover, 1897 was an abnormal year, and 1898 would be a better year for a fair comparison with 1910.

Mr. Smalley's figures in support of his contention are as follows: "Between 1897 and 1907, while railway mileage expanded 25 per cent. and the total expenses of all railway companies were augmented 106 per cent., passenger traffic increased 126 per cent., from 12,256,939,647 to 27,718,554,030 passenger miles; and freight traffic grew 149 per cent., from 95,139,022,225 to 236,601,390,103 ton miles." It means very little to take average figures for the whole country in a case like this. For instance, to lump together a mile of road of the Pennsylvania and a mile of Texas line, and divide by two, gives a meaningless average, especially when in 1897 each road had a different way of making up these figures. Taking at random two roads that have made their annual reports for 1910, both of which are considered more prosperous than the average, we find that the Louisville & Nashville expenses per mile of road in 1898 were \$4,994, and the expenses per mile of road in 1910 were \$7,682. This is an increase of \$2,688 per mile, or 54 per cent. The freight density, that is, the number of tons carried one mile per mile of road, was 746,575 tons in 1898 and 1,124,001 tons in 1910. This is an increase in freight density of 377,426 tons, or 51 per cent., comparing with an increase in operating expenses per mile of 54 per cent. The Baltimore & Ohio makes an even more striking showing. Operating expenses on the Baltimore & Ohio amounted to \$10,108 per mile of road in 1898 and \$13,831 per mile in 1910. This is an increase of \$3,723, or 37 per cent. Freight density, on the other hand, was 2,135,214 tons carried one mile per mile of road in 1898 and 2,712,581 tons carried one mile per mile of road in 1910. This is an increase of 577,367 tons, or 27 per cent. Mr. Smalley talks about freight density and passenger density, but when he comes to give the figures he does not give figures for density at all; that is, tons carried one mile per mile of road, but gives gross ton mileage and passenger mileage and per cent. of increase of mileage, leaving the reader to unconsciously make a comparison of unweighted averages.

STEAM AUXILIARIES FOR PASSENGER SERVICE.

IN marine engineering the boilers for passenger liners are proportioned for a production of steam considerably in excess of that required for the main engines, in order to provide for auxiliary engines at the winches, pumps and ventilating fans, and for those of the electric generators for lighting, heating and power.

The requirements of modern passenger car service include almost as many kinds of auxiliaries, which in one form or another are a constant drain on the locomotive boiler. The steam consumption of these auxiliaries is becoming so large that it is important to take account of it in considering questions relating to locomotive economy and capacity. It is also important to investigate the numerous ways in which the economy of the auxiliaries themselves may be unfavorably affected.

The fixtures to be considered in this connection are the air pump and those auxiliaries used in electric lighting, steam heating and ventilating. All those internal fixtures which increase steam consumption, either directly or by increased train resistance, may properly be included. The application of heat in producing useful results in all these fixtures is so indirect that the efficiency is low; it is difficult to say how low it is in each case, for it has rarely been measured. The leakage of air brake pipes and valves, is often so great that it requires the constant operation of the pump, and the maximum consumption of steam from this source may be estimated from results at sea, which show that with the ordinary pumps 3 cu. ft. of air are compressed to 70 lb. with 1 lb. of steam. The 11 in. pump uses an equivalent of 3.13 lb. of coal per minute, or 200 lb. per hour, when required to keep up pressure on a leaky train line. The 9½ in. pump uses an equivalent of 2½ lbs. of coal per minute, and if two pumps are used, as in current practice, the coal required for constant use is 5 lbs. per minute, or 300 lb. per hour, or approximately 75 hp. This may represent maximum conditions, but pumps deteriorate rapidly and piston packings leak,

so that the efficiency soon drops below that of test conditions with a new pump or one newly repaired.

With two 16 or 18-in. brake cylinders used per passenger car, as now proposed for heavy cars, the air consumption per stop will be considerably increased and the extent of the leakage with a 100-car freight train will call for large volumes of air and a heavy draft of steam from the boiler.

Where there is such a large consumption of steam outside the main engine of a locomotive, it should be occasionally measured so that the amount may be definitely known and the causes of waste detected. The compound air pump has not been used very extensively in the past, but where large volumes of compressed air are required it is not good economy to compress it in a simple pump, and compounding is the most promising method of reducing steam consumption with the air brake system. The economical use of the exhaust from large air pumps is a subject which has not been properly settled. With recently improved devices it can be utilized in the heating system, but it is more frequently introduced into the stack, thus stimulating the wasteful burning of fuel while the locomotive is standing.

The steam consumption for electric lighting of passenger cars is not even approximately known, and comparisons of the cost of operating the different systems are usually incomplete in this particular. For the head-end system, using the steam turbine, it is possible to get a clear estimate of the steam consumption by condensing the exhaust. These turbo-generators consume about 100 lbs. of steam per kilowatt hour, or a total of about 60 h.p. With axle lighting it is not possible to measure the amount of steam used to overcome the increased train resistance, though some approximate estimate can be made by measurements of power absorbed by the generator. With both these systems there is the weight of the small batteries and equipment as a constant charge, causing increased train resistance. With straight battery lighting there is a still larger charge; the heavy weight of the batteries and the cost of hauling them at high speed is much greater than is generally realized. The uncertainties connected with the cost of operating train-lighting plants were plainly brought out at the recent meeting of the Railway Electrical Engineers, when estimates of the cost of hauling batteries varied from 1 mill to 7 mills per ton mile, and, as the latter is about the average cost of hauling freight at slow speed, it is evident that the charge for hauling batteries on high-speed trains should be considerably more than the highest figure suggested. This is of sufficient importance to warrant a careful investigation of the subject so that a proper charge may be made against battery lighting, and its share in the increased steam consumption be more definitely known.

Steam heating of passenger trains has been in the past a heavy drain on the locomotive boiler, though improved traps and greater care in operation have reduced the waste which attended almost all heating systems. The improvements in ventilation, however, are requiring such frequent changes of air that the condensation in the pipes must be considerably increased. With one system in which fresh cold air is forced into the car at the rate of 60,000 cu. ft. per hour the condensation in the radiating pipes is equivalent to 150 h.p. for a train of 10 cars. When the change of air is made more rapidly, as in the deck exhaust system, the steam requirement is even greater. If we assume the following as maximum figures, we may take the steam requirements for air brakes at 75 h.p.; for electric lighting, 60 h.p.; heating and ventilating, 150 h.p. We have a total of 285 h.p. for a 10-car passenger train, which may easily be increased to 300 h.p. on account of external condensation in cold weather. This will call for the combustion of 1,300 to 1,500 lbs. of coal per hour at the very time in winter when train resistance and radiation from the boiler are at a maximum. The steam and electrical auxiliaries connected with passenger train service are thus of sufficient importance to warrant an investigation by a committee of the Master Mechanics' association of their extent and the possible economies that may be effected in their use.

THE STREET RAILWAY CONVENTION.

THE street railway convention held last week at Atlantic City consisted, as usual, of meetings of four separate associations—accountants, engineers (civil and mechanical), claim agents, and transportation and traffic men. It is, of course, quite out of the question to pass even in brief review the work that was done by each of these separate associations, extending from two days to a week. From that done in the three associations arising for solution are closely parallel to those obtaining on steam railways, in so far as they have to do with the discipline of their employees, the enlistment of their interest and loyalty, and the general relations to the public.

In the engineering department the problems are modifications of those that obtain in steam railway work. In grappling with these the first characteristic in the methods that will attract the attention of an outsider will be the strong tendency toward standardization that permeates everything. It seems as though the general conception of a millennium in things mechanical and structural was the establishment of a standard that is to solve all troubles and make work easy and cheap. No one really thinks this; it is merely the impression conveyed by an observance of what appears to be a feverish haste to one accustomed to the deliberation and caution exercised by the Master Mechanics' and the Master Car Builders' associations; a caution that now exists because it has been forced by experience and which was equally forced in the early days by the impossibility of drawing a majority of the members into agreement.

It is all right to establish standards, and standards when once adopted should not be of that Medes and Persians character that cannot be changed. But to adopt a standard at one convention, criticize it as unsatisfactory at the next, and call for a change at the one following—this tends to belittle its value in the eyes of its users and such of the public as know anything about it, as well as to cast discredit on the promoters of the standard itself. It has been found, too, in the experience of the older associations, that in drawing up specifications it is well to be explicit, but not too much so. We have found that it is well not to pin a manufacturer down too closely, especially in the matter of the chemical composition of materials, because the very limitations so imposed will make for a relief from responsibility as to the quality of the goods delivered. This is a little item of experience that the street railway men seem to have overlooked.

In dealing with the matter of axles a recommendation has been made that a heat-treated axle shall be produced for use in heavy traffic. From the personnel of the committee having the matter in charge it is fair to infer that the Interborough Rapid Transit, of New York, has found the ordinary axle unsatisfactory, and so called in the representatives of the several steel companies making a heat-treated axle for consultation and advice, and that these representatives have agreed to furnish the axle called for in the specifications. This assumption is made because of the composition of the committee, which consisted of two representatives of the Interborough, two from the Midvale Steel Co., and one each from the Bethlehem Steel Co., the Cambria Steel Co. and the Carnegie Steel Co. The agreement is that the steel shall have an ultimate strength of 85,000 lbs., an elastic limit of 50,000 lbs., shall have a contraction of area at point of fracture of a test piece of 45 per cent. and an elongation of 22 per cent. in 2 in.; this with the usual provision of protection in the way of good workmanship and analyses to see that the phosphorus does not rise above .04 per cent. It is also tacitly understood, although the understanding is given no expression in the report, that "heat treatment" is to consist of a hardening in oil with a subsequent drawing. Apparently the distinct agreement as to this matter must be made by the consumer with each contractor, and must be done to insure protection. A case is on record where a manufacturer agreed to give a certain lot of axles a heat treatment. That treatment consisted, when the axle left the hammer, of throwing it down

and covering it with a piece of sheet iron and allowing it to cool as it might under that protection.

In the discussion pending the reference of this specification to the standardization committee a matter cropped up that may be of vital moment to the proper conduct of the meeting.

According to the constitution the associate membership is admitted through rather widely open doors. Those eligible to this membership are "individuals, co-partnerships and corporations who are actively identified with street and interurban railway interests, and other persons who, in the opinion of the executive committee, have had experience of such a nature as to render desirable their connection with the association." This is in such marked contrast to the recent action of the Master Car Builders' Association, in expelling all of their active members who are engaged in trade and in carefully scrutinizing their associate list, as to warrant some comment. Further than this it is a rule which has always been rigidly enforced that there should be no exploitation of patented devices or special products on the floor of the convention.

When, however, the heat-treated axle was under discussion, and two representatives of steel companies making such an axle had spoken and promised assistance, and had repeatedly referred to "our" practice and "our" product, a third arose and flatly asserted that his company had been unfairly treated in that they had not been invited to join the conference, and they should have been invited to make their recommendations, because as it stood it was a condition of unfair discrimination. He was told with equal directness that he was incapable of making an axle that was suited to heavy traffic and would have to be content to take light-work orders. Such controversies are undignified and a repetition would be apt to result in a war of words if the disputants failed to keep their tempers and attempted to fight it to a finish. Under the conditions of associate membership it is difficult to see how such a possibility can be well avoided.

Harking back once more to this matter of standardization, its scope can be appreciated when it was urged that certain standards of construction should be adopted for passenger work, as though local conditions could be disregarded. And yet the impression conveyed in the discussion was that it was the idea of the man and not his surroundings that was responsible for the present discrepancies of practice, although each individual must have known that he had very good reasons for what he did and that it would cause no end of trouble to change. Probably each hoped that the other fellow would come to his practice.

In the papers devoted to track and maintenance of way there were a set of specifications for open hearth rails and a series of prints showing the forms for the proposed standardization of girder rails, which practically means the standardization of rails for urban work, a proceeding which, if carefully worked out, cannot fail to be of the same value to the street railways that the standardization of the T-rail has been to the steam roads. The care demanded is probably greater than with the T-rail because of the conditions of service. The provision of a suitable amount of wear in the head; the depth and width of the groove; and the adjustment of these dimensions to meet the demands of both tangent and curve work where widening of the gage is practised, must be looked to. As to the requirements on all of these points our information is woefully deficient, and it would seem that long and careful study would be required before a decision that is final can be reached.

Then, too, this rail question is complicated by the tendency of the head to corrugate, a phenomenon evident on most electric roads. No demonstrated reason has yet been developed, though many of the undemonstrated variety have been promulgated. The condition was well expressed in the Atlantic City paper, where it was asserted that the users were placing the responsibility for corrugations on the rail makers, while the latter promptly retorted by loading the conditions of traffic with the trouble. When it will be settled no one knows. The work of the convention, taken as a whole, was admirably well done, and the ample allowance of time for the presentation of the papers

and discussion of them produced results that cannot fail to be satisfactory. And this satisfaction is increased when the full attendance at all of the sessions is considered.

HARMONIOUS RAILWAY ACTION REGARDING SAFETY APPLIANCES.

THE policy adopted by the railways in handling with the Interstate Commerce Commission the question of what, and how, safety appliances should be put on equipment in obedience to the new safety appliances law, set a precedent the roads may follow with profit in handling similar matters in future. There were several conferences between a committee of railway mechanical men and representatives of the commission before the proposed standards were made public. Later, a general committee was formed to prepare data, select witnesses and present arguments at the hearings before the commission. This general committee appointed sub-committees to deal with the various phases of the subject, which included the preparation of statistics. It was suggested that all railways authorize this general committee on safety appliances to represent them in the proceedings before the commission. Two hundred and seven railways, operating 207,362 miles of track and having 2,103,138 freight cars, gave authorizations. Armed with these credentials, the general committee was able to appear before the commission as the spokesman of nearly all of the important railways of the United States. Before the hearings took place all differences of opinion between members of the committee as to what the policy of the roads should be were discussed and harmonized, and witnesses and counsel were selected; and, while some of the individual lines put in testimony and statements of their own, the general committee practically handled the entire case for the railways.

The advantages of this course of action are plain. Usually in the past when a matter of importance has been pending before a commission, a state legislature or Congress, either all the roads concerned have appeared individually or some have appeared individually, and the case of only part has been presented by a general committee. Some roads have asked for some things; others have asked for other things; and some have favored what others opposed. The matters discussed usually have been of a technical nature. The consequence of the failure of the roads to act in harmony has been to confuse the minds of the lawmakers or the commission as to what the railways really wanted and did not want, and the reasons for their attitude. The points regarding which the railways agree are usually the important ones; the points as to which they disagree are apt to be relatively or absolutely unimportant. The effect of the raising of the unimportant issues often has been to cloud the important ones and to lead the lawmakers and commissions to concede to the railways points of trivial consequence while deciding against them on points of the greatest moment. Quite often the result has been that the railways have lost on every point. For example, their failure to present a united front and vigorously and harmoniously state their case when the Mann-Elkins bill was pending, resulted in the passage of a law which includes numerous provisions to which all the railways were strongly opposed and not a single one which any of them favored.

The Interstate Commerce Commission, particularly, has numerous heavy duties to perform. The amount of time and study it can give to any matter, however important, is but small. It would be able to give much more intelligent consideration to the various questions coming before it if the evidence of the railways was more commonly presented to it in a concentrated and consistent form. That the roads, when important matters are pending, such as the question of safety appliances, standards and general advances in freight rates, do not present a united front, is sometimes due to the fact that their officers differ as to the theory on which their case should be handled; sometimes to the fact that they think their interests are different; and sometimes to both these things. But generally the respects in which their

interests are identical are so much more numerous and important than those in which they are antagonistic, and the advantages to be derived from presenting their case according to a consistent theory—even though it be not an ideal one—are so great that it would seem that the roads as a whole, and each of them individually, would usually gain more in the long run by acting together, as they have in regard to the matter of safety appliances, than one or a few can hope to gain by playing a lone hand.

NEW YORK, ONTARIO & WESTERN.

THE New York, Ontario & Western is a subsidiary of the New York, New Haven & Hartford; it is a pretty important one at present and is certain to be more important in the future. Pending that future development, the general policy of the controlling corporation is substantially to let the Ontario & Western take care of itself, under the single limitation of earning a fair return on the New Haven's investment. That investment is represented by \$29,162,200, at par, out of \$58,117,982 total capital stock, or a bare majority. The investment stands on the New Haven's books at \$13,108,397, showing an investment price of about 45 and an annual investment return of about 4.44 per cent.—a good investment by itself, but particularly so when future strategical advantages of the Ontario & Western are taken into account.

The main line of the Ontario & Western runs from Cornwall, on the Hudson river, northwest to Oswego, on Lake Ontario, 272 miles. It connects at Campbell Hall with the Central New England, which, via the Poughkeepsie bridge, connects it with the New Haven. It owns some 50 miles of branch lines and leases 174 miles.

Taking up the Ontario & Western as an independent railway proposition, the returns for the fiscal year 1910 are also satisfactory. Direct gross earnings rose from \$8,290,170 to \$8,578,782, accompanied naturally by the rise in direct operating expense, which was from \$5,643,101 to \$5,882,146, leaving the slight but definite rise of net operating revenue from \$2,647,068 to \$2,696,636, further decreased slightly by a deficit in outside operation, which increased from \$36,321 to \$43,842. The final showing is not quite so good, after charges. The inevitable increase of taxes from \$189,159 to \$211,693; a decrease of other income from \$428,410 to \$403,316, and increase of rentals, interest, etc., from \$1,506,870 to \$1,531,619, left net applicable to dividends \$1,312,797, as compared with \$1,343,127 in 1909. The dividend of 2 per cent. (\$1,162,328) left surplus over dividends of \$150,469.

The property was evidently well maintained. The figures of the year for maintenance per mile of road operated rose from \$1,867 in 1909 to \$2,099 in 1910, and, though maintenance per locomotive fell from \$2,859 to \$2,634, it rose per passenger and freight car from \$78 to \$85. More noteworthy is the increased cost of additions and betterments, which in 1910 were, for local betterments and additions alone, \$410,596, as compared with \$238,142 in 1909; and in the last fiscal year there was expended, besides, \$5,728 on main line second track, \$96,868 on the second track of the Scranton division, and \$195,382 on the extension of the Capouse branch to the Lehigh Valley lines. The total for all additions and betterments is \$933,757, as compared with \$802,124 in 1909. There have been purchased during the past summer 14 new locomotives, 500 coal cars and 7 passenger coaches. These various increases of the property necessarily imply new financing, which will be in the form of general mortgage bonds, to liquidate floating debt, and car trust certificates to the amount of \$700,000. But the new expenditures are evidently all of a type that yield quick returns. The form of the general balance sheet has been changed during the year so as to make itemized comparison unsatisfactory, but the slight upward change of the totals from \$93,810,123 to \$94,132,960 indicates no radical new financing. The profit surplus of \$5,706,795 in 1909 rises to \$5,891,138 in 1910.

Some of the items of increased business are worth notice.

Passenger earnings (local) rose from \$1,295,552 to \$1,365,982, through passenger business from \$211,144 to \$226,368. Local freight earnings, excluding, evidently, coal and brick, increased from \$1,032,456 to \$1,088,443, and through freight earnings, with the same exclusions, from \$851,132 to \$898,967. Coal earnings rose from \$185,583 to \$290,732, and the large brick business of the company from \$734,115 to \$766,153. But on the freight business there is one shadow very briefly referred to by Vice-President Childs in his sub-report in the words: "The differential freight rates which the company has used almost continuously since 1888 were withdrawn on March 15, 1910. Since that date the rates have been on what is called the 'standard' basis. The effect of such change has resulted in a large loss of traffic." The quoted words refer to the trunk line controversy of last spring and the threatened trunk line war of rates. It was, ostensibly at least, aimed at the Grand Trunk's differential via New London. President Mellen, of the New Haven, for the sake of peace, yielded the Ontario & Western differential, which was raised from 69 cents to the standard 75 cents on the through western business. The Grand Trunk, refusing to yield, has maintained its differential, and the Ontario & Western is the victim. But the reported new traffic arrangement with the Delaware & Hudson may be an offset.

The tables of the report extending through many years show the advance of railway efficiency. One notes, for example, the average increase in weight of engines to 70.44 tons in 1910, as compared with 54.7 tons 10 years ago, and 34.5 tons in 1881; in the average freight car capacity to 31.33 tons in 1910 from 27.71 tons ten years ago, and 13.68 tons twenty-five years ago; and the rise in the tractive power of engines from 13,870 lbs. in 1885 to 20,570 lbs. in 1900, and 26,080 lbs. ten years later. In the last three years the average tons per train have risen from 276 to 281, and average per car from 13.03 to 13.38. Operating ratio was 76.55 per cent. in 1890; now 68.56 per cent. In the use of foreign cars the company is a debtor line with an adverse net balance of \$120,151.

As a large and slowly but evenly developing subsidiary of the New Haven, with possibilities, not at all remote, of expanding considerably its coal business and becoming a more and more important member of the anthracite group, the Ontario & Western is not without interest. But its more remote future will be its development on a larger scale, now that it has become a frontier property of the New England railway monopoly. Not many months have gone by since it was an open secret that, by new arrangement with the New York Central for transferred business between the junction point, Oneida, N. Y., and the Niagara frontier, it was proposed that the Grand Trunk should gain entrance to New York City via Weehawken—this to be attended, perhaps, with Grand Trunk concessions to the New Haven in southern New England. One may also consider the Ontario & Western's northern outlet on Lake Ontario not so very far from extension to the Canadian railway systems; or, turning eastward, the New Haven's northern extension through Westchester county, to connect ere long with the Poughkeepsie Bridge route, and, by it, with the Ontario & Western, has something more than a hint of a new eastern entrance of the latter to New York City in addition to that firmly secured already by its trackage rights over the West Shore.

The annexed table shows the more important results of operation in 1909 and 1910:

	1910.	1909.
Mileage	846	835
Freight revenue	\$6,649,635	\$6,465,585
Passenger revenue	1,592,250	1,506,585
Total operating revenue	8,578,782	8,290,170
Maintenance of way	1,034,454	920,196
Maintenance of equipment	1,816,045	1,880,386
Traffic	130,243	114,263
Transportation	3,191,408	3,053,847
*Total operating expenses	6,125,742	5,899,401
Taxes	211,698	189,159
Operating income	2,696,686	2,647,068
Gross corporate income	2,844,417	2,421,587
Net corporate income	1,812,797	1,343,127

SOUTHERN RAILWAY.

A YEAR ago the Southern Railway was just emerging from a crisis which had threatened its very corporate existence. In the twelve months ended June 30, 1910, the company has shown that its period of uncertainty is past and that it has definitely made progress on the uphill road. In 1910 the company earned \$57,300,000 gross, or \$8,127 per mile; and after the payment of operating expenses, which included ample maintenance, the company had net operating revenue of \$18,700,000, an increase of 13 per cent. over the net of 1909. As a matter of fact, the road that in 1907 seemed almost on the verge of disaster earned in 1910 over 9 per cent. on its preferred stock. It wisely paid nothing, choosing rather to use the surplus to help extinguish the discount on securities sold in 1909. President Finley, in an engagingly sincere man-to-man talk with his officers, says: "The future success of the company under existing economic conditions depends largely upon its relations with the public, who are its customers. * * *" By analogy, the company's success last year was due to its improved relations with the public and to the greater efficiency of its employees.

There is a tendency in discussing the Southern Railway to patronizingly say that this or that is good "for the Southern Railway." This is hardly just. In so far as the main lines are concerned, the Southern's standards of construction and of operation, as well as of maintenance, are on a parity with those of other great railway systems.

The Southern Railway lines may be fairly accurately divided into three classes. The line from Alexandria across the Potomac from Washington to Lynchburg, Va., is representative of the first class. A good part of this mileage is double tracked. The double-track road has been built in the last few years. It has a maximum grade of 0.6 per cent. and a maximum curvature of 4 deg. Bridges and culverts are all permanent steel and concrete structures. It is laid with 85-lb. rail and is rock ballasted. It replaces an old single-track line, in the sense that it runs between the same two termini. At Lynchburg there is a great deal of very expensive work now under way. The old line dipped down to the level of the James river and then wound up the hill on the other side of Lynchburg. The new double-track line which is being built maintains the grade north of Lynchburg, and will cross the James river by a viaduct now partly built, thus avoiding about 100 ft. of dip.

The line from Sycamore, Va., to Danville, and the line from Atlanta to Birmingham, are two types of the second class of line in the system. The line from Sycamore to Danville is part of the old main line of the Southern. It is single track, laid with 85-lb. rail, well ballasted and well maintained. It has numerous 1 per cent. grades and many curves, some of them 6 deg. It is obvious that this line and other stretches like it will have to be double-tracked and brought up to the standard of the line north and south of it. The other type of this second class, the line between Atlanta and Birmingham, has a great number of curves, and nearly the entire line is on grade, both eastbound and westbound. It is laid with 85-lb. rail, has a maximum grade of about 1.2 per cent., although most of the grades are 1 per cent. or less, and is ballasted either with rock or slag. The structures are nearly all wooden, and during the past summer a large number of new ties were placed in track and considerable stretches of new 85-lb. rail were laid. Notwithstanding that this is single-track line, it is estimated that it can handle more than twice the traffic that it now gets without increasing the present facilities. It would appear that to rebuild such a line as this at present would be foolish extravagance. Its operation is expensive, but it is there, and it can handle the business; and it is not necessary to have a knowledge of higher mathematics to see that to throw away a tool which is perfectly capable of doing its work and replace it with a new, more expensive tool which could not conceivably be used to full capacity and pay interest on both the cost of the old tool and the new, would be business folly.

The third class of lines comprises the branch lines, of which there are more than 3,500 miles in the Southern Railway. These branches reach out into the country, affording comparatively

*Includes "outside operations."

thinly populated agricultural districts railway facilities which, while pretty poor, are in reality the only hope of future development. These branches are laid with light rail and are lightly ballasted; in many cases their operation is as yet quite unprofitable.

As to passenger stations, in the majority of cases in the smaller towns the railway station is far and away the best building in the place. In the last few years a great number of new passenger stations have been built, probably many of them against the better judgment of the railway officers, because of the pressure of public opinion demanding these improvements; but the demand for attractive, clean stations, if accompanied by an appreciation of them, is in itself a good sign for the Southern.

The South has been more backward than any other section of

are more to be desired than an immediate gain in traffic.

In 1910 355 new industrial plants on the lines of the Southern Railway were completed. Of these, 69 were lumber mills, 36 textile mills and 21 cotton seed oil mills. The South is beginning to understand the economic advantages to be gained by manufacturing its own raw products. One aspect of the establishment of new cotton mills is rather interesting from the railway's point of view. This is the increased use of electricity, generated by water power, as a means of power in cotton mills. The cost of electricity is slightly greater in most cases than the cost of generating steam power by the use of coal. The power, however, furnished by the transmission lines is steadier and permits of greater output than is the case when steam engines



Southern Railway.

The Southern does not operate the lines shown cross-hatched, but has an interest in them.

the country in its development—it is the haunt of the hook worm. But in the last few years there has been a marked change. Whitewash is used more freely; pride is taken on the condition of the front doorstep and more diversified farming is being undertaken. A Southern Railway officer will point with pride to a cornfield that was previously a cotton field; and here is a rather interesting contradiction that shows the extent to which the Southern Railway interests are allied with the welfare of the South. Cotton is one of the most profitable commodities which a railway can carry. The railway is sure to get traffic from the cotton market, while corn may be hauled by wagon to a mill and consumed locally. The triumph over one farmer's change from a grower of cotton exclusively to a grower of corn is well an appreciation of the mill's own growth and an acknowledgment that better citizens

are used. The use of electricity takes away from the railway the haul of coal that it would have got if the mill had used steam power; but this latter, it is estimated, is more than compensated for if the mill can better meet the competition of its Massachusetts rival.

Of the total tonnage carried in 1910, products of mines contributed 39.69 per cent; products of manufactures, 30.16 per cent; products of forests, 18.13 per cent; products of agriculture, 10.86 per cent; products of animals, 1.16 per cent.

In connection with the active efforts at colonization that are being carried on by the Southern's industrial department, it may be noted that the tonnage of agricultural implements amounted to 30,309 tons in 1910, as against 14,176 tons in 1909; and the tonnage of household goods amounted to 13,654 tons in 1910, as against 22,678 tons in 1909. Under manufactures and miscella-

means, only cotton factory products and petroleum and its products show any decrease from the tonnage of 1909.

The gain in gross business in 1910 on the Southern, which amounted to over \$5,000,000, was to have been expected, but the gain in net, which amounted to \$2,000,000, is highly encouraging. Moreover, a study of the details of operating expenses shows that the gain in net is much more noteworthy than the percentage of increase would indicate. To repeat, operating expenses as a whole amounted to \$48,000,000 in 1910 and to \$55,000,000 in 1909. Maintenance of way and structures cost \$6,600,000 in 1910 and \$6,000,000 in 1909; maintenance of equipment cost \$9,900,000 in 1910 and \$8,000,000 in 1909, while transportation expenses cost \$18,000,000 in 1910 and \$18,000,000 in 1909. In other words, of the total increase of \$3,100,000 in operating expenses, 21 per cent. was in maintenance of way, 50 per cent. in maintenance of equipment, and only 23 per cent. in transportation expenses. Transportation expenses consumed 33 per cent. of gross operating revenues in 1910, as against 35 per cent. in 1909. It was to be expected that maintenance charges would be higher in 1910 than in 1909. The company had economized in 1909, as compared with 1908, and so considerable overhauling was postponed until 1910. The table shows the unit costs of maintenance:

	1910.	1909.
*Maintenance of way, per mile.....	\$832	\$745
†Repairs, per locomotive.....	2,220	1,445
" passenger car.....	609	554
" freight car.....	64	50

*Per mile of first, second, third, etc., track, the cost of two miles of siding and switch tracks being taken as equal to the cost of maintenance of one mile of main track.

†This is for repairs only and does not include renewals, depreciation or superintendence charges.

The figures for 1910 not only show extraordinary increases over 1909, but are large in themselves. For a road having as much branch line and side track mileage as the Southern Railway, \$832 per mile of track is a large sum. Anything over \$2,000 for repairs only of locomotives is large.

Under transportation expenses it is interesting to note that less was spent on the following seven accounts in 1910, notwithstanding the greater train movement and traffic carried, than in 1909: Despatching trains; yard, switch and signal tenders; lubricants for yard and road locomotives; telegraph and telephone operation; loss and damage to freight; and damage to baggage.

The trouble that threatened the Southern in 1907 was due to an almost complete collapse of credit. The plan to raise new funds and to refund maturing securities was perfected in 1909 and was commented on in these columns in the discussion of the 1909 report. The results of that highly skillful financial plan put forth in 1909 are shown in the balance sheet and capital account, as well as in the income account, in the 1910 report. On November 1, 1909, the three-year convertible 6 per cent. notes due 1911, amounting to \$11,105,000, were redeemed. On February 1, 1910, \$15,000,000 three-year 5 per cent. notes, which were issued in 1907, matured and were redeemed. Of this debt, \$5,000,000 was paid off in cash with treasury funds, and the balance was renewed by the issue of \$10,000,000 5 per cent. notes due February 1, 1912. On January 1, 1910, the three issues of Atlanta & Charlotte Air Line bonds, amounting in the aggregate to \$5,500,000, were refunded by their acquisition under provisions of the first consolidated mortgage; \$5,000,000 of consolidated bonds being sold. Through these and other refunding operations, the amount paid for interest on funded debt and equipment obligations was less in 1910 than in the previous year, despite the fact that a full year's interest on the \$41,333,000 development and general mortgage bonds issued during 1909 was paid only in 1910. The \$5,700,000 surplus after the payment of fixed charges was credited to profit and loss, and there was charged off to profit and loss \$2,800,000 discount on securities sold in 1909. There is now but \$4,850,000 discount left undisposed of on the balance sheet. The wisdom of using current surplus to extinguish bond sales discount instead of using any part of it to pay dividends cannot be too strongly emphasized.

The balance sheet shows that the company had current assets amounting to \$22,200,000 in 1910, of which \$8,700,000 was cash

in the treasury. In 1909 the total current assets amounted to \$18,400,000, of which \$11,100,000 was cash in the treasury. There was an increase of about \$6,000,000 in miscellaneous current securities held in the treasury. Current liabilities in 1910 totaled \$13,600,000, of which \$1,700,000 was bills payable, including current obligations for new rail; in 1909 current liabilities amounted to \$11,500,000, of which \$1,000,000 was bills payable.

A word should be said in regard to the form of the annual report. The report furnishes as complete a fund of information as even the nice theories of accounting developed by the Interstate Commerce Commission under Professor Adams has been able to ask. A detail illustrates this. In the statement of materials and supplies on hand each separate class of supply is stated and the value at which it is carried is given.

The following table shows the results of operation in 1910, compared with 1909:

	1910.	1909.
Average mileage operated.....	7,050	7,020
Freight revenue.....	\$38,161,392	\$31,376,619
Passenger revenue.....	11,639,161	13,510,791
Total operating revenue.....	57,294,508	52,188,107
Maint. of way and structures.....	6,635,725	6,016,661
Maint. of equipment.....	9,876,729	8,193,753
Traffic.....	1,490,776	1,252,928
Transportation.....	18,934,427	18,348,507
Total operating expenses.....	36,635,746	35,568,981
Taxes.....	1,979,722	1,916,702
Operating income.....	16,698,020	14,939,388
Gross corporate income.....	19,877,156	17,787,699
*Net corporate income.....	5,757,019	3,589,355
Additions and betterments.....	52,373	78,285
Surplus.....	5,704,646	3,511,100

*The deductions from gross corporate income include \$266,806 in 1910, and \$535,214 in 1909, discount on securities sold, proportion charged to income. These sums are in addition to the amounts charged off through profit and loss.

NEW BOOKS.

Railroad Administration. By Ray Morris. Published by D. Appleton & Co., New York and London. 309 pages; 6 in. x 8 in.; cloth, \$2.00.

The first chapter, "The Beginnings of a Railroad," is one which every intelligent person should read and will enjoy reading. It is a plain statement of what the American banker, or other agent for investors, needs to be shown in order to induce him to advance money to build a new line of railway. Aside from the dangers of destructive competition, and the necessity for an independent line to have more than one rail connection with the rest of the world, the volume of expected traffic and its probable growth must be computed and checked by several methods. These are described well and completely, although briefly. It is difficult to imagine that any reasonable person, after reading this chapter, could remain, or become, a believer in the valuation of railways for the purpose of rate making; and it suggests that this part, as well as the entire volume, is well adapted for a university text-book.

The study of organization and management begins with a very small road, the Hearne & Brazos, only 18 miles long and with one locomotive. The president is in New York, exercising "static functions" only, but the general manager is at Hearne in charge of the "dynamics." Then the Salt Lake & Ogden, 50 miles, with 10 locomotives, with the president acting as general manager and having both static and dynamic duties. The author's careful examination of the kind of officers needed on the smaller roads shows clearly, in miniature, the basis of organization for any road, provided that organization is a divisional one.

The volume is well illustrated with organization charts of American railways: the Norfolk & Western, the Union and Southern Pacific systems, the Pennsylvania, the New York Central, the Buffalo, Rochester & Pittsburgh, and the Rock Island. In the discussion of these varying methods Morris has availed himself of his exceptional opportunities to familiarize himself with their practical workings, and he speaks frankly and unsparingly. American practice tends strongly to divisional, rather than departmental, organization, and this change seems to be due to the inevitableness of emergencies requiring greater flexibility and fuller authority for the one man who is on the spot—

the division superintendent—so that he can command, and be accustomed to command, the technical as well as the operating forces.

"A railroad managed on the departmental plan is not comparable to an army. The company, or division, here has several partial commanders, reporting to headquarters through different channels; the lines of authority do not concentrate short of the general superintendent or of the general manager. Such a situation would be created in an army if one lieutenant in each company was in charge, let us say, of small arms practice, reporting neither to the captain nor the colonel, but to an adjutant on the brigadier-general's staff, while the other lieutenant was a lieutenant of engineers, reporting likewise to the brigadier-general's staff. With a mobile unit, like a military company, such an organization is unthinkable; with a fixed unit, like a railroad division, it can be managed, though the results are questionable."

The chapter on the scope and limitations of the work of railway staff and line officers is an instructive and fine example of condensed statement of present-day requirements for an efficient president, general manager, general superintendent, division superintendent, superintendent of car service, trainmaster, superintendent of motive power, master mechanic, chief engineer, division engineer, comptroller, treasurer, auditor and traffic department officers.

The fundamental differences in foreign and American methods of administration are shown in the organization charts of the London & North Western, the London & South Western, the Lancashire & Yorkshire, the Prussian State Railways, the East Indian Railways, the Paris-Orleans, and the Paris, Lyons & Mediterranean. A clear statement is given of the reasons for difference, and for this Morris was reasonably well equipped by a pretty thorough practical acquaintance with British railway operation.

In a series of charts, of novel design, he compares the control of minor employees (from conductor to laborer) in England and America, and traces that control back through the departments to the head of the company.

In an appendix is given a description of the Unit System of railway organization, designed by Major Hines, already applied to many divisions of the Union Pacific, and to be applied to the entire Union and Southern Pacific systems.

Heat Engines. By Professor John R. Allen and Assistant Professor Joseph A. Bursley, University of Michigan. McGraw-Hill Book Company, New York and London. 280 pages.

So much that is acceptable on this general subject is already available that a new book to justify itself must either be very well written or it must present some new grouping of topics. The work of Professors Allen and Bursley merits attention upon both of these questions. It is well written, and though it contains but 280 pages it deals with the whole field; with the thermodynamic theory and with the mechanism of various forms of steam and gas engines. There are four chapters dealing with heat, thermodynamics, properties of steam and calorimetry; three chapters discuss fuel, boilers and boiler auxiliaries; two brief chapters describe the elementary theory of the steam engine and the different types of such engines; six other chapters discuss the testing of steam engines, valve gears, governors, compound engines, condensers, air pumps and steam turbines; three chapters are devoted to the problems of the gas engine; and a final chapter presents a brief general discussion of the economy of heat engines. This summary by chapters will serve to make the purpose of the book clear. It is an elementary text, not a treatise. It cannot be exhaustive in its treatment of any one of its several widely different topics, but it can, and, in fact, does, constitute a simple and readable course of study touching all of the more important phases of the heat engine problem. Judged by this standard, the book is in every way excellent. All but the simpler equations developed by the text are illustrated by numerical solutions which make easy reading for the beginner. Each chapter ends with a series of problems in good variety and admirably stated, by which the student may test his skill in applying the principles of the text. The book will be found serviceable to those who seek to secure, by as direct a path as possible, a general view of the construction and action of the more common types of heat engines.

RAILWAY CAPITAL AND CAPITALIZATION.

BY WILLIAM Z. RIPLEY.

Professor of Economics, Harvard University.

The definition of railway capital is a far simpler task than its actual determination; and yet even that is not altogether easy. It consists of tangible assets, such as real estate, rails, locomotives and cars, and, in addition, all the attributes of a going concern usually known as good-will, including among other things profitable contracts and alliances and reputation. These more or less real assets are commercially represented by securities. And it is the aggregate of this paper certification of value, taken at par, which constitutes a railway's capitalization. These securities being the agencies by means of which money was raised to construct and operate the railway, are also commonly known as capital, the term being thus used in a commercial rather than an economic sense. Thus these two terms, capital and capitalization, are often used interchangeably, on the tacit assumption, first, that the real value of the property, judged by its earning power, is equal to the amount of its certificated worth on paper; and, secondly, that therefore in some way the asserted value is a realizable one in terms of cash. Usually in the case of going concerns, in normal times, these assumptions are more or less true, the degree of approximation to truth being measured by the deviation of the market price of the securities above or below par. Only in those instances where the assumption is absolutely true, that is to say, when the securities are commercially worth their face value, can it be said that the capitalization and the capital are equal. In all other cases the amount of the actual investment is more nearly represented by the aggregate market price of the securities, while the capitalization is a purely artificial total arrived at by taking the amount of these securities at par instead of at the market price. Although purely artificial, it is difficult to disabuse the public of the impression that it represents a very real thing. It may or it may not, according to circumstances.

The primary division of railway securities is into the two groups, respectively, of capital stock and evidences of indebtedness. The distinction between these two is fundamental. The shareholders, represented by the capital stock, are the owners of the property, charged with the responsibility of its administration, for good or ill. The holders of its evidences of indebtedness, on the other hand, be these bonds or promissory notes, are merely creditors of the enterprise. At first sight it would thus appear as if only the stock of a railway constituted its capital, while its bonds or promissory notes were of the nature of charges thereon. But in practice this is not so. For, although bonds in form represent a mortgage, yet their issue and sale was probably one means of collecting the funds necessary to create the property against which the mortgage lies. In the two most recently built transcontinental railways, for example, the Chicago, Milwaukee & St. Paul extension and the Western Pacific, practically all the funds were raised by the issue of bonds, taken by the parent or allied lines.* The capital stock, also held by these companies, has little or no commercial value, except for purposes of control. This stock was given as a bonus with the bonds. These facts are well recognized in English financial parlance, which designates the two groups as share and loan capital, respectively, as a result of these circumstances. The stock of few corporations stands for the entire investment. It seldom measures the full value of the property. For the full value of that property one must take account of both share capital, or capital stock and bonded debt.

Not all of the indebtedness, however, can be held to have been incidental to the creation of the property. Some of it may have been incurred in connection with its current operation. This distinction usually appears in the differentiation of funded indebtedness from current liabilities. Funded indebtedness represents long-time investment by creditors, while the other forms are merely incidental to its recent conduct. No separation in

*It might be pointed out that most of the actual money spent on the St. Paul's extension was obtained from the public by the issue of stock of the St. Paul. [Error.]

this regard appear in the official Statistics of Railways of the United States, prior to 1896, which up to that time indiscriminately included all current liabilities, such as bills payable, audited vouchers, and wages and salaries due, on the ground that, although being circulation as distinct from fixed capital, they nevertheless represented actual investment in the enterprise. But since 1896, at the instance of the American Association of Railway Accounting Officers, these latter forms of indebtedness have been separately classified. How considerable an item these current liabilities may be appears from the fact that in 1906 they amounted to no less than \$5,133 per mile of line for the whole United States. Still another modification of the official data appears in the Statistics of Railways for 1908, in the reinclusion of certain railway notes in capital. In 1896 they had been deducted from it as being one form of current obligations. These notes, as will appear later, have been much resorted to since 1905. They originally stood for unsecured indebtedness, but in these later years, being incurred in order to raise funds for improvements, are properly treated as railway capital. The revised official statement in 1908 permits the separation of mortgage and collateral trust bonds, of plain bonds, debentures and notes, of income bonds, equipment trust obligations and miscellaneous obligations. All of these are included in capital under the head of funded debt.

There still remains the most important consideration of all in the determination of railway capital. A clear distinction between gross and net capitalization is always necessary. The absence of this practically vitiates all of the federal as well as other private data concerning railway capital between 1899 and 1907. Prior to this time the practice of interinvestment of railways was not common. Methods of financing were simple and direct. Most railways were merely operating common carriers. The overwhelming majority of stock and bond issues were based upon the real property or earning power of the issuing company by itself. Therefore the figures given by Poor's Manual of Railroads and the United States Statistics of Railways were approximately correct. The principal exceptions were the Pennsylvania and Southern Pacific companies, and some of the anthracite coal roads, notably the Philadelphia & Reading and the Erie. These latter companies had extensive reserves of coal lands, purchased through the sale of bonds. Obviously such bonds were not a part of their railway capital as such, and inordinately swelled the volume of capital apparently devoted to transportation. But soon after the resumption of prosperity in 1898, largely as a result of consolidation into large systems, railway companies began on a large scale to acquire securities of other roads either for investment or control, and oftentimes to raise funds therefor by the issue of their own stocks or bonds. Such collateral trust bonds or securities, based upon the deposit of other stocks or bonds, were, of course, merely duplications of existing issues, unless used as a means of inflation otherwise. Hence the amount of "securities owned" should have been deducted from the gross capitalization in order to obtain the net amount of capital to be supported by operating income. From 1898 to 1907 such duplication of securities issued, progressively falsified the returns as to capital obtained by totalizing all issues of stocks and bonds by railway companies. Nor did the distinction between "capital in the hands of the public" and "owned by other railways" in the federal statistics enable the net capital to be accurately ascertained. The railways of the United States thus held not less than \$12,100 out of a total of \$65,926 per mile of line in 1905. This apparently left a balance of about \$54,000 capital outstanding per mile of line "in the hands of the public." This form of statement roughly sufficed for the returns made by each system as to its own finances. But obviously it was often impossible for any company to ascertain what portion of its securities, openly issued to the public, had ultimately found a lodgment in the treasury of other companies outside its own system. Hence even this data was open to grave objection.

The imperative need of correct returns as to the amount of railway capital to be supported by current earnings led to a comprehensive and detailed investigation of the whole subject.

A special report in 1908 of the Interstate Commerce Commission on Intercompany Relations of Railways was the result. And not only was a careful analysis made for the year 1906, but the system of annual returns was so remodeled that the actual net capital outstanding year by year could be made known thereafter. These official figures, then, show, first, the total of outstanding securities based upon railway property, as distinct from such capital based upon other securities; and secondly, they show this total after elimination of all such securities held by the railways themselves. For 1906 the grand total of outstanding securities for the railways of the United States amounted to \$9,342,900,000 of funded debt and \$8,884,200,000 of capital stock. From this gross capitalization there should be deducted \$1,440,300,000 of funded debt and \$4,114,800,000 of stock held by railway corporations, thus leaving in the hands of the public \$7,902,600,000 of debt and \$4,769,300,000 of capital stock. Making allowance for railways under construction, there remained an average of \$36,173 of funded debt and \$21,877 of capital stock per mile of line in the hands of the public. This total net capitalization per mile of line of \$58,050 for the railways of the United States may be taken as a bench mark for subsequent calculations. It amounts to a substantial reduction—\$10,000 per mile of line—from the figures in current use prior to that time. For the year 1907 this net railway capital was \$58,298 per mile of line. This figure, it will be observed, comprehends, in addition to all strictly railway securities, an aggregate also of \$460,302,000, consisting of miscellaneous investments of railways in other enterprises, from mining and lumber companies, electric street railways and steamship lines, to opera houses and newspapers.

A bald comparison of official figures shows an apparent increase in railway capitalization from about \$60,000 in 1890 to \$70,000 in 1907 per mile of line. These figures are, however, entirely misleading, for reasons heretofore given, principal among which is the duplication of issues incident to the growing complexity of intercorporate relations. No way of accurately measuring this change is possible, owing to the imperfectness of the returns in earlier years. There can be little doubt, however, that the net capitalization of American railways per mile of line has substantially increased during the last twenty years. In other words, issues of securities have grown much faster than mileage. This increased capitalization, aside from intercorporate financing, is accounted for, naturally enough, in various ways. It should not, by itself, be interpreted as indicating a tendency toward undue financial expansion, popularly characterized as stock watering. Enormous investments by roads already existing in 1890 have been rendered necessary by the steady filling up of the country and the growing density of traffic. Between 1890 and 1907 the density of traffic has increased for passenger service by nearly two-thirds, and for freight service it has more than doubled. On the great trunk lines the density has vastly exceeded even these notable figures. To accommodate this business many roads have been double and some have been quadruple tracked. In the period above mentioned, while only 66,000 miles of new line have been built, trackage has increased by 128,000 miles, or nearly twice as fast. The demands of the public for better, and particularly for speedy and specialized, service constantly requires more capital per mile of line. And the mere filling up of the country and the growth of large cities puts a heavy strain upon the roads for all sorts of improvements. It would be of great value and interest to compare the growth of these demands with changes in the volume of capitalization per mile. But the unfortunate circumstance must be recognized that data for any such analysis simply does not exist. In this field such matters must be matters of guesswork.

Determination of the net capitalization of individual railways along the lines indicated above is a difficult matter, owing primarily to the growing complexity of intercorporate relations. Unfortunately the above-mentioned Report on Intercorporate Relations of Railways did not attempt an investigation in this regard, its interest being solely the determination of the net capitalization, not of individual companies, but of the railways of

the country as a whole. Hence, our process of determination is rendered not only perplexing but imperfect by reason of the limitations of the official statistical data. In the first place, all duplication must be avoided, by subtracting from the total of outstanding securities of all companies within a given system the amount of such issues which are held within the group. In 1901 the Reading Company acquired \$14,500,000 par value of the capital stock of the Central Railroad of New Jersey, paying \$160 per share for this majority holding. The Reading Company then raised the necessary funds by issuing its new collateral trust bonds, based upon the deposit of this stock. Obviously the value of this investment should be deducted from the total capitalization of the system, which includes the Jersey Central lines, as otherwise the purchased stock and the Reading bonds based upon it, added together, would create a fictitious total.

At this point a few more concrete instances of the magnitude of inter-railway investments may not be out of place. The gross capitalization of the Pennsylvania Railroad in 1906 was about \$110,000 per mile, but of this sum about \$60,000 stood for security holdings, leaving a net capitalization of only about \$50,000 for a system of largely two and often four tracks. In a similar way the apparently heavy capitalization of \$95,000 per mile of the New York Central shrinks to less than \$60,000 when allowance is made for investments equal to nearly \$40,000 per mile. The most conspicuous example of this kind is, of course, the Union Pacific Company. Practically one-quarter of its net income in 1906 was derived from investments, enough, in fact, to permit payment of its fixed charges and the customary 4 per cent. dividend on the preferred stock without moving a ton of freight or carrying a passenger.* Without approving in the least of the dangerous financing by which this result was obtained, one must nevertheless concede that its gross capitalization of \$133,000 per mile of line in 1905 needs substantial correction before comparisons may be made with other roads not engaged in a general banking and brokerage business. In four years prior to 1907, according to the testimony of President Mellen before a Massachusetts legislative committee, not less than \$157,000,000 in capital had been raised by sale of securities, of which \$103,000,000 had been expended for investments in other companies and \$10,000,000 for real estate for terminal purposes. Distribute this sum over the line mileage of the company and a deduction of a large amount from its gross capitalization would be the result.

The fair market value of investments, by one road in other companies, rather than merely the par value, ought properly to be the basis of all calculations. In the case of the Reading Company, it paid \$160 per share for its holdings. This would make the actual cost of \$14,500,000 par value equal to \$23,200,000. The present market price of this stock is now nearer \$300 per share. On the other hand, the Illinois Central holds all of the capital stock and all but \$96,000 of the \$19,111,000 bonds of the Yazoo & Mississippi Valley. Whatever they may have cost the parent company, the fact that this subsidiary road has for two years failed to earn its fixed charges by a round half million dollars certainly would cause calculations based upon par value for its investments to deviate widely from recognized fact. Unfortunately, however, it is practically impossible to take account of such market prices in any general investigation. Aside from the mere labor involved, it is often impossible to ascertain the market value of inactive securities, some of which may have reposed in safe deposit boxes for many years; some perhaps, such as the capital stocks of the new transcontinental lines, having never had a public quotation. One must be content to inventory such holdings within a system at par. This may do mischief at times; but, on the whole, it seems probable that plus and minus errors will largely balance.

Eastern roads will be generally prejudiced by basing conclusions upon par values; while roads in the West and South will be benefited by it. Par values, at all events, are the best one can find, and must suffice for general purposes.

(To be continued.)

RAILWAY SIGNAL ASSOCIATION.

The fifteenth annual meeting of the Railway Signal Association was held at the Hotel Jefferson, Richmond, Va., on October 11, 12 and 13. There were about 400 members and guests in attendance. President H. S. Balliet (Grand Central Terminal, New York City), presided. Secretary C. C. Rosenberg was detained at home by reason of a death in his family.

The association was welcomed to the city of Richmond by the Mayor, the Hon. D. C. Richardson, who, in addition to the usual pleasant phrases of such speeches, gave a leaf out of his own experience in the signaling field. As a lawyer he had several years ago been counsel for the inventor of an automatic stop and cab signal which was tried on the Baltimore & Ohio, and which did what was claimed for it; but the usual practical difficulties ensued and the story ended in a tragedy. Following the disappointments resulting from the experiments, which were conducted near Baltimore, the inventor, who was a resident of Richmond, committed suicide.

Following the Mayor, Mr. Balliet gave the president's annual address. Looking back over his 28 years of railway experience, he gave a brief sketch of the marvelous progress that has been made in that time; and this is apparent not alone in machinery and methods but in the character of the men. He referred to the increase in recent years in the mileage of railways block-signalized, and said that for the year 1910 there would be important additions on many roads, which will probably aggregate 933 miles of road equipped with manual block signals, 1,419 miles with controlled manual, and 8,900* miles with automatic block signals and electric train staff. Also, about 360 interlocking plants will be built this year. He referred to the enormous traffic on the busiest lines, such, for example, as the Interborough subway in New York City, with 1,900 trains a day, and the holiday traffic of the large terminal stations. One terminal referred to (presumably the Grand Central in New York), on days preceding holidays, has trains in and out in 24 hours equivalent to a single train 61 miles long.

The president referred to the success of the intermediate meetings and said that judging by the experience of the past year it will be necessary soon to extend these meetings over two days, at least in the case of the New York meeting. He complimented the committees on having made particularly successful reports and on reaching definite conclusions, simplifying the work of the convention. The standards established by the association find ready recognition and are adopted widely. The association has decided, and rightly, that in specifications no mention should be made of proprietary names, but in discussions in the meetings it is quite likely that this rule might be relaxed with profit. Other associations have relaxed it. Mr. Balliet exhorted all the committee chairmen to carry on their work with a view to the early collection of material for a manual of recommended practice; such a publication ought to be made next year. As particular subjects for consideration during the coming year, he mentioned the standardizing of signal plans and the formulation of a standard contract between contractor and purchaser. The association should also consider the electrical requirements to be incorporated in agreements in reference to insulating and bonding around crossings where steam roads cross electric roads.

The report of the secretary-treasurer for the year ending Oct. 1, showed a membership one year ago of 1,139; new members and reinstatements, 196; total, 1,335. Loss by deaths, 8; by lapses and withdrawals, 134; total, 142. Membership Oct. 1, 1910, 1,193.

Cash on hand a year ago amounted to \$2,269; dues received (including some for the previous year, and including \$764 from representative members—part of this for 1909), \$3,873; advertising, \$1,692; total, including miscellaneous, \$8,184.

*1. Mr. Balliet is correct in his estimate, this means an increase of automatic signals of more than four times as great as occurred in 1909. His estimate of new manual signaling seems to have been taken from the statement issued last spring by the Interstate Commerce Commission, as to that at controlled manual (which refers to single track lines of the Burlington).

Expenditures—printing, \$2,184; salaries, \$1,740, total, including other items, \$3,779. Cash on hand Oct. 1, 1910, \$2,496. A statement of assets and liabilities shows a surplus at the present time of \$7,507.

The report of the executive committee, which was adopted, recommended that from June 1, 1910, the salary of the secretary be \$125 per month.

PROPOSED AMENDMENTS TO CONSTITUTION

The first subject discussed by the convention was the proposed amendments to the constitution. The proposal to move farther west the line which divides the association geographically was based on the feeling that the western members had not received their fair share of the benefits of the association. Mr. Anthony, who had recently analyzed the list of members, found that at present the number of active members in the eastern district (east of Buffalo and Pittsburgh) is 240, and in the western district, 274. If the line were shifted to Chicago and the Mississippi river the number would stand 308 in the eastern district and 213 in the western. Of junior members, the present numbers are 221 east and 132 west; under the proposed change 239 east and 114 west. But the only effect which the geographical line has on the activities of the association is in the choice of the vice-presidents, and the most prominent sentiment in the discussion was that the dividing line should be abolished. The only important geographical question in connection with the work of the association is to have the committees properly made up from men of the North, South, East and West. It was stated that there had been possibly some jealousy west of Chicago over the fact that the roads east of that city had too many of the officers, but the statement that this situation resulted from nothing but legitimate efforts to select men for their individual capacity, and in the utmost fairness, was not challenged. The discussion brought out a general expression of opinion as to geographical considerations, and Mr. Mann (Mo. Pac.) called attention to the fact that many members can attend committee meetings which are held within a single night's journey from their homes when they could not attend if the work necessitated an absence of two or three days from their offices.

The other proposed changes were briefly discussed. That concerning the nominating committee provides for the election of the members of this committee a year in advance; at present they are appointed. It is proposed to put three past presidents on this committee, to get the advantage of their acquaintance with the association, but they would not constitute a majority of the committee. The changes in the dates in the clauses relating to the annual meeting were proposed for the purpose of adjusting these parts of the constitution to the date of the annual meeting, in case it should be held in some month other than October.

All these proposed changes will go to letter ballot with a

full report of this discussion, as a guide to members in voting.

MECHANICAL INTERLOCKING

The first committee report was that of committee No. 2, C. J. Kelloway, chairman. The recommendation of the committee concerning home signal connections was modified to read that pipe connected home signals at mechanical interlocking plants, where the automatic return to normal is not required, is "good practice," etc. The next recommendation of the committee, on motion of Mr. Peabody (C. & N. W.), by a vote of 14 to 5, was revised to read: "The committee recommends as good practice power-operated signals in mechanical interlocking plants at points where three-position signals are required to return to the stop position automatically and at all points where three-position automatic block signals are in use or are contemplated."

The conclusion of the committee concerning means of insuring the return of a signal to the normal position was approved. The specifications for concrete reported by this committee were referred to the executive committee to be harmonized with similar work done by other committees.

That part of this committee's report which dealt with arithmetical values to be given to the different units of an interlocking plant was referred back to the committee, and the paragraphs concerning specifications for wrought iron pipe, and correspondence with the committee on standards, were received as information. The additions to the specifications for interlocking proposed by the committee was accepted and ordered sent to letter ballot, as were those other conclusions, referred to above, which have to do with standards of practice.

In connection with the subject of mechanical interlocking, Mr. Rudd (Penn.) said that the committee on track of the M. W. association was engaged in designing patterns of fixtures which have to be fastened to rails which will be entirely clear of the ballast, and the committee had called his attention to the fact that bolts used for fastening bell cranks

and other signal fixtures to ties, and which extend beyond the bottom of the tie, are objectionable because they may make an undesirable earth connection where track circuits are used.

POWER INTERLOCKING.

The report of committee No. 3 on power interlocking, B. H. Mann, chairman, was next presented. The report of this committee on the subject of methods of "indicating" and on the question of finding a substitute for the mechanical bolt lock was accepted as information. The same action was taken with reference to nine diagrams of typical indication circuits and circuits for operating electric motor semaphores. The committee accepted the suggestion that electric circuits which take the place of detector bars should be called "track indication circuits." The drawing of a circuit of this kind for use for power interlocking was criticized in relation to the arrangement of the



Charles E. Denney.

track battery on the side track, and the drawing was referred back to the committee. The matter relating to route-locking was offered by the committee simply as a report of progress and it was so accepted. With this, seven typical circuits were presented. On the subject of protection of wires in underground trunking the committee reported a code of specifications for treatment with pitch. This was discussed at considerable length, Mr. Cobb, representing a manufacturer, answering a number of questions. The makers can furnish pitch which will not crack at 60 deg. F. or at 32 deg., or even at zero. The makers in using the term "pitch" in this connection always mean oxidized petroleum asphaltum. After some further discussion the specifications were referred back to the committee. This committee recommended a code of arithmetical values for units of interlocking plants, but after some discussion the executive committee was instructed to appoint a conference committee to harmonize these recommendations with those made by other committees.

This committee submitted a code of specifications for electro-pneumatic interlocking filling 35 pages, together with six pages of notes. These specifications were discussed at considerable length and a number of changes in details were proposed by Mr. Rudd and others and were approved by the meeting; but the specifications had been offered by the committee only as a progress report and it was voted that they should be omitted from the permanent minutes of the meeting, so as to avoid cumbering the minutes with unnecessary matter. In connection with this report the president was directed to appoint, with the approval of the executive committee, a committee to deal with all matters in which different committees are likely to make reports which conflict with one another, or which, by covering the same ground, cause unnecessary work.

INDEX TO SIGNAL LITERATURE.

The committee on signal education, W. J. Eck (So. Ry.), chairman, presented a report embodying an index to signal literature, filling about 150 pages, which had been prepared largely by the chairman and Mrs. Eck, Mr. Eck spending many evenings in the Library of Congress and his wife doing editorial work at home. The index proper is made up of references to articles which have appeared in periodicals, the work being brought down to April 30, 1910. Besides this there is a separate list of books, pamphlets and catalogues, arranged under the names of authors or publishers and a list of those educational institutions which give some attention to signaling. This includes a report, in considerable detail, of the work of the School of Railway Signaling at Utica, N. Y. There are also several pages of replies from railway officers, telling what they do in the way of educating men in signaling work. The longest report is from the Union Pacific, with the work of which the readers of the *Railway Age Gazette* are already familiar. Mr. Eck called attention to a number of typographical errors in the report as printed, referring particularly to one on page 163, where the printed matter which has been issued by the School of Railway Signaling should be given as sixteen hundred pages. The committee spent two days at Utica and expresses a very favorable opinion of the school. In regard to education by railway companies, special mention is made of the Pennsylvania and the Union Pacific. Mr. Eck moved, and the meeting adopted, a resolution to accept this index as information and that the index proper be printed in a pamphlet to be sold at a reasonable price (probably \$1, bound in cloth), alternate blank pages to be inserted to enable the owners of books to insert new items as the need may arise. On motion of Mr. Waldron, seconded by Mr. Rudd, a resolution was passed thanking Mr. and Mrs. Eck for their valuable work.

COMMITTEE NO. 1.

Committee No. 1, on signaling practice and standards, presented a report discussing the merits of semaphores working in the upper left-hand quadrant, a subject which was discussed at some length at a meeting last March. Mr. Rudd, chairman of

the committee, moved that it be declared the sense of the association that while upper left-hand quadrant signals are not to be condemned, upper right-hand quadrant signals be recommended for new work and renewals. This motion was carried, the question to be submitted to letter ballot.

On the subject of a complete system of signaling the committee reported as follows:

The letter ballot in last year's report rejected so emphatically the propositions advanced that the committee was somewhat at a loss as to future procedure. The fundamental differences in the viewpoints of the majority and minority, were so pronounced that a unanimous report this year seemed out of the question. Our report, as is the custom, was submitted by Committee No. 10 of the American Railway Engineering and Maintenance of Way Association as its report to that body in March, together with a minority report signed by four members. After considerable discussion it was referred back to the committee, with instructions to confer with the proper committee of the American Railway Association, for decision. The President of the Maintenance of Way Association arranged such a conference which was held at Niagara Falls on June 8. After a hearing, lasting about two hours, the Committee on Transportation [A. R. A.] appointed a sub-committee of three to thoroughly investigate the matter and report its findings to the entire committee, with the understanding that that committee would later advise us what, in their opinion, were the signal indications necessary for proper railroad operation. Our work, on receipt of this report, will, of course, be to recommend to the Maintenance of Way Association the aspects for the display of such indications and we ought to be able to present a unanimous report. Meanwhile, with the conditions prevailing, we have no option but to report progress on this subject.

The sub-committee on standards has adopted specifications for wrought iron pipe, but the subject was inadvertently omitted from the notice of last year, and therefore under the constitution cannot be referred to a letter ballot by the present meeting, but as the specifications have been substantially agreed to by the association, it was voted to submit them to a letter ballot for a tentative vote.

Mr. Rudd, chairman of the committee, moved the adoption and reference to letter ballot of drawings of various standards which had been prepared by the committee and were presented in the report. Action on these was as follows: Semaphore Spectacle design A, approved; Semaphore Spectacle design B, approved; Spectacle Rings, approved. Drawings 1045 and 1046 (two-arm and three-arm semaphores, ground and bracket) approved as standards for spacing but not in all details. Ladders, 1026; Ladder Clamps and Stays, 1029; Ground Signal Masts, 1035, and Cast Iron Base for Bracket and Bridge Signal Posts, 1036, all approved. The designs for Bracket Post and Bridge Signal Masts, 1037, were approved as standards for indicating the height of the arms above the top chord of bridges, but there was considerable discussion over the desirability of having standard drawings showing such signals when the base of the post is fixed to the bottom chord of a bridge. It was the general opinion, however, that standard drawings are not particularly desirable because of the great variety of designs which would have to be considered.

The designs for Lamp Bracket, 1049, for Pinnacles, 1050 and 1051, and for Ladder Foundation, 1052, were approved. Design 1055B, for Porcelain Terminal Block, for use in electric connections, was discussed at considerable length in relation to its size and cost as compared with other designs, but was finally approved by a vote of 20 to 8. The design for a brass washer and nut and for a concrete foundation for a pipe carrier were approved.

The design for a Semaphore Lamp, 1100B, was discussed at considerable length because of differences of opinion as to the most suitable diameter for the lens. Dr. Churchill, of the Corning Glass Works, described at length the merits of a lens 5 1/8 in. in diameter, or 1/2 in. larger than the standard recommended by the committee. Western roads use a large number of lamps with lens 5 1/8 in. in diameter, and presumably do not wish to make a change unless there are important reasons for doing so. Dr. Churchill suggested that the standard be "not less than 5 in.," thus leaving anyone free to use a larger size. This is a matter in which a standard is not so important as in some things, because lenses are not frequently changed. The meeting finally voted (with but one negative) that the design

of lamp be accepted, but that the letter ballot to be taken should not be landing in regard to the size of the lens.

On motion of Mr. Rudd the meeting accepted as a preliminary report the following 12 designs presented by the committee: Ladders (1028A), Cast Iron Base for Bracket Post (1028A), Pipe Bracket Post (1039A), Channel Column Bracket Post (1028A), Ladders for Ground Post carrying power signals with mechanism at the top of the post (1041), Details of Ladders for Power Signals with mechanism at the top of the post (1047), Details of Ladder Platform Handrails and Stays, for top post mechanisms (1048), Platforms for Bracket Post Deck (1030B), Deck for Bracket Post (1031B), Clearance Diagram for Dwarf Signals between tracks 12 ft. 2 in. apart center to center, traversed by locomotives with very large cylinders (1081A), Semaphore Bearing (1082A), and "U" Bolt and Clamp for Semaphore Bearing (1083A).

The study which had been made by the committee of drawing 1081A showed that for the largest Mallet compound locomotives dwarf signals would have to be set so very low as to be in a position very undesirable for use as a general standard, and the prevailing sentiment of the meeting was that probably two standards would be necessary; and on motion of Mr. Waldron (Interborough Rapid Transit Co.) the committee was requested to prepare two designs. Mr. Mock called attention to the fact that design 1082A would need to be changed to be put in harmony with design B (1041) for a Semaphore Spectacle, but no action was taken and the subject apparently is left with the executive committee.

AUTOMATIC BLOCK SIGNALS.

Committee No. 4, on automatic block signals, A. G. Shaver, chairman, presented codes of specifications for direct current low voltage electric motor semaphore signals; for direct current relays; for trunking, and for caustic soda primary battery cell, the first two codes being revisions of earlier specifications. In moving the approval of the specifications for electric motor signals, Mr. Shaver first called attention to a few changes desired by the committee in the printed report. In paragraph 3, prescribing the designs for one-arm signal, two-arm signal, three-arm signal, etc., the numbers of the designs were cut out, the aim in drafting the specifications being to provide a form which will be useful for an indefinite time, even if the standard designs of signals should be changed. This elision of numbers was carried out through the whole of the specifications. Under paragraph 19, the meeting voted to cut out the requirement that every mechanism must be marked with the purchaser's order number, and also the requirement that the name of the tester should be given. All that is needed is a mark by which he may be identified. Mr. Peabody said that he had found that marks made on paper made with indelible pencil and then covered with varnish were very durable.

After some further discussion concerning the resistance of relays, the meeting approved the specifications for motor signals.

Mr. Shaver next presented the specifications for tinned channel pins, calling attention to a number of typographical errors. The material for pins should have .15 per cent. to .20 per cent. combined carbon. A member suggested that the test of tinning ought to be harmonized with similar tests used on wire, but it was pointed out that the tin on wire is of different thickness, requiring different treatment. Mr. Patenall (B. & O.) has a rail with a thick web and uses pins $1\frac{1}{2}$ in. in diameter. The specifications were approved, with a slight change in the drawing, the difference between the taper with the axis and the total taper was made .014 in. instead of .012 in.

In discussing the specifications for wood trunking it was suggested that these be received only as information and that the executive committee should order that they be harmonized with similar specifications prepared by other committees, but in view of the desirability of having the present specifications available for use, the meeting accepted the view of Mr. Elliott (N. Y. C.) that the harmonizing process be considered later, and the specifications were adopted.

The next thing taken up was the proposed battery cell. There was some objection to the rest on the top of the cell containing design 1080B, a thermos case being claimed to be more convenient for use in cold weather when a man must fix the battery with his gloves on his hands. There was also some discussion over the fact that two manufacturers have patents on some features which are desirable in the standard cell. It was believed, however, that these proprietors of patents would relinquish their rights, and the specifications were finally accepted and ordered to letter ballot, with the proviso that all patent claims must be waived.

Following this action, the meeting reconsidered its action on relays and it was voted that the table showing the limits of resistance in relays should be revised so as to show the maximum reverse pick-up in percentages of the minimum direct pick-up; and it was then voted to refer these relay specifications back to the committee.

At the request of the executive committee, this committee submitted plans of typical circuits for normal clear and normal danger signals, with and without overlap, etc. These drawings were discussed briefly, and the committee was instructed to change them so as to show three-position upper quadrant signals instead of two-position lower quadrant signals.

The committee presented detailed specifications for material in signals, relays, batteries, conductors and many other things, but not in complete form, and these specifications (pages 44-53) were approved as to form, but with the understanding that they should not yet be submitted to letter ballot.

ELECTRIC RAILWAYS.

Committee No. 10, C. C. Rosenberg, chairman, presented a carefully prepared report of about 68 pages, embracing a thorough study of electric signaling for electric railways, including the history of the development of such signaling from the first installation, which was made on the Boston Elevated in 1901. This report was received as information, and will be further noticed in a future issue of the *Railway Age Gazette*.

AUTOMATIC STOPS.

Committee No. 6, on automatic stops and cab signals, Robert C. Johnson, chairman, presented a report, supplementary to that made one year ago on the same subject, and presenting lists of requisites and desirable characteristics which are substantially the same as those presented last year but with improvements in phraseology and certain details. The committee also presented notes on eight schemes for automatic stops or cab signals, which have been considered by it. One of these, the Harrington suspended automatic stop, is in use on the Erie, and another has been tested on the Hightstown & Pemberton in New Jersey. The committee thinks that on the whole considerable progress has been made during the past year, and that railway officers are showing increased interest in automatic stops.

That part of the committee's report describing these inventions was accepted as information. The lists of requisites and characteristics were briefly discussed.

Mr. Ames, discussing requisite No. 2, that apparatus should be proof against failure by the removal of any essential part, spoke of a design, recently brought to his attention, in which the apparatus on the locomotive is so designed that at frequent intervals of space, or of time, it will automatically stop the train, unless by the action of the fixture on the roadway it is prevented from doing this; so that the entire removal of the roadway apparatus would cause the stopping of the train by the absence of the necessary influence on the locomotive.

"Desirable characteristic" No. 5, providing that the engine must be able to run either backward or forward, was ordered transferred to the list of requisites. After some further discussion of details and corrections of a few typographical errors, the conclusion of the committee was accepted and ordered sent to letter ballot in the following form (which omits the last seven words of the sentence as presented by the committee):

That the requisites of installation and desirable characteristics embodied

in this report form an adequate basis on which to design and construct a system of automatic stops and cab signals.

Committee No. 7, C. C. Anthony, chairman, presented a brief report embracing definitions of the terms "Blade-grip" and "Blade," which was accepted and ordered submitted to letter ballot.

This ended the business of the first two days.

THURSDAY.

Committee No. 9, "Wires and Cables," W. H. Elliott (N. Y. C.), chairman, presented a number of codes of revised specifications. Mr. Elliott presented first those for rubber insulated wire for current of 600 volts or less, calling attention to some typographical errors and to changes which the committee had concluded to make in its report as presented. In paragraph 9 the torsion test was cut out. Paragraph 15 should include a provision that the tensile strength at 70 deg. F. must be 1,000 lbs. per square inch. Explaining the changes which had been made in the former specifications, Mr. Elliott said that in paragraph 2 the words "Pure Upriver" had been added. Most of the clauses had been changed only in phraseology and not materially in meaning. Paragraph 8 had been drawn so as to provide for holding wire at the factory until the chemical analysis can be made. Paragraph 11 has been changed so that the sodium sulphide shall have an excess of sulphur. In paragraph 14 the tensile strength has been increased from 800 lbs. to 1,000 lbs. Paragraph 19, prescribing lengths, is believed to best accommodate the purchaser without unreasonable requirements. In the table of resistances, under the head of "Electric Tests of Insulation," the committee had prescribed limits about 25 per cent. higher than those in the former specifications, but finally concluded to withdraw this recommendation, leaving the old limits still in force; this at the request of the manufacturers, who said that they could demonstrate the sufficiency of the old figures. Under paragraph 5 the five-minutes time limit was justified on the ground that as the insulation acts as a Leyden jar, a brief test is not sufficient. In the discussion the committee agreed to introduce in paragraph 7 a provision that tests shall be made "immediately."

Answering criticisms of the standard of specific gravity adopted by the committee, Mr. Elliott said that all samples examined had been found 1.75 or more.

After some further discussion these specifications were approved, to be sent to letter ballot, and the meeting took up the revised specification for weatherproof copper line wire. The committee pointed out some typographical errors in the printed report. In the discussion a letter was presented from Mr. Christofferson (N. J.) saying that much insulation of this kind has proved brittle and unsatisfactory in extremely cold weather. He tests by immersion in a freezing mixture (20 deg. above zero) for 30 minutes and then bends the wire four times around itself. Mr. Shaver tests at 10 deg. above. This is to test the quality of the cotton.

After further brief discussion these specifications were accepted and sent to letter ballot. The same action was taken with aerial braided cables for current of 600 volts or less, these being changed in some details to correspond with the changes which had already been made in the specification for rubber insulated wire.

Next Mr. Elliott moved the adoption of the specifications for galvanized E. B. B. iron bond wires. In these, changes in the wording were made to correspond with the specifications for iron line wire. Mr. Elliott explained that the bending test had been eliminated because it was difficult to get wire which would meet that test. Mr. Shaver tests this wire by bending it around a mandrel $2\frac{1}{2}$ in. in diameter. It was the sense of the meeting that bundles of 300 wires were often convenient in new work, and paragraph 15 was amended to provide that bundles should be made up of 100 wires or 300, as ordered. After some further discussion these specifications were accepted and sent to letter ballot. The same action was taken with revised specifica-

tions for double-braided weatherproof galvanized B. B. iron line wire.

The specifications for rubber insulated lead-covered armored submarine cables for 660 volts or more were next taken up. Mr. Elliott indicated the necessity of the same changes that had been made in the specifications for rubber insulated wire. Mr. Peabody (C. & N. W.) thought that wires in cables need not have insulation of the thickness prescribed by the committee; thinner would be equally satisfactory, as he had found by long experience. It was the sense of the meeting, however, that as the cost of the insulation is so small a part of the total cost of a cable, it is better to be on the side of extreme safety. These specifications were approved and sent to letter ballot. The same action was then taken on the specifications for weatherproof copper-clad wire; on a proposed form for a wire inspection report, and on the tables of insulation resistances given in pages 4 and 5 of the committee's report.

The committee on storage battery, A. H. Yocum, chairman, presented a set of specifications for portable storage batteries in railway signal service, which was received as information, and the committee was directed to continue its investigations.

The special committee on methods of reporting signal failures, J. C. Young, chairman, presented a report embracing proposed blank forms for (1) report of signal failure, to be sent by the engineman or conductor; (2) inspection report; (3) supervisor's report of failures, and (4) a monthly signal report to summarize failures on the whole of a railway or division. After slight changes in the wording these forms were accepted and ordered printed, but not to be sent to letter ballot. It was the sense of the meeting that the forms should be tried by members before being proposed as association standards. In connection with the discussion on this report, and on motion of Mr. Waldron, the executive committee was instructed to appoint a committee to formulate rules for maintainers.

This was the last report and, after announcement of the election of officers, as given in the *Railway Age Gazette* last week,* the meeting adjourned.

It was voted unanimously to hold the next annual meeting (October, 1911) at Colorado Springs, Colo.

The entertainment features of this convention, including the annual dinner on Wednesday evening, were unusually satisfactory. The committee of arrangements, Charles Stephens, signal engineer of the Chesapeake & Ohio; J. B. Kirtley, C. J. Kelloway and W. J. Eck, provided automobiles and all desirable conveniences for the ladies, and the Chamber of Commerce of Richmond and business men generally were unstinted in their expenditures of time and money for the entertainment of the association.

Charles E. Denney, the new president of the association, is signal engineer of the Lake Shore & Michigan Southern, with headquarters at Cleveland, Ohio. He was born in Washington, D. C., in October, 1879, and was educated at Pennsylvania State College. He left that institution in 1899 and went to work in the shops of the Union Switch & Signal Company, at Swissvale. He continued in the service of that company in various capacities until May, 1905, when he was appointed Assistant Signal Engineer of the Lake Shore & Michigan Southern. He was appointed Signal engineer in May, 1906. He was made a member of the executive committee of the signal association in 1907, and has been prominent in the activities of the association since that time. He is a member of Committee No. 10 of the Engineering and Maintenance of Way Association, which deals with the signaling.

The signal supply association was represented by about sixty manufacturing firms, and the exhibits, a list of which is here given, were indicative of rapid and effective work in the perfection of signaling and allied appliances.

*President, C. E. Denney; second vice president, B. H. Mann; secretary, C. C. Rossbach; Berldorff, Pa.; members of Executive Committee, F. P. Paternall and A. G. Shaver.

Ray & Woodbury, Chicago. Showing acetylene, signal and beam lamps. Represented by W. H. Ballou, Assistant General Manager, Chicago.
 A. H. Adams, Chicago. C. E. Carson, Chicago. W. I. Peterson, Chicago. H. G. Gifford, Chicago. I. I. Langworthy, Eastern Manager, Philadelphia, and E. N. Koenig, Philadelphia.
 American Railway Signal Co., Cleveland, Ohio. Represented by G. I. Wagoner and D. M. Albright.
 American Vacuum Co., Inc., Washington, D. C. Showing sheet and plate glass, sheet and plate glass, plate glass.
 American Machine & Foundry Co., New York. Showing steel lamps and lamp glass. Represented by C. K. Freeman.
 Edison Electric & Manufacturing Co., New York. Showing the Edison primary cell. Represented by W. C. Banks and George W. Davis.
 E. S. Beach Supply Co., New York. Showing the Beach type 20 lightning arrester, the Beach type 25 lightning arrester, lightning arrester cabinets, the VanDusen trucking outfit, the new Universal fire stock and other specialties. Represented by I. S. Beach, H. E. Gifford, and A. G. McClure.
 Bryant Zinc Co., Chicago. Showing interlocking relays, crossing bells, indicators, lightning arresters and the Premier electrical instruments. Represented by E. M. Deems.
 Buda Manufacturing Co., Chicago. Showing Buda motor cars. Represented by J. L. Artmaier and R. M. Smith.
 Central Electric Co., Chicago. Represented by J. M. Lorenz and Charles F. Brown.
 Corning Glass Works, Corning, N. Y. Represented by Dr. Wm. Churchill and Esel Cameron.
 Commercial Acetylene Co., New York. Represented by R. E. Bruckner and R. P. Steward.
 Dixon Crucible Co., Joseph, Jersey City, N. J. Showing paint and pipe joint compound. Represented by Henry W. Chase.
 DuPont Electric Co. of America, Belleville, N. J. Represented by R. T. Hungerford.
 Dresser Railway Lamp Works, New York. Showing signal, switch and semaphore lamps, long time and one-day burners, oil founts and engine and tail marker lamps. Represented by Robert Black, F. W. Edmunds and R. Palmer Clairborne.
 Duntley Manufacturing Co., Chicago. Showing the Rockford motor car. Represented by G. E. Graber.
 Duplex Metals Co., New York. Showing Copper-Clad line wire, tie wire and Copper-Clad nails. Represented by J. F. Kinder, W. T. Kyle and George P. Fondersmith.
 Edison Manufacturing Co., Orange, N. J. Showing the Edison primary cell and a number of novel features in battery construction. Represented by E. E. Hudson, E. W. Brown and F. J. Lepreau.
 Edison Storage Battery Co., Orange, N. J. Showing the new Edison storage battery for interlocking and portable use. Represented by H. G. Thompson.
 Electric Storage Battery Co., Philadelphia, Pa. Showing the Chloride accumulator, the Exida and Tudor cells and the Permanized negative plate plates and the Permanized Westinghouse negative. Represented by G. H. Atkin, H. M. Beck, H. E. Hunt and Hugh Lesley.
 Fairbanks, Morse & Co., Chicago. Showing the new type No. 28 two-cycle gasoline engine motor car, the type 2-J motor car and a new bonding drill. Represented by A. A. Taylor, J. L. Jones, W. W. Adams and C. T. Fugitt.
 Federal Signal Co., Albany, N. Y. Represented by John T. Cade, Harry Cade and Aaron Dean.
 Gale Signal Oil Co., Franklin, Pa. Showing signal and headlight oils. Represented by John W. Bunn.
 General Electric Co., Schenectady, N. Y. Showing A. C. and D. C. relays, tower indicators, mercury time release, resistance units, panel boards and testing instruments. Represented by Frank Rhea, F. B. Corey, H. K. Ferguson and C. H. Jones.
 Gould Storage Battery Co., New York. Showing signal batteries. Represented by George R. Berger.
 General Railway Signal Co., Rochester, N. Y. Represented by H. M. Sperry, Morris Wuercel, F. O. Poor, F. L. Dodgson, L. Thomas, Mark Briney, W. P. Graves and M. F. Geer.
 Grasselli Chemical Co., Cleveland, Ohio.
 Gray & Sons, Peter, Boston, Mass. Showing switch, signal, bridge and tail marker lamps, burners, including new automatic electric burners and acetylene gas burners and founts. Represented by George M. Gray, J. M. Brown and J. F. Leonard.
 Hall Signal Co., New York. Represented by W. H. Lane, Harry L. Hollister, G. W. Hovey, W. A. Peddle and H. J. Mullineaux.
 Hazard Mfg. Co., Wilkes-Barre, Pa. Represented by R. A. Peet.
 Kerite Insulated Wire & Cable Co., New York. Represented by R. D. Brixey, Azel Ames, F. W. Miller, G. V. Watson, R. A. Patterson and J. A. Renton.
 Lawrence Electric Co., F. D., Cincinnati, Ohio. Represented by Charles F. Nelloth.
 Lutz-Lockwood Co., Aldene, Union County, N. J. Represented by W. M. Kinch and George Marloff.
 Lauder & Patterson, New York. Represented by H. K. Patterson.
 Macbeth-Evans Glass Co., Pittsburgh, Pa. Showing lenses for switch and signal lamps. Represented by J. M. Barnett.
 Massey Co., C. F., Chicago. Represented by C. F. Massey.
 National Carbon Co., Cleveland, Ohio. Showing the Columbia dry cell, the new multiple battery, the Columbia track battery and battery specialties. Represented by M. H. Moffett and E. L. Marshall.
 National India Rubber Co., New York. Represented by Avery P. Eckert.
 Okonite Co., New York. Represented by John Langan.
 Pocket List of Railroad Officials, New York. Represented by J. Alexander Brown.
 Rail Joint Co., New York. Represented by Fred A. Poor, V. C. Armstrong, K. W. Smith and E. F. Schermernhorn.
 Railroad Supply Co., Chicago. Showing locomotive and standard types of crossing bell, battery supplies, channel pins, bonding tools, fiber and aluminum tags, new model 2 switch box and hand-controlled circuit breakers. Represented by E. W. Vogel, H. M. Buck and J. F. Leonard.
 Railway Specialty & Supply Co., Chicago. Showing the Arc-damp, lightning arrester, the P. M. rail anchor and bond wire protectors. Represented by Phillip Moore and L. W. Kent.
 Roller-Smith Co., Bethlehem, Pa. Showing electrical measuring instruments. Represented by H. I. Shiire and W. J. Shiire.

[illegible]

MR. McCREA ON RAILWAY FINANCES.*

The Pennsylvania system east of Pittsburgh has cost very much more than the capitalization represents. On that capitalization it has never paid more than a fair return—less, in fact, than most other characters of investment, such as manufacturing, mining and agriculture. The results of constant increases in its business have been distributed either through reductions in rates, increases in amounts paid for wages and material, or by reinvestments in the property not capitalized. It has always been typical of good and constantly improved service—in fact, the character of service which, if I understand the American people, they desire perpetuated and improved. A railway system of this character being so capitalized and rendering a service which is not only of the highest character, but satisfactory to the public and to its patrons, deriving as it did in the year 1909 net earnings to the amount of but 5.01 per cent. of the amount actually invested in the property, it is difficult for me to understand how a system of rates which secures such results can be regarded as on too high a basis.

The Pennsylvania Railroad Company has for many years past, as a result of its operations, realized a substantial surplus in each year over and above the amount required to enable it to meet its interest charges and pay moderate dividends on its stock to its stockholders. This surplus has varied in amount from year to year. For the last ten years the average has been about \$12,000,000 a year, practically all of which has been expended on the property for the purpose of enabling the company to conduct its operations more safely, more efficiently and more cheaply.

Since the passage of the Interstate Commerce Act in 1887 the amounts expended on the property of the lines east of Pittsburgh out of the earnings and from other sources than the proceeds of the sale of bonds or stock or other securities aggregate \$262,000,000, and the company was enabled to provide almost all of this large sum out of the surplus earnings derived from the operation of its property. The Pennsylvania Railroad and many of the roads embraced in its system were built at a time when it was difficult to secure capital for such enterprises. The country through which the roads were built was at that time comparatively thinly settled and the business light. The character of the construction, which was suitable for the time and the existing conditions, was, to a large extent, unsuited to later conditions. The safety of the public and of employees required elimination of grade crossings of highways, the use of safety appliances and the use of improved material and equipment, all of which in themselves do not yield much, if any, net return, and it was to meet these conditions and to adapt its road and equipment to modern requirements that the uncapitalized earnings in

*Testimony of James McCrea, president of the Pennsylvania Railroad, before the Interstate Commerce Commission, at Washington, October 12.

the form of surplus have been so freely spent. Had these earnings not been available, and had they not been expended for the purposes indicated, the Pennsylvania Railroad would to-day be a very different railway and would have been wholly unable to render the service to the public which it is to-day rendering. The accumulation of the surplus earnings which have been thus expended has only been possible because the rates of freight in force since the passage of the Interstate Commerce Act have been sufficient to realize for the company amounts in excess of its expenses, taxes, interest and dividends.

The fact that these surplus earnings were being earned in each year has not been a matter that has been concealed from the public, but, on the contrary, the existence of the surplus and the disposition made of it have not only been public property, but the method or practice pursued by the company in providing in part, at least, for the necessary additions to and improvement of its property in this manner has been generally and publicly commended and approved. It is vitally important that in the future the company should be enabled to continue to pursue the policy which has guided it in the past, and to provide in part, at least, for future additions and improvements out of surplus earnings. It is fairly to be expected that the company will be required to make as great expenditures in the future as it has made in the past. An enormous amount of work remains to be done, for which additional funds will have to be secured. The public of to-day is demanding a service of a far more costly character than ten or twenty years ago was expected or desired, and in order to make the improvements required to meet the constantly increasing demands of this character and to furnish a service which, according to modern views and standards, the public, in a sense, has a right to ask for, large expenditures must continue to be made upon the property, and if this company is to meet these conditions and is to continue to progress and not to go backward (because there is no such thing as a large railway system standing still), it must continue to derive earnings from its operations, not merely sufficient to enable it to make a fair return to its stockholders, but sufficient to earn a surplus which can be expended on the property sufficiently large to maintain the credit which it has established.

In the last ten years the Pennsylvania Railroad Company has expended upon its property out of income upward of \$116,000,000 and has also secured, through the sale of its stock, exclusive of premiums, to the amount of about \$275,000,000, and through the increase of its bonded debt, exclusive of car trusts (\$25,000,000) of about \$172,000,000. Its ability to sell its stock and bonds has been due to the fact that it has not merely paid dividends of 6 per cent. or 7 per cent., chiefly the former, but that it has been able to show at the end of the year large surplus earnings, which it has put back into the property.

When investors have been asked to purchase its stock or bonds the company has been able to show that it was then in receipt of enough income to enable it to make a fair return on the securities that it proposed to issue, even if the proceeds of these securities could not be so invested as to enable the company to derive an immediate return thereon. In other words, the existence of the surplus earnings established a credit which enabled the company to secure the additional funds necessary to make improvements or additions as these became necessary.

What would have been the condition if the company's earnings had been so restricted in the past as to prevent it from accumulating surplus earnings available for the improvement of its property? If the \$262,000,000 which has been thus expended on the lines east of Pittsburgh had been realized through a sale of securities these securities would have had to have been sold at a price which could have been realized for them, and if the earnings of the company had been such as to barely cover the amounts required to meet its interest and dividends on its then outstanding securities, the prices realized for any additional issues of securities would have been such that the additional charge to which the company would have been subjected would have to-day necessitated rates higher than those which have been prevailing.

in order to enable the company merely to meet its interest and dividend charges.

But there is another feature to be borne in mind in this connection, and that is that a large part of the \$262,000,000 thus expended upon the property has been spent for purposes which would hardly justify an increase of its capital. Take, for instance, the amounts expended in changes of line in order to eliminate curves or to reduce grades. In almost all cases of expenditures of this character the old line is abandoned. Take, also, the large amounts which have been spent in the elevation of the railway through cities and many other items of a like character. Expenditures of this character, which do not result in any additions to the property which would tend to increase its gross earnings or revenue, ought not, where it is possible to avoid it, to be treated as capital expenditures.

During all the period that these large expenditures were being made—mainly out of surplus earnings—one of the main purposes that the company had in view was the reduction in the cost of transportation. Throughout this period the general trend of wages has been upward, and the same has been true of its taxes and of many other items which enter into and affect operating cost. Increased cost resulting from these features has been largely met by the reduction in cost resulting from expenditures made for this purpose, and thus it has been possible to avoid constant and frequent increases in rates of freight which otherwise would have had to have been made in order to enable the company to meet its increased operating cost.

In the present year the expenses of the companies whose lines are embraced in what is known as the "Pennsylvania lines east of Pittsburgh" have increased, due to an increase in the rate of wages paid to their employees, between \$7,000,000 and \$8,000,000 per year, and it is necessary for this company in some way to recoup itself for this additional tax on its income. Heretofore in similar cases this has been accomplished partially by advances in rates and partially through economies resulting from reductions in grades, increased hauling capacity of locomotives, increased capacity of cars and increased volume of business.

So far as concerns economies which will result from reductions in grades, increased hauling capacity of locomotives and increased capacity of cars, the companies are to-day already practically deriving the full benefit from those which are possible in this direction, due to expenditures heretofore made, for we have practically completed our grade reductions and have probably reached the maximum size for our cars and engines. And it is to be borne in mind in this connection that we are now largely unable to secure the benefit of increased economies resulting from larger engines and cars and reduced grades with respect to our preference freight trains, in which the merchandise class traffic as a rule is transported, due to the fact that the amount hauled by these trains is limited by higher speed and the maximum grades over which they must pass, this being necessary in order to avoid the breaking up of the trains at transfer points.

For the last three years there has been practically no growth in business. The records of 1910 will show that the business of that year is below that of 1907. I do not mean that it should be inferred from this that there is not, in my opinion, going to be any future growth in business, but east of the Mississippi, at least in my judgment, it is going to be at a markedly slower rate than in the past, and with that growth will probably come a diminishing length of haul, thereby tending to reduce the gross earnings of the companies. But even if our gross earnings are to continue to grow as the result of growth in business, the additional net earnings that will be derived from the increased business will in all probability fall very far short of making good the additional cost put upon the companies by the wage increase.

That this is true is largely demonstrated by the results of the company's operations for the five months following the advance in wages. In these five months the gross earnings of the lines east of Pittsburgh increased about \$6,700,000, while the net earnings, including in the expenses expenditures heretofore made for address and betterments, in order to enable a comparison

to be made with last year, when expenditures of the same character were also included in operating expenses, decreased about \$300,000. Treating these months as typical months, and there is no reason why they should not be regarded as such, and extending the figures so as to embrace a year's business on this basis, the result would be that with increased gross earnings of about \$1,000,000, there would be a decrease in the net earnings of about \$300,000. The results of the five months' operation already referred to have also shown that (treating again the expenditures heretofore made for the additions and betterments as part of the operating expenses, in order to enable a comparison to be made), the operating ratio has risen from 69.70 per cent in 1909 to 75.51 per cent in 1910, an increase of almost 6 per cent. There is no reason, in my judgment, for expecting that further increases of gross earnings will tend materially to reduce this operating ratio, except to the extent to which increased rates of freight will tend to do this. The company will therefore in the future be obliged to expend for operating expenses probably not less than 75 per cent. of any increased earnings which it may derive, but the 25 per cent. which will be thus left will not represent surplus earnings; thus, for example, gross earnings of the Pennsylvania Railroad Company in the year 1909 exceeded those for the year 1900 by about \$66,000,000 the operating expenses, including taxes, increased \$52,000,000 and the net earnings about \$14,000,000.

But in this same period the investment of the company in the property from which this income was derived had increased to the extent of \$288,000,000. Interest on this amount at the rate of 6 per cent. would be more than \$17,000,000, so that of the increased earnings of 1909, which, as has been already said, amounted to \$66,000,000, \$52,000,000 was absorbed by operating expenses and taxes, leaving \$14,000,000 net earnings, or \$3,000,000 less than the interest on the amount necessary to secure them.

In my judgment, therefore, it would be wholly unsafe to assume that the company will, as the result of the growth of its business, be enabled to recoup itself for the depletion in its surplus revenue, which is certain to result from a continuance of the present operating cost. Under these conditions I feel that it is essential, in the interest of the public and of shippers, as well as of the railway company itself, that it should be permitted to secure through an advance in rates the amount which represents its additional outlay on account of the advance in wages in order that its surplus earnings may continue at approximately the rate at which they have been running in the past. It will require the expenditure of more than these surplus earnings to enable the company to keep pace with the demands of the public and of its shippers, and unquestionably additional capital must be secured in the future. If we are to obtain this we must not only be in a position to make a fair return on it, but we must be able to show a margin of safety in our earnings.

I believe, generally speaking, that what I have said in regard to the Pennsylvania Railroad as to the necessity for the rate advance is equally true of almost all railways in the United States, certainly those which are conservatively managed and which are endeavoring to give the public such a service as they have a right to expect.

THE STREET RAILWAY EXHIBIT.

One of the interesting points to be noted in connection with the exhibit at the street railway convention at Atlantic City last week was the close affiliation that there seems to be between the manufacturers that deal almost exclusively in electrical machinery and the makers of some purely mechanical specialty which, it would seem, might well be bought in the open market of whomsoever might come along. An example of this is to be found in the matter of armature shaft pinions. There has been so much trouble with breakage and the proper operation of the motor is so dependent on pinion conditions that one of the large companies manufactures its own, with an elaboration of detail and care that few would imagine possible

in order to improve the quality of the goods if possible. One of the lines along which this experimentation is working is that of producing a hard case-hardened surface over a soft steel core. Case hardening is old, but, as usually practised, it produces a mere skin $\frac{1}{8}$ in. or possibly $\frac{1}{4}$ in. thick. This new method, on the other hand, is driving the carbon in until the skin is $\frac{1}{2}$ in. or $\frac{3}{4}$ in. thick, or even more. It is a new development in the heat treatment of steel that probably owes its origin to the demands on the part of electric railways for a pinion that has an exceedingly hard wearing surface backed by a soft, tough, ductile metal that can withstand the shocks and stresses to which the parts are subjected.

In like manner, too, that hard material, manganese steel, has received one of its widest, if not its widest, application in street railway work. So successful has it been in cutting down the cost of maintenance of special work that it is now taken for granted that it will be used in any well-constructed line, while it may also be said that, in some cases, the use of manganese steel rails on curves has made the operation of a road possible. Although it may have been the case of a good wine needing no bush, the applications of the metal are some of them new, and it was undoubtedly well to drive it home to those few who are not familiar with the many uses to which it can be put; hence the exhibit of the various types of crossings, rails and switches.

It is interesting, too, to note what an evident hold the solid steel wheel has on the electric railway men, when it is remembered that it is only a few years since the first solid steel wheel was put on the market, and that, at first, it was considered of doubtful economic value. The dangers to passengers from a wheel failure on an ordinary urban railway are practically nil, so that the widely extending adoption of the steel wheel for that class of work must be the result solely of economic forces. There is no doubt but that it is gaining ground rapidly and is fast pushing the cast wheel to the wall for heavy work; and the fact is emphasized by the number and types of steel wheels that were exhibited at Atlantic City.

In the whole exhibit there was no neglected department and every officer and employee of every street railway in the country could have found something on the pier that should have interested him and interested him deeply. That this was so and that the value of the exhibit was appreciated is shown by the fact that the busy men of the engineering section thought it worth while to stop their convention work for a whole day in the midst of their sessions and devote it to the examination of the exhibits. It was a wise and graceful step, and one which not only enabled them to gain much that was of value, but acted as an encouraging stimulant to the exhibitors.

It is perhaps useless to comment on the arrangement of the exhibit. The growth at Atlantic City has been phenomenal and it is difficult to see how the arrangements could be improved. As at the June exhibit, the committee having the matter in charge have it so well in hand that the exhibits are arranged, not only so as to be thoroughly accessible and easily found, but in such a manner as to appeal to the eye and be called artistic, not only in individual cases but as a whole. As one lady expressed it: "Who would have thought that men could have taken a lot of wheels and things and make them look as they do?"

The following were among the firms represented:

Adams & Westlake Company, The., Chicago.—Car hardware, electric headlights, oil and electric signal lamps, hand lanterns, brake handles, etc. Represented by B. L. Compton, J. W. Foster.

American Brake Shoe & Foundry Company, Mahwah, N. J.—Brake shoes, association standard. Represented by F. W. Sargent, W. S. McGowan, E. L. Jones, R. E. Holt, F. L. Gordon, J. B. Thompson.

American Hoist & Derrick Company, St. Paul, Minn.—Moving pictures of company's machinery used in railroad work. Represented by W. L. Manson, F. J. Johnson and W. O. Washburn.

American Railway Supply Company, New York.—Conductor and motorman cap and coat badges; employee cap and coat badges; uniform buttons, police badges, etc. Represented by Walter Chur.

American Rolling Mill Company, Middletown, Ohio.—American ingot iron rust-resisting products, such as railway culverts, roofing, plates, boiler tubes, etc. Represented by G. H. Charles, G. E. Althaus.

Baldwin Locomotive Works, Philadelphia, Pa.—One heavy interurban truck for the Southern Pacific Company (Alameda electrification), class 84-55-S; one light city truck for the Shore Line Electric Railway, class

CAR-TRAVERSING BALLAST LOADER.

The ballast loader shown in the photograph was designed by E. J. Beard while he was chief engineer of construction for J. G. White & Co., New York, in charge of building the Philippine Railway. We are indebted to him for the following description.

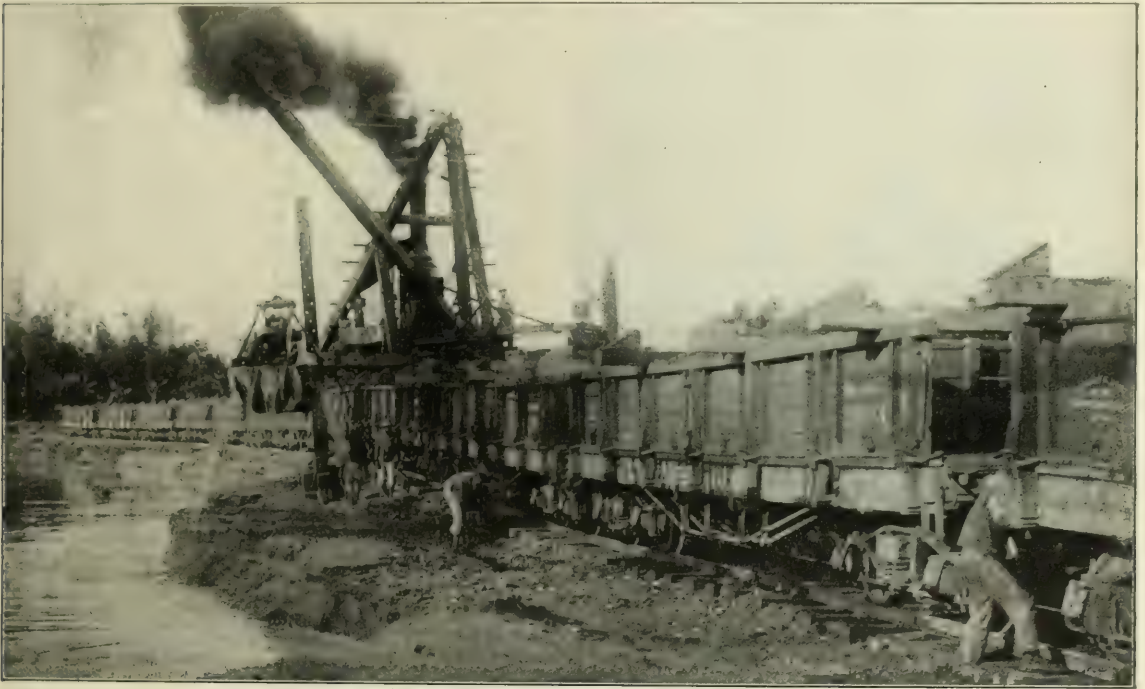
This loader was born of one necessity, a mention of some of which will show the reason for such an, at first sight, awkward machine. Track had to be ballasted pretty close up to the track laying, and the only fit ballast material was gravel. This was only to be had in the beds of streams, dry a good deal of the time, but subject to sudden flood from rains in the mountains, often at times when no rain occurred along the railway or at the pit.

On the island of Cebu delay in receiving shipments found us with only two locomotives with which to lay track, swing material and handle ballast, leaving no spotter engine for ballast pits. As ballasting had become imperative if track laying was to

weight and strain, when working, was largely carried by the needle beam and its spuds. The carriages were moved back with tackle running to a drawhead one or two cars back, and operated with one of the nigger heads, arranged while loading was going on.

The other nigger head lifted the spuds. To bring these home after moving the car back, they were dropped, and the boom swung to the left or to the opposite side from the pit; then a native dipped a 12-in. pin into the highest exposed hole under the needle beam, the boom was at once brought over and the loading begun, the native getting the pin through the other spud before the loaded bucket was back over the car. I never saw the pit spud settle enough after this one operation to require repeating it. To avoid settlement, each spud had four blocks bolted on each side at the foot, increasing the bearing area to about 4 sq. ft.

The machine was operated with a double 7-in. two-drum engine. Both a clam shell and orange peel bucket, each of 1 cu yd.



Ballast Loader Used on Cebu Island.

continue, one engine was assigned to track laying during the day and swinging material at night; the other to hauling and distributing ballast. This left one engine at night for repairs or extra work. The ballast loader was built out of what material was available. It travels over the tops of a standing string of cars, beginning at their front end, and thus avoids the need of a spotter engine. The machine always stands on an empty car, making two moves to load the car in front of it, and of course occupies an empty car at the rear after loading all the others. This car, with a single switch, comes on the front of incoming empties when the track is pulled, so the machine is in position to proceed with the loading of them.

The first machine, the one on Cebu, has two side sills of hard wood and was pulled backward, the sills acting as runners engaging on the crosspieces seen in the photograph. The crosspieces had chuck blocks at the ends to guide the runners and a $\frac{3}{4}$ -in. sunken roller at each end, over which the sills or skid pieces rolled. These crosspieces rested on the car sides, which was a little hard on the stake pockets, and in some cases they required reinforcing. The machine was not hard on the cars, as the

capacity, were used, alternated on account of repairs. The repairs, at first, were considerable, particularly during the experimental stage, due largely to poorly adapted but the only available material, and also to lack of shop facilities. It did not appear, however, that it was the cause of much additional repairs to the cars; the principal trouble with them was due to the climate causing tremendous shrinkage and rapid deterioration, requiring constant tightening up of rods and all bolts.

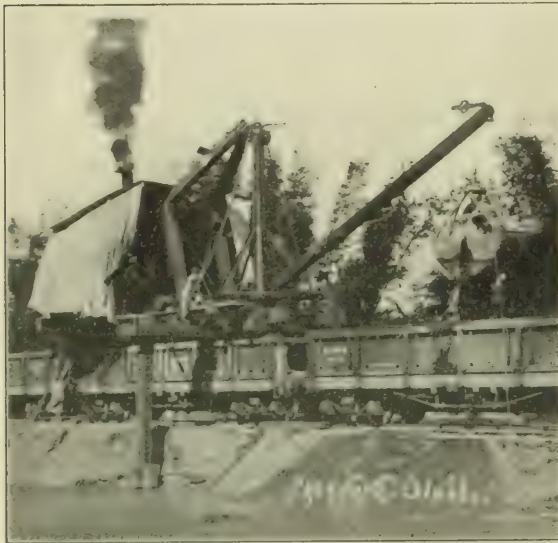
The cars held about 12 yds., and a good white foreman with an efficient engineman and about six natives would, after experience with the machine, load a string of cars in 10 minutes per car, including moving and loading. They often made very much less for single cars, but, owing to the shortage of equipment and other causes, this output was seldom attained per day. During my time the machine loaded nearly all the ballast for about 40 miles of track on the island of Cebu, and I understand that it was continued in service until the completion of the ballasting.

I built a second machine on the island of Panay, and used it to load for the track on that island. It operated in exactly the

same way, but was heavier and stronger, had an 8-in. engine, and the machine was mounted on four small wheels, traveling on 40-lb. rail laid on a light stringer on top of posts set over the side car sills. A pair of changeable filler rails was used between the cars; these were moved back to between the cars of the next set-up while loading was going on. In my time it probably loaded 50,000 or 60,000 cu. yds., but it made no better economic showing than the primitive Cebu machine. At the same time it is more like a machine, is on the right lines, and with better details and facilities to make them it would do good work under conditions similar to those that occasioned these two.

They were easily moved over the road from pit to pit by going slow and keeping the spuds close to the ground, but with pins held tight against the needle beam by the engine; and no overturns, as far as I know, ever occurred, with a 3-ft. 6-in. gage, nor should one. There is nothing particularly novel about the machine, except that we consider that operating a derrick atop of the car instead of on the ground is an upside-down proceeding.

One thing that occurred illustrates the kind of expected hap-



Machine on Panay Island.

penings that called for something like these machines. It was a clear day overhead at the pit, but with clouds hanging around the tops of the mountains seven or eight miles away and 1,500 to 2,000 ft. high, which, unknown to those at the pit, were precipitating a heavy rain at the head of the stream. In a few minutes after the show of water it was above the sills of the cars that stood on the track along the edge of the long pit, which was exhausted and excavated from 15 to 20 ft. deep its full length, at the time a track farther over was under way. The water soon went down, but it had replenished the pit to such an extent that after straightening up the track and cars, a small job, work went on and that track was not abandoned for months. In the meantime other floods had occurred, however, adding to the supply.

The Swiss alone seem to be able to keep down working expenses this year. The prospect of a deficit was so threatening last year that train service was cut down, and other measures taken to save money. Now for the first eight months of this year the gross earnings have increased 6.4 per cent., and the expenses decreased 1.3 per cent.—from 65 to 66 per cent. of the earnings. The result of this is an increase of no less than 20.7 per cent. in net earnings.

THE RAILWAY OWNER, RAILWAY EMPLOYEE AND RAILWAY USER.*

BY HOWARD ELLIOTT,
President Northern Pacific.

The railway owner, by his courage, energy and intelligence in adopting advanced methods, has been able to improve the railway system of the United States steadily in the last 40 years and still maintain and operate his property in spite of reductions in rates. If the railway user had paid, for the year which has just passed, the same average freight rates as in 1870, he would have paid \$2,691,473,751.36 more than he did pay; if he had paid the same average rates per passenger mile as in 1888, the additional payment would have been \$147,260,000, the two amounts being greater than the entire earnings of all the United States railways in the last year.

But the railway owner is now put to it to maintain and operate his property on the basis of present rates, present wages, present prices for material, present taxes, present rigid government restrictions, and the growing demand of a prosperous people for more and better service.

Railways are using rails of 90 and 100 lbs. weight to the yard; freight cars carrying 50 and 60 tons of freight; passenger cars weighing 50 and 70 tons often carrying only a dozen people, or five tons of dead weight for one passenger, and locomotives weighing 300,000 to 600,000 lbs., with 58,000 lbs. on a single axle. The railway owner can go no farther in using larger tools in his plant and must depend for any further economies upon an improvement in the work of the railway user and employee in using that plant. If the railway user fails to load and unload the cars promptly, if the railway employee is careless and inefficient, the railway cannot be used to its full effect.

The American railways to-day are represented by a capitalization of \$13,600,000,000, or a trifle less than \$58,000 per mile of road, and less than \$40,000 per mile of track. Compare this total capitalization with the total reported for farm values—\$20,514,001,838 for 1900, and in manufacturing—\$12,686,265,673 for 1905, and it will be seen that the railway is the second great industrial interest in this country. The railways in Europe are capitalized per mile as follows:

United Kingdom.....	\$275,040
France.....	130,300
Germany.....	109,788
Austria.....	113,879
Russia.....	80,985
Belgium.....	169,806

Here is evidence that the American railway owner has produced a piece of machinery with far less average capitalization than in any other country; which does more work in moving the commerce of the country per mile of railway than in any other country, and which has steadily reduced the prices charged to the railway user in spite of increasing costs and complications in doing the business. The American railway system of to-day could not be reproduced for a figure anywhere near what it stands for on the books. Monthly, daily, almost hourly, improvements have been made, and the railways are becoming seasoned and better adapted to the great work they have to perform. Go to any of the large cities and growing towns and try to acquire sufficient terminal ground to do even a moderate business. Not long ago in New York, an investigation was made with the idea of seeing what it would cost to get an entrance to the city and a moderate terminal area, from the northern boundary down to about Fortieth street. One of the best real estate agents in New York made a calculation, and a right of way down through Manhattan Island sufficient for two tracks and with a limited terminal at the end, he thought might be obtained for \$170,000,000, but would probably cost \$200,000,000. This would be an investment of \$170,000 or \$200,000 a mile for the New York terminal alone of a railway between Chicago and New York, and in addition right of way between the two cities, intermediate terminals, and the railway itself must be obtained. And every man of his own knowledge is aware of the fact that property suitable for terminals, in common with

*Extracts from a recent address at the Montana State Fair, Helena, Mont.

object real estate, has advanced very much in value in all cities, big and little, in the United States in the last 20 years, and that the railway owner is paying taxes on those increased values, and is surely as much entitled to a return on the increased value as is the owner of a farm, or the owner of a business block.

There are 1,525,000 railway employees, including the officers, representing at least 6,000,000 of the population of this country. They are equal in honesty, intelligence, industry and character to the average of American citizens engaged in other pursuits. They are trying to do their part in managing and operating this great piece of commercial machinery that the railway owner has created. As they are human, they make mistakes, and sometimes forget that they assume an obligation when they enter the railway service, to be honest, fair and loyal to the railway owner and to the railway user. The great army of railway employees in their efforts to obtain the highest wages possible must remember that there are only 100 cents in a dollar; that it is possible to force wages to a point beyond the ability of the railway owner to pay and still maintain his plant for the benefit of the railway user, and that the constant wage increase has already discouraged the railway owner, and will tend to discourage him more unless additional revenue can be obtained from the railway user. The railway user often fails to understand the wage situation, and the railway employee and the railway user must remember that in fixing wages they must consider the ability of the business to pay the wages demanded.

In 1908 the official figures show that there were 1,458,244 railway employees receiving \$1,051,632,225 in wages, or an average of \$721.16 per year. For the year 1907 the average pay of railway employees in the United Kingdom was \$260; in Germany, \$371; in Switzerland, \$292; in Belgium, where the railways are owned by the state, firemen received \$15 to \$23 a month, the higher rate only after 15 years' service; engineers from \$2.50 a month to \$28 a month after 24 years' service; conductors from \$15.97 a month to \$34.70. The average railway worker in Belgium gets 43 cents a day. Certain classes of American railway employees get more in a month than Belgium railway employees average in a year.

The advances made in wages in 1906 and 1907 increased the payrolls of the railways about \$120,000,000, and increases since then and now under discussion mean \$60,000,000 to \$75,000,000 additional. These two increases are equal to 7 per cent. per year on a capitalization of from \$2,500,000,000 to \$2,750,000,000, a sum of money that would go a long way in adding to the transportation facilities of the country.

The railway employee has a responsibility to the railway user to be sober, industrious and careful, so as to furnish the best and safest transportation to the public, and he has a responsibility to the railway owner to furnish a full day's honest and efficient work for the compensation that he receives, whatever it may be. The industrial supremacy of America cannot be maintained unless that is done, and every patriotic man, no matter what his employment, should stop waste in labor as well as in material, and expect hard work and rigid economy.

Suppose each one of the railway employees should, by better work and greater care, save only 1 cent a day; that would mean for the country \$5,566,250 a year, or enough to buy between 5,000 and 6,000 freight cars; or, enough to build 200 miles of branch line railway in Montana. If they could save 10 cents a day, it would mean \$55,662,550 a year, which could be applied to adding to the railway facilities in the country.

In addition to the 1,525,000 employees working directly for the railways, there are 2,500,000 in coal mines, steel mills, manufacturing plants, all supplying what is necessary for the railways in their operations, who represent at least 10,000,000 of our total population. So the railway employees, and the employees of the industries dependent more or less on its maintenance on a sound basis represent approximately 16,000,000 people whose rights must be considered.

The railways are the great purchasers of materials of many

kinds, and the moment they are turned so they become the owner's burden to be felt in the market, the more the well and the common.

Of the 90,000,000 people in the United States, 100,000,000 are 4,000,000 interested directly as railway owners, and their dependent families; 6,000,000 as railway employees, and their dependent families, leaving 80,000,000 as railway users, with an indirect interest in the prosperity of the railway. Some of these 80,000,000 are vitally interested, because they work for industries dependent upon the purchasing power of the railway for their success; others because they have their savings in banks and trust companies; others because they hold life insurance policies for the protection of their families, and fire insurance policies for the protection of their homes and business, and all are interested in having enough transportation and good and safe transportation.

The railway user, however, is too apt to think that his interest lies in having railway rates constantly reduced, railway wages constantly raised, and railway taxes constantly increased, forgetting that it is equally important to him, and really more important, to have the railway system of the United States so handled that capital will feel safe in adding to investments necessary to furnish the transportation that the business of the country demands. Already, in certain parts of the country, the margin between adequate and inadequate transportation is too small. Only last winter, between the Missouri river and Chicago, and in the vicinity of Chicago, the railways could not furnish that prompt and regular service that is essential for a satisfactory movement of the commerce of the country.

The railway user needs safe and adequate transportation, and it will be furnished just so long as the business pays. The railway owner cannot constantly be borrowing money for every minor improvement and addition to the property. The cry is sometimes raised that the railways should not make improvements out of current earnings. They should not make all of their improvements out of current earnings, but they should put back into the property every year a substantial amount of their earnings for improvements like better passenger stations, more side tracks, better rails, better ballast, safety appliances, and other forms of improvement of which the present generation of railway users get the immediate benefit, as well as enabling a higher development of the country for their children and grandchildren.

The railway owner, the railway employee, and the railway user must co-operate, and all must remember the definition: "The association of a number of persons for their common benefit." In the long run it will not benefit the railway user to crowd down rates so low, and raise taxes so high that he takes away all chance of profit from the railway owner. The railway employee must remember that in the long run he will not profit if he crowds up wages so high that the railway owner has not sufficient margin for the development of the facilities along progressive and safe lines. On the other hand, the railway owner must, in fixing the rates, do so in such a way that a healthy development of the country will be promoted.

Individually, the railway owner, the railway employee, and the railway user, when they discuss the subject, are fair, and agree there should be fair treatment to all.

There is, however, a school of politicians who make wild and extravagant statements and who are assuming, without knowing the facts, and without adequate study of the situation, that great injustices are being done. It is important for the railway employee and for the railway user to post themselves about this general subject if they are to continue to exercise their present control in the management of the business of the railway owner. His business is now an open book, and every transaction is recorded in plain black and white and reported at frequent intervals to railway commissions, state or national. The charges that he makes for service performed are largely decided by statute or by railway commissions. Many of the rules under which he conducts his business are made by law, or by various boards. The railway user, if he wants the best railways and

progressive development of them, must see to it that his law-makers and his boards of one kind and another are the right kind of men, and that they look at this question, not in a narrow, partisan way, but in a broad, far-sighted manner.

The future welfare of the railway system of the United States is largely in the hands of the railway user, and what will he do? Will he crowd the railway owner so hard that the latter cannot produce the increasing amount of transportation needed for the free flow of the commercial life blood of the nation? Then what? The railway user will have several courses open to him. He can have a less rigid system of regulation and government red tape and encourage the railway business and the railway owner to go on as does other business, subject to the great laws of supply and demand, competition and the natural desire of the owner to manage his business in such a way that it will be a success, with the hope of profit, which is the main incentive of all business. Or, he can take over the ownership and management of the railways and become responsible for their operation and for the money needed for additions and betterments to existing properties, and for the building of new ones. In the present state of politics in this country such a plan is almost terrifying in its possibilities, because the government has not shown that it can do work of this character as efficiently and economically as private individuals can. Government ownership, management and development of the railways would become a matter for the politicians to trade upon. Just recently, in Austria, there has been considerable discussion because the railways were taken over by the state on the theory that better service and lower rates would be given to the public. Now, there is agitation to put them back into private hands, for, instead of proving profitable, there is a heavy annual deficit, which the general taxpayer has to make up. The service has deteriorated and railway expansion has ceased.

Or he can continue the present system of rigid governmental control and supervision, and interference with the judgment and management of the owner, which is rapidly having a deadening and discouraging effect on the development of the business, and is preventing those additions and improvements so much needed in a growing country like the United States. Or, he can continue the present system of government regulation and control, but guarantee to the railway owner some minimum return upon his investment, so he will be willing to put money into the business. Such a plan, however, means that the nonuser of the railway will be taxed for the benefit of the user.

To my mind the first course, of more commercial freedom, is by far the better for a growing and expanding country like the United States. We have not yet reached the state of perfection, politically or socially, where government ownership and bureaucratic management of the large, complicated and delicately adjusted railway system of the country will be a success. Putting a government uniform on a railway employe does not at once endow him with a new kind of intelligence and supernatural powers, and it will reduce his feeling of responsibility.

If the railway user and the railway employe are not careful to see that justice is done to the railway owner, and if he is not protected and encouraged a little, the time is rapidly coming when the railway user will go to buy some transportation for his wheat, his coal, his cattle, his manufactured articles, and he will be confronted with the statement from the railway owner that all the transportation he has has been sold, and furthermore, that he cannot produce any more transportation because he cannot get any more money, and if the railway user desires an increased quantity or quality of transportation he must organize and produce it for himself. The railway employe will find that the monthly pay day is not so regular and certain as it used to be, and that the wages paid are lower than they now are.

The ultimate good sense of the American people and their belief in the rights of property will, in the long run, I believe, prevail over the misstatements and misrepresentations of some public men, who, without careful study and full knowledge of the situation, and without due regard to the effect of their ex-

travagant language, make indiscriminate attacks upon the railway system of the United States, and upon the men who are giving the best that is in them to the work of advancing that system.

This wonderful American railway system has been created by the railway owner and capitalized at from one-half to one-fifth of the European railways. It does twice as much work at rates from one-half to one-third of, and pays wages from two to five times as much as are paid by European railways. The size of the United States and the wide distribution of the products are such that it is necessary to have a large use of the railways and low rates. To accomplish this, there must be an expansion of facilities; the railway owner has done his part; further expansion can only be brought about through the help of the railway employee and the railway user.

The railway owner, the railway employee, and the railway user form an "association of persons who should act for their common benefit;" not for the benefit of one and the injury of the other, but for the common benefit of all. There has just been a meeting in St. Paul where there was much discussion about the Conservation of Natural Resources. It is high time for the railway user to consider carefully the conservation of the railway system of the United States. Common sense, publicity, plain statements of the facts, and justice to all interests, whether individual or corporate, will help to settle this question properly.

EARLY DAYS OF THE RAILWAY SIGNAL ASSOCIATION.*

BY GEORGE M. BASFORD.

This is a very pleasant occasion; but the signal engineer was formerly a serious man. He seldom smiled. How could he? He had little to smile about. He had plenty of responsibility and very little else. To-day he has much to encourage him and make him happy.

Five heroes and a secretary met in Chicago March 11, 1895, to prepare for this very successful movement. These young men, pioneering in signaling on western railways, working under difficulties, realized the greatness of the signaling problem and saw the need of recognition of the possibilities of signals and signal engineers. In the railroad organizations we reported to all kinds of officials. Some reported to chief engineers, others to superintendents of bridges, others to operating officials. The speaker had under his charge fifteen interlocking plants and all the signals on a 6,000-mile railway [Chicago, Milwaukee & St. Paul]. At the beginning he had two lonesome assistants for their maintenance and for miscellaneous construction work. But for the valuable and efficient assistance of the signal companies our burdens would have been much greater than they were. Few of us had up-to-date apparatus. Most of us had a generous sprinkling of old "wheel machines" which required regular attendance of trained nurses, but we did not even receive the compensation now gratefully accorded to that profession. We had, in some cases, three kinds of signaling at a single plant. We picked ice out of switches. We broke our necks climbing poles. We assisted at wrecks which persisted in occurring at interlocking plants. We sat up all night, in the cold, with sick automatics. We were "called" at 2 a. m. to handle a tower, telegraph train orders and all, because the night man was drunk and no one else knew the combinations. * * *

Railway signaling has now reached a point which makes it a vital and fundamental part of railway construction and operation. Signaling is not now considered as a safety measure alone. Railway managements now consider it as a means for increasing intensity of traffic as well as providing safety. The two are necessarily combined. * * * There lies before the signal engineer the problem of co-operation with all other engineers and operating officials to produce the maximum intensity

* From an address at the annual dinner of the Railway Signal Association, Richmond, Va., Oct. 14. Mr. Basford, now with the American Locomotive Company, was the organizer and first secretary of the Railway Signaling Club, which has grown into the present national association.

General News Section.

The Cincinnati, Hamilton & Dayton now uses the Union station for all passenger trains in Toledo.

Passenger trains began running regularly through the Michigan Central tunnel under the Detroit river October 16.

At Los Angeles, October 1, the Atchison, Topeka & Santa Fe was fined \$100 for violating the federal hours-of-labor law.

The Northeastern Pennsylvania Car Demurrage Bureau, A. G. Thomason, manager, with headquarters at Scranton, Pa., is to be abolished at the end of this month.

Near Genoa, Wis., on Thursday of last week, the engineman of an express train of the Chicago, Burlington & Quincy was shot in the head by a stray bullet from the rifle of a hunter.

In the Federal Court at Jefferson City, Mo., last Tuesday the Missouri Pacific was fined from \$10 to \$25 each on 24 counts for violating the sixteen-hour law. The evidence indicated that employees were worked overtime from ten minutes to one hour.

Machinists of the Baltimore & Ohio, who have been on a strike for about a year, are to be reinstated, an agreement having been reached between Mr. Harris, superintendent of motive power, and Mr. Mulholland, attorney for the National Organization for Machinists.

The shops of the Seaboard Air Line at Portsmouth, Va., are now running nine and a half hours daily (with a Saturday half holiday), following a long period of short hours. We understand that the same change has been ordered at the other principal shops of the company.

The turbine steamships, Yale and Harvard, heretofore running between New York and Boston direct, in the service of the Metropolitan Line, have been sent from New York around Cape Horn to San Francisco, and it is said that they are to be used by the Western Pacific in coastwise service, probably between San Francisco and Los Angeles.

The directors of the Grand Trunk Pacific have issued a statement as to the progress being made in the construction of the line, which says that satisfactory progress is being made on the Winnipeg, Lake Superior and prairie sections, but that a great scarcity of labor exists in the mountain sections, where contractors are short 5,500 men of the number required, despite wage offers of \$3 per day.

On November 26 the New York State Civil Service Commission will hold examinations for the following positions: Assistant chief, Division of Statistics and Accounts, Public Service Commission, Second district, \$2,400; junior statistician, \$1,200 to \$1,500; mechanical engineer, Transportation Department, Public Service Commission, First district, \$2,401 to \$3,000. Application blanks must be filed on or before November 19.

The Canadian Railway Accident Insurance Company of Ottawa, Ont., has been absorbed by the Liverpool & London & Globe, the price paid for the shares (par \$25) being \$100 per share. The Canadian Company was established in 1895, with an authorized capital of \$500,000, of which \$250,000 was subscribed and \$62,500 paid in cash. The company issues accident policies for railway employees and last year had a premium income of \$333,336, with losses of \$149,462.

The strike of railway employees in France was called off on Monday night last and the men reported for work the next day, but considerable disorder continued and the government maintained a strong force of troops in Paris. Bombs were found at 12 different railway stations in that city. On Monday a bomb was thrown at the entrance of the tunnel near the Chantiers station at the moment a passenger train was due from Dreux, and all Versailles was shaken. Attempts at train wrecking were reported from various parts of France, and serious catastrophes were narrowly averted.

On Sunday last, October 16, Mr. Clement, of the firm of Clement & Bayard, with six other persons, including his assistants and a member of the British Parliament, representing a committee of that body, flew from Paris to London in a dirigible balloon, making the passage of 195 miles in six hours. He

started at 7:15 a.m. and reached London at 1:15 p.m. The distance and the starting point are not clearly stated in the despatches, and it is stated that the railway trains and connecting boats across the channel traverse a route of about 246 miles, so the figure above given appears to be the air line distance actually traveled. It is said that the war department of Great Britain will make experiments with this balloon. No stop was made in the flight. The altitude maintained was from 300 to 700 ft.

Safety Appliance Order.

The Interstate Commerce Commission has concluded its consideration of the freight-car questions which were the subject of its hearing on the 29th of September and on October 15 issued an order, as required by the terms of a law passed by Congress at its last session, establishing uniform standards for the equipment of freight cars with certain appliances. The order has not yet been published but a statement issued by the commission says:

"The order does not make any radical change in equipment. Its main purpose and intent is to require that all classes of freight cars shall be equipped alike in all parts of the country, as such uniformity is regarded as highly conducive to the safety of employees. All the appliances covered by the commission's order are now used on cars, with the exception that two additional ladders are required on certain classes of cars, and two additional sill steps are required on all cars.

"In the past the appliances placed upon cars for the safety of the men have been covered by rules made by the Master Car Builders' Association. These rules have not been binding upon the railways, and have not been lived up to, the consequence being that each road has followed its own ideas, and it has been impossible to secure the desired uniformity.

"It is not expected that compliance with the order will cause any undue expense to the roads, as the order applies entirely to new equipment and is immediately effective only with respect to new cars. The change in equipment of cars now in service so as to bring them up to the requirements of the commission's order will be made gradually, as the cars go through the shops for general repairs. This part of the subject will be dealt with by the commission in a future order, a sufficient extension of time being granted to bring old equipment up to the uniform standards without undue expense."

The Public's Investment in Railways.

By dealing a blow at the railways a great part of the population is dealing a blow at its own interests. Take first the case of the depositors in savings banks. Three years ago a statement was prepared which showed that in the six states chiefly distinguished for their savings deposits, the aggregate of railway securities of steam roads owned by the savings institutions was no less than \$442,354,086. The aggregate deposits in the six states then amounted to \$2,177,859,256, so that over 20 per cent. of the entire total was invested in railway securities. There were 5,174,718 depositors in these six states at the time. In other words, over five million persons were interested as depositors in the savings institutions in these states, and these institutions had one-fifth their entire funds out in investments in railway bonds. The savings banks in thirty other states, according to incomplete private returns, at that time showed \$128,677,191 more of railway securities owned, this constituting over 26 per cent. of the deposits as represented by over a million depositors.

The life insurance companies at that time had \$668,262,896 invested in railway bonds and stocks, this forming over 31 per cent. of their aggregate assets of \$2,128,131,253.

The task of bringing these figures down to date would be a very laborious one and a great deal of time would be required to do it. We shall content ourselves, therefore, simply by indicating that the aggregate amount invested in this way is to-day very much larger than it was at the time of the compilation from which we have been drawing was prepared. We have gone to the pains to look up the statistics for the savings banks

in the six states already reported to, and find that the aggregate of the six states now stands at \$61,648,224, or 82.91 per cent of the total. The difficulty in the different states appear in the following table. It will be observed that in Maine over 50 per cent of the deposits are invested in railway securities; in Connecticut, 41 per cent; in New Hampshire, 38 per cent; and in New York, New Jersey and Massachusetts, 16.87 per cent. In 1910 per cent. It should also be noted that the number of deposits in these six states now exceeds six million.

State	No. of deposits	Amount of deposits, dollars	Railway securities, percent of total	P. C. A.
New York	1,111,871	\$18,119,194	\$300,000,000	16.84
New Jersey	1,044,896	\$16,670,661	\$2,792,175	22.49
Massachusetts	2,749,804	\$44,490,482	\$10,439,540	26.91
New Hampshire	1,101,416	\$8,770,067	\$2,708,912	38.06
Connecticut	1,003,414	\$16,132,667	\$108,102,686	41.05
Maine	298,775	\$8,871,074	\$45,078,610	50.90
Total	6,410,372	\$82,664,818	\$611,648,224	82.91

It may be taken for granted that the investments of other classes of institutions at this date would be correspondingly larger than three years ago. Roughly speaking, it is probably correct to say that the aggregate investments of savings institutions, insurance companies and educational institutions at this date must stand in the neighborhood of \$1,750,000,000. Just think of placing such an enormous investment in jeopardy by adopting a policy which would deny to the railways the right to advance the price of the services rendered by them as the cost to them of doing the work increases. Is not the policy a short-sighted one, and will it not react to the detriment of those who are endeavoring to gain political capital for themselves by arousing the passions of those who do not stop to think that they themselves have so much at stake in seeing that fair treatment be accorded the carriers?

—Commercial and Financial Chronicle.

Wellman's Airship.

The long heralded attempt to sail across the Atlantic ocean in a balloon was finally begun on Saturday morning, October 15. Walter Wellman, with five companions, started from Atlantic City, N. J., about 8 o'clock in the morning in the dirigible balloon "America," and on Sunday about noon he passed Nantucket; but during the next 24 hours nothing was heard of the airship, although many steamships equipped with wireless telegraph apparatus were on the watch for messages. On Tuesday morning about 5 o'clock the airship was cited by the British steamship "Trent," about 450 miles east of Cape Hatteras, whence it had been blown by adverse winds, about 350 miles (south) out of its intended course. The aeronauts were rescued by the "Trent" and the "America" was abandoned. When the life boat, suspended beneath, was detached, the balloon at once rose rapidly, and it is expected that when heated by the sun it will burst and sink. The "America" was in the air about 71 hours and traveled approximately 850 miles. Count Zeppelin with his airship, much larger than the "America," remained aloft 37 hours at one time.

On Sunday the "America" had to descend to nearly the surface of the water to get out of an electrical storm, and then in order to rise again it was necessary to throw overboard several barrels of gasoline. On Monday the heat of the sun caused the gas to expand and the balloon to rise, and there was great difficulty in getting down again. Later it was necessary to throw overboard about all of the fuel.

Just Plain Common Sense in Utah.

The Utah Press Association has passed resolutions to the effect that a state railway commission is undesirable. It says: What Utah needs is further railway development in order that she herself may expand and develop, and this association desires to endorse the policy of the present railway management and to encourage rather than to retard railway building. What we want is more railways in Utah. We are opposed to the creation of a railway commission for this state, regarding it not only as wholly unnecessary from a business point of view but also dangerous because of the probability that it will become a political machine capable of great and unreasonable oppression in the hands of designing or unscrupulous politicians. With the great number of commissions which the state already has, such creation not only is uncalled for but possibly is oppressive

Car Efficiency, 1

As long ago as July 1910 we noted in our first issue that the surplus of cars was diminishing rapidly. We, therefore, urged the railways to halt the increase of their shippers to the fact that we still have a surplus and that it would be well to realize it by making all possible private elements. Up to the first of September it looked as if a serious car shortage were coming, the surplus rapidly diminished and we noted quite a sizeable little shortage, over twice the shortage of a year ago, but when we came to our next bulletin, for the middle of September, the shortage had not increased. It had dropped to the unimportant figure of a year ago. The only sign of the importance of the freight car was my receiving two invitations to dinner from two traffic clubs. Something had happened, but what that was it was very difficult to find out. I was afraid there was something in the political situation, that something had possibly been said by gentlemen who were asked out to dinner, more than I am, but when I put the figures up to the Committee on Relations Between Railroads of the American Railway Association, a committee composed of transportation men from all over the country, they did not feel that traffic was falling off, even if there were not much of a car shortage. They felt that we were handling more business than ever before, but that we were handling it better, and that the shippers and consignees were handling it better. They felt that the railways were making so much better time in handling the cars and that the industries were making so much better time in handling the cars, that we were then doing a big business without a big shortage, but they thought that quite a shortage might be coming. Our last bulletin, which is just out, tends to confirm their impression. The surplus is still dropping, as it did last year, and the shortages are twice what they were last year. The resumption of mining in the Middle West is the chief factor in this. It seems to be the first period in three years that the railways have run full, and I am convinced that they are making a record.

There have been two changes in conditions, as compared with last year. First, the railways have increased their rate of payment for cars 40 per cent. A year ago they were paying each other 25 cents a day for the use of freight cars; this figure has been raised to 35 cents. This is not as high as the 50 cent figure which was in effect three years ago, and which was broken down by the panic. Some of us feel that the old 50 cent figure was not as much of a success as it might have been in stimulating the movement of freight cars, but it did stimulate the building of freight cars at the time when they were most needed. The 50 cent rate did not operate to quicken the movement of cars when they absolutely could not be moved faster, but I believe that when the round up is made and the figures are ascertained we shall find that the 35 cent rate does stimulate the movement of cars now that there are sufficient facilities to allow a quicker movement.

The national car demurrage rules have been put in general effect throughout the country. There has been a fight against them in Michigan which the railways have won in the Michigan state courts, and there is still a fight on them in New England, but in the great body of the country the national rules are in effect.

Some parts of this code are not popular in Pittsburgh, but I understand that you gentlemen have accepted them with your usual loyalty, and that you have made the best of them and found out that they were not quite so bad as they look. I trust that you realize the important thing in these rules, and that is that they are uniform. You can feel that when you handle a car promptly, it is not going to be delayed through the local regulations of any state, and the people in the extreme West and South know that if they handle a car promptly it is not going to be delayed here in the North.

This introduction of uniform rules has resulted in a great saving in cars. There is no doubt that the cars are making more miles every day this year than they did last, and we must acknowledge the cordial co-operation of the public in the handling of cars.

As to the future, there are special difficulties now before the

*From an address by Arthur Hale before the Traffic Clubs of Pittsburgh and Chicago.

railways in the way of improving their facilities, but I assure you that they are doing everything they can.

There is another step in advance which the railways ought to take, and in which, I think, the industries can help. We ought to use cars more than we do in common. There is a theory, often put into practice, that the markings on a car have something to do with the point to which it should be loaded, and it is very easy for railway officers to sit in their offices in times of car shortage and say, "we want our own cars back," but, in practice, when a car takes a load of raw material into an industry, it is not uncommon for the industry to load it out with finished product in some other direction. When the railways attempt to regulate this, when the roads try to tell industries that cars of Eastern roads must always be loaded East, and cars of Western roads must always be loaded West, they are undertaking to do many difficult things on their own account, and they are enforcing still more difficult things upon their patrons. In practice the theory does not work out. In all cases of stress the theory gives way to the practice, and we do use our cars in common, but this rough and ready method of using cars in common leads to grave injustices. The originating road which is generally the car owner, suffers as it ought not to suffer. There is only one way out of this, and that is to provide suitable regulation. I believe that a regulation can be devised under which the shipper will be able to load the cars we give to him as he pleases. When that proper regulation is provided we will make even better movement with our cars, and we will again postpone car shortage.

There is another way in which the industries can help. You can unload cars even quicker than you are doing it now. In periods of car shortage every time an industry gives us back a car well inside of the free time, we ought to make proper payment to the industry. I think that a rule can be devised by which the industries and the railways can directly share the benefit of quick work at loading and unloading points.

I hope we shall not have a serious car shortage this fall, but some time we shall have a serious car shortage, and when it comes I hope you will remember that it will take combined action to keep the industries of this country on an increase.

There are a great many ways in which what we call a car shortage may arise. There may be a real shortage in cars, but it may be only a symptom of a shortage in something else; perhaps in tracks or in repair shops, or perhaps a shortage of men, and perhaps of brains. If the car shortage prove only to be a symptom, and the real shortage be a shortage of brains or men, I trust you will sympathize with the railways and remember that they have not a monopoly in shortages of men, nor in shortages of brains.

Testimony in Illinois Central Car Repair Fraud Case.

H. C. Dolph, formerly vice-president of the Ostermann Manufacturing Company, testified at Chicago last week in the criminal proceedings in the municipal court against certain former officers of the Illinois Central for alleged frauds against the road in the repair of cars. Mr. Dolph produced a "red book" in which were recorded payments made by check by the Ostermann Manufacturing Company to officers of the Illinois Central. The special bank account against which these checks were drawn was maintained in accordance with a resolution of the board of directors of the Ostermann Manufacturing Company from February, 1908, to October, 1909. The book tended to corroborate testimony previously given by H. C. Ostermann regarding payments to the Illinois Central officers. T. J. Kirby, president of the Kirby Equipment Company, testified that certain stock of the Ostermann Manufacturing Company, which was owned by Rawn, had been carried in his name at the request of J. E. Buker.

Evidence regarding the bank accounts of Ira G. Rawn, F. B. Harriman, Charles L. Ewing, J. M. Taylor, J. E. Buker, William Barclay and J. H. Niles, was introduced to corroborate testimony previously given regarding large sums of money that these men had received as a result of their alleged participation in the car repair frauds. The evidence showed that Ira G. Rawn, whose salary as vice-president of the Illinois Central was \$30,000 a year, deposited \$19,930 in the Western Trust & Savings Bank between January 4, 1909, and May 28, 1910; \$13,572 in the Railway Exchange bank between May, 1908, and February, 1910, and \$11,333 in the Corn Exchange National bank between 1908 and 1910. F. B. Harriman, on \$19,000 a year,

deposited \$113,675 in the Railway Exchange bank between May, 1908, and September, 1910; \$146,219 in the Corn Exchange National bank between December, 1905, and April, 1910, and \$36,000 in the Western Trust & Savings bank between March, 1909, and April, 1910. Deposits in the Railway Exchange bank ceased in April of this year, shortly after his resignation from the Illinois Central, and the other two accounts were closed out on April 7. He also had a deposit at the Continental National bank, the details of which were not introduced. C. L. Ewing, on \$5,000 a year, deposited \$235,765 between February, 1907, and June, 1910, in the Fort Dearborn National bank, and had a balance on July 18 of \$258.54. The deposit of William Renshaw, former superintendent of machinery of the Illinois Central, in the Illinois Trust & Savings bank, grew from \$98,692 in March, 1908, to \$558,605 on January 10, 1910. Others of the persons implicated by the testimony also enjoyed rapid increases in their bank accounts.

Fashion Note.

"Subscriber" sends the following: "A motorman on a western road running a McKen motor car in turning in his delay report mentioned a delay of three minutes at Station A—loading a young lady dressed in a hobble skirt. This is a new condition with which the transportation companies have to cope. No doubt if the style becomes prevalent some ingenious mind will devise an apparatus for picking up such packages similar to that used for picking up mail sacks from a crane."

Which reminds us, through some vague suggestion the psychology of which eludes us, of a more truly pathetic case: A lady leaned over the seat in front of her and timidly addressed a fellow passenger: "Excuse me, sir, but would you mind getting off with me at the next station? You see," she explained, "I am rather stout, and it is easier to go down the car steps backwards. But when I do that the conductor thinks I am trying to get on and he insists on helping me back into the car. That's happened at the last three stations," she concluded, plaintively.

American Railway Bridge & Building Association.

The twentieth annual convention was opened on Tuesday morning of this week at the Hotel Albany, Denver, Colo., with J. S. Lemond, engineer of maintenance of way, Southern, presiding. The secretary's report showed 50 new members, making a total of 460. The treasurer's report showed a balance of \$342.92. There was an attendance of 100 members and 100 guests.

The entertainments consisted of an automobile trip and theater party for the ladies on Tuesday, the excursion over the Georgetown Loop to Silver Plume, Col., on Wednesday, and a trolley ride into the foothills and a banquet on Thursday. On Friday there will be a trip to Manitou, Colo.

The following officers were elected for the coming year: H. Rettinghouse, Chicago & Northwestern, president; F. E. Schall, Lehigh Valley, first vice-president; A. E. Killam, Intercolonial, second vice-president; J. N. Penwell, Lake Erie & Western, third vice-president; L. D. Hadwen, Chicago, Milwaukee & St. Paul, fourth vice-president; C. A. Lichty, Chicago & Northwestern, secretary, and J. P. Canty, Boston & Maine, treasurer.

The supply association was represented by 28 firms. The officers for this association for the ensuing year are: W. H. Lawrence, Standard Asphalt & Rubber Company, president; L. E. Walcott, U. S. Wind Engine & Pump Company, vice-president; H. Henning, Eastern Granite Rosting Company, treasurer, and J. A. Meaden, Paul Dickinson Company, Inc., secretary.

Stevens Engineering Society.

The membership of this society, which is affiliated with the American Society of Mechanical Engineers, is made up of students of the Stevens Institute of Technology, Castle Point, Hoboken, N. J. The secretary has just issued a pamphlet containing an outline of the course of lectures which will be delivered at the institute under the auspices of this society during the coming season. All members of the alumni, undergraduates and friends are welcome at these lectures. Following is the list of subjects: "Membership in Engineering Societies," "The Design and Construction of a Central Power Station," "Art and

the Engineer," "The Services of Chemistry in the Promotion of the Public Welfare," "The Story of an Island," "The Origin of Petroleum," "The Kimberley Diamond Mines," "The Development of the Railroad on the North American Continent," "The Caskill Water Supply," "The Electric Furnace," "Reclamation," "Metallography as Applied to Engineering," "Radioactive Phenomena" and "Illuminating Engineering."

American Street & Interurban Railway Association.

The final meeting of this association, the name of which has been changed to the American Electric Railway Association, to which the other three affiliated associations will conform in name, was held on October 13, at Atlantic City, N. J.

The following officers were elected for the ensuing year: Arthur W. Brady, Indiana Union Traction Company, Anderson, Ind., president; Thomas M. McCarter, Public Service Railway, Newark, N. J., first vice-president; George H. Harries, Washington Railway & Electric Company, Washington, D. C., second vice-president; Charles N. Black, United Railroads of San Francisco, San Francisco, Cal., third vice-president, and W. G. Ross, Montreal Street Railway, Montreal, Can., fourth vice-president.

For general comments on the meetings of this association and for a list of exhibitors, see other columns of this issue.

Chicago Signal Club.

The Chicago Signal Club held its regular meeting at the Plymouth building, Chicago, on October 10. The principal topic of discussion was the relative merits of detector bars and track circuits. Although not on the program, an impromptu discussion on the advisability of using hand signaling at interlocking plants brought out some decided opinions. It was announced that at the next meeting, to be held October 24, there will be a talk on "Dry Batteries for Ignition Service" by Hibbard S. Green, of the Nungesser Electric Battery Company. Some excellent data on the use of storage batteries for track circuits will also be presented at this meeting. It will be the regular open meeting and supply men are invited.

Chicago Car Foremen.

The Car Foremen's Association of Chicago held its annual meeting and dinner October 10. The following officers were elected for the coming year: President, W. B. Hall, superintendent equipment, Mather Stock Car Company; first vice-president, George Thompson, division general foreman, Lake Shore & Michigan Southern; second vice-president, P. T. Dunn, master mechanic, Pennsylvania Lines West; treasurer, W. E. Sharp, superintendent, Armour Car Lines; secretary, Aaron Kline, 841 North 50th court, Chicago.

National Association of Railway Commissioners.

Wm. H. Connolly, secretary, Washington, D. C., announces that the twenty-second annual convention of this association will be held in Washington Tuesday, November 15. A number of new committees are to report at this convention and, with other matters of unusual interest, it is expected that this will be the most important meeting the association has thus far held.

American Society of Civil Engineers.

At the meeting held on October 19, 1910, a paper by W. F. Strouse, M. Am. Soc. C. E., entitled "The Reconstruction of the Passenger Terminals at Washington, D. C.," was presented for discussion. This paper was printed in the August number of *Proceedings*.

New York Railroad Club.

At the regular meeting held on Friday evening, October 21, William Marshall, president of the Anglo-American Varnish Company, New York, will present a paper entitled "Protection of Metal Equipment."

Western Railway Club.

At the regular monthly meeting held on the evening of October 18, Paul Synnestvedt read a paper on "The New Commerce Court Act."

MEETINGS AND CONVENTIONS.

The following list of meetings is compiled from reports of clubs and regular meetings, and is subject to change.

- ATLANTIC RAILWAY ASSOCIATION—F. M. Nichols, 28 West 4th St., New York, N. Y.
- AMERICAN ASSOCIATION OF PORTLAND CEMENT MANUFACTURERS—1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 2682, 2683, 2684, 2685, 2686, 2687, 2688, 2689, 2690, 2691, 2692, 2693, 2694, 2695, 2696, 2697, 2698, 2699, 2700, 2701, 2702, 2703, 2704, 2705, 2706, 2707, 2708, 2709, 2710, 2711, 2712, 2713, 2714, 2715, 2716, 2717, 2718, 2719, 2720, 2721, 2722, 2723, 2724, 2725, 2726, 2727, 2728, 2729, 2730, 2731, 2732, 2733, 2734, 2735, 2736, 2737, 2738, 2739, 2740, 2741, 2742, 2743, 2744, 2745, 2746, 2747, 2748, 2749, 2750, 2751, 2752, 2753, 2754, 2755, 2756, 2757, 2758, 2759, 2760, 2761, 2762, 2763, 2764, 2765, 2766, 2767, 2768, 2769, 2770, 2771, 2772, 2773, 2774, 2775, 2776, 2777, 2778, 2779, 2780, 2781, 2782, 2783, 2784, 2785, 2786, 2787, 2788, 2789, 2790, 2791, 2792, 2793, 2794, 2795, 2796, 2797, 2798, 2799, 2800, 2801, 2802, 2803, 2804, 2805, 2806, 2807, 2808, 2809, 2810, 2811, 2812, 2813, 2814, 2815, 2816, 2817, 2818, 2819, 2820, 2821, 2822, 2823, 2824, 2825, 2826, 2827, 2828, 2829, 2830, 2831, 2832, 2833, 2834, 2835, 2836, 2837, 2838, 2839, 2840, 2841, 2842, 2843, 2844, 2845, 2846, 2847, 2848, 2849, 2850, 2851, 2852, 2853, 2854, 2855, 2856, 2857, 2858, 2859, 2860, 2861, 2862, 2863, 2864, 2865, 2866, 2867, 2868, 2869, 2870, 2871, 2872, 2873, 2874, 2875, 2876, 2877, 2878, 2879, 2880, 2881, 2882, 2883, 2884, 2885, 2886, 2887, 2888, 2889, 2890, 2891, 2892, 2893, 2894, 2895, 2896, 2897, 2898, 2899, 2900, 2901, 2902, 2903, 2904, 2905, 2906, 2907, 2908, 2909, 2910, 2911, 2912, 2913, 2914, 2915, 2916, 2917, 2918, 2919, 2920, 2921, 2922, 2923, 2924, 2925, 2926, 2927, 2928, 2929, 2930, 2931, 2932, 2933, 2934, 2935, 2936, 2937, 2938, 2939, 2940, 2941, 2942, 2943, 2944, 2945, 2946, 2947, 2948, 2949, 2950, 2951, 2952, 2953, 2954, 2955, 2956, 2957, 2958, 2959, 2960, 2961, 2962, 2963, 2964, 2965, 2966, 2967, 2968, 2969, 2970, 2971, 2972, 2973, 2974, 2975, 2976, 2977, 2978, 2979, 2980, 2981, 2982, 2983, 2984, 2985, 2986, 2987, 2988, 2989, 2990, 2991, 2992, 2993, 2994, 2995, 2996, 2997, 2998, 2999, 3000, 3001, 3002, 3003, 3004, 3005, 3006, 3007, 3008, 3009, 3010, 3011, 3012, 3013, 3014, 3015, 3016, 3017, 3018, 3019, 3020, 3021, 3022, 3023, 3024, 3025, 3026, 3027, 3028, 3029, 3030, 3031, 3032, 3033, 3034, 3035, 3036, 3037, 3038, 3039, 3040, 3041, 3042, 3043, 3044, 3045, 3046, 3047, 3048, 3049, 3050, 3051, 3052, 3053, 3054, 3055, 3056, 3057, 3058, 3059, 3060, 3061, 3062, 3063, 3064, 3065, 3066, 3067, 3068, 3069, 3070, 3071, 3072, 3073, 3074, 3075, 3076, 3077, 3078, 3079, 3080, 3081, 3082, 3083, 3084, 3085, 3086, 3087, 3088, 3089, 3090, 3091, 3092, 3093, 3094, 3095, 3096, 3097, 3098, 3099, 3100, 3101, 3102, 3103, 3104, 3105, 3106, 3107, 3108, 3109, 3110, 3111, 3112, 3113, 3114, 3115, 3116, 3117, 3118, 3119, 3120, 3121, 3122, 3123, 3124, 3125, 3126, 3127, 3128, 3129, 3130, 3131, 3132, 3133, 3134, 3135, 3136, 3137, 3138, 3139, 3140, 3141, 3142, 3143, 3144, 3145, 3146, 3147, 3148, 3149, 3150, 3151, 3152, 3153, 3154, 3155, 3156, 3157, 3158, 3159, 3160, 3161, 3162, 3163, 3164, 3165, 3166, 3167, 3168, 3169, 3170, 3171, 3172, 3173, 3174, 3175, 3176, 3177, 3178, 3179, 3180, 3181, 3182, 3183, 3184, 3185, 3186, 3187, 3188, 3189, 3190, 3191, 3192, 3193, 3194, 3195, 3196, 3197, 3198, 3199, 3200, 3201, 3202, 3203, 3204, 3205, 3206, 3207, 3208, 3209, 3210, 3211, 3212, 3213, 3214, 3215, 3216, 3217, 3218, 3219, 3220, 3221, 3222, 3223, 3224, 3225, 3226, 3227, 3228, 3229, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3265, 3266, 3267, 3268, 3269, 3270, 3271, 3272, 3273, 3274, 3275, 3276, 3277, 3278, 3279, 3280, 3281, 3282, 3283, 3284, 3285, 3286, 3287, 3288, 3289, 3290, 3291, 3292, 3293, 3294, 3295, 3296, 3297, 3298, 3299, 3300, 3301, 3302, 3303, 3304, 3305, 3306, 3307, 3308, 3309, 3310, 3311, 3312, 3313, 3314, 3315, 3316, 3317, 3318, 3319, 3320, 3321, 3322, 3323, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3332, 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344, 3345, 3346, 3347, 3348, 3349, 3350, 3351, 3352, 3353, 3354, 3355, 3356, 3357, 3358, 3359, 3360, 3361, 3362, 3363, 3364, 3365, 3366, 3367, 3368, 3369, 3370, 3371, 3372, 3373, 3374, 3375, 3376, 3377, 3378, 3379, 3380, 3381, 3382, 3383, 3384, 3385, 3386, 3387, 3388, 3389, 3390, 3391, 3392, 3393, 3394, 3395, 3396, 3397, 3398, 3399, 3400, 3401, 3402, 3403, 3404, 3405, 3406, 3407, 3408, 3409, 3410, 3411, 3412, 3413, 3414, 3415, 3416, 3417, 3418, 3419, 3420, 3421, 3422, 3423, 3424, 3425, 3426, 3427, 3428, 3429, 3430, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3440, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 3448, 3449, 3450, 3451, 3452, 3453, 3454, 3455, 3456, 3457, 3458, 3459, 3460, 3461, 3462, 3463, 3464, 3465, 3466, 3467, 3468, 3469, 3470, 3471, 3472, 3473, 3474, 3475, 3476, 3477, 3478, 3479, 3480, 3481, 3482, 3483, 3484, 3485, 3486, 3487, 3488, 3489, 3490, 3491, 3492, 3493, 3494, 3495, 3496, 3497, 3498, 3499, 3500, 3501, 3502, 3503, 3504, 3505, 3506, 3507, 3508, 3509, 3510, 3511, 3512, 3513, 3514, 3515, 3516, 3517, 3518, 3519, 3520, 3521, 3522, 3523, 3524, 3525, 3526, 3527, 3528, 3529, 3530, 3531, 3532, 3533, 3534, 3535, 3536, 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547, 3548, 3549, 3550, 3551, 3552, 3553, 3554, 3555, 3556, 3557, 3558, 3559, 3560, 3561, 3562, 3563, 3564, 3565, 3566, 3567, 3568, 3569, 3570, 3571, 3572, 3573, 3574, 3575, 3576, 3577, 3578, 3579, 3580, 3581, 3582, 3583, 3584, 3585, 3586, 3587, 3588, 3589, 3590, 3591, 3592, 3593, 3594, 3595, 3596, 3597, 3598, 3599, 3600, 3601, 3602, 3603, 3604, 3605, 3606, 3607, 3608, 3609, 3610, 3611, 3612, 3613, 3614, 3615, 3616, 3617, 3618, 3619, 3620, 3621, 3622, 3623, 3624, 3625, 3626, 3627, 3628, 3629, 3630, 3631, 3632, 3633, 3634, 3635, 3636, 3637, 3638, 3639, 3640, 3641, 3642, 3643, 3644, 3645, 3646, 3647, 3648, 3649, 3650, 3651, 3652, 3653, 3654, 3655, 3656, 3657, 3658, 3659, 3660, 3661, 3662, 3663, 3664, 3665, 3666, 3667, 3668, 3669, 3670, 3671, 3672, 3673, 3674, 3675, 3676, 3677, 3678, 3679, 3680, 3681, 3682, 3683, 3684, 3685, 3686, 368

Traffic News.

The annual meeting of the National Industrial Traffic League will be held at the Congress hotel, Chicago, on October 27.

The Lehigh Valley announces that at the end of this month it will withdraw from all of the car demurrage bureaus to which it belongs.

The Morgan line steamers have made a reduction of 10 cents per 100 lbs.—50 cents to 40 cents—on drygoods and certain similar articles in lots of 10 tons or more from New York to Texas ports.

A press despatch from San Francisco says that all the transcontinental railways are now offering to carry fruit through to Chicago in eight days and to the Atlantic seaboard in ten days—a large reduction from the best time heretofore made.

Hearings on the trunk freight rate cases will be resumed by the Interstate Commerce Commission at Washington November 21. On Tuesday next, October 25, a hearing will be held in Chicago on the western rate question. It is expected that the eastern cases will be brought up for final argument December 14.

The passenger department of the Pennsylvania Lines West of Pittsburgh, in accordance with the wishes of the Pennsylvania State Railroad Commission, will abolish the rule under which it has refused to check baggage through to another line except on a through ticket. This means that a passenger from Fort Wayne (for example) to New York, holding a single trip ticket on the lines west of Pittsburgh and a mileage book for the lines east, can have his baggage checked through. Hitherto a passenger in such a case has been obliged to recheck at Pittsburgh.

Following conferences of bankers in New York during the past week, concerning bills of lading for cotton, it was announced that probably English and American bankers would combine in the establishment of an insurance company to insure the genuineness of such bills. It was estimated that the cost of such insurance would be 6 or 7 cents a bale. Sir Edward H. Holden, the English banker, who was in New York this week, has favored this plan to the extent of telegraphing the European bankers advising them to postpone for two months—October 31 to December 31—their proposed refusal to longer continue the acceptance of bills of lading on the present basis.

Trunk Line Presidents on the Rate Question.

Hearings given by the Interstate Commerce Commission, in connection with its inquiry as to the propriety of increasing long distance freight rates on the roads of the trunk line association, were continued at Washington last week, the principal witnesses being Presidents McCrea, of the Pennsylvania; Willard, of the Baltimore & Ohio, and Brown, of the New York Central, and Vice-President J. C. Stuart, of the Erie.

The first statement was that by Mr. McCrea, and this we give substantially in full in another column. In the cross examination of Mr. McCrea, Mr. Brandeis, representing merchants' associations of eastern cities, asked if the stockholders of the Pennsylvania had not during the past year received the equivalent of 12 per cent. on their stock. Mr. McCrea replied in the negative; and that seems to have been the end of that question. Mr. McCrea said that during the past ten years his employees had had their pay raised 33 per cent., this mainly because of the increase in the cost of living; but in the same time the Pennsylvania stockholders had received no increase whatever in their income from their investments in the road. Clifford Thorne, of Iowa, representing certain shippers, asked questions which seemed to impugn Mr. McCrea's truthfulness. He appeared in the confusion for protection and was sustained. Commissioner Lane asked about the present condition of the railway bond market; Mr. McCrea gave no sign of encouragement in the immediate future. As to railway development in new territory, he did not know of any place to get money for such enterprises at present.

David Willard, president of the Baltimore & Ohio, said that during the present year his road had had to raise 50 million dollars, but that bonds could not be sold at a reasonable rate and so it was necessary to sell short time notes. Four-fifths of these are become due in 1913. The increase in the pay-

rolls amounts to \$1,635,000 a year and the increased interest burden is at the rate of \$1,900,000 a year. Railway stock paying less than 6 per cent. is not attractive to the investor. Some years ago investors were willing to accept regular dividends of less than 6 per cent. on the hope of occasional extra dividends, but with the government prescribing transportation rates, investors are no longer willing to take the chance of loss on stock paying such low dividends. Mr. Willard had found investors in Europe this summer extremely anxious to ascertain what the rate situation was going to be in this country.

He estimated that the gross income of the Baltimore & Ohio this year would be 87 millions as compared with 77 millions in 1909; but the increase in net will be only two millions. For every dollar paid in dividends the B. & O. has put 50 cents into improvements. Bankers tell Mr. Willard that the application of one-third of the surplus to improvements is the minimum that should be used in that way.

Mr. Brandeis asked if expenses could not be economized so as to make up for the increased burdens of enlarged pay-rolls, etc. Mr. Willard said he would leave it to the commission to determine whether the railways are managed with sufficient economy. Mr. Willard not only thought that the general basis of rates was too low; but said that this would be his opinion even had there been no recent increase in wages.

W. C. Brown, president of the New York Central, said that the increase made in wages of employees last spring on his line amounted to \$7,831,000 a year. He gave the following details concerning different roads of the system:

N. Y. C.—Increase in pay-rolls, \$3,590,000; additional increase after this year, \$125,000. Lines west of Buffalo. Increase in wages, \$4,200,000; additional next year, \$50,000.

Improvements now going on:

N. Y. C., \$155,000,000, of which 75 millions was expended prior to January 1, 1910; expenditures this year, 42 millions; future years, 38 millions.

Lake Shore & Michigan Southern.—Expenditures, 61 millions; of this prior to January 1, 1910, 30 millions; during current year, 12 millions; future years, 19 millions.

Michigan Central.—Expenditures, \$14,200,000; prior to this year, \$9,700,000; current year, \$3,500,000; future years, \$1,000,000.

Pittsburgh & Lake Erie.—Expenditures, \$9,150,000; prior to this year, \$4,500,000; current year, \$3,400,000; future years, \$1,200,000.

C., C. & St. L.—Expenditures, \$7,300,000; prior to this year, \$660,000; current year, \$6,300,000; future years, \$340,000.

In addition to the improvements included in the foregoing estimates, Mr. Brown said that another hundred millions would be needed for other improvements which would have to be made soon; and among these he mentioned new stations and changes in grades in Utica, Syracuse and Buffalo, and also the following:

"As soon as the plans and details can be agreed to with the authorities of the city of New York, our entire freight line from Spuyten Duyvil to St. John's Park, lying along the west side of Manhattan island, must be rebuilt, including its elevation or depression; electricity must be installed, and new terminals constructed.

"The completion of the four tracking of the main line between Albany and New York, including realignment and necessary station changes.

"The Stuyvesant cut-off, connecting the West Shore with the Boston & Albany south of Albany, in order to send traffic around the congested terminals at Albany." [Stuyvesant station is 18 miles south of Albany and about 10 miles from Chatham on the B. & A.]

Mr. Brown said that a considerable part of the capital for the improvements now in progress was secured before the recent increases in wages rendered the situation acute; but as to future improvements, the money can be obtained only in case the compensated rate acute increased revenue by means of increased freight rates.

The Atlantic Central recently tried to sell 17 millions of 4 per cent. debentures, and that road has a low bonded indebtedness, but the best offer received for these bonds, either in this country or in Europe, was \$7. This would have involved a discount of over \$2,700,000 which the company could not stand. The only alternative is to borrow on temporary notes at 6 per cent.

Frank Lyon, counsel for the commission, produced copies of letters showing that the New York Central had made a charge

in the month of March for the entire cost of all the put into the track during January, February and March, and asked the witnesses of this. The latter showed that "certain changes were pending," but Mr. Brown could not recall that any important changes had been pending at that time.

On cross-examination, Mr. Brown said that Mr. McCrea's was at putting a dollar into the property every time a dollar was paid in dividends was a good rule but that the New York Central had never been able to carry it out. It had not even been able to do so well as the Baltimore & Ohio. During 21 years the New York Central had paid annual dividends averaging 4.75 per cent. and had applied yearly to improvements only 1.27 per cent. Asked if there had been heavy drains on the company, Mr. Brown replied in the negative. The bonded debt of the road is \$24,291,845, and every dollar except 48 millions was borrowed at 3½ per cent.

The proposed increases in rates are not so large as they should be, but if granted, they will make it possible to borrow money in Europe.

"The New York Central stock, every dollar of it," said Mr. Brown, "has been paid for at \$100 a share, except such as was paid for at the rate of \$125 to \$158 a share, and the New York Central cannot be reproduced to-day for 200 per cent. of its total stock and bonds. I say that under oath."

Mr. Brandeis wanted an explanation of the increase in the dividends on the New York Central stock when the directors knew that the employees were soon to demand higher pay. "Did you not thus disable yourself to the extent of \$1,786,000 a year from meeting the increased liabilities?" Mr. Brown replied that the dividends, when increased, were less than what could have been got by the stockholders on first class mortgages.

Mr. Brandeis said he would bring witnesses to show that if the railways were managed with the highest efficiency they could pay their dividends and make the necessary improvements without increasing rates. To this Mr. Brown said that when those men were found he would like to hire five or ten of them; they were just the sort of persons he was looking for.

J. C. Stuart, vice-president of the Erie, testified mainly concerning the operation of the road. He said that the road needed this year budget of \$13,000,000 for general improvements. With this he read a statement of the expenses that must soon be met which gave a total for construction and equipment of \$34,917,588. It is but natural to recognize the impossibility of expecting a railway to be run as economically as a manufacturing plant, for the movement of traffic must go on both day and night, sunshine or storm, and during depressions as well as through prosperous times. Unlike the manufacturing plant, it cannot close whenever business becomes bad. Practically all the repair work of the Erie is done on the piecework basis, and now the road has 70,000 items of work which is done by the piece and paid for by the piece, from repairing a locomotive to the laying of a track.

Commissioner Lane asked the witness if there was anything which cost the roads more now than that would be offset by the cutting off of passes and rebates. He said he understood that the roads were claiming that the increased powers of the commission would be a heavy burden and expense to them, but he believed that the same law by eliminating passes and rebates would in that way more than make up for the other expenses. The witness was doubtful of this view.

Feeding the Razorback.

"Hogs can be raised as cheaply in the South as anywhere else, and in many cases more cheaply, but hogs cannot be raised profitably on corn alone," says Prof. Gray in "Farmers' Bulletin 411," in which he gives in full detail the proper methods of feeding hogs in order to realize a profit. Figures are given showing the results obtained from the use of various feeds in experiments conducted at different points in the South. The Southern Railway, which is greatly interested in having the South raise its food supplies at home, will send a copy of this bulletin to any farmer in the South who will address a request to 1300 Pennsylvania avenue, Washington, D. C., or request may be made directly to the department of agriculture.

Prof. Gray gives figures showing the consumption of home raised and western animals in Birmingham, Ala., in 1907, showing that in that year alone more than a million dollars went

out of Birmingham into other states, all in one, might have gone into the pockets of southern farmers. Great reason why southern farmers should raise more hogs are stated as follows:

"Another reason for raising hogs in the South besides that of keeping the money at home is the influence it would probably have on the price of cotton. It will never be possible for the South to control the price of cotton until the southern farmer places himself in such a position that he can hold the crop after it is produced. So long as all the farmers are required to sell the entire crop of cotton each fall, so long will its price be an unreliable and unstable one. The only way by which a farmer can place himself in a position where he will not have to sell all his cotton each fall is to produce something in addition to cotton; and unquestionably one of the best supplements to the cotton crop would be the raising of hogs. The hog business can be so managed that the owner can have money coming in from it at least twice a year, which would enable him to hold his cotton as long as he pleases.

"Furthermore, the hog is especially adapted to the farmer with small capital, as but a small amount of money is required with which to begin the business, and returns begin to come in a few months after it is started. The sow is a rapid producer. Money is turned over rapidly. With \$125 invested in one boar and five to eight sows it is easily possible to have for sale from 5,000 to 8,000 lbs. of pork, live weight, in a year. In other words, the yearly sales should be from two to four times the amount of the investment."

American Association of Passenger Agents.

The annual meeting of the American Association of Passenger Agents was held in Dallas, Tex., last week. The following officers were elected for the next year: President, Charles W. Humphrey, district passenger agent St. Louis & San Francisco, St. Paul, Minn.; vice-president, A. M. Hall, traveling passenger agent Missouri, Kansas & Texas, Dallas, Tex.; secretary-treasurer, G. Gordon Noble, southeastern passenger agent, Lehigh Valley, Philadelphia, Pa. The next annual meeting will be held in Florida, but at what city was not decided. After the convention the delegates went on a trip through Texas over the Missouri, Kansas & Texas, the International & Great Northern, the Galveston, Harrisburg & San Antonio and the Gulf, Colorado & Santa Fe, the trip including stops at Waco, Austin, San Antonio, Galveston, Harrisburg, Houston and Ft. Worth.

The Rock Island's "Breakfast Bacon Special."

The Rock Island recently sent what it called a "Better Hog Train" through Iowa. It was at once nicknamed the "Breakfast Bacon Special," which seems to be a popular designation. The special aroused so much interest among hog raisers in Iowa that it is now to be sent through Missouri, Kansas, Nebraska and Minnesota. The train consists of seven cars, and on its trip through Iowa carried lecturers from the Iowa Agricultural College, who in less than two weeks, it is said, addressed over 20,000 people on hog culture and the use of hog products. Banks, business houses and schools were closed during the visits of the train, and the results promise even greater returns than those from the "Better Seed Wheat Special" recently run by the same road through Oklahoma.

STATE COMMISSIONS.

W. H. Cowgill, a member of the Nebraska railway commission at Lincoln, Neb., died at Lincoln as a result of a paralytic stroke on October 17. He had been a member of the commission since 1908.

The Railroad Commission of Louisiana has held that it is not necessary for the Louisiana Railway & Navigation Co. to have a night agent at New Verda. The evidence showed that the total receipts at New Verda averaged \$147.72 per month. There are two night trains, and the sale of tickets for these two trains ran from \$13.25 to \$11.35 per month, while the cost of a night agent would be at least \$30 a month.

The Railroad Commission of Louisiana holds that when a railway company has opened its ticket office 30 minutes before the

schedule time of departure of a train and kept it open continuously until the train departs, it may require a passenger to show a ticket before entering the train, but if the ticket office is closed after it has been opened, the railway company is liable to a penalty for violation of the rules of the commission.

The Oklahoma corporation commission has issued an order fixing many new class and commodity rates between points in the state. The new scale adopted is much lower for distances under 350 miles than the Texas or Arkansas scale, and is about the same for distances greater than this. The order establishes joint rates between all railways in the state, and requires them to publish joint tariffs, and requires that the tariffs be printed and posted at all stations ten days prior to December 1, when the new rates go into effect.

COURT NEWS.

The Oklahoma supreme court has denied the petition of the Oklahoma railways for an order restraining the corporation commission from enforcing its requirement of reports on the physical valuation of the railways in the state.

The petitions of the western roads for rehearings in what are known as the Missouri river and the Denver rate cases, which the supreme court last spring sustained, the Interstate Commerce Commission in ordering radical reductions in rates, have been denied by the court. The petitions were filed on the day of adjournment of the court.

Judge Kohlsaat, of the federal court at Chicago, issued a temporary injunction on October 12 restraining the Illinois state railway commission from enforcing an order requiring heavy reductions in the rates of the express companies doing business in that state. The injunction was issued on the complaint of the Adams, American, United States, Wells-Fargo and National companies. The express companies filed statements indicating that on present rates they are not making much money in Illinois and that on the rates proposed by the commission they would be unable to earn a fair return.

Judges Sanborn, Hook, Vandeventer and Adams, in the United States circuit court at St. Paul, Minn., on October 10, rendered a decision upholding the findings of Master in Chancery F. N. Dickson, in the suit brought by the Great Northern, the Northern Pacific, the Burlington and the Union Pacific, to test the validity of the order made by the Interstate Commerce Commission two years ago, fixing lumber rates from the Pacific northwest. The rate on lumber from Portland to St. Paul was raised by the roads in the fall of 1907 from 40 cents to 50 cents per 100 lbs. The commission cut the rate to 45 cents, where it is now. The Master recommended a 50-cent rate. The railways made a rate from Portland to Chicago of 60 cents. The commission reduced this rate to 55 cents, and the Master held that the 60-cent rate was reasonable.

Judge Wolvorton, of the federal court at Portland, Ore., has issued an injunction temporarily restraining the Oregon railway commission from enforcing an order made by it for a reduction in rates until the reasonableness of the rates and the constitutionality of the law under which the commission acts can be determined. The injunction was issued at the instance of the Southern Pacific and the Oregon & California. While the petitions of these roads attack the constitutionality of the Oregon railway commission act, they call in question mainly the reasonableness of the rates fixed by the commission. The commission's order requires a reduction of 15 to 25 per cent in rates on 12 classes of freight. Officers of the Southern Pacific estimate that obedience to the commission's order would reduce the earnings of that road about \$300,000 a year. The Southern Pacific claims that its business in Oregon never has been profitable.

Pres. Lee, Charles S. Mellen, of the Boston & Maine, has ordered the abandonment of opposition to a suit brought by the attorney general of the state of New Hampshire to restrain the B. & M. from continuing to effect certain freight rates on loaded freight, alleged to be in violation of the statutes. The announcement was made in a letter to Gov. Quincy. Mr.

Mellen says that the road intends to obey the statutes literally and will restore the old schedule in cases where it is found that rates have been raised illegally. In his letter he says:

"Whether the action brought by the attorney-general can be maintained I do not know. I do not know whether the state has the power in authorizing a lease to insist upon a condition which interferes with interstate commerce. But the Boston & Maine Railroad has received benefits in the way of leases under the authority of these statutes and it should not accept the benefits and seek to avoid the obligations.

"I understand that on certain lines there has been no increase of rates in excess of those in force at the time of the passage of these statutes, and that it is difficult to determine as to just what lines these statutes are applicable. I shall be very glad if there is any dispute between the attorney-general and our counsel upon these questions, to have them submitted to the supreme court at the earliest practicable moment for determination."

Hearings in the Harriman Merger Suit.

St. Paul.—Arguments of counsel for defendants in the Harriman merger suit were opened by P. F. Dunne, who said in part:

"The right of the Union Pacific, a state railway corporation, to buy a minority of Southern Pacific stock by out-and-out sale is the point in the case.

"Union Pacific was only an intermediate carrier. It depended on the Southern Pacific from Ogden to San Francisco as its sole rail connection for access to the great business of California. Union and Southern Pacific were connections, not competitors. Solicitation for Atlantic seaboard traffic via Ogden is just as strong as ever by virtue of activity of Union Pacific's eastern connections. The Southern Pacific always did and does solicit this traffic via New Orleans. On interior traffic also the zones of solicitation are unchanged. Business from Atlantic seaboard to Utah and Colorado common points was insignificant and not so much as thought of when the Southern Pacific stock was bought. If the Southern Pacific water line to Galveston and rails north to Ft. Worth are competitive with the Union Pacific which lies west of that point, what lines are not competitive? Portland business from the East or Utah and Colorado points is naturally Union Pacific business. The haul over the Sierras and north over the Siskiyous makes the Southern Pacific route unnatural. The Portland business was relatively insignificant. It is hardly to be supposed that Union Pacific bought the Huntington stock to restrain competition it feared in this business. Between San Francisco and Portland the freight haul by rail is costly and difficult. It is impossible to meet the cheap service by water. On the other hand, passenger business avoids the rough water trip for the scenic rail trip. The Huntington stock certainly was not purchased to protect a couple of steamers hauling a small amount of local business. Traffic into Montana, Idaho and eastern Washington moved by water and rail preferably to paying higher rates by the Southern Pacific rails and connections. This traffic was of absolutely no moment. Union Pacific was a partner with Southern Pacific on the general Oriental traffic by virtue of each owning half the stock in the Occidental & Oriental S. S. Co. All Oriental business of importance inbound came through San Francisco and passed over the Ogden route and Union Pacific rails. This condition was not changed by the merger.

"Actuated by public knowledge that a railway bill would be proposed in the last Congress authorizing purchase of stock of other railways, competing or otherwise, where the purchaser already owned 50 per cent. of the stock, Union Pacific started to increase its Southern Pacific holding to 50 per cent., merely because availing itself of such a provision would, without any derogation from the position that Union and Southern Pacific were related as connecting, not as competing lines, go to displace any issue attempted to be made on that head.

"The policy of the Union Pacific management since 1901 has been to move traffic along the lines of natural commercial gravitation. Shippers are no longer pressed to ship over unnatural routes out of consideration for an agent. They are given the benefit of the best routes.

"To question the acquisition and ownership by a Utah railway corporation of Southern Pacific stock in the market by out-and-out purchase is not within the regulative power of Congress under the commerce clause of the Federal Constitution, but on the contrary pertains to the police power of the State and rests

between the corporation and the State of its domicile. Again, above purchase is not assignable to the categories of section 1 of the Anti-Trust Act either as a contract, combination or conspiracy in restraint of trade, nor can said purchase in the market be said to be monopolizing or attempting to monopolize in respect to interstate commerce with which the second section of the Anti-Trust Act is concerned. The Union and Southern Pacific were not competitors, and therefore their amalgamation was not in violation of the law.

Congress encouraged by land grants and otherwise the extension of the original Central Pacific both north and south in California. It was the Central Pacific that first put on the Sunset line. The acquisition by Union Pacific of an interest in the Sunset line was incidental only. Evidence shows that Mr. Harriman endeavored to purchase the Central Pacific alone, but was unable. Union Pacific had to have an outlet over the Central Pacific or be bottled up at Ogden.

"The Northern Pacific, Great Northern and Atchison stocks have been sold and these questions are moot and academic.

"The Oregon Short Line had already been constructed to the Utah-Nevada boundary, and the joint line, the San Pedro, Los Angeles & Pacific, is no more than a consolidation of connecting lines, the Clark half of which had not been constructed at the time of the agreement.

"There was no combination of steamship lines to suppress competition. There had been no substantial competition."

In his argument for the defendants N. H. Loomis made the following points:

"The object of acquiring an interest in Southern Pacific was not to suppress competition or to obtain a monopoly, but to secure for Union Pacific an entrance into San Francisco. Rival interests were likely to secure the Central Pacific and bottle the Union Pacific up at Ogden. The consolidation of the two roads was contemplated by Congress when their construction was authorized. Southern Pacific in unfriendly hands would turn eastbound traffic over to the Rio Grande at Ogden.

"Amalgamation of the Union Pacific with the Central Pacific simply advanced the Southern Pacific gateway to Omaha instead of Ogden. It in no wise altered the previous dominant position of the Southern Pacific as to California business by virtue of both its Oregon and New Orleans routes.

"The Supreme Court says Congress 'may prohibit those contracts which directly and substantially, and not merely indirectly and incidentally regulate traffic among the States.' Combining the revenues of both systems arising from the so-called Union-Southern Pacific competitive routes, we find that in 1900, the year prior to the amalgamation, it amounted to 2.89 per cent. of their total revenues.

"The attempted use of the Portland route would result in the destruction of Union Pacific's transcontinental business to California points. The distance from Omaha to Portland is greater than from Omaha to San Francisco. Then there would be a sea voyage from Portland to San Francisco, requiring transfer of freight to ships, with attendant damage. No shipper would use this route at equal rates. No traffic has moved over the route. To open the Portland-San Francisco route at cut rates would result in diversion from Union Pacific at Ogden by Southern Pacific of more business than would be gained. The Union Pacific could not possibly afford to give up its efficient route via the Central Pacific in favor of the inefficient one via Portland. The route via Portland was of absolutely no value as a competitive factor against Southern Pacific.

"The consolidation of agencies would follow the consolidation of connecting lines as naturally as of competing lines and indicates nothing as determining the relation of the Union and Southern Pacific.

"President Jeffrey of the Rio Grande testified: 'Q. The difference lies in the fact that whereas previous to 1901 the Southern Pacific, as between the Rio Grande and Union Pacific, was impartial, since 1901 it has preferred the Union Pacific with unrouted traffic; isn't that the difference? A. That is the difference, yes. The Union Pacific is the preferential connection of the Southern Pacific; that is all there is to it.'

"Instead of depriving the public of facilities, the beneficial results which have flowed from the amalgamation have been manifold. The expenditure of \$363,452,000 on the Harriman lines on extensions and improvements does not indicate an intention to let them be hampered for want of facilities to properly serve the public. The public has been saved \$154,000,000 by fact that

Harriman lines did not advance rates to keep pace with advancing cost of labor and materials. The cost management per day on the Harriman lines is greater than that of almost any other system in the country.

"The act of Congress governing construction and operation of the Union and Central Pacific refers only to the physical connection of the roads as to gage, etc., and in the second place was not intended to control relations between the Union and Central Pacific and their connecting carriers. The Southern Pacific could, without disturbing through rates or divisions, make the Rio Grande a preferred connection just as it has the Union Pacific and with the same effect. Moreover, the Supreme Court has said: 'Different roads forming a continuous line are free to adopt or refuse to adopt joint through tariff rates.'

"Most of the lines alleged by the complainant to be competitive are composed of the railways in question and their connections. Eliminate the connections, and practically no competitive Harriman lines remain. Include the connections, and every railway in the United States is made a competitor of every other railway and with itself.

"A review of the entire record demonstrates that a monopoly has not been created, that there has been no suppression of competition, and that there was no conspiracy to effectuate either purpose. The record shows, on the other hand, that the interest which the Union Pacific acquired in Southern Pacific has been of direct and substantial benefit to trade and commerce."

Frank B. Kellogg, counsel for the government, concluded the complainant's rebuttal and the argument of the case as follows: "In the case at bar we have seen that by the acquisition of less than a majority of its stock the Union Pacific absolutely controls the Southern Pacific. As previously shown, the Union Pacific secured the election of two of its directors as directors of the Atchison, since which time they have been acting in harmony as to rates, in division of traffic, and in agreeing not to enter each other's territory." He then summarized the arguments of the government (printed in the columns last week), and in answer to the testimony showing that the Union Pacific had sold its "investment stocks" said:

"The fact that the Union Pacific has, since the commencement of this suit, sold the balance of its stock in the Great Northern and Northern Pacific, and in the Santa Fe, is no reason why an injunction should not be granted. As we have shown, the evidence is clear in this case that the object in purchasing the stock in the Northern Pacific, with the consequent control of the Burlington, and which, upon distribution of the assets of the Northern Securities Co., vested in the Oregon Short Line a large amount of Northern Pacific and Great Northern stock, and the purchase of the stock in the Santa Fe was to suppress competition between those lines of railway.

"The Union Pacific still has one director on the board of the Santa Fe. The government is entitled therefore to an injunction, although temporarily the stock has been sold. The defendants could easily buy the stock and compel the government to bring another suit.

"The control of the San Pedro, Los Angeles & Salt Lake under the circumstances of this case tended to suppress competition and is void, although that line was not completed at the time of the acquisition of the stock. Bearing in mind that this is not an action under a statute preventing a railway from purchasing stock in a competing line, but an action by the Federal Government to enjoin a restraint on trade, it is evident on principle that competition is restrained by throttling and preventing the construction of competing lines, as well as by controlling the competition of such lines after they are constructed. Competition is not confined to the making of rates on existing lines of railway. It includes extension of railways into competitive country, and this competition may be throttled as well by preventing the construction of independent lines as by controlling those which have already been constructed.

"The combination of steamship lines between American and foreign ports for the purpose of suppressing competition is within the inhibitions of the Sherman Act. Before the acquisition of the Southern Pacific by the Union Pacific each of these systems had a line of steamers running to Oriental ports, competing for that trade. The combination of these lines was as much in violation of the Sherman Act as the combination of competing railways.

"We submit that the government is entitled to a decree as prayed in the bill."

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

F. L. McMillan, aged 50, former 1908, general superintendent of the Baltimore & Ohio, has been elected vice president and general manager of the Kansas City Southern, with office at Kansas City, Mo., succeeding Wm. Coughlin, general manager, retired.

Operating Officers.

A. J. Apperson has been appointed superintendent of the Southern Utah, with office at Price, Utah.

Wm. C. O'Brien, general manager of the Kansas City Southern, with office at Kansas City, Mo., has resigned.

James Purcell has been appointed transportation inspector of the Atchison, Topeka & Santa Fe, with office at Guthrie, Okla.

F. M. Falck, assistant superintendent of the Philadelphia & Reading at Reading, Pa., has been appointed superintendent of the Wilmington & Columbia division, with office at Reading, succeeding F. S. Stevens, transferred.

W. M. Jeffers, division superintendent of the Union Pacific at Ogden, Utah, has been transferred with his staff to Green River, Wyo. The offices heretofore used by the Union Pacific at Ogden will be used by the Southern Pacific officers only.

C. H. Ewing, engineer maintenance of way of the Philadelphia & Reading and subsidiary companies, has been appointed superintendent of the Atlantic City Railroad and the Cape May, Delaware Bay & Sewells Point, succeeding A. G. McCausland, resigned.

Daniel J. Higgins, trainmaster of the Illinois Central at Champaign, Ill., has been appointed trainmaster of freight terminals, with office at Fordham, Ill., succeeding Charles H. Boone, resigned. W. G. Tiley, a chief train dispatcher, succeeds Mr. Higgins.

Herbert H. Adams, who has been appointed general manager of the Toronto, Hamilton & Buffalo, with office at Hamilton, Ont., as previously announced in these columns, was born in August, 1876, at Detroit, Mich. He took a course in civil engineering at the Massachusetts Institute of Technology, receiving the degree of B.S. in 1899. He began railway work in July, 1899, with the Michigan Central, since which time he has been consecutively, December, 1900, assistant engineer; March, 1902, assistant chief engineer; December, 1902, assistant division superintendent, and from February, 1904, to October, 1909, he was division superintendent on the same road. On October 1, 1909, he was appointed general superintendent of the Toronto, Hamilton & Buffalo, which position he held at the time of his recent appointment as general manager.

Fayette R. Rockwell, whose appointment as general superintendent of the Colorado lines of the Denver & Rio Grande, with office at Pueblo, Colo., has been announced in these columns, was born May 2, 1864, at Hornellsville, N. Y. He left high school in 1877 to begin railway work as a messenger boy on the Erie, and remained with that company for six years, being promoted consecutively to caller, telegraph operator and train dispatcher. In 1883 he went with the Denver & Rio Grande as train dispatcher and was later promoted to chief train dispatcher. For two years from 1899 he was superintendent of the Florence & Cripple Creek. He then returned to the Denver & Rio Grande and was superintendent from May, 1901, to November, 1902, and again from November, 1904, to June, 1909. For two years from November, 1902, and from June, 1909, to date he was engaged in private business.

M. C. Roach, whose appointment as superintendent of the New York division of the Lehigh Valley, with office at Jersey City, N. J., has been announced in these columns, was born on August 10, 1870, at New Alexandria, Ohio. Mr. Roach was educated in the public schools, and began railway work with the Pittsburgh, Cincinnati, Chicago & St. Louis on August 10, 1883, and for about three years was a telegraph operator on that

road. In April, 1896, he went to the Erie Railroad as the same position, and was later in the equipment room at that company until his recent appointment. He was appointed as a dispatcher in June, 1899, and from June, 1901, to January, 1902, was chief dispatcher and superintendent of train dispatching. In February, 1902, he was appointed chief train dispatcher and two years later was made a trainmaster. He remained in that position until February, 1905, when he was promoted to general superintendent, which he has now moved to at the Lehigh Valley as superintendent of the New York division.

James M. Kurn, whose appointment as general superintendent of the Atchison, Topeka & Santa Fe, with office at La Junta, Colo., has been announced in these columns, was born November 10, 1870, at Mt. Clemens, Mich. He received a public school education, and began railway work June 10, 1886, as an operator on the Michigan Central. The next year he was made operator and agent of the Atchison, Topeka & Santa Fe at Millsdale, Ill., and McCook, Ill., and then went to Topeka, Kan., as operator. During the ten years from 1892 he was train dispatcher at the following places: Topeka, Arkansas City and Emporia, Kan., and La Junta, Colorado Springs and Pueblo, Colo. He was then made chief dispatcher at Pueblo and afterwards trainmaster. He was transferred to Las Vegas, N. Mex., as trainmaster in June, 1905, and later in the same year was made superintendent of the Rio Grande division, with office at San Marcial, N. Mex. The next year he was transferred as superintendent of the New Mexico division to Las Vegas, which position he held until his recent appointment as general superintendent of the Western grand division at La Junta, Colo.

Traffic Officers.

C. W. Taggart, acting general freight and passenger agent of the Baltimore & Ohio Chicago Terminal, has been appointed general freight and passenger agent, with office at Chicago.

John F. Sullivan, traveling passenger agent of the Louisville & Nashville at Houston, Tex., has been appointed a traveling passenger agent of the Houston & Texas Central, with office at Houston.

Fred G. Stehle, city passenger agent of the Union Pacific and the Southern Pacific at Pittsburgh, Pa., has been appointed a traveling passenger agent, with office at Pittsburgh, succeeding W. A. Golden, transferred to the southern California territory.

C. L. Lyons, commercial agent of the Missouri, Kansas & Texas at Joplin, Mo., has been appointed commercial agent, with office at St. Louis, Mo., succeeding R. S. Fife, transferred to New York as general eastern agent. J. J. Daggy, traveling freight agent at Kansas City, Mo., succeeds Mr. Lyons, and B. F. Longley, as has been previously announced in these columns, succeeds Mr. Daggy.

W. L. White, northwestern freight agent of the Pere Marquette at Minneapolis, Minn., has been appointed general agent, with office at Milwaukee, Wis., and will have general charge of all traffic crossing Lake Michigan by car ferries or breaking bulk steamers. E. F. Blomeyer, assistant general freight agent at Milwaukee, having resigned to accept service with another company, that office has been abolished. F. W. Goldie, Pacific coast agent at Seattle, Wash., succeeds Mr. White as northwestern freight agent at Minneapolis, and C. D. Moorhead succeeds Mr. Goldie.

The jurisdiction of J. H. Drake, general freight agent; W. F. Paton, assistant general passenger agent, and V. M. Gutierrez, industrial agent, of the National Railways of Mexico at Mexico City, has been extended over the Vera Cruz & Isthmus and the Pan-American Railroad. C. Cardona, general freight and passenger agent of the Vera Cruz & Isthmus at Mexico City, has been appointed an assistant general freight and passenger agent, and his former position has been abolished; and C. L. Daniel, general freight and passenger agent of the Pan-American at Gamboa, Oax., Mexico, has been appointed an assistant general freight and passenger agent, and his former position is abolished.

C. J. Chisam, commercial agent of the Chicago Great Western at St. Louis, Mo., has been appointed an assistant general freight agent, with office at Omaha, Neb. Ewing Duval has been appointed a general agent, with office at Kansas City, Mo.,

succeeding E. B. McConahy, assigned to other duties. George F. Daniels, traveling freight agent at Peoria, Ill., succeeds Mr. Chisam as commercial agent at St. Louis, and will in addition have charge of the territory handled by him as traveling freight agent. T. M. Smith, traveling freight agent at Chicago, has been appointed a commercial agent, with office at Detroit, Mich., and F. J. Bonavita, also traveling freight agent at Chicago, has been appointed a commercial agent, with office at Cincinnati, Ohio. The offices of traveling freight agent at Peoria and at Chicago have been abolished. These appointments are effective October 24.

Engineering and Rolling Stock Officers.

The office and staff of C. C. VanArsdol, division engineer of the Grand Trunk Pacific at Prince Rupert, B. C., has been transferred from Prince Rupert to Hazelton.

J. Beaumont has been appointed signal engineer of the Chicago Great Western, with office at Chicago, succeeding W. H. Fenley, resigned to engage in other business.

F. S. Stevens, superintendent of the Philadelphia & Reading and subsidiary companies, at Reading, Pa., has been appointed engineer maintenance of way, succeeding C. H. Ewing, transferred. (See an item under Operating Officers.)

L. L. Wood, formerly general foreman of shops of the Evansville & Terre Haute and the Evansville & Indianapolis, and since August acting superintendent of motive power, has been appointed superintendent of motive power with office at Evansville, Ind., succeeding G. H. Bussing resigned.

The jurisdiction of J. M. Reid, chief engineer of the National Railways of Mexico at Mexico City, Mex., having been extended over the Pan-American Railroad and the Veracruz & Isthmus, D. D. Colvin, chief engineer of the Pan-American Railroad at Gamboa, Oaxaca, Mex., has been appointed assistant chief engineer of that company and the Veracruz & Isthmus, with office at Tierra Blanca.

F. H. Murray, who has been appointed master mechanic of the Erie Railroad, at Port Jervis, N. J., as previously announced in these columns, was born February 24, 1875, at Meadville, Pa. He was educated in the high schools and began railway work June 18, 1892, with the Erie Railroad as a machinist's apprentice, and since that time has been in the continuous service of that company. He was appointed a machinist in June, 1896, at Meadville, and was made roundhouse foreman at the same place in November, 1902. He was appointed general foreman at Salamanca, N. Y., in February, 1904, and was transferred in January, 1905, in the same capacity to Jersey City, N. J., which position he held at the time of his recent appointment as master mechanic.

C. L. McIlvaine, who was recently appointed assistant engineer of motive power of the Erie division of the Pennsylvania Railroad and the Northern Central, with office at Williamsport, Pa., as previously announced in these columns, was born September 25, 1876, at Wilmington, Del. He received his education in private schools at Wilmington and Philadelphia, and graduated from the University of Pennsylvania in 1899. Mr. McIlvaine was appointed a special apprentice on the Philadelphia, Baltimore & Washington in the shops at Wilmington in October, 1899, and in January, 1901, he was transferred in the same capacity to the Altoona shops of the Pennsylvania Railroad, remaining in that position until January, 1903, when he was appointed a draftsman in the office of the superintendent of motive power at Jersey City, N. J. In February, 1905, he was promoted to inspector in the same office, and the following May was appointed assistant master mechanic at the Camden shops, Amboy division. Two years later he was appointed assistant engineer of motive power of the Buffalo & Allegheny Valley division, which position he held until his recent appointment.

Paul L. Grove, whose appointment as assistant engineer of motive power of the Buffalo & Allegheny Valley division of the Pennsylvania Railroad, with office at Buffalo, N. Y., has been announced in these columns, was born October 3, 1878, at Altoona, Pa., and was educated in the schools of his native town. He entered the service of the Pennsylvania Railroad in 1894 as a messenger, and two years later began his apprenticeship in the Altoona machine shops. He finished his apprenticeship in 1900 and was detailed for special work successively in the offices of assistant engineer of motive power at Altoona, the master mechanic at Pittsburgh, and the road foreman of the Pittsburgh division at Pittsburgh, until he was transferred to the Philadelphia division in 1901 as an inspector in the motive power department. Two years later he was transferred to the Bedford division as foreman at the State Line shop, and the year following he was promoted to assistant master mechanic at Altoona, remaining in that position for five years, until his recent appointment as assistant engineer of motive power.

Purchasing Officers.

Edward Everett Bashford, whose appointment as general purchasing agent of the National Railways of Mexico, with office at Mexico City, Mex., was recently announced in these columns, was born August 13, 1868, at Yonkers, N. Y. He was educated in the public and private schools of his native town, and began railway work September 1, 1888, as stenographer and general clerk in the treasurer's office at New York of the National Railroad of Mexico, now a part of the National Railways of Mexico, and in June, 1890, he was promoted to cashier in the same office. In August, 1892, he was appointed division storekeeper at Mexico City, and from June, 1893, to October, 1897, he was chief clerk of the material department in the auditor's office, of the same company. From October, 1897, to May, 1901, he was chief clerk of the auditor's office, and was appointed assistant auditor in May, 1901, remaining in this position until September, 1902, when he resigned from the service of the National Railroad of Mexico to go to the Mexican General Electric Co., at Mexico City, as accountant. In September, 1905, he returned to railway work as assistant purchasing agent, and assistant secretary, at New York, of the National Railroad of Mexico and subsidiary companies. In November, 1908, he was made assistant purchasing agent of the Mexican Central in New York, and on the consolidation of the N. R. R. of M. and the M. C. he was appointed assistant secretary of the new company, the National Railways of Mexico, and secretary of the New York local board of directors, which he now leaves to become general purchasing agent of the same company and subsidiary lines at Mexico City.

Special Officers.

Major Charles Hine, special representative of the director of maintenance and operation of the Harriman Lines, is on leave of absence, and has been appointed temporarily special representative on the staff of the president of the National Railways of Mexico, and will do special organization work on these lines.

OBITUARY.

Samuel B. Sweet, until May, 1908, general freight agent of the Lake Erie & Western at Indianapolis, Ind., died at his home in Indianapolis on October 12, at the age of 65 years. Mr. Sweet was born near Ft. Wayne, Ind., and began railway work in 1866 as a bill clerk for the Toledo, Wabash & Western, now a part of the Wabash. Three years later he became chief clerk and for ten years from 1874 was general agent; he then became division freight agent at Peru, Ind., and in 1887 he was appointed assistant general freight agent of the Lake Erie & Western. He was promoted to general freight agent at Indianapolis in 1896, and held that position until he retired in 1908.

W. W. Peabody, formerly vice-president and general manager of the Baltimore & Ohio Southwestern, died at his home in Cincinnati on October 14. Mr. Peabody was born at Gorum, Me., in 1836, and began railway work in 1852. He was with the Marietta & Cincinnati successively as assistant engineer, president's private secretary, paymaster, master of transportation and general manager, until 1877, when he became general superintendent and general manager of the Ohio & Mississippi; for three years from 1883 he was president and general manager. He then became manager of the trans-Ohio division of the Baltimore & Ohio. In January, 1890, he became vice-president of the Baltimore & Ohio Southwestern, and when that road consolidated with the Ohio & Mississippi as the Baltimore & Ohio Southwestern in 1893, he became vice-president and gen-

eral manager of the consolidated property, from which position he retired in 1898.

Warren G. Purdy, who was president of the Chicago, Rock Island & Pacific from June, 1898, to December, 1901, died at his home in Chicago on October 13. Mr. Purdy was born May 29, 1843, at Baltimore, Md., and began railway work in 1859 as a clerk in the office of the Illinois Central at Chicago. Almost all of his railway career was on the Rock Island, he having entered the service of this road as a bookkeeper in the cashier's office at Chicago in 1867, and having risen to an executive officer through the financial department. During the 11 years that he was second vice-president and first vice-president (1887 to 1898) he was the right-hand man of R. R. Cable, then president, and it was at Mr. Cable's instance that he was promoted to succeed him as president.

Mr. Purdy served during the civil war as chief clerk in the quartermaster's department of the U. S. Army and took a considerable interest in military matters later. For four or five years in the 80's he was lieutenant-colonel of the Second Illinois Infantry, and in that capacity took an active part in helping to put down a strike of large proportions for those days in the Chicago stockyards. He was also very much interested in the Masonic order and became a thirty-third degree mason. In 1880 he was adjutant-general at the Knight Templars' convocation.

When Mr. Purdy entered the service of the Rock Island it had less than 500 miles of line and did not extend west of the Missouri river. It was during the period that he was vice-president that the road's mileage was most rapidly increased, and, as its chief financial officer, he was most active in providing the funds for its development. The period during which he was president was not one of extensive so much as of intensive development. The road was then engaged in strengthening its hold on the large territory of which it had in the preceding years taken possession. Mr. Purdy was not a brilliant man in the sense in which that word is ordinarily used, but he was a very resolute, courageous, solid, hard-working one. In 1894, when the American Railway Union strike under the leadership of Eugene Debs took place in Chicago, he was second vice-president and the active executive of the road. He was among those railway officers who believed in standing their ground against labor union walking delegates who sought to dictate to them how the railways should be run, and during the time when the fighting was fiercest he borrowed two cots from a hotel near the Rock Island station, put them in the station, and he and George H. Crosby, now vice-president, secretary and treasurer of the road, slept on them every night for two weeks. He wanted to be near the scene of action when any fighting for the protection of the rights of the company was apt to have to be done. He was, in a sense, an "old-fashioned" railway president. That is, he thought that the business of the president of a road was to run it in the interests of the public and the stockholders, and not to spend most of his time gratifying the curiosity of state railway commissions regarding matters which are really of no consequence to the public so long as the public is well served by the railway. It was this attitude of mind that caused him, when the Iowa railway commission asked him to inform it what salaries the Rock Island paid its president and other officers, to send word that "that was none of the Iowa railway commission's business."

A number of years ago Mr. Purdy was injured in a railway wreck and he subsequently suffered from a spinal trouble which he supposed was traceable to this accident.



Warren G. Purdy.

Railway Construction.

New Incorporations, Surveys, Etc.

ALBERTA CENTRAL.—Three grading outfits are at work, it is said, between Red Deer, Alberta and Rocky Mountain House. Grading and construction work is going on at Medicine river, four miles north of Evans. J. A. Graham has a contract for some of the work. J. T. Moore, president; J. G. MacGregor, chief engineer, Red Deer.

ALTUS, LUBBOCK & ROSWELL.—Grading on a section of about 60 miles from Memphis, Tex., southwest to Lockney, will be finished early in December, it is said, and arrangements are now being made for the construction of the bridges between Memphis and Cap Rock. From Lockney the line is to be built southwest via Lubbock, thence west to Roswell, N. Mex., about 150 miles. It is announced that several hundred thousand dollars of cash subsidy and large bonuses, that were donated in aid of the project, have been taken over by the Texas Construction Co., of Memphis, Tex., and Kansas City, Mo. This company is backed by the Empire Construction & Finance Co., Kansas City, which is constructing the line.

AUGUSTA NORTHERN.—An officer writes that work is now under way building from Ward, S. C., on the Southern Railway, north via Bell to Saluda, 12 miles. Contract has been let to the Independent Construction Co., Ward. Track laying will be started between December 1 and 15. Maximum grades will be 1.5 per cent. and maximum curvature eight degrees. Bids are being asked for a plate girder bridge, to be 60 or 70 ft. long, to be built over Red Bank creek, at Saluda. The company will also put up three stations, one section house and a railway shop. M. C. Woods, president, Marion, and T. C. McNeeley, secretary and general manager, Ward.

CANADIAN PACIFIC.—An officer of the Esquimalt & Nanaimo writes that contracts for grading are to be let by the end of October, for work on the Cowichan branch between Duncans, B. C., and Cowichan lake.

CAROLINA, CLINCHFIELD & OHIO.—An officer writes regarding the reports that an extension is to be built from Elkhorn City, Va., north, that surveys for an extension north of Elkhorn City have been made for some time and certain revisions of this line are now being made. He adds that there is no more assurance at the present time that the extension will be built than there has been during the past five years.

CHESAPEAKE & OHIO.—The directors have authorized an expenditure of \$850,000 for improvements to be carried out during the current fiscal year, to be made on the line between Cincinnati, Ohio, and Chicago. The improvements and additions include the construction of 14 new side-tracks, the filling of the big trestle at Cincinnati, important additions to the facilities of the switching yard at Summit, outside of Cincinnati, ballasting and grade revision. The work has already been started and will probably be completed before June 30, 1911. This is part of the plan to bring the newly acquired road between Cincinnati and Chicago up to the physical standard of the Chesapeake & Ohio proper, in order that it may handle some of the through business now going over the Big Four. The traffic agreement with the Big Four will probably remain in force for some time or until the Chesapeake & Ohio of Indiana will be ready to handle all of the Chicago traffic with economy.

CHICAGO, MILWAUKEE & PUGET SOUND.—An officer writes regarding the reports that improvement work is to be carried out at St. Joe, Mo., that some time in the future a tunnel will be pierced through the Cascade mountains at a lower elevation than the present crossing. The company has located the line, because at the west end some excavating, to secure material which is immediately needed for filling bridges, will be done.

COLORADO ROADS (ELECTRIC).—Surveyors are now at work securing right-of-way, it is said, for a line from Pueblo, Colo., east to La Junta, about 70 miles. J. S. Vail, Pueblo, is said to be back of the project.

CROSBYTON-SOUTH PLAINS.—An officer writes that work is under way by W. H. Denison, Lubbock, Tex., from Lubbock, easterly to Crosbyton, about 40 miles. One-half mile of track has been laid. Maximum grades will be 0.6 per cent. and maximum curvature 3 degs. The principal outbound traffic will be

cattle and farm products. John A. Knox, chief engineer, Lubbock. (July 22, p. 174.)

ESQUIMALT & NANAIMO.—See Canadian Pacific.

FAIR VIEW & INTER-MOUNTAIN.—An officer writes that the owners of the Fair View coal mine of Fort Collins, Colo., are back of a project to build from Delta, Colo., to Fair View coal mine, 16 miles. From this line at a point about four miles from the mine, a branch is to be built to Cedaredge, about five miles. Another branch is to be built from Delta, along the California mesa to its upper end in Montrose county; surveys have not yet been made for this branch. The most difficult part of the grading is finished. Contracts will be let for track laying and bridge work as soon as the bonds are placed. There will be one steel bridge over the Gunnison river. W. Ziegler, president, Fort Collins, and C. G. Mantz, secretary, 1154 Clark-street, Denver.

GEORGIA & FLORIDA.—A contract is said to have been given to John F. Lamb, Thomasville, Ga., to build 1.5 miles of line through the city of Valdosta, Ga.

LEXINGTON & EASTERN.—An officer writes that contracts have been let in sections of about 18 miles each, and work is being carried out by the following contractors: Lane Brothers Co., Alta Vista, Va.; Mason & Hanger Co., Richmond, Ky.; Jones Brothers, Columbus, Ohio; W. J. Oliver, Knoxville, Tenn., and the Luck Construction Co., Roanoke, Va. This work is on an extension from Jacksonville, Ky., up the north fork of Kentucky river to a point about three miles above Whitesburg, about 88 miles. There are several tunnels and a number of river crossings on this section. The grade is 0.3 per cent. compensated down the river or against loads, and 0.5 per cent. compensated up the river or against empties. Contracts are to be let as soon as surveys are finished for an additional section of 12 miles up Boone's Fork. The line is being built to develop the coal and timber lands in that section. J. E. Willoughby, chief engineer construction, Louisville, Ky. (Sept. 30, p. 599.)

MAINE CENTRAL.—Plans have been made for the construction of a new short line to Brunswick, Me., connecting the main line west of the station with the Lewiston branch north of the station, also for the construction of new coal pockets at Brunswick. These improvements are part of a plan for new routing of freight between Portland and towns and cities on the Androscoggin river. The distance will be greater but the heavy grades near Danville Junction and Walnut Hill will be avoided.

MASSILLON & BREWSTER AIR LINE (ELECTRIC).—An officer writes that the prospects of building from Massillon, Ohio, south to Brewster, about eight miles, are good. It has not yet been decided when contracts will be let for the work. The plans call for putting up a power house.

NATIONAL RAILWAYS OF MEXICO.—Surveys are finished and plans are now in the hands of the government for approval, it is said, for a line from Tampico, Mexico, north to Matamoros, near the mouth of the Rio Grande, about 300 miles, where connection is to be made with the 'Frisco system.

Official announcement is made that the government of the state of Durango has granted a subsidy of \$600,000 to the National Railways of Mexico for the construction of the line from Durango, Mex., southwest to Gutierrez, Zacatecas, on the old main line of the Mexican Central. The subsidy applies only to that portion of the line through the state of Durango, about 50 miles. It is understood that a subsidy will be granted by the state of Zacatecas covering the section of the line through that state. (Oct. 14, p. 711.)

NEVADA & CALIFORNIA.—See Southern Pacific.

OSAGE & WENDELL.—An officer is quoted as saying that grading will be resumed within 30 days from Ellinas, Noble county, Okla., east towards Fairfax, Osage county. The company was organized to build from Enid, Okla., east to Vinita, 178 miles. R. D. Hunt, president, Fairfax, C. Walters, general manager, and E. J. Noonan, locating engineer, both of Muskogee. (Sept. 2, p. 449.)

PACIFIC & INTER-MOUNTAIN.—An officer writes that the extension of the line from Elgin, Idaho, northeast to New Meadows, 16 miles, is nearing completion. There are 20 bridges on that section, of which 14 are completed. Grading is 85 per

cent. finished and track laying has just been started. Maximum grades are 2 per cent. and maximum curvature 12 degs., the grade being compensated on the curves. The line will be laid with new 65-lb. Bessemer rail, with continuous joints. It is expected to have the line in operation by December 1 of this year. (July 29, p. 206.)

PITTSBURGH & SHAWMUT.—An officer writes that the Pittsburgh & Shawmut has 35 miles of line finished, connecting with the Pittsburgh, Shawmut & Northern. Work is now under way by the Pittsburgh & Shawmut, building about 100 miles additional to complete the line south via Knoxdale, Pa., along Mahoning creek to Mahoning, thence over the Allegheny river and along the west bank to Freeport. A contract has been let to James H. Corbett, Kitanning, to build the line, and the bridge work is being done by the American Bridge Co., Pittsburgh. The work is heavy and includes five tunnels and seven trestles. It is expected that the entire line will be finished before January 1, 1912. Edwin E. Tait, president, Bradford; Dwight C. Morgan, vice-president and general manager, and W. W. Hensley, chief engineer, both of Kitanning.

PITTSBURGH, SHAWMUT & NORTHERN.—See Pittsburgh & Shawmut.

SANDY RIVER & RANGELEY LAKES.—The Railroad Commissioners of Maine recently issued a certificate of necessity for taking land at Phillips, Me., for the purpose of carrying out improvements. The plans call for additional tracks, stations, coal sheds, wood sheds, repair shops and car, engine and freight houses.

SOUTHERN PACIFIC.—According to press reports, work on the Nevada & California, from Mojave, Cal., north to Lonepine, Inyo County, 150 miles has been finished.

SOUTHERN RAILWAY.—The report of this company for the year ended June 30, 1910, shows that no new construction of importance was undertaken during the year, but that the work under way during the previous year has been prosecuted. This work included a revision of grade and double-tracking the main line south from the terminal yard at Monroe, La., across the James river, through the city of Lynchburg, thence across the Staunton river to Sycamore, a total of 33.14 miles, shortening the old line 2.16 miles. The operation of the revised line through Lynchburg was postponed by a disastrous fire in the new tunnel while still incomplete and in charge of the contractor. This delayed the completion of the work, but it is now expected that the new line will be put in operation this fall. The double-track operated on the main line has been increased during the year by the completion of second-track between Spencer, N. C., and Concord, 24.07 miles; between Harrisburg and North Charlotte, 8.27 miles, and north from Greensboro, 1.80 miles. The heavy work on 13.67 miles of revised line and double-track between Clifton, Tenn., and Ooltewah (the approach to Chattanooga, Tenn., from the east), has been prosecuted throughout the year, and is nearing completion. The improvements to provide new terminal facilities, including new passenger and freight stations, and increased yard facilities at Jellico, Tenn., were finished during the year, and new transfer facilities at Inman yard, near Atlanta, Ga., were under construction at the close of the year. At Atlanta, the freight station and other improvements are still incomplete, nothing having been done on them during the year. Miscellaneous station buildings at various places were put up during the year. Additional tracks and facilities at Charlotte, N. C., and Mobile, Ala., were completed, and at the close of the year there was in course of construction tracks and approaches for the new passenger terminal station at Birmingham; additional tracks and facilities at North Birmingham; similar work at Hamburg, S. C., and an interchange yard at Montview, Va. The enlargement of shop facilities, including new machinery and tools at Coster, Tenn., has progressed during the year. (See report of this company elsewhere in these columns.)

WISCONSIN & NORTHERN.—A concession has been granted this company to build five miles of line through the Menominee-Indian reservation, it is said, where a large amount of timber damaged by fire must be taken out at once. It is understood that the company will build the extension from Shawano, Wis., south to Appleton as soon as financial arrangements can be made.

Railway Financial News.

ALTON & ALTON.—See Contract, Toledo & Ironton.

BOSTON & ALBANY.—Frank G. Webster has been elected a director, succeeding Henry B. Clifton, deceased.

BUFFALO & ALTON. President Melton is quoted as saying: "There is nothing in the Buffalo & Alton situation calling for a reduction in the current dividend. We may be forced to issue a dividend this year after the demand of 6 per cent. on common stock, but we can later on make it good."

BOSTON RAILROAD HOLDING CO.—This company has asked permission of the Massachusetts Railroad Commission to issue \$20,012,000 4 per cent. preferred stock in exchange for the outstanding like amount of 4 per cent. bonds. These bonds are held by the New York, New Haven & Hartford.

BUFFALO, ROCHESTER & PITTSBURGH.—The New York Stock Exchange has listed \$177,000 additional consolidated mortgage, 4½ per cent. bonds, of which \$67,000 bonds were issued to pay for \$1,200,000 stock of the Silver Lake Railway. The Silver Lake runs from Perry, N. Y., to Silver Springs, seven miles.

CHICAGO & ALTON.—This company has bought for \$250,000 the Toluca, Marquette & Northern. This is a 31-mile line in the coal district of Illinois and crosses the Chicago & Alton's line at Custer. The company also owns 12,000 acres of undeveloped coal lands. The Toluca, Marquette & Northern has \$150,000 stock and \$970,000 bonds.

CHICAGO, BURLINGTON & QUINCY.—Holders of the \$5,551,000 Hannibal & St. Joseph 6 per cent. bonds which mature March 1, 1911, are offered the privilege of exchanging their bonds for general mortgage 4 per cent. bonds of the C., B. & Q. at the rate of one C., B. & Q. 4 per cent. bond with interest coupon due March 1, 1911, attached and \$10 in cash, for each Hannibal & St. Joseph bond without interest coupon due March 1, 1911, and the holder of this interest coupon may discount it for cash at 4 per cent. or hold it until maturity.

CHICAGO GREAT WESTERN.—Judge Sanborn in the United States Circuit Court has approved an agreement by which the Chicago Great Western assumes all the leases and traffic agreements entered into in 1901 between the Wisconsin, Minnesota & Pacific and the old Chicago Great Western Railway.

DETROIT, TOLEDO & IRONTON.—Under a decree made by Judge Swan, of the United States District Court, sitting as circuit court judge, H. L. Baker, as special master, will sell on November 25, at New York, in collateral deposited under the \$5,500,000 5 per cent. notes of 1905. This collateral consists of \$5,000,000 consolidated mortgage 4½ per cent. bonds, \$3,001,000 preferred stock and \$2,190,000 common stock of the Ann Arbor.

GRAND TRUNK.—The company has asked the Canadian Parliament to give it power to make a number of changes, among others, to hold one annual meeting instead of two semi-annual meetings and to make an annual report instead of semi-annual reports; to make dividend payments semi-annually; to guarantee interest at 4 per cent. on an issue of the Grand Trunk Western, first mortgage 50-year bonds.

GREAT NORTHERN.—R. A. Jackson has been elected a director, succeeding H. W. Cannon, resigned.

KANAWHA & MICHIGAN.—The minority stockholders' committee that succeeded the Mackey committee has been dissolved and members of the committee have sold their stock and the stock they represented, presumably to the Chesapeake & Ohio interests. This is the committee that obtained an injunction against the retirement of the Hocking Valley preferred stock.

KANSAS CITY, MEXICO & ORIENT.—The company has asked the London Stock Exchange to list script representing \$5,000,000 4 per cent. 50-year first mortgage bonds, representing bonds sold last July.

MACON & BIRMINGHAM.—John B. Munson, vice-president and general manager of the Georgia, Southern & Florida, has been

appointed receiver of the Macon & Birmingham railroads. (See Finance Division.)

MEXICO & ALBANY.—Of the original issue of \$100,000 6 per cent. bonds, all except \$100,000 have been retired at the sinking fund. The \$100,000 not retired are due December 1, 1910, and the company offers to extend these bonds to 1915 at 6 per cent., or to purchase the bonds at par and interest.

MEXICAN RAILWAY.—The directors have declared three-quarters of 1 per cent. dividend on the ordinary shares for the half year ending June 30, 1910, and have declared the full annual dividends of 8 per cent. on the first preferred and 6 per cent. on the second preferred stock. In 1909 no dividends were paid on the ordinary stock; 2½ per cent. was paid on the second preferred stock and the full 8 per cent. was paid on the first preferred.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—The New York Stock Exchange has listed \$3,607,000 additional first consolidated mortgage 4 per cent. bonds, of which \$3,600,000 were issued to pay for extensions, additions and betterments, and \$7,000 to retire a like amount of Minneapolis & Pacific first mortgage bonds.

NEW YORK CENTRAL & HUDSON RIVER.—Wall street rumors credit the New York Central & Hudson River with plans that include: Purchase of the Wabash-Pittsburgh Terminal, which would secure another entrance into Pittsburgh; control of the Wheeling & Lake Erie, which would give the New York Central lines another outlet to the lakes; joint control with the present owners of the Western Maryland, which would give the New York Central an outlet at Baltimore when the new line which the Western Maryland is building from Cumberland to a connection with the Pittsburgh & Lake Erie has been completed; purchase of the Virginian Railway, and construction of the Virginian with the Kanawha & Michigan to form a through line from Toledo in connection with the Lake Shore, the Toledo & Ohio Central and Kanawha & Michigan to tidewater at Norfolk.

NEW YORK, NEW HAVEN & HARTFORD.—See Boston Railroad Holding Co.

NORFOLK SOUTHERN.—Through the sale of first mortgage bonds of the new company, under the plan of reorganization, the new company is to retire the \$1,980,000 Norfolk & Southern notes which fall due November 1. The \$1,000,000 receivers' certificates dated December 29, 1908, have been called for payment on November 10, 1910.

NORTHERN CENTRAL.—Townsend Scott & Son, Baltimore, in explaining their reason for opposing the lease of the Northern Central to the Pennsylvania Railroad say that the income of 11.2 per cent. which the lease would afford on par value of the present stock, should be compared, not with the present 8 per cent. rate but with the 8 per cent. rate plus the average amounts received by way of stock dividends, etc., which have raised the annual return to the stockholders during the last ten years to 20 per cent. They say that the Northern Central could be compelled to pay at least 11.2 per cent., notwithstanding the opposition by a controlling interest. The meeting to vote on the lease will be held November 2.

PENNSYLVANIA RAILROAD.—White, Weld & Co., New York, have bought from the company and are offering to the public \$1,000,000 Allegheny Valley general mortgage 4 per cent. bonds guaranteed, principal and interest, by the Pennsylvania Railroad. Offering price is 100¼ per cent.

ROME & CLINTON.—In explanation of the reduction of the semi-annual dividend from 3½ per cent. to 3 per cent. paid in July, the company says that owing to the corporation income tax it becomes necessary to slightly reduce an occasional dividend. It is expected that the usual 3½ per cent. will be paid in January.

The Swiss have just begun on a tunnel under the Furka Pass, which will pass a railway from Brieg, at the north end of the Simplon Tunnel in the Rhone valley, northeastward to Disentis, in the upper Rhine valley, crossing the Gothard Railway on the way.

Supply Trade Section.

At the annual stockholders' meeting of the American Locomotive Co., New York, held on October 18, the former directors of the company were re-elected.

The Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa., has received from the Boston & Maine a contract for the entire equipment for the electrification of the Hoosac tunnel under the Hoosac Mountain in Massachusetts.

The Isthmian Canal Commission will receive bids until November 7 for hose, hose couplings, oil cups, cocks, saws, chucks, punches, reamers, track gages, cabin-door hooks, screen-door latches, metallic tapes, emery cloth, shellac, etc. (Cir. No. 610.)

The Northern Engineering Works, Detroit, Mich., recently shipped two 10-ton, 60-ft. span electric traveling Northern cranes to the Detroit Bridge & Steel Works, and two 7½-ton cranes to the Lenoir Car Works. The Kewanee Boiler Company is installing four 5 to 15-ton electric traveling Northern cranes made by this same company.

C. H. Peterson, heretofore in the Chicago office of the Baldwin Locomotive Works, Philadelphia, Pa., and the Standard Steel Works Company, Philadelphia, Pa., has been appointed southwestern representative of these companies, with office at 914 Security building, St. Louis, Mo. Edward B. Halsey, who has been in charge of the St. Louis office, was transferred to the sales department of the Philadelphia office.

The exhibit of the R. D. Nuttall Company, Pittsburgh, Pa., at the convention of the American Street and Interurban Railway Association at Atlantic City, N. J., included a pneumatic pantograph trolley of this company's latest type for service where conditions provide low clearance, a design that is used on the New York Central Lines. Another interesting feature of the exhibit was in connection with the butt welded reinforced trolley poles.

The Gisholt Machine Company, Madison, Wis., and Joseph T. Ryerson & Son, Chicago, have announced an association of interests in the manufacture and sale of machinery and machine tools. Extensive additions will be made at once to the Gisholt plant which will greatly increase the output of that company, and permit of development which the association of one of the leading machine tool builders with a strong machinery organization would seem to prophesy.

The following locomotives, recently ordered, were equipped with superheaters manufactured by the Locomotive Superheater Company, New York:

Northern Pacific	18	Pacific
Chicago, Rock Island & Pacific	50	Pacific
St. Louis & San Francisco	12	consolidation
Chicago & Alton	20	Mikado
Minneapolis, St. Paul & Sault Ste. Marie	6	consolidation
New York Central & Hudson River	10	Pacific
Baltimore & Ohio	1	Mallet
Chicago & North Western	5	Pacific and
	30	consolidation

Judge Kohlsaat, of the federal court at Chicago, has issued an injunction restraining the Ryan Car Company and the Lemack Carriers' Company from infringing on patents obtained by Frank X. Mudd, general manager of the Live Poultry Transportation Company, for improvements on poultry cars. The title to the patents is now in the name of the Live Poultry Transportation Company, and bears the number of 539,229. The ascertaining of what damages the defendant companies shall pay to the plaintiff was delegated to James S. Hopkins as master in chancery.

The Signal Appliance Association at its annual meeting, held in Richmond, Va., last week, in connection with the Railway Signal Association, elected for the ensuing year the following officers: A. F. Klink, Bryant Zinc Co., chairman; H. M. Buck, Railroad Supply Co., vice-chairman; Frank Edmunds, Dressel Railway Lamp Works, secretary; H. M. Sperry, General Railway Signal Co., treasurer. The executive committee consists of the officers and Avery P. Eckert, National India Rubber Co.; Azel Ames, Kerite Insulated Wire & Cable Co.; Fred A. Poor, Paul Joint Co., and J. S. Hanson, Union Switch & Signal Co.

The exhibit of the Westinghouse Companies, Pittsburgh, Pa., at the convention of the American Street and Interurban Rail-

way Association at Atlantic City, N. J., was in its usual location in the main building. The principal exhibit of the Westinghouse Traction Brake Company was a rack representing a complete equipment for a 10-car subway or elevated train of motor or trailer cars, furnished with the latest electro pneumatic brake system and Westinghouse governor synchronizing system for distributing the work of supplying the compressed air equally among all compressors in the train. The Westinghouse Electric & Manufacturing Company exhibited a complete working outfit of its new type HL multiple unit control for street and interurban lines, connected to two 40-h.p. railway motors, loaded by Prony brakes. A large number of detail parts of the control apparatus were also shown. The Westinghouse single phase system was represented by the No. 135 motor, which has a capacity of 75 h.p. operated on 25-cycle, and 90 h.p. operated on 15-cycle. This is the motor used by the New York, New Haven & Hartford, and will also be used by the Boston & Maine in connection with the electrification of the Hoosac tunnel. The Westinghouse Machine Company showed a Westinghouse-Leblanc condenser, with air and circulating pumps direct-connected to a 15-h.p. Westinghouse steam turbine. The Westinghouse Lamp Company had on exhibition one of each size of its 110-volt wire type tungsten lamps.

Charles W. Reinhoehl, superintendent of the frog and switch department of the Pennsylvania Steel Company, Steelton, Pa., was killed at Buena Vista, N. J., Sunday, Oct. 9, by the overturning of the automobile which he was driving. H. G. Barbee and W. R. Miller, employees of the same company, who were also in the automobile, were injured. The party was on its way from Steelton to Atlantic City to attend the convention of the American Street and Interurban Railway Association. The car is said to have been running at the speed of 15 miles an hour. Mr. Reinhoehl was seen to rise and wave his hand to friends who were in a car following. At that moment his car skidded toward the side of the road and nearly overturned. It again changed its course sharply for the opposite side of the road; then a wheel broke and the car turned over twice. At the first turn Mr. Reinhoehl was thrown out into the road and received injuries from which he died in a few minutes. H. F. Martin, general sales manager for the company, who was at Atlantic City, went at once to Buena Vista and took charge of the body, which he sent to Steelton, where the funeral was held Wednesday, Oct. 12. Mr. Reinhoehl leaves a widow. He was born at Lancaster, Pa., in 1860, and had been continuously in the service of the Pennsylvania Steel Company for 27 years. He entered the employ of the company as a machinist, and as he passed through all grades of promotion to the head of the frog and switch department, he became one of the most widely known men in that special work in the country.

Exhibition of Railway Appliances at the Coliseum, Chicago, March, 1911.

Preparations are now being made for the annual exhibition of railway appliances used in the construction and maintenance of steam and electric railways, which will be given by the Railway Appliances Association, formerly the Road and Track Supply Association, at the Coliseum, in Chicago, March 20 to 25, inclusive, 1911, the week during which the American Railway Engineering and Maintenance of Way Association will hold its twelfth annual convention and the Railway Signal Association will hold its spring meeting. The arrangement of the floor space will be practically the same as last year, with the exception that, owing to the large number of applications being received, it will be necessary to use the balcony in addition to the main floor and the annex. The price will be the same, 40 cents per sq. ft., on the main floor and annex, but will be only 25 cents per sq. ft. on the balcony. The first allotment of space will be made on or about November 1, 1910, by the Working Board of the Executive Committee of the Railway Appliances Association, therefore it is advisable to have all applications for space in the hands of the secretary before that date. Address John N. Reynolds, secretary, Plymouth building, 303 Dearborn street, Chicago.

TRADE PUBLICATIONS.

The Preservation.—The Indian Refining Company, Cincinnati, Ohio, has just issued a pamphlet describing its Indian Timberasphalt, used in connection with the preservation of railway ties.

Draw and Rivet Headers.—The National Machinery Company, Trumbull, Ohio, in a leaflet just issued, illustrates and describes its National 1½ in. wedge grip, bolt and rivet header for making square or hexagonal head bolts or rivets.

Water Softener.—The L. M. Booth Company, New York, has just issued a leaflet describing its type G water softener. A half-tone illustration illustrates the mechanical parts which are installed at the top of this softener.

Ventilators for Interurban Cars.—Burton W. Mudge & Company, Chicago, have issued a folder describing their Garland car ventilators for use on interurban street, elevated, subway or tunnel cars, with monitor deck and high or low elliptical roofs.

Kerosene Torches.—The Hauck Manufacturing Company, New York, in its pamphlet No. 31, describes a torch for the use of kerosene instead of gasoline. This torch is suitable for general shop work and is said to be more efficient and powerful than the gasoline torch.

Freight and Package Conveyor.—The Link-Belt Company, Nictown, Philadelphia, Pa., in book No. 83, gives a large number of illustrations, with general information of a large number of installations of a type of conveyor which this company manufactures for handling freight and packages.

Farlow Draft Gear.—Catalogue A, just issued by T. H. Symington Company, Baltimore, Md., gives a very complete description of the Farlow draft gear. A number of excellent half-tone engravings, in phantom style, show this draft gear and its attachment to and position between the center sills.

Lighting Fixtures.—Bulletin No. 9,635 of the Western Electric Company, New York, illustrates and describes the Hawthorn commercial and folding type mazdaliers lighting fixtures which have been developed since the advent of the mazda lamp. A portion of the bulletin is devoted to the anti-jar link suspension which is described as a simple yet effective means of protection against vibration.

Cardwell Draft Gear.—"Mike" is the title of the latest publication by Bruce V. Crandall, advertising the Cardwell friction draft gear made by the Union Draft Gear Company, Chicago. Mr. Crandall states that this is his latest attempt "to get away from the stereotyped advertisement," but no apologies are necessary, as the story and illustrations will make interesting reading for any railway man, whether he is a "son of Erin" or not.

Electric Equipment.—The Crocker-Wheeler Company, Amherst, N. J., has just issued bulletin No. 120, which supersedes bulletin No. 100, on form I, belt type d. c. motors and generator; bulletin No. 125 on Remek type transformers of light and power; bulletin No. 122, superseding bulletin No. 101, on form D, belt type d. c. generator and motors, and bulletin No. 123, superseding bulletin No. 89, on adjustable speed motors.

RAILWAY STRUCTURES.

CHAMBERSBURG, PA.—The Cumberland Valley will begin work soon on a two-and-a-half story brick office building on Kennedy street, in Chambersburg.

DELTA, COLO.—See Fair View & Inter-Mountain under Railway Construction.

DES MOINES, IOWA.—The Chicago, Burlington & Quincy is trying to secure property on which to locate a large freight house, but up to the present time has been unsuccessful.

EXCELSIOR SPRINGS, MO.—The Chicago, Milwaukee & St. Paul is remodeling and building an addition to its passenger station. The addition is of frame and the work has already begun.

HARLOWTON, MONT.—The Chicago, Milwaukee & St. Paul is building a five-stall addition to its roundhouse. A similar addition is being made to the roundhouse at Three Forks, Mont., and a new two-stall frame engine house is being built at New England, S. Dak. This work is all well under way.

LAFAYETTE, ILL.—Plans are being made by the Atlantic Coast Line for building up a new passenger station at Lafayette.

LEWISTON, ME.—The Lewiston & Auburn Board of Trade is back of a movement to secure a union passenger station in Lewiston.

LIMA, OHIO.—The Ohio Electric Railway formally opened its new interurban station at Lima on October 16. The building is a handsome one, covering nearly a city block, and cost between \$60,000 and \$75,000. The upper floors are given over to executive officers and train dispatchers.

LOS ANGELES, CAL.—The Southern Pacific will build a draw-bridge over the channel into the west basin at San Pedro harbor. An addition of 50 ft. x 160 ft. is being built by Wells, Fargo & Co. at the Santa Fe station in Los Angeles.

The county supervisors are asking for putting up a concrete bridge, 165 ft. long, across Arroyo Seco, between Los Angeles and South Pasadena. The San Pedro, Los Angeles & Salt Lake will pay part of the cost of the improvements for the privilege of having a 16-ft. right-of-way over the structure.

MASSILLON, OHIO.—See Massillon & Brewster Air Line (Electric) under Railway Construction.

MONTROSE, PA.—Surveys have been completed by the Scranton & Binghamton for a viaduct to be built over the Delaware, Lackawanna & Western tracks at Montrose.

NEW ENGLAND, S. DAK.—See Harlowton, Mont.

NEW MEADOWS, IDAHO.—Work has been started on a new passenger station for the Pacific & Idaho Northern at New Meadows. The building will be of brick construction, faced with pressed brick, two stories high, 42 ft. x 105 ft., and will be equipped with steam heat, electric lights and modern improvements. (See Pacific & Idaho Northern under Railway Construction.)

NORRISTOWN, PA.—The Chamber of Commerce will ask the county commissioners to build jointly with the Philadelphia & Western a bridge over the Schuylkill river.

OTTAWA, ONT.—Plans are under consideration for putting up a combined highway and street railway bridge over the canal at Bank street in Ottawa.

PHILLIPS, ME.—See Sandy River & Rangeley Lakes under Railway Construction.

PRINCETON, IND.—Officials of the Southern Railway recently made arrangements to rebuild on a larger scale the shops at Princeton which were damaged by fire, with an estimated loss of \$150,000.

RENO, NEV.—Press reports state that the Southern Pacific intends to build a new passenger station and office building.

ST. LOUIS, MO.—The Missouri, Kansas & Texas Terminal Company has received a building permit for a \$100,000 two-story freight house. The building will be located at 1600 North Broadway, and work is to be rushed with the expectation of having it ready for use January 1, 1911.

SALEM, N. Y.—The New York Public Service Commission, Second district, has ordered the Greenwich & Johnsonville, to begin at once the construction of an overhead crossing at the Cambridge-Salem turnpike in Salem, Washington county.

SALUDA, S. C.—See Augusta Northern under Railway Construction.

SPRINGFIELD, OHIO.—The new station for the Ohio Electric in Springfield will be completed in about a month.

THREE FORKS, MONT.—See Harlowton, Mont.

TIA JUANA, MEX.—The San Diego & Arizona will build a bridge over the Tia Juana river, 500 ft. long, and another bridge over the Matanuca creek, 180 ft. long. Both structures will have steel towers.

TRENTON, OHIO.—Work on the Ohio Electric Company's bridge over the Miami river, near Trenton, on the Cincinnati & Dayton division, is rapidly nearing completion. Six or seven new concrete piers are being built, and some important work on the C., H. & D. overway, nearby, is also progressing rapidly. When this work is completed early in the spring a cut-off will be available, saving several miles and reducing the running time between Cincinnati and Dayton appreciably.

TUCSON, ARIZ.—The Southern Pacific shops at Tucson, which were destroyed by recent fires, are to be rebuilt at once at a point east of the former location.

Late News.

The items in this column were received after the classified departments were closed.

The Grand Trunk Pacific has made an arrangement with the Canadian Government to operate that part of the National Transcontinental running from Winnipeg to Superior Junction.

Judge Holland in the United States Circuit Court has denied the motion of the Pennsylvania Railroad Co. for a non-suit in the action brought against it by the 11 coal companies which charge discrimination in car distribution.

F. A. Markley has been appointed a commercial freight agent of the Baltimore & Ohio, succeeding E. N. Kendall, promoted, and E. H. Smith has been appointed a traveling freight agent, succeeding W. K. Davis, promoted, both with offices at Toledo, Ohio.

Edgar Freeman, cashier of the New York Central & Hudson River, at New York, has been appointed assistant treasurer of the Lake Shore & Michigan Southern, the Michigan Central and the Cleveland, Cincinnati, Chicago & St. Louis, with office at New York. A. W. Elliman succeeds Mr. Freeman, with office at New York.

The Texas railway commission has been notified that the sale of the Rio Grande Railroad to William E. Guey, of St. Louis, representing, it is said, St. Louis & San Francisco interests, would stand, the minority stockholders having been unable to file a bond for \$125,000 as a guarantee that the road would bring at least that at a second sale.

George H. Eaton, assistant general freight agent of the Boston & Maine, at Boston, Mass., has been promoted to general freight agent, with office at Boston, succeeding Thomas A. Dugan, deceased. Abel E. Prescott, chief of rate bureau, has been promoted to assistant general freight agent. D. J. Flanders, passenger traffic manager at Boston, has been retired on account of ill health. This position is not to be filled at the present time. F. E. Brown, assistant general passenger agent at Concord, N. H., has been promoted to first assistant general passenger agent, and F. T. Grant, chief clerk, has been promoted to assistant general passenger agent.

At the annual meeting of the stockholders of the Illinois Central at Chicago on Wednesday Attorney Maxwell Edgar, who held 60 shares of stock, was present, with two deputy sheriffs, who served subpoenas on the directors in a suit for \$10,000,000 damages, which Mr. Edgar has started in the circuit court. The defendants are the directors, whom Mr. Edgar seeks to hold responsible for alleged financial loss through car repair graft, general mismanagement and rebating. Mr. Edgar said that, in addition to representing 60 shares of stock, he spoke for a special committee of stockholders, including Secretary MacVeagh, of the United States Treasury, and others. Three resolutions were introduced by Edgar, but all were lost by an overwhelming vote. Mr. Edgar has been prominent in the filing of suits against corporations for the collection of back taxes, which he says are still due the state of Illinois to the extent of many millions of dollars. President Harahan said that he attached no weight to Edgar's suit.

The Interstate Commerce Commission has made the following order in regard to the long and short haul clause of the amended act: "That until February 17, 1911, carriers may file with the commission, in manner and form as prescribed by law and by the commission's regulations, such changes in rates and fares as would occur in the ordinary course of their business, continuing under the present rate basis or adjustments higher rates on basis of intermediate points, and through rates of fares higher than the combined rates on the intermediate points of 1910, provided that in so doing the discrimination against intermediate points is not made greater than that in existence on August 17, 1910, except when a longer line of route reduces rates on fares by the more direct route for the purpose of meeting by a short haul reduction of rates or fares made by the short line. The commission does not hereby approve any rates or fares that may be filed under this permission, all such rates and fares being subject to complaint, investigation and correction if they conflict with any other provisions of the act."

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Pacific & Idaho Northern has ordered two 10-wheel locomotives from the Baldwin Locomotive Works.

The Raleigh & Southport has ordered one 10-wheel passenger locomotive from the Baldwin Locomotive Works.

The Stuttgart & Rice Belt, George C. Lewis, De Valls Bluff, Ark., a new line building in Arkansas, will soon be in the market for motive power.

The Crosbyton-South Plains, a steam railway building between Lubbock, Tex., and Crosbyton, is in the market for motive power. John A. Knox, chief engineer, Lubbock.

The Chicago Junction Railway, reported in the *Railway Age Gazette* of September 30 as having ordered five six-wheel switching locomotives from the American Locomotive Company, has increased this order to seven.

CAR BUILDING.

The Lehigh Valley is in the market for 50 steel coaches and three steel combination parlor-buffet cars.

The Stuttgart & Rice Belt, George C. Lewis, De Valls Bluff, Ark., a new line building in Arkansas, will soon be in the market for rolling stock.

The Crosbyton-South Plains, a steam railway building between Lubbock, Tex., and Crosbyton, is in the market for car equipment. John A. Knox, chief engineer, Lubbock.

The Massillon & Brewster Air Line, J. G. Wise, Massillon, Ohio, an electric line building between Massillon, Ohio, and Brewster, is figuring on the purchase of electric cars.

The Winston-Salem Southbound, reported in the *Railway Age Gazette* of September 23 as being in the market for 100 box and 50 gondola cars, is building the gondolas in its own shops.

The Chicago, Burlington & Quincy, reported in the *Railway Age Gazette* of September 23 as being in the market for six steel postal cars, has ordered this equipment from the American Car & Foundry Company.

The Boston Elevated, reported in the *Railway Age Gazette* of October 14 as being in the market for 100 passenger cars, has added 30 all-steel elevated cars to its inquiry. The 100 passenger cars are for the surface lines.

The Galveston-Houston Electric Railway has ordered 12 interurban cars through the Stone & Webster Engineering Corporation. The order includes 10 passenger cars and two express cars to be built by the Cincinnati Car Company. The passenger cars are 52 ft. long, will seat 54 passengers and have smoking compartments.

IRON AND STEEL.

The Baltimore & Ohio is in the market for 100 tons of bridge steel.

The Chesapeake & Ohio is in the market for 1,000 tons of bridge steel.

The Pennsylvania is in the market for 200 tons of bridge steel for a bridge at Trafford, Pa.

The New York, Westchester & Boston is in the market for 2,000 tons of structural steel for trolley bridges.

Structural conditions in steel.—C. M. Schwab, president of the Bethlehem Steel Co., is quoted as saying that the present condition in the steel business is not worse than at any time since he became president of the company. General sentiment continues cheerful, the steel men being uniformly confident of an early removal of obstacles in all branches of the industry.

Metal Car Seal.

The Metal Car Seal Company, Iola, Kan., has perfected a simple and efficient means of sealing box cars. A seal to furnish effective protection must seal the car in such a way that it cannot be tampered with and re-used; its identification mark must be very legible so as to eliminate errors in reading and in recording, and the seal should not be capable of duplication.



Application of Metal Car Seal.

The seal made by this company consists of a single stamping of metal with the initials of the company and identification number stamped in its face, two triangular notches cut on one edge and extending about three-fourths of the way across the seal, and a small circular hole for stringing the seals on a wire for shipment.



Metal Car Seal Applied.

In operation the seal must be used in connection with a car pin having a rectangular hole. The seal is inserted in this hole and the ends bent up at the notches, forming a triangle with the initials and identification number outside. The act of bending up the ends breaks the metal just enough to insure

its breaking off if an attempt is made to straighten it. The surface of the metal is coated with tin so that it is impossible to treat the seal by heating before their application so that they will stand the rebending. In case heat is applied, the tin is melted and the fact that the seal has been tampered with is shown by its change in color.

The manufacturers assert that two-thirds of the freight cars now in use are equipped with car pins with which this seal can be used, and that it would not be expensive for the remaining third to be so equipped. The advantages claimed for the seal are that it is cheap, easy to apply, positive in its indication of tampering, and easily readable. The cuts shown herewith illustrate the application of this metal car seal to the rectangular hole of the pin and its appearance after application.

Automatic Mail Catcher.

A demonstration of a new mail catching device patented by the Railway Automatic Mail Device Company, Chicago, recently was given on the Burlington at Western Springs, Ill., near Chicago. The illustration shows two posts with bags full of mail hanging therefrom. Any number of posts may be used so that more than one bag of mail may be taken readily into the car while the train is passing at any speed. At the car door there is a grating made of iron pipes which is attached to a vertical



Automatic Mail Catcher.

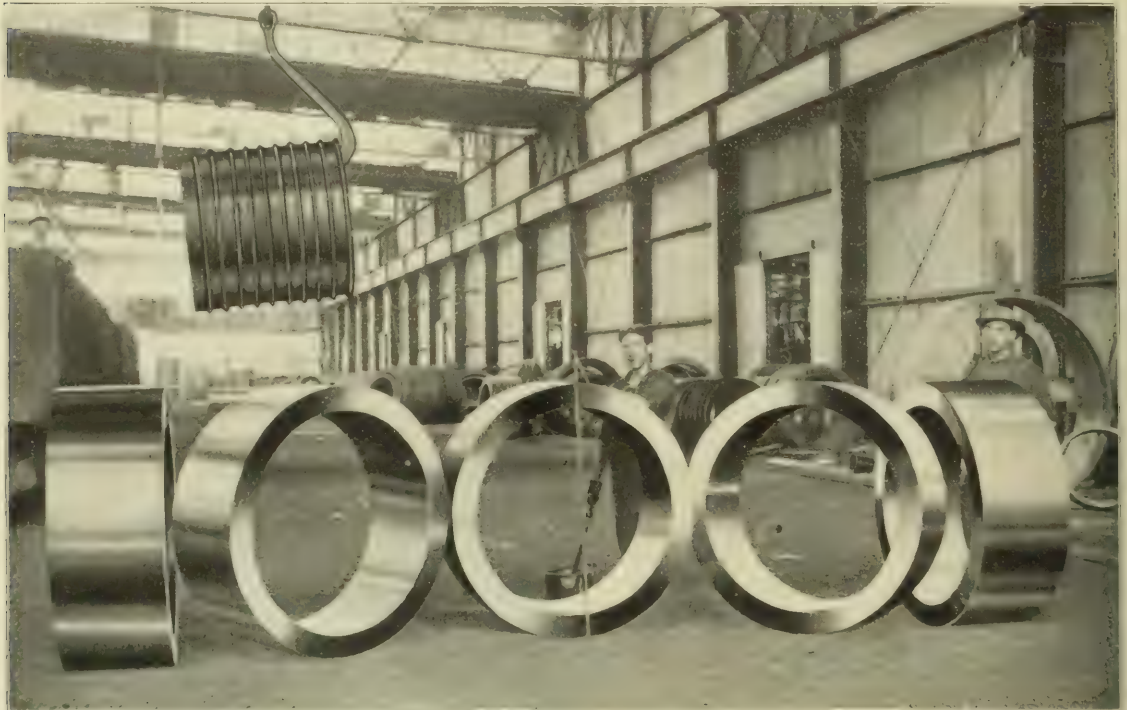
post going through the floor of the car and extending down to within about 18 in. of the level of the rail. At the lower end of the post is an arm with a hook on one end, the normal position of the arm being parallel with the side of the car and pointing upward. Short standards are set on the ends of the ties for some distance each side of the post to which the mail bag is attached, these standards carrying a pipe rail. The pipe rail is only a few inches higher than the track rail and is parallel with it except at the ends, which are bent toward the track. As the train approaches the mail post an operator in the car depresses a lever with his foot. This drops the arm so it engages with the curved end of the guide rail which carries the end of the arm out until it stands at an angle of 30 deg. with the side of the car. The movement of the arm causes the frame on the door to swing out at the same angle. The frame in this position sweeps the bags into the car without grasping them, so full bags are handled without injury and all shock is transmitted to the door frame. The bags are attached to the post by means of clips on the ends of arms, as in ordinary cranes, and the impact of the frame as the train goes past detaches the bag, and

it is slid along the frame fast enough to carry it into the car before it can fall.

To throw mail from the car, an iron pin which hangs from the side of the car is raised to rest on the top of the frame, pointing upward to serve as a hook. The bag to be thrown off is hung to this pin outside the frame and is thrown off as the frame is moved out when the lower arm strikes with the guid-

Large Steel Shells Made by the Inter-Ocean Steel Company.

The new plant of the Inter-Ocean Steel Company at Chicago Heights, Ill., is now in full operation, and is turning out a large number of locomotive and car wheel tires per day, and, in addition, it is manufacturing steel-tired car wheels and rolled steel rings. The illustration herewith indicates the great width and weight of the rings which it is possible to roll. These rings,



Interior of Inter-Ocean Steel Company's Tire Storehouse, Showing Method of Loading Tires; Also Steel Shells, 20 in. wide x 5 in. Thick.

ing pipe rail. The frame can be changed to the other side of the door frame by two men in less than one minute. In the other door of the car, the front door in the illustration, the end of a pile of bags is shown resting on another device owned by the same company and used for the purpose of discharging second class mail. A movable platform which lies flat on the floor until required for use is attached to the floor by means of hinges. When approaching a station the platform is raised and the bags of mail placed on it. As the train passes the station the operator depresses a lever with his foot, which action causes an arm to drop and engage with the guide rail on the ground. When the straight part of the guide rail is reached the frame moves forward and down by means of hinges, lowering the platform and casting the mail from the car. Both devices are automatic in action after the operator presses the lever in the car floor. In the demonstration at Western Springs 600 lbs. of second class mail were discharged from the car with the train moving at a speed of 15 miles an hour. The experiments mentioned were made at speeds of 10 miles to 15 miles per hour without any accident or failure, and were watched by a number of railway men. An immediate result of the tests was a request from the Burlington to be permitted to equip the entire line from Chicago to St. Paul, 31 stations, as well as the four mail cars running in that service, for a six months' test. The superintendent of the Railway Mail Service granted permission for this six months' test on September 24, and work has been started. The Canadian Post Office has given permission for a six months' test of this automatic mail catcher, and the Canadian Pacific near Ottawa.

or shells, are 54 in. outside diameter, 5 in. thick and 20 in. wide on the face, weighing 4,404 lbs. each. They were forged under a 5,000-ton press and rolled in the tire-rolling machines. It is believed that this is the heaviest section ever rolled into this shape. The Inter-Ocean Steel Company is equipped to forge and roll rings of larger diameter and width than have ever been attempted heretofore in this country.

FOREIGN RAILWAY NOTES.

The railway employee Zeis, tried on the charge of having caused by his negligence an accident at Uhersko, in Austria, last Christmas, has been sentenced by the court which tried him to six months' imprisonment.

It is said that when the Arica to La Paz Railway, Chile, is completed, which should be within 18 months, the time from the Pacific coast to La Paz will be reduced for passengers from 23 to 14 hours, and for freight from four days to 25 hours.

A press despatch from Port-au-Prince, Haiti, says that the beginning of the construction work on the new railway, the concession for which to an American syndicate, headed by James P. McDonald, of New York, was recently ratified by the Haytian government, was celebrated to-day at Gonaives. Representatives of the government took part in the celebration.

ANNUAL REPORT.

SOUTHERN RAILWAY COMPANY—SIXTEENTH ANNUAL REPORT.

Washington, D. C., October 6, 1910.

To the Board of Directors of the Southern Railway Company:

The Board of Directors submit the following report of the affairs of the Company for the year ended June 30, 1910.

INCOME STATEMENT.

	1910.	1909.	Increase or decrease.
Miles of Road, Miles, Ave.	1,050.17	7,170.36 Dec.,	120.19
Gross Operating Revenues...	\$67,294,008.34	\$62,188,106.64 Inc.,	\$5,106,401.70
Less Operating Expenses...	38,669,744.94	36,668,980.60 Inc.,	3,066,765.34
Net Operating Revenue...	\$18,658,763.40	\$16,610,120.04 Inc.,	\$2,039,636.36
Outside Operating Net Rea.	18,980.36	136,963.39 Dec.,	117,983.03
Net Revenue...	\$18,677,742.76	\$16,756,089.43 Inc.,	\$1,921,653.33
Taxes Accrued...	1,979,722.33	1,916,701.65 Inc.,	63,020.68
Operating Income...	\$16,698,020.43	\$14,839,387.78 Inc.,	\$1,858,632.65
Other Income...	3,179,135.72	2,898,311.70 Inc.,	280,824.02
Total Gross Income...	\$19,877,156.15	\$17,737,699.48 Inc.,	\$2,139,456.67
Interest on Funded Debt and Equipment Obligations...	\$11,313,636.11	\$11,314,538.85 Dec.,	\$852.74
Other Deductions from Total Gross Income...	2,806,151.43	2,833,775.21 Dec.,	27,323.78
Total Deductions...	\$14,120,187.54	\$14,148,314.06 Dec.,	\$28,176.52
Balance Income over Charges...	\$5,757,018.61	\$3,589,385.42 Inc.,	\$2,167,633.19
Additions and Betterments...	52,372.91	78,285.18 Dec.,	25,912.27
Balance carried to Credit of Profit and Loss...	\$5,704,645.70	\$3,511,100.24 Inc.,	\$2,193,545.46

There was at the close of this fiscal year, a balance to be absorbed of \$7,684,004.16 in discount on securities, resulting principally from the large sales of Development and General Mortgage Bonds in the year ended June 30, 1909. In transferring the balance of income over charges for the year ended June 30, 1910, to the credit of Profit and Loss, the Board of Directors deemed it proper to charge \$2,831,459.89 of this discount to Profit and Loss, thus reducing the amount still to be absorbed to \$4,853,144.57. The net balance remaining to the credit of Profit and Loss as of June 30, 1910, after such credit and debit was \$8,685,959.91.

This discount is being charged off partly by proportionate charges to Income during the life of the securities and partly by extraordinary charges to Profit and Loss. The charge to Profit and Loss this year will result in substantial reductions in such charges to Income during subsequent years in disposing of the balance now in the account.

Statements of the accounts and statistics of the Company, in the usual detail, will be found in the tables hereto annexed.

The accounts have been examined, as usual, by Certified Public Accountants, Messrs. Patterson, Teale & Dennis, and their certificate is made a part of this report.

THE OPERATING CONDITIONS

The income statement reflects the improvement in business during the year. Freight revenues increased 11.97 per cent., passenger revenues 9.92 per cent., and total operating revenues 10.90 per cent. The gross operating revenues were the largest in the history of the Company. But, while this is gratifying, it must be observed on the other hand that the increase in total operating expenses during the year almost kept pace with the increase in revenues, being 9.91 per cent. The operating ratio, excluding taxes, was, however, 67.43 per cent., as compared with 68.04 per cent. last year, and 76.01 per cent. in 1907, the improvement in the three years being largely the result of the improved transportation conditions under the wage scale heretofore in effect. The property has been well maintained during the year and is in as good physical condition as is necessary, not only for the preservation of the integrity of the capital account, but also to make possible efficient operation. Insistent effort to increase efficiency in operation has been made, looking especially to maintaining a reasonable ratio between transportation expenses and gross revenue. The continued high cost of all the materials and supplies which a railroad consumes, and the increased cost of labor, without any proportionate increase in the selling price of the one thing the railroad produces and has for sale, viz., transportation, has so intensified the problem of successful railroad operation that the opportunity for good results is narrowed under existing conditions to efforts to increase the volume of business and improvement in operating efficiency.

Particular attention is invited to the General Manager's report for a statement of some of the most important results which have been accomplished during the year in those respects.

Later in the year general accounts were made at the rate of pay of one percent, which will have the effect of adding approximately \$2,000,000 to the annual profits of the Company.

THE CAPITAL ACCOUNT.

Important changes have taken place in the capital account during the year. The property investment has been increased \$14,061,568.29, of which \$3,923,593.70 was in road and \$10,137,964.59 was in equipment. The increase in the road account was due to additions made during the year, but the increase in the equipment account is largely a readjustment made necessary to better meet the requirements of the new uniform system of accounting prescribed by the Interstate Commerce Commission. There were, however, actual net additions to equipment during the year costing \$844,772.15.

Equipment obligations amounting to \$2,528,402.48 matured and were paid during the year. On April 1, 1910, a new equipment trust (Series N) was created, under which, equipment costing \$6,532,535 was contracted for, and new equipment obligations amounting to \$5,200,000 were issued and sold, the balance of cost being paid in cash. This increase in equipment obligations brought the total of such obligations outstanding on June 30, 1910, to \$18,208,791.84, which is \$2,308,095.13 less than the total of such obligations outstanding on June 30, 1907. In the three years since June 30, 1907, there have matured and been paid equipment obligations amounting in all to \$9,324,911.30, or more than the total of the new obligations now assumed. This reduction in the amount of contracted and fixed obligations for the purchase of equipment, which must be financed currently, and the necessity of additional engines and cars of large power and capacity to handle an increased volume of business with reasonable economy, were the justifications for the creation of the Equipment Trust, Series N.

THE FUNDED DEBT.

On January 1, 1910, there were drawn and taken into the Treasury \$5,000,000 of Development and General Mortgage bonds, which, under the terms of that mortgage, could be so drawn to reimburse the Treasury for its advances made for construction during the calendar year 1910. In like manner there were drawn and taken into the Treasury during the fiscal year \$1,766,000 of Development and General Mortgage bonds to reimburse the Treasury for the proportion of equipment obligations paid during the year, which, by the terms of the Development and General Mortgage, was to be charged to capital account.

By reason of these drawings the total amount of Development and General Mortgage bonds free in the Treasury on June 30, 1910, was \$7,536,000.

On November 1, 1909, the Three-Year Convertible Six Per Cent. Notes of 1911, amounting to \$11,105,000 were redeemed. These notes were the outstanding balance of the entire issue of \$15,000,000, which were called during the Spring of 1909, when the debt was permanently financed in the manner explained in the annual report for the year ended June 30, 1909.

On February 1, 1910, the \$15,000,000 of Three-Year Five Per Cent. Notes which were issued in 1907, matured and were redeemed. Of this debt \$5,000,000 was paid off in cash with treasury funds, and the balance was renewed by the creation and issue of \$10,000,000 of new Three-Year Five Per Cent. Notes, due February 1, 1913.

On January 1, 1910, there matured the three issues of bonds of the Atlanta and Charlotte Air Line Railway Company, amounting in the aggregate to \$5,500,000. These bonds had been extended from time to time in the past, and during the last three years had borne interest at the rate of 4½ per cent. The contract by which this Company operates the property of the Atlanta and Charlotte Air Line Railway Company provides for a perpetual right of possession and operation of that property, conditioned, among other things, upon the payment of the interest upon this bonded debt. Provision was accordingly made in the First Consolidated Mortgage for the acquisition of these bonds, and the maturity on January 1, 1910, was financed by the purchase of all the Atlanta and Charlotte Air Line Railway Company bonds, which were thereupon further extended at 4½ per cent. for ten years, or until January 1, 1920, and as so extended were pledged under the First Consolidated Mortgage against the issue and delivery of a like amount, at par, of First Consolidated Mortgage Five Per Cent. Bonds reserved in the custody of the Trustee for that purpose. \$5,000,000 of the First Consolidated Mortgage Five Per Cent. Bonds so issued, were sold at a price approximately sufficient to reimburse the Treasury for the cost of the acquisition of the \$5,500,000 Atlanta and Charlotte Air Line Railway Company bonds, thus leaving free in the Treasury of the Company \$500,000 of First Consolidated Mortgage Five Per Cent. Bonds.

On January 1, 1910, there matured the \$400,000 of First Mortgage Five Per Cent. Bonds of the Richmond, York River and Chesapeake Railroad Company. These underlying bonds upon property of this Company were redeemed with treasury funds, and a like amount of First Consolidated Mortgage Five Per Cent. Bonds which had been reserved in the custody of the Trustee against such redemption, were issued and taken into the Treasury.

On June 1, 1909, the amount of the interest on the Charlotte, Columbia and Augusta Railroad Company First Mortgage Five Per Cent. Bonds, Extended, which had not previously been acquired by this Company in exchange for First Consolidated Mortgage Five Per Cent. Bonds under the provision in that respect of the First Consolidated Mortgage. These matured bonds were redeemed by this Company with treasury funds, and there were issued and placed in the treasury to represent the disbursement a like amount of First Consolidated Mortgage Five Per Cent. Bonds.

By reason of these refunding operations and the sinking funds in respect of the underlying bonds upon the Charlottesville and Rapidan Railroad and the Franklin and Pittsylvania Railroad, there were taken into the treasury in all during the year First Consolidated Mortgage Five Per Cent. Bonds aggregating \$1,212,500, which, with the \$65,300 of such bonds previously held in the Treasury, amount to \$1,277,800 of Southern Railway First Consolidated Mortgage Five Per Cent. Bonds, which were free in the Treasury on June 30, 1910.

Advantage was taken of market conditions during the year to acquire a number of the underlying 6 per cent. bonds the maturity of which is approaching. These acquisitions were made by the issue in exchange on an agreed basis, of First Consolidated Mortgage Five Per Cent. Bonds reserved for that purpose. The underlying bonds so acquired and retired, with a consequent immediate saving in the interest charge, were:

Columbia and Greenville First 6s of 1916.....	\$27,000
Richmond and Danville Consolidated 6s of 1915.....	194,000
Virginia Midland Serial 6s of 1911.....	271,000
Western North Carolina Consolidated 6s of 1914....	56,000

The result of all of these financial operations in respect of the funded debt has been that, despite the accrual this year of a full year's interest on the \$41,333,000 of Development and General Mortgage bonds issued during the year ended June 30, 1909, the amount paid for interest on Funded Debt and Equipment Obligations was less in the year ended June 30, 1910, than in the previous year, as will be noted from the Income Statement.

The net increase of \$29,147.26 in the charges accrued during the year for Interest on Funded Debt, Equipment Obligations and Rents Accrued for Lease of other Roads, which items include all the Company's fixed charges was due to an arbitrary increase during the year of \$30,000 in the rental paid the Atlantic and Danville Railway Company under the provision of the lease made in 1899.

CONSTRUCTION.

No new construction of importance was undertaken during the year, but the work in progress as described in the last annual report has been prosecuted.

The benefit expected to be derived from the operation of the revised line through Lynchburg, Va., was postponed by a disastrous fire in the new tunnel while still incomplete and in charge of the contractor. This delayed the completion of the work beyond the time predicted, but it is now expected that the new double track line through Lynchburg from Monroe, Va., to Sycamore, Va., 38.14 miles, will all be in operation by this Fall.

The double track operated on the main line has been increased during the year by the completion of the second track between Spencer, N. C., and Concord, N. C., 24.07 miles; between Harrisburg, N. C., and North Charlotte, N. C., 8.27 miles, and north from Greensboro, N. C., 1.80 miles.

The heavy work on the 13.67 miles of revised line and double track between Citico, Tenn., and Ooltewah, Tenn. (the approach to Chattanooga, Tenn., from the east), has been prosecuted throughout the year and is nearing completion.

INDUSTRIAL PROGRESS.

There were 255 new industrial plants completed on the lines of this Company during the year ended June 30, 1910, classified as follows:

Brick Works	28
Cotton Seed Oil Mills	21
Fertilizer Works	3
Flour and Feed Mills	21
Furniture Factories	7
Iron Industries	21
Lumber Mills	69
Stone Quarries, Coal and other Mines.....	30
Textile Mills	36
Wood-working Plants	16
Miscellaneous Plants	103
Total	355

The number of industrial plants under construction at the close of the year was 72, and the number of additions made to existing plants during the year aggregated 163.

THE SERVICE OF EMPLOYEES.

It is proper to record, with appreciation, the industry, loyalty and efficiency of the officers and employees of all ranks during the year. The future success of the Company under existing economic conditions depends largely upon its relations with the public, who are its customers, and these relations depend largely upon two things which the officers and employees can and will and do give for the Company in ever increasing degree. These two things are Solicitation and Service. The Company has during the year met the expectation of its employees in respect of increased wages, because of the increased cost of their individual living, but in so doing it has heavily increased its own cost of living, and it relies upon its officers and employees to justify such increase by securing for the Company through proper relations with the public, effective solicitation and efficient service, such net revenue as will promote its welfare.

Respectfully submitted, by order of the Board,

W. W. FINLEY, President.

PROFIT AND LOSS ACCOUNT FOR YEAR ENDED JUNE 30, 1910.

Balance at Credit of this Account June 30, 1909.....	\$6,962,007.81
Add: Credit Balance of Income for the Year.....	5,704,645.70
	\$12,666,653.51
Debit	
Discount on Securities charged to Profit and Loss during the year	\$2,831,459.39
Tennessee Central Railroad Accounts written off	404,648.92
Net Miscellaneous Debits	744,584.79
	3,980,693.10
Credit Balance June 30, 1910.	\$8,685,959.91

INCOME ACCOUNT FOR YEAR ENDED JUNE 30, 1910, COMPARED WITH YEAR ENDED JUNE 30, 1909.

1909.		1910
	OPERATING REVENUES.	
\$24,366,619.13	Freight	\$28,161,391.93
13,510,791.49	Passenger	14,639,160.76
597,721.31	Miscellaneous Passenger Train Revenue	279,092.78
1,496,292.11	Mail	1,375,681.64
1,491,613.02	Express	1,620,028.34
28,214.09	Other Transportation Revenue	845,782.71
287,784.59	Other Revenue from Operations	373,370.18
\$48,485,109.64	Total Operating Revenues	\$58,094,088.34
	OPERATING EXPENSES.	
\$6,616,660.64	Maintenance of Way and Structures	\$6,634,794.58
8,193,733.44	Maintenance of Equipment	9,806,758.58
1,592,378.45	Train Expenses	1,436,776.24
14,343,601.68	Transportation Expenses	18,931,426.06
1,701,159.09	General Expenses	1,732,089.98
\$32,458,533.30	Total Operating Expenses	\$38,035,745.94
\$16,026,576.34	Net Operating Income	\$18,658,362.40
1,906,061.99	Income from Real Estate and Other Sources	18,980.36
\$17,932,638.33	Total Income	\$18,677,342.76
1,906,061.99	Income from Real Estate and Other Sources Excluded	1,919,722.33
\$14,826,576.34	Operating Income	\$16,008,020.43

INCOME ACCOUNT FOR YEAR ENDED JUNE 30, 1910, COMPARATIVE WITH YEAR PRECEDING

1910		1909
OTHER INCOME		
\$1,000.00	Rents Accrued from Lease of Road	1,000.00
114,181.89	Hire of Equipment—Balance	114,181.89
114,051.73	Rents Accrued from Land and First Mortgage Investments	114,051.73
	Miscellaneous Rents	
	Miscellaneous Income	
1,641,176.27	Income from Investments	1,641,176.27
672,918.31	Miscellaneous Interest and Commission	672,918.31
		3,179,135.72
	TOTAL GROSS INCOME	3,179,135.72
DEDUCTIONS FROM TOTAL GROSS INCOME		
	Southern Railway Company in Mississippi, Income from operations, All other state lines in California, Miss.	841,566.46
\$1,351,504.00	Rents Accrued for Lease of Other Roads	1,351,504.00
80,094.27	Rents Accrued for Joint Tracks, Yards and Terminals	80,094.27
1,493.54	Hire of Equipment—Balance	1,493.54
45,714.79	Miscellaneous Rents	45,714.79
81,463.71	Separately Operated Properties	81,463.71
585,914.14	Discount on Securities sold—Proportion charged to Income	585,914.14
	Federal Corporation Tax	4,789.69
81,200.00	Miscellaneous Deductions	81,200.00
	Total	2,806,451.43
\$11,903,924.27	Total Available Income	\$11,903,924.27
\$10,306,016.41	Interest on Funded Debt	\$10,306,016.41
711,714.64	Interest on Equipment Obligations	711,714.64
226,808.00	Provisions Accrued on Southern Ry., Mobile & Other Stock First Corporation	226,808.00
	Total	11,314,538.85
\$8,593,885.42	Balance of Income over Charges	\$8,593,885.42
18,285.18	Dividends and Retirements	18,285.18
\$8,611,100.24	Balance Carried to Credit of Profit and Loss for the Year	\$8,611,100.24

TRAFFIC STATISTICS FOR YEARS ENDED JUNE 30, 1910, AND 1909.

	1910.	1909.	Per Cent. of Increase or Decrease.
AVERAGE MILES OF ROAD OPERATED	7,050.17	7,030.38	Increase 0.28
PASSENGER TRAFFIC:			
Number of Passengers Carried	15,694,486	14,623,136	Increase 7.33
Number of Passengers Carried One Mile	671,732,143	615,252,906	Increase 9.18
Average Distance Hauled per Passenger (Miles)	42.80	42.07	Increase 1.74
Total Revenue from Passengers	\$14,639,160.76	\$13,317,925.23	Increase 9.92
Average Receipts per Passenger per Mile (Cents)	2.179	2.165	Increase 0.65
Total Passenger Train Revenue	\$17,943,964.32	\$16,343,236.79	Increase 8.29
Passenger Train Revenue per Mile of Road	\$2,540.93	\$2,332.97	Increase 7.99
Passenger-Train Revenue per Train Mile	\$1,148.13	\$1,156.89	Decrease 0.73
Average Number of Passengers in Each Train	43.06	43.03	Increase 0.07
Average Number of Passengers in Each Car	13.42	13.73	Decrease 2.26
FREIGHT TRAFFIC:			
<i>Revenue Freight:</i>			
Number of Tons Carried	25,204,297	21,970,066	Increase 14.72
Number of Tons Carried One Mile	3,985,363,091	3,590,900,091	Increase 10.99
Average Distance Hauled per Ton (Miles)	158.13	163.45	Decrease 3.25
Total Freight-Train Revenue	\$38,161,391.92	\$34,081,032.51	Increase 11.97
Average Receipts per Ton per Mile (Cents)	0.957	0.949	Increase 0.84
Freight-Train Revenue per Mile of Road	\$5,412.83	\$4,847.68	Increase 11.66
Freight-Train Revenue per Train Mile	\$2,273.68	\$2,060.47	Increase 10.35
Average Number of Tons of Freight in Each Train	237.46	217.10	Increase 8.00
Average Number of Tons of Freight in Each Loaded Car	11.53	14.19	Increase 2.39
<i>All Freight (Including Company's Material Hauled Free):</i>			
Number of Tons Carried	30,183,606	26,135,269	Increase 15.49
Number of Tons Carried One Mile	4,999,652,728	4,440,969,266	Increase 11.90
Average Number of Tons of Freight in Each Train	296.10	268.49	Increase 10.28
Average Number of Tons of Freight in Each Loaded Car	18.12	17.55	Increase 3.25
REVENUES AND OPERATING EXPENSES:			
Passenger and Freight-Train Revenue	\$56,075,355.45	\$50,622,289.30	Increase 10.77
Passenger and Freight-Train Revenue per Mile of Road	\$7,953.76	\$7,200.65	Increase 10.46
Gross Operating Revenue	\$57,294,508.34	\$51,661,579.44	Increase 10.90
Gross Operating Revenue per Mile of Road	\$8,126.68	\$7,348.33	Increase 10.59
Gross Operating Revenue per Revenue Train Mile	\$1,829.91	\$1,733.41	Increase 5.57
Operating Expenses (Taxes Excluded)	\$38,635,745.94	\$35,152,731.60	Increase 9.91
Operating Expenses per Mile of Road	\$5,480.11	\$5,000.12	Increase 9.60
Operating Expenses per Revenue Train Mile	\$1,233.97	\$1,179.49	Increase 4.62
Net Operating Revenue	\$18,658,762.40	\$16,508,847.84	Increase 13.02
Net Operating Revenue per Mile of Road	\$2,646.57	\$2,348.21	Increase 12.71
Net Operating Revenue per Revenue Train Mile	\$0.59294	\$0.55392	Increase 7.59

*Includes Sleeping, Parlor and Observation Cars.

COMPARATIVE BALANCE SHEET, JUNE 30, 1910, AND JUNE 30, 1909.

ASSETS.

		June 30, 1910.
	PROPERTY INVESTMENT	
\$295,854,999.40	Road: Investment to July 1, 1909.....	\$295,854,999.40
	Additions during the year.....	3,923,393.70
\$46,330,776.20	Equipment: Investment to July 1, 1909.....	\$46,330,776.20
	Additions during the year.....	10,137,964.59
		\$56,468,740.79
1,752,553.41	Less: Reserve for Accrued Depreciation on all equipment in service.....	12,050,132.83
		\$44,418,607.96
	Total Net Road and Equipment.....	\$344,197,201.06
\$30,808,607.31	Leasehold Estates: Road.....	\$31,558,607.31
1,540,392.09	Equipment.....	1,540,392.09
	Total Leasehold Estates (Per Contra).....	33,099,000.00
32,349,000.00	Deposit with Trustee for the Purchase of Equipment, under Equipment Trust, Series N.....	5,797,848.03
\$372,752,192.19	Total Net Road, Equipment and Leasehold Estates.....	\$383,094,049.09
	COST OF SECURITIES PLEDGED OR HELD FOR SPECIAL PURPOSES:	
\$13,306,634.97	Pledged under First Consolidated Mortgage.....	\$18,806,636.97
20,296,872.21	Pledged under Development and General Mortgage.....	20,260,472.21
23,313,703.20	Pledged or deposited under Various Indentures.....	23,319,317.11
10,774,697.05	Unpledged, held for Special Purposes.....	6,872,508.78
		69,258,935.07
11,105,000.00	Special Deposit with Financial Agent to Redeem on Nov. 1, 1909, Convertible Six Per Cent. May 1, 1911.....	
	Southern Railway Development and General Mortgage Bonds.....	1,800,000.00
\$451,549,099.62	Total Net Road, Equipment and Securities Held as Stated.....	\$454,152,984.16
\$3,995,255.50	Material and Supplies on Hand.....	\$4,215,870.11
380,212.41	Rail and Fixtures Leased.....	391,513.51
		4,607,383.62
\$455,924,567.53	TOTAL CAPITAL ASSETS.....	\$458,760,367.78
4,015,569.88	Miscellaneous Securities Owned—in Treasury Unpledged.....	4,061,052.94
574,929.10	Less: Amounts deducted but secured.....	574,929.10
925,622.01	Less: Amounts deducted but secured.....	1,078,584.19
473,472.80	Less: Amounts deducted but secured.....	446,841.28
712.97	Insurance Paid—not accrued.....	807.73
620,659.19	Insurance Fund (Per Contra).....	700,610.56
500.00	Summa Loans—Uninvested Balance in Hands of Trustee.....	
1,797,010.65	Not Accounted on Securities Sold—to be charged off prior to maturity of the Securities.....	4,853,144.57
1,534,968.75	Sundry Accounts.....	1,153,696.52
	CURRENT ASSETS:	
\$11,124,664.97	Cash in hands of Treasurer, Banks and Financial Agents.....	\$8,728,256.71
1,117,014.74	Cash in Transit from Agencies.....	1,269,872.40
125,307.26	Due from United States Post Office Department.....	116,359.96
515,961.41	Due from Agents and Conductors.....	450,220.46
3,093,271.11	Due from Other Transportation Companies.....	2,973,420.75
966,652.53	Due from Individuals and Companies.....	1,047,014.34
583,064.56	Bills Receivable—current.....	602,085.14
824,300.00	Miscellaneous Current Securities.....	7,013,800.00
		22,201,029.76
\$490,239,800.02		\$493,831,064.43

COMPARATIVE BALANCE SHEET, JUNE 30, 1910, AND JUNE 30, 1909.

LIABILITIES.

		June 30, 1910.
	CAPITAL STOCK:	
\$120,000,000.00	Common.....	\$120,000,000.00
60,000,000.00	Preferred.....	60,000,000.00
	Total Capital Stock.....	\$180,000,000.00
\$180,000,000.00	SOUTHERN RY. MOBILE & OHIO STOCK TRUST CERTIFICATES.....	\$180,000,000.00
5,670,200.00	BONDED DEBT.....	5,670,200.00
32,349,000.00	OUTSTANDING SECURITIES ON LEASEHOLD ESTATES (Per Contra).....	33,099,000.00
	EQUIPMENT OBLIGATIONS:	
\$220,000.00	Equipment Trust, Series C.....	
354,000.00	Equipment Trust, Series D.....	
1,617,000.00	Equipment Trust, Series E.....	\$1,323,000.00
59,200.00	Equipment Contract, Series F.....	
125,400.00	Equipment Contract, Series G.....	
2,700,000.00	Equipment Trust, Series H.....	2,260,000.00
1,820,000.00	Equipment Trust, Series K.....	1,540,000.00
7,200,000.00	Equipment Trust, Series L.....	6,600,000.00
	Equipment Trust, Series M.....	1,260,000.00
	Equipment Trust, Series N.....	5,200,000.00
294,000.00	Miscellaneous Equipment Contracts.....	35,794.84
		18,208,791.84
11,175,000.00	UNMATURED BALANCE OF PURCHASE PRICE, NORTHEASTERN RAILROAD OF GEORGIA.....	107,000.00
6,118.71	UNMATURED BALANCE ON HARTWELL, IND., BRANCH.....	6,118.71
\$466,609,876.78	TOTAL CAPITAL, FUNDED AND LIEN LIABILITIES.....	\$467,388,405.55
	Other Liabilities:	
\$101,807.96	For Maintenance of Way and Structures.....	\$122,370.64
105,017.04	For Maintenance of Equipment.....	127,223.24
1,588,000.00	Motor Expenses.....	77,145.78
344,681.65	Interest and Bonds Accrued and Due.....	326,080.65
1,888,100.80	For Freight and Freight Charges.....	1,813,900.34
2,112.83	For Freight and Freight Charges.....	807,306.47
900,940.21	Unmatured Obligations for New Street Cars.....	
600,000.00	Insurance Fund (Per Contra).....	700,610.56
295,472.15	Other Liabilities.....	316,988.50
	CURRENT LIABILITIES:	
\$7,741,471.99	Interest and Rent Due and Unpaid, in full or in part, on June 30, 1910.....	\$2,876,246.25
980,000.00	Bills Payable, including current obligations for long steel and.....	1,724,336.26
100,000.00	Freight Claim Authorized Outstanding.....	91,028.97
1,874,700.00	Unpaid Wages, including Long Payrolls.....	1,873,480.31
2,606,818.84	Unpaid Wages.....	2,806,538.40
455,000.00	Due from Other Transportation Companies.....	1,161,826.04
200,000.00	Due from Individuals and Companies.....	87,386.00
419,084.19	Material and Supplies in Transit and on hand.....	676,173.63
1,712,986.11	Unmatured Liabilities awaiting adjustment.....	1,880,989.13
		13,638,758.98
\$101,807.96	APPROPRIATE SURPLUS—Additions to Property since June 30, 1907, through June 30, 1910.....	253,366.46
105,017.04	PROPERTY AND LOSS.....	8,485,959.91
\$466,609,876.78		\$493,831,064.43

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY EXCEPT TIMES IN JUNE BY
THE RAILROAD GAZETTE (INC.), 33 TILDEN ST., NEW YORK

CHICAGO: Plymouth Bldg.
LONDON: Queen Anne's Chambers, Westminster

CLEVELAND: Williams Bldg.

W. H. BOARDMAN, President.

L. A. SIMMONS, *For Press & Trade.*

HENRY LEE, *Secretary.*

The address of the company is the address of the officers.

EDITORS

W. H. BOARDMAN, *Editor.*

ROY V. WRIGHT

B. B. ADAMS

SAMUEL O. DENNE,

G. L. FOWLER

W. E. LEE

Business & Ad. Mgr.

WILLIAM FORSYTH

F. E. LEE

BRADSHAW BOARDMAN,

S. W. DUNNING

E. W. KRAIGER

Editorial & Ad. Mgr.

CLARENCE DEMING

H. H. SIMMONS

Subscriptions, including regular weekly issues and special daily editions, published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada.....	\$6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year
Single Copies.....	15 cts each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49. FRIDAY, OCTOBER 28, 1910. NUMBER 18.

CONTENTS

EDITORIAL:

Editorial Notes.....	771
Ideal and Actual Paint Practice.....	772
Divided Responsibility for Railway Management.....	772
Northern Pacific.....	773, 822
Baltimore & Ohio.....	775, 815
Chicago, Rock Island & Pacific.....	776, 818
New Books.....	778

ILLUSTRATED:

Marvin Hughitt.....	783
William A. Gardner.....	784
Bridge and Building Convention.....	786
Pacific Type Locomotive: Central of Brazil.....	795
Double Track Railways in Georgia and Florida.....	797

MISCELLANEOUS:

Railway Capital and Capitalization.....	778
Train Accidents in September.....	795
Transportation and Traffic in Austria-Hungary.....	797
Unloading Coal with Ballast Spreader.....	799
Foreign Railway Notes.....	785, 796

GENERAL NEWS SECTION..... 800

SUPPLY TRADE SECTION..... 813

A FEW weeks ago at an up-country flag station a number of would-be passengers awaited a train at the scheduled hour and minute. The regular signal was given, but the train ran by without stop and those in waiting were forced to walk some miles to their destination at the terminal of the branch line—or wait three hours for the next train. There was, of course, natural and just wrath, but only one of the irate parties took up the idea of reporting to the railway company. On his asking for names of the others to confirm his testimony, *not one* of them would assent. They “didn’t want trouble”; they tamed down into the conviction that “it wouldn’t happen again,” and one of the gentler sex, with some show of feminine asperity, answered that “she wasn’t a suffragette.” But the single man went ahead. He communicated the facts to the division superintendent, who

made prompt investigation, found the train and engine crew at fault, notified the complainant that severe disciplinary measures would be taken and, in behalf of the company, gave him thanks; while, presumptively, those who walked and did not write took it out in abuse of the corporation. The incident illustrates the proneness to abuse rather than make formal complaint; the inertness of the passenger who would rather have things pleasant for himself than right for everybody; and his ignorance of the real desire of the railway manager to detect through the public the misdoing which only through the public’s co-operation can be detected. And, in another direction, it is quite possible that the episode symbolizes and illustrates the results of that dependence on the union, in place of loyalty to the corporation, which the author of “Confessions of a Railway Signalman” has so forcibly put in print.

THE contributions of British railways to benevolent objects (not including their own employees) as reported to the Board of Trade amounted in 1909 to \$82,411, about half of the total going to hospitals, infirmaries and dispensaries. The summary names 27 objects, ranging from the Welsh National Pageant to the International Railway Congress. Schools and technical institutes got \$4,815, including \$1,000 from each of several roads for the London School of Economics. At Crewe, where the London & North Western, in a sense, owns the city, the curate of Christ Church received from that railway \$875. Other roads contributed considerable sums to churches. The South Western gave \$25 to the London Cart Horse Parade Society. The Great Southern & Western of Ireland contributed small sums to Killarney church, to the Newbridge Nursing Fund, to the Dungarvan Band, the Cork City Regatta and to fifty other objects, including races, presumably horse races, at 22 different places. The races at Curragh, Cork and Punchestown got \$500 each. We regret that we cannot favor the reader with any American statistics with which to compare these expenditures. Professor Adams has been working at Washington now for over four years in a strenuous endeavor to make the railways tell all things that ever they did; but we have not noticed that he has published, as yet, anything concerning contributions to horse races. However, American railway managers will not fail to notice, and, we trust, emulate, the impartiality of the G. S. & W. in treating the 22 suppliants all alike. Probably Professor Adams’ search of the railways’ books will not reveal much material of this kind, anyway. All of the big roads have dried up the fountains of their generosity—and the small ones haven’t any. Even if he should go back to the time when Mr. Harriman saved the country with his \$50,000 check, the Union Pacific’s books might not show the item.

IS railway transportation a commodity or a service? is a question which the layman can view from various angles. Thus transportation is the product of invested funds turned into a great material machine—the railway—operated by a sub-machine—the locomotive; and the analogy thus becomes, in a sense, complete between the railway and the factory that turns out, by its investment, its building and its machinery, a product which everybody concedes to be a commodity or, to use a synonym, “goods.” In the same way a somewhat similar analogy can be traced between transportation and the commodity which the merchant sells. He has his money invested in goods, his mechanism (plant) of store and counter and his operating force of clerks. On the other hand, there is the different final analysis which makes transportation a service and demarcates it from a commodity because a service, directly, at least, and as popularly understood, is not the product of a mechanism; and hence comes the derived idea of the public service relation of the individual to transportation as based on a civic right, of his railway ticket as a kind of tax receipt, of his right to uniformity of fares and freight rates and of the railway’s deprivation of the freedom of private contract when it sells its service. When we move a step further and ask what the attitude of the government should

be, can anyone point out the vital principle. The government may look on transportation as a free commodity or as a service under restrictions based on political rights, but it cannot do both. It may make transportation flesh or fowl, but it cannot make it a hybrid. Yet that is just what the government is doing, or rather trying to do. It calls, under one line of policy and law-making, for the competition of railways, which, right on its face, means competitive rates and discrimination of rates; under another line of policy it calls for uniformity of rates and non-discrimination. It assails as a "conspiracy" an agreement on rates, while at the same time it assails railway rivalry as involving unjust discrimination. These are facts to bear in mind when important decisions of the United States Supreme Court are not far away. Will that final tribunal clarify both its earlier decisions and elucidate the federal policy, or shall we have a new maze of inconsistencies hung up somewhere midway between the theorems of "commodity" and "service"?

IDEAL AND ACTUAL PAINT PRACTICE.

IN a paper read before the New York Railroad Club, last week, William Marshall gave a very thorough and exhaustive review of the conditions necessary for securing the best possible results in the protection of iron and steel against rust. The reading of the paper was followed by an equally comprehensive discussion. As a record of the best current practice it was apparently all that could be desired, but when the last analysis is made it will be found that there was little or nothing in it of real novelty, and in this lies the reason for these comments. From time immemorial engineers and all who have had to do with the protection of iron and steel have urged that a proper cleansing of the surface of the metal before the application of the paint is an absolute necessity, or at any rate the best possible means of insuring good results, the sand blast being the best known means of cleansing them. Then must come the careful application of the coating with a good round brush, with which it must be well worked in; and not least of the requirements is the use of a properly inert pigment, ground in the best quality of linseed oil. And then, when all of this has been done, there must be ample time allowed for drying. All of this was emphasized in the paper and reiterated in the discussion, but not one man of all the painters present said that he was following these practices. Nor did anyone point to some other who was using the sand blast or allowing time for drying. As a matter of fact, we have a record of but one man in the whole wide range of railway mechanics who uses a sand blast for cleaning his tender tanks before painting, and he claims to be obtaining all the results that would be expected. There seems to be little difficulty in the matter of securing the desired mixtures of paints, but their method of application is frequently as far from this theoretically ideal practice as the usual lack of cleansing the surface is from the use of a sand blast. The paint is loaded with dryer, is put on with a brush as big as one used for whitewash, is given from six to eight hours to dry, and is laid on over all manner of rust and mill scale. Of course, this statement does not apply to passenger cars, but it does to almost everything else; to freight cars, bridges, elevated railway structures, roofs, buildings and floors. Anyone who has eyes has seen the ethics of the painting of metallic structures violated so long and so often that the times when really first-class work has been done are unknown.

We know what is right, why don't we do it? In the case of freight cars it may not pay to paint well or even decently, but surely for bridges and permanent structures it must be better at least to clean the dirt off the surface before applying the paint. If not, why does not someone in authority come out and squarely assert and prove that this idea of using a sand blast is an unnecessary expense, that paint slapped on in any old way is just as good as when applied with an extra expenditure of elbow grease, and that dirt on the surface is just the thing to afford a hold for the paint, serving to lock the new to

the old coats? This would make our theories conform to our practice and free our consciences from the burden of the thought of illy-performed duties. The nearest approach to this was a long quotation in Mr. Marshall's paper from a writer who advocated the artificial development of rust over the whole surface before the paint was applied. But the speakers who discussed the paper rejected the idea as absurd, and left us stranded high and dry with the most beautiful theory in the world for the best means of protecting metal surfaces without the citation of a single example of a place where the aforesaid beautiful theory was put into practice.

DIVIDED RESPONSIBILITY FOR RAILWAY MANAGEMENT.

ONE of the points on which the eastern railway presidents laid much stress in their recent testimony in the rate advance cases at Washington is that the financial credit of the railways of the country is now largely in the hands of the Interstate Commerce Commission. The managers still have the duty and responsibility of developing traffic and increasing operating efficiency. To the extent that their efforts to do these things are effective they tend to increase net earnings and strengthen railway credit. Formerly if the results of their work along these lines were insufficient to maintain credit they could supplement it by changes in rates. That is a thing of the past. The Interstate Commerce Commission can now reduce rates and they cannot be advanced without its consent. The power to control rates is the power to prevent increases in traffic and operating efficiency from resulting in increases in profits. The commission, therefore, has as much, or more, power over railway credit as the managers of the roads.

At the hearing in Washington, Commissioner Lane chided those railway officers whose free speaking about the condition of American railways has hurt their credit abroad. No doubt there have been exaggerated statements made as to the seriousness of the results that will come if the roads are not allowed to make all the advances in freight rates that they want to. But the railway manager nowadays is in a very delicate and trying position. He wishes the credit of his road to stand high because he desires to sell its securities at a good price. But he also wishes to earn enough to pay such a return on its securities as will make them permanently attractive. To prevent reductions in rates which will reduce its earnings and secure advances which will increase them, he has to present evidence showing his road's needs. It is not enough to present this evidence to the commission alone. The commission is a fluctuating body. Its members are appointed for terms of only seven years. If it were convinced that a certain policy were right and adopted it, and the public were left unconvinced, the public could and would make changes in the commission which would cause a reversal of its policy. Therefore, the public must also be convinced. But when a road which really needs increased earnings presents fully and vigorously to the commission and the public the facts about its needs, it is pretty apt to hurt its credit. The wise railway manager will recognize the fact that credit, to be permanent, must be built on actual earning capacity, and will tell the facts when this must be done to secure needed increases in earnings, even if the effect be temporarily to injure his road's credit. If others, in trying to get rates reduced or prevent them from being advanced, minimize his road's needs, the railway manager, being human, is apt to get warmed up and magnify them.

The division between the railway managers and the commission of responsibility for the maintenance of railway credit is typical of the division of responsibility which is being made by government regulation in all railway affairs. Formerly it was the duty of the railways alone properly to equip their cars with safety appliances; and if they did not perform that duty they were entirely responsible. Safety appliance legislation has changed this. The commission now prescribes the standards to be used down to the minutest detail. The roads were before, and still are, under a moral responsibility to make their opera-

tion as safe as practicable. But the extent to which it is practicable for them on their own initiative to make it safe has been much reduced, for they must use the appliances prescribed by the commission whether they think them good or otherwise. The government having assumed the responsibility of telling them exactly what appliances they must use, they are pretty sure, being human, not to do much more than the government requires. If the installation and use of the appliances prescribed unduly increase railway expenses, the railways can lay much of the blame on the commission. If the appliances prescribed are not satisfactory and adequate, and, in consequence, accidents do not decrease or do actually increase, much of the blame naturally will be laid on the law and on the commission. On the other hand, the commission naturally will try to put on the railways the blame for any bad results. In these circumstances, who is the public to hold responsible for accidents due to defective safety appliances?

The ceaseless agitation of the railway question and the incessant hearings before state and interstate commissions are interfering most seriously with the fostering of traffic and with needed improvements in railway plant and operating methods. Those in control of the financial affairs of the roads are refusing to allow money to be spent for extensions and improvements while the question of the amount that they shall be allowed to earn is pending. The operating executives, instead of giving all their time to the study of means of effecting economies and increasing efficiency, are giving a large part of it to the preparation of data and arguments to be presented to commissions, law-makers and people, in support of the contention that the roads need more revenue. The traffic officers, instead of giving the bulk of their time to the study of means of developing traffic along their lines, are devoting an entirely disproportionate part of it to preparing evidence and giving testimony to show that they need higher freight rates on the traffic that they already have. The tendency of these things is to prevent rates from being adjusted to fit changing commercial and industrial conditions and to hinder the provision of adequate transportation facilities.

If this condition of things lasts long it will lead to serious results. If, for instance, operating officers continue to give time to the protection of the properties which they ought to give to improvements in methods and plant, and financiers continue to withhold money which ought to be invested in improvements and extensions, the result is going to be—perhaps not this year, but, at any rate, when the commerce of the country gets back to normal—the worst shortage of facilities and congestion of traffic that the country ever saw. The question will arise then as to who is responsible. The railways will say it is because the government has not let them earn enough to make needed improvements and extensions. The commission will say, perhaps, as it said at the time of the car shortage in 1906-7, that it is because the railway owners and managers, wanting in proper appreciation of their duty to the public, have not tried as they ought to provide needed facilities. Whom in that case will the public hold responsible?

With every increase of government regulation, this baneful division of responsibility for railway management, between the commissions and law-makers, on the one hand, and the officers of the railways, on the other, is going to become more marked. The public, in trying to fix the blame for shortcomings of railway management, is apt to be like the man who tried to sit on two stools and occupied the floor. The stockholders will be in much the same plight. They cannot call the government authorities to a direct accountability because the government officials are not accountable to them. And they cannot call the officers of the railways to an account for what the government officials do.

The proper function of government regulation is to exercise a broad, general supervision for the purpose of causing the directors and officers of the railways to do their duty. So long as government regulation is confined within these limits, the

managements of the railways can properly be called to account by the government authorities for their errors of omission and commission. But under our present system of regulation the government authorities are stepping in and themselves attempting to perform the detailed duties of the directors and officers. But they cannot properly perform these duties. If the Interstate Commerce Commission were composed of seven men with the wisdom of seven archangels, it could not intelligently and completely do the work that congress requires of it without the sincere and zealous co-operation of railway officers; and this co-operation it never can get so long as it tries to perform duties which railway officers think—and in most cases rightly—is their own proper function. In these circumstances, instead of the commission's being in a position to call the railway officers to account for the results of railway management, it itself properly ought to be held to a strict accountability for the results of railway management. But the public is the only power that can call it to account; and how is the public, with its very limited facilities for learning who is right, when railway officers and commission differ as to the causes of bad results of railway management, to tell who is at fault? It cannot do it now and never will be able to do it.

Just how the problem presented by this condition of divided responsibility is to be solved, it is impossible now to see. The Interstate Commerce Commission is not to blame for it, or, if it is to blame, is so only to a limited extent. The trouble is mainly with the laws for the regulation of railways which Congress has passed. The commission is not a law-making body; it is not a court; therefore, it can neither determine what the laws shall be nor nullify unjust or unconstitutional laws. As an administrative body, it is its sole duty to administer the laws that Congress passes in the spirit in which they are enacted. If the laws require it to try to perform the proper duties of railway officers, it must try to perform them. Any effective remedy of the situation must be applied to its cause; and its cause is the unfair and unwise public sentiment finding its natural expression in equally unfair and unwise legislation.

NORTHERN PACIFIC.

THE increase in operating expenses on the Northern Pacific in the fiscal year ended June 30, 1910, was nearly \$6,000,000, or from \$67,800,000 in 1909 to \$73,800,000 in 1910. This is abnormal. In the first place, last year was the culmination of the very extensive betterment work which has been carried on during the past few years. This betterment work has cost huge sums, which were charged to capital account. The work has also been the direct and indirect cause of higher operating expenses because, in addition to the obviously higher cost of conducting transportation when improvements are made under traffic, the work has made maintenance of way expenses higher than they would be under normal conditions and higher than they probably will be in the future. The work has consisted of relocation of the old line, extensive double-tracking, reduction of grades and replacing light rail with 85 and 90-lb. rail. On June 30, 1910, 2,941 miles of main line was laid with 85 or 90-lb. rail, and it is estimated that by the end of the calendar year 1910 all main line between St. Paul and Duluth, and between St. Paul, Duluth, Seattle and Portland will have been laid with heavy rail, with one or two minor exceptions where changes in curvature or grade are contemplated.

It will be remembered that, under the rules prescribed by the Interstate Commerce Commission, the cost of replacing light rail with heavier rail is divided between expenses and capital account by charging to maintenance of way the cost of the same weight of steel that was previously in track and charging only the cost of the additional weight of steel to capital account.

During 1910 741 miles of main line was laid with new 90-lb. rail. The total cost of maintenance of way and structures was \$10,800,000, an increase of \$3,000,000, or 38 per cent., over 1909. The standards on main line to which the company is working are: 0.4 to 0.6 per cent. grades; 85 or 90-lb. rail; and 6 to 8

degrees curvature. The higher grades and sharper curves are on the western part of the line.

A program of improvement and betterment similar to that carried out in regard to roadbed has been adopted for equipment. In 1910 there were 1,430 locomotives in service, an increase of 107 over 1909; 1,119 passenger-train cars, an increase of 114 over 1909; and 43,816 freight-train cars, an increase of 2,318 over 1909. It is interesting to note that of the locomotives added in 1910, 40 were Mikado locomotives, with an average tractive force of 46,300 lbs.; six were Mallet compounds with an average tractive force of 64,940 lbs.; and five were Mallet compounds with an average tractive force of 89,540 lbs.

The following table shows the unit costs of maintenance:

	1910.	1909.
*Maintenance of way, per mile.....	\$1,324	\$980
†Repairs, per locomotive.....	1,916	1,751
" passenger car.....	524	448
" freight car.....	58	42

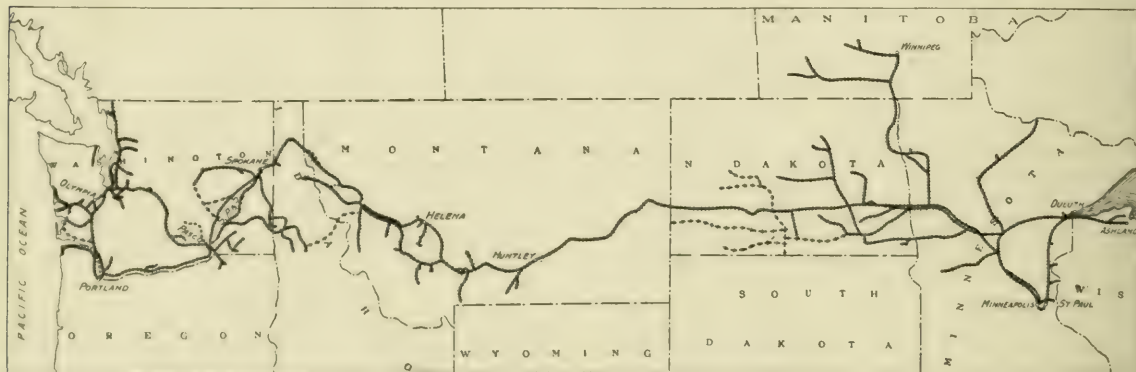
*Per mile of first, second, third, etc., track, the cost of two miles of siding and switch tracks being taken as equal to the cost of maintenance of one mile of main track.

†This is for repairs only and does not include renewals, depreciation or superintendence charges.

The figure for maintenance of freight cars is especially noticeable, and the annual report states that of the total number of freight cars on the road on June 30, 1909, only 1,744, or 3.98 per cent., were in need of repairs costing \$5 or more. The in-

\$1,700,000 was from freight revenue, the remaining increase of \$4,200,000 being almost entirely from passenger revenue. The freight revenue was 3.85 per cent. greater in 1910 than in 1909. This is considerably less than the normal increase in freight revenue, and compares with an increase of more than 20 per cent. in freight revenue during the same period on the Great Northern. It, however, speaks well both for the Northern Pacific and for the development of the country that the Northern Pacific was able to show any increase in freight business at all in 1910, since the road had to meet new and severe competition from at least four important sources. The Chicago, Milwaukee & Puget Sound more or less closely parallels the Northern Pacific all the way from the Missouri river to the Pacific coast. In many places through Montana and Idaho the two roads are but a few miles apart, and nearly all the local business through these states that is now going to the Puget Sound would of necessity have gone to the Northern Pacific if the St. Paul's new line had not been built.

The second important competitive force that the Northern Pacific is called on to meet is due to the loss of business that is being diverted from its line by a connection at Billings between the Great Northern and the Chicago, Burlington & Quincy. Before this connection was made the Burlington had only the Northern Pacific to exchange traffic with at Billings.



Northern Pacific.

crease in number of freight cars in service in 1910 amounted to 5.59 per cent. of the total cars in service at the beginning of the year.

An additional reason for the abnormally high cost of operation in 1910 was the very severe weather in December and January, and the strike of the switchmen. These two causes of higher operating costs may be classed as accidental, and certainly a recurrence in the present year of anything corresponding to the switchmen's strike after the increase in wages that has been granted is quite unlikely.

Still another reason for extraordinarily high operating expenses was that the increase in gross business came largely in passenger business, necessitating a much larger passenger train mileage. Transportation expenses amounted to \$24,000,000 in 1910, an increase of \$3,700,000, or over 18 per cent. More than half of this increase came from higher cost of labor, due both to the increase granted in wages and to the greater train movement. Passenger train mileage amounted to 12,600,000 miles in 1910, an increase of 3,000,000 miles, or over 31 per cent., above 1909. The Alaska-Yukon-Pacific Exposition was held in Seattle from June 1, 1909, to October 16, and accounted for a good part of the heavier passenger traffic on the Northern Pacific. In addition to this, the Flathead, the Coeur d'Alene and the Spokane Indian reservations were opened, and land reclamation was in progress from July 15, 1909, to August 5.

Total operating revenue amounted in 1910 to \$73,800,000, an increase over 1909 of \$5,900,000, but of this increase, only

Another source of competition has been the Duluth extension of the Minneapolis, St. Paul & Sault Ste. Marie, which parallels the Northern Pacific's line from St. Paul to Duluth. Presumably this line is a heavy carrier of grain.

President Elliott says that about half of the total business that is being done by the Spokane, Portland & Seattle is being exchanged with the Northern Pacific, and that nearly all of the traffic originating between Spokane and points east, and the Gray's Harbor territory, in the state of Washington, and points south, including Portland and business handled via Portland, is now commonly routed over the Spokane, Portland & Seattle. It is probable, however, that this loss of business to the Northern Pacific is much more than compensated for by the business originating on the Spokane road which is delivered to the Northern Pacific. In any case, the business given to the Spokane road is eastbound business and can be easily spared.

The outlook for future traffic is bright along the whole road. In the eastern part, the company has to build and improve its lines rapidly to keep up with grain production. The Dakota division, for instance, which is on the present western border of the hard wheat country, is building 200 miles of branches. Farming is spreading westward in Montana, and it is expected that stock raising will increase rather than diminish with the growing of diversified crops. In western Montana Indian lands are being opened, and, while the Indians retain the most fertile sections, white settlers are getting land which will be most profitable under "dry farming" or, more properly, intensive cul-

tivation. Irrigation in Idaho and Washington is bringing big returns in fruit growing, particularly, and in other high priced crops.

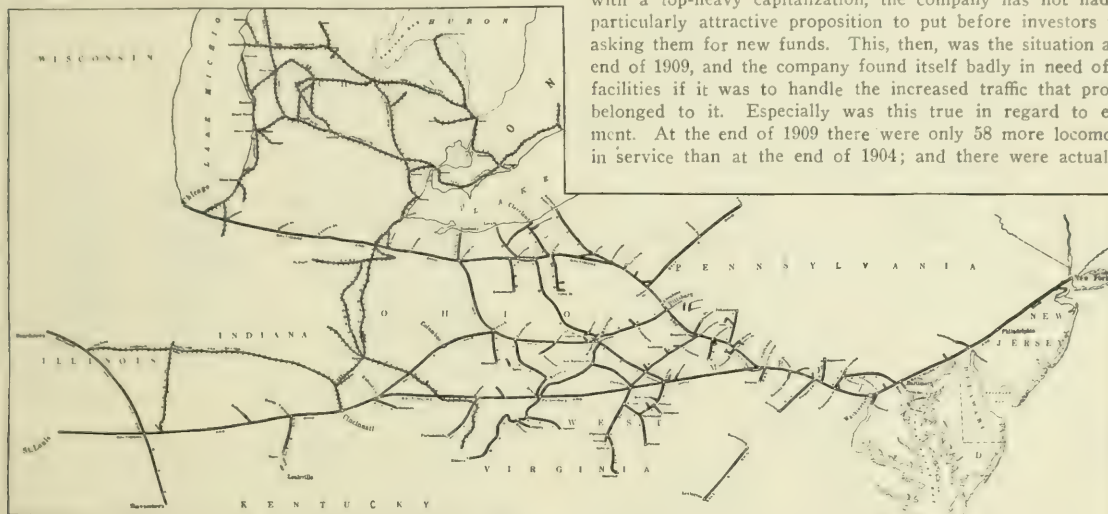
The following table shows the results of operation in 1910 compared with 1909:

	1910	1909
Average mileage operated	5,755	5,671
Tonight revenue	\$48,758,246	\$47,073,805
Passenger revenue	21,336,313	17,330,698
Total operating income	71,325,826	68,460,747
Maint. of way and structures	10,842,965	7,841,950
Maintenance of equipment	8,992,137	7,845,680
Interest	1,035,104	919,109
Transportation	23,944,197	20,360,674
Total operating expenses	45,287,405	38,000,005
Income	3,632,000	2,311,835
Operating income	20,518,896	28,312,267
Gross corporate income	39,178,301	32,019,995
Net corporate income	22,206,259	21,639,350
Dividend subscriptions on new stock		3,208,416
Dividends	17,360,000	14,105,000
Surplus	4,936,259	7,534,350

BALTIMORE & OHIO.

TO understand the situation in Baltimore & Ohio affairs at the beginning of the last fiscal year it is necessary to get clearly in mind the physical characteristics of the road and the nature of its traffic, and to review briefly the financial history of the company.

The Baltimore & Ohio has been characterized as both a trunk line and a soft coal road, but the importance of low-grade traffic



Baltimore & Ohio.

The Cincinnati, Hamilton & Dayton and Pere Marquette are shown by a cross-hatched line. From Philadelphia to New York the B. & O. simply has trackage rights.

entirely outweighs what may be strictly called trunk line business. About 65 per cent. of the total tonnage carried in 1910 was products of mines, 43 per cent. of the total tonnage being bituminous coal. The comparatively small importance of such commodities as grain may be understood when it is noted that the tonnage of stone, sand and like articles totaled 4,600,000 tons in 1910, while the total tonnage of grain amounted to but 1,300,000 tons. The coal tonnage originates at about the grade summit on the road and moves both ways. Most of the coal originates in the territory west of Cumberland and in the Connellsville district, part of it moving to the Pittsburgh district and the remainder to seaboard at Baltimore. At Cumberland the two lines, one coming from Chicago and the other from Cincinnati, join, and the road from Cumberland to Baltimore, which is double track, is compelled to handle the traffic brought to it from two double-track roads.

The Baltimore & Ohio was originally laid out over difficult country. The road is exceedingly crooked and originally had high grades. This explains the great sums that have been spent in the past on rebuilding the road, and the productiveness of the

country through which the road runs is the justification for these large expenditures. Gross earnings per mile of road in 1910 amounted to \$20,048.

At the beginning of the last fiscal year the road was being worked just about up to its physical capacity. In the past five or six years ample sums have been spent on maintenance of way proper and on repairs of equipment, and in addition considerable sums have been spent on betterment to the road; in fact, in the testimony before the Interstate Commerce Commission in the rate hearings it was shown that the company had put back into the property for improvement about 50 cents for every dollar paid in dividends. Nearly all of this, however, in the past five or six years has been put into road betterments rather than into additions to equipment.

When the Baltimore & Ohio was reorganized in 1898 there was no radical scaling down of indebtedness or capitalization; and the great success that the company attained after its reorganization was due in part to the great prosperity of the country that the road served, and in part to the fact that the company was fortunate in securing unusually efficient management.

To repeat, first, the road runs through highly competitive territory, which is capable of furnishing an enormous traffic of low-grade products; second, it has been necessary to spend very freely for additions and betterments to keep the road up to the development of the country; and third, while not overburdened with a top-heavy capitalization, the company has not had any particularly attractive proposition to put before investors when asking them for new funds. This, then, was the situation at the end of 1909, and the company found itself badly in need of new facilities if it was to handle the increased traffic that properly belonged to it. Especially was this true in regard to equipment. At the end of 1909 there were only 58 more locomotives in service than at the end of 1904; and there were actually 53

less passenger cars and 39 less freight cars in 1909 than in 1904. In 1910, 284 locomotives and 15,000 freight cars were ordered. As we have said, the two-track line from Cumberland to Baltimore was having dumped on it the tonnage from two two-track lines terminating at Cumberland. It was absolutely necessary to add at least a third track from Cumberland to Washington Junction, and in time it will unquestionably be necessary to make this a four-track line.

In January, 1910, Daniel Willard, vice-president of the Chicago, Burlington & Quincy, at the head of the operating department, was elected president of the Baltimore & Ohio, and Oscar G. Murray was elected chairman of the board. Mr. Willard had the reputation on the Burlington of being one of the best operating men in the country and a tremendously hard worker. Before going to the C., B. & Q. he had been on the Erie, and previous to that had been general manager of the Baltimore & Ohio. The new management has laid out a general scheme for the betterment of the line to facilitate the handling of traffic and render operation more effective and economical.

It is not unusual for industrial companies to make a revalua-

tion of a part of their plant and to write off on their balance sheet a sum for depreciation, and it is on this theory that there is an attainable rate of depreciation of plant that the Interstate Commerce Commission ordered the railways to make an allowance in their income accounts for depreciation of equipment. It is, however, quite unusual, except in a reorganization, for a railway company to write off from the asset side of its balance sheet a large sum covering the depreciation in value of plant in past years; but this is the course that has been taken by the Baltimore & Ohio under its new management. During the fiscal year 1910 a committee of officers of the operating, mechanical and accounting departments made a physical appraisal of the rolling stock and motive power of the company and reported that the book value of the equipment, as shown on the balance sheet of June 30, 1909, was higher by \$8,500,000 than the appraisal value which was fair in the judgment of these officers. On the recommendation of the executive officers, the board of directors approved charging to appropriated surplus this \$8,500,000, writing down the value of equipment in capital account by \$7,100,000 and crediting \$1,400,000 to reserve for accrued depreciation.

This, taken in connection with the orders for new equipment, is possibly the most striking example in the annual report for 1910 of the vigorous policy of betterment and physical organization, but it is only one of many.

The total expenditures called for immediately when the general plan referred to by President Willard was decided on include \$5,550,000 charged to construction during the past year, \$23,000,000 for 284 locomotives and 15,000 freight cars, and \$20,000,000 for improvements to road, etc.

To finance these improvements the Baltimore & Ohio found it necessary to issue short term notes, the bond market not being favorable for permanently funding the amount of money required. The company sold \$10,000,000 one-year 4 per cent notes dated March 10, 1910, and subsequently authorized the issue of \$50,000,000 4½ per cent, three-year notes dated June 1, 1910, and secured by the deposit of the B. & O.'s Reading stock and B. & O. Chicago Terminal first mortgage bonds. Of the three-year notes, \$10,000,000 were reserved to retire at maturity the one-year notes, and the remaining \$40,000,000 notes were sold. The balance sheet shows the results of this financing, but is not comparable with the balance sheet of 1909 because of the new form prescribed by the Interstate Commerce Commission. After the changes made necessary by writing off depreciation on equipment and taking into the general balance sheet affiliated companies, which is done this year for the first time, road and equipment investment up to June 30, 1907, amounted to \$266,000,000, and since June 30, 1907, there has been \$21,000,000 invested in road and equipment. After subtracting the reserve for accrued depreciation amounting to \$6,000,000, total capital assets amounted to \$281,000,000. Working assets amounted to \$79,900,000, of which \$11,800,000 was cash, \$7,400,000 stocks and bonds issued or assumed by the Baltimore & Ohio but held in the treasury, and \$39,600,000 loans and bills receivable. Working liabilities amounted to \$20,100,000, this sum including the \$10,000,000 one-year notes.

Total operating expenses amounted to \$61,300,000 in 1910, comparing with \$51,200,000 in 1909. The greater part of this \$10,200,000 increase came in maintenance expenses; transportation expenses cost \$29,700,000 in 1910 and \$26,300,000 in 1909, an increase of \$3,400,000. As is the case on other roads, and to about an equal extent, the increased cost of transportation was due to the increase in wages paid and to the higher cost of fuel due to the greater train movement. The following table shows the unit costs of maintenance:

	1910	1909
* Maintenance of way, per mile	\$1.071	\$1.806
Repairs, per locomotive	2.880	2.184
" " passenger car	600	800
" " freight car	70	66

*Per mile of first, second, third, etc., track, the cost of two miles of siding and switch tracks being taken as equal to the cost of maintenance of one mile of main track.

This is for repairs only and does not include renewals, depreciation or superintendence charges.

The larger maintenance charges have already been commented on.

Traffic statistics show that the total number of tons carried one mile amounted to 12,024,600,000 tons, an increase of 1,975,300,000 compared with 1909. The average distance each ton was carried was 191 miles, a decrease of five miles from the 1909 figure; the average earnings per ton per mile were 5.77 mills, a decrease of 0.4 mills; the average train load was 462 tons, an increase of 14 tons over 1909.

The total number of passengers carried one mile was 763,450,000, an increase of 42,690,000; the average earnings per passenger per mile were 1.897 cents, an increase of 0.017 cents. The large increase in ton mileage and passenger mileage is reflected in increases in earnings as shown by the table in the end of this review.

The Cincinnati, Hamilton & Dayton, shown on the map with its controlled line, the Pere Marquette, has been operated during the entire fiscal year under Baltimore & Ohio control. Among the advantages of control of this line are the new markets it affords to coal producers on the Baltimore & Ohio. Both the B. & O. and the C., H. & D. face new competition in the near future. The Hocking Valley line of the Chesapeake & Ohio will, within the next year or two, be given a considerable part of the coal tonnage consigned to the Lakes that the C. & O. is now turning over to the C., H. & D. The Western Maryland is building an 87-mile line from Cumberland to a connection with the Pittsburgh & Lake Erie. The same factors, however, that make it necessary for the B. & O. to increase its facilities so greatly, namely, the industrial growth of the country served by the road, bid fair to offset the competition.

The following table shows the results of operation in 1910 compared with 1909:

	1910.	1909.
Average mileage operated	4,434	4,460
Freight revenue	\$69,408,113	\$58,355,112
Passenger revenue	14,485,585	13,551,238
Total operating revenue	83,901,252	76,412,856
Maintenance of way	11,661,410	9,694,560
Maintenance of equipment	16,373,776	11,810,507
Traffic	1,877,203	1,717,388
Transportation	29,738,992	26,346,960
Total operating expenses	61,333,801	51,163,981
Taxes	2,469,954	2,271,576
Operating income	24,497,854	23,438,500
Gross corporate income	28,715,752	25,785,307
Net corporate income	16,247,587	*18,736,006
Additions and betterments	415,761	549,572
Dividends	11,474,213	12,472,982
Surplus	4,857,614	713,452

*The income account for 1909 has been restated by eliminating debits and credits of interest on bonds in treasury.

CHICAGO, ROCK ISLAND & PACIFIC.

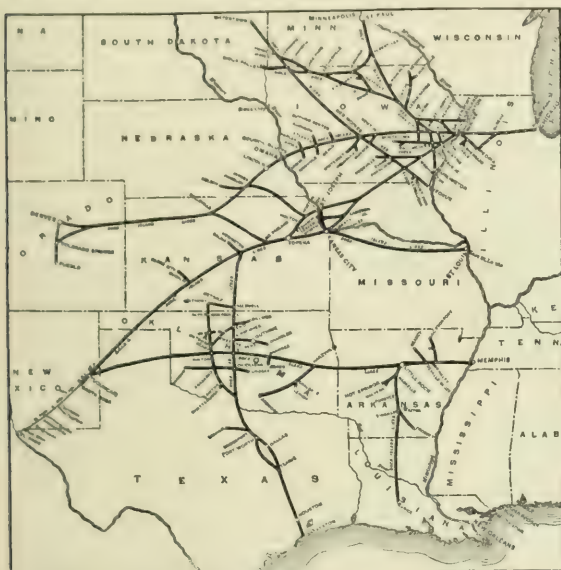
FOR seven months of the last fiscal year the Chicago, Rock Island & Pacific Railway was operated independently of the St. Louis & San Francisco. A controlling interest in the stock of the St. Louis & San Francisco had, previous to that time, been held by the Chicago, Rock Island & Pacific Railroad, all of the stock of the Railroad company being owned by the Rock Island Company. In January the Railroad company sold its interest to B. F. Yoakum and associates. As a matter of fact, the two properties, the Rock Island and the Frisco, were never operated as a closely-knit system. The Frisco is a homogeneous property in itself, but the Rock Island sprawls out into so many different sorts of territory that while a part of its system may have benefited from joint operation with its former partner, the operation of the company as a whole was not affected to any appreciable extent by the loss of the Frisco.

To find any system that could be at all accurately compared to the Chicago, Rock Island & Pacific, it would be necessary to compile some sort of composite figures from the Hawley lines. If the Clover Leaf, the Alton and the Katy were combined they would form a system not so different from the Rock Island. And this explains the nature of the problems that have to be solved by the C., R. I. & P. management. They have to operate as a single unit a system of lines that are, geographically, three or more distinct units.

For the first time the Rock Island annual report classifies lines as to main lines and branch lines. The main lines are as

follows. One running from Chicago to Colorado Spring, with lines via both Omaha and Kansas City, and running from Kansas City to a connection with the El Paso & Southwestern, which gives it its route to El Paso, Tex., the line from Kansas City to Dallas, Tex., and the line from Memphis to El Paso are also classified as main lines, and the line running south from Little Rock, Ark., to Unice is treated as main line. In 1904 less than two miles of track was laid with 85-lb. rail, and only about 800 miles of track had rock ballast. At the end of the fiscal year 1910 more than 26 per cent. of the total 4,695 miles of main line, first, second and third tracks, was laid with 85-lb. rail and 45.59 per cent. of the main line trackage was laid with rock ballast. Moreover, in 1910, 26 per cent. of this main line trackage was rock ballast. The chief efforts of the management have apparently been devoted to improving the main lines; a large part of branch line mileage is still laid with light rails and is unballasted.

In 1910 the Rock Island earned total operating revenue amounting to \$66,200,000, which is greater by \$5,000,000, or a little over 8 per cent., than the gross of 1909, but operating expenses amounted to \$48,100,000, an increase of \$5,600,000, or



Chicago, Rock Island & Pacific.

13 per cent. over 1909, so that the operating income, after the payment of taxes, was less by \$1,100,000 in 1910 than in 1909. After the payment of interest and rentals, the Chicago, Rock Island & Pacific Railway Company had \$4,700,000 balance available for dividends in 1910, as compared with \$6,200,000 in 1909. Dividends of \$3,700,000 were paid to the holding company in 1910 and \$3,900,000 in 1909, leaving a surplus of about \$1,000,000 last year, as compared with the surplus of \$2,300,000 the year before. It will be remembered that the dividends paid to the holding company, the Chicago, Rock Island & Pacific Railroad, are used to pay the interest on Railroad company bonds. The Rock Island Company stock, which is the stock that is quoted on the New York Stock Exchange, simply represents control of the Railroad company which in turn controls the C., R. I. & P. Railway. The Rock Island Company's organization is such that the preferred stock, of which there is \$54,000,000, elects a majority of the board of directors and therefore carries control of the company, notwithstanding that there is \$96,000,000 common stock. Neither the common nor preferred stock of the Rock Island Company is paying dividends.

The \$5,000,000 increase in operating revenue of the operating company was due to an increased revenue from both freight and

passenger. Freight revenue last year amounted to \$42,900,000, an increase of \$3,000,000 over 1909. Freight is about 61 per cent. of the total operating revenue. The number of tons of revenue freight carried totaled 19,200,000 in 1910, an increase of 2,000,000 over 1909, and the number of tons moved one mile totaled 4,567,000,000 in 1910 as against 4,166,000,000 in 1909. The revenue per ton mile on the Rock Island is 9.2 mills. This is less by .2 mills than the revenue per ton mile in 1909, and is slightly less than the average revenue per ton mile on either the Frisco or the Santa Fe.

The average haul of revenue freight in 1910 was 238 miles, or about four miles less than the average haul in 1909. The average train load of revenue freight was 257 tons in 1910, or 7 tons less than in 1909. Loaded freight car mileage totaled 303,100,000 in 1910 as against 274,700,000 in 1909, and empty mileage totaled 123,400,000 in 1910 and 107,800,000 in 1909.

From the geographical position of the Rock Island it is apparent that its tonnage is very diversified. In 1910, 31.93 per cent. of the total tonnage carried consisted of products of mines; 12.34 per cent. products of forests; 22.13 per cent. products of agriculture; 19.55 per cent. products of manufactures, and 7.08 per cent. live stock and animal products. The tonnage of every important commodity, with the exceptions of grain and live stock, was greater in 1910 than in 1909; the most notable increase in tonnage being, as might be expected, in manufactures. Last year 3,700,000 tons of manufactures was carried, which is 20 per cent. more than in 1909.

Passenger revenue last year amounted to \$19,400,000, an increase of 8 per cent. over 1909. The number of passengers carried one mile was 1,016,000,000. The average revenue per passenger per mile was 1.91 cents in 1910 and 1.88 cents in 1909. This very low passenger rate may be in part explained by the fact that 1,346 miles of Rock Island lines lie in Oklahoma and 476 miles in Texas. In connection with the hostility of these states to railways it is worth while noting that the taxes of the Rock Island amounted to \$2,900,000 in 1910. This is an increase of 26.68 per cent. over the taxes of 1909, and the 1909 taxes were greater than the 1908 taxes by 26.87 per cent.; during this time there has been only a comparatively small increase in Rock Island mileage.

As on other lines, the increase in operating expenses last year was due both to higher transportation expenses, because of greater train movement and increased cost of labor, and to more liberal expenditures for maintenance. Transportation last year cost \$25,200,000, or 10 per cent. more than in 1909. Maintenance of way cost \$10,700,000, or 18 per cent. more than in 1909, and maintenance of equipment cost \$8,500,000, or 13 per cent. more than in 1909.

The following table shows the unit costs of maintenance:

	1910.	1909.
*Maintenance of way, per mile.....	\$1,373	\$1,146
†Maintenance per locomotive.....	2,580	2,459
" " passenger car.....	820	801
" " freight car.....	80	68

*Per mile of first, second and third main track owned and leased.

†This is the cost of repairs and charges for renewals and depreciation, but includes no superintendence or other overhead charges.

For some reason not stated, the Rock Island, while making its annual report in other respects in the form prescribed by the Interstate Commerce Commission, does not show the cost of repairs, renewals and depreciation of equipment separately, so that the figures in the accompanying table are not comparable to those given in our columns for other roads, which include repairs only and take no account of renewals and depreciation. The company in its estimate of the average cost per mile for maintenance takes no account of the side track and spur mileage. If the maintenance of two miles of siding and switch track is taken as equaling the cost of maintaining one mile of main track, the maintenance figure for 1910 would be \$1,206 per mile.

The balance sheet as of June 30, 1910, shows total working assets of \$34,300,000 and working liabilities of \$10,000,000. Of the working assets, \$4,500,000 was cash, an increase in cash of a little over half a million over 1909. Included in working

RAILWAY CAPITAL AND CAPITALIZATION.

BY WILLIAM Z. RIPLEY.
Professor of Economics, Harvard University.

II.

Having allowed for duplication of capital within a given system, it is then necessary to reckon with outside investments. These may consist of holdings of stocks and bonds in other railway systems, or they may represent investment in other enterprises than transportation. As for the first of these, investments in other railways outside its own system, these are somewhat imperfectly given by the Report on Intercorporate Relations. The amount of what are designated as "Minority Holdings" of railways in other roads, however, in all probability gives returns sufficiently accurate for our general purposes. They include all of the investments of this kind which are substantial in amount. Majority holdings in other companies would bring those roads "within the system," as just described; and would appear in the tables under that heading. As for the miscellaneous investments, their scope is surprisingly wide. It is clear that the value of all these investments must also be subtracted from the total of securities outstanding for each system, in order to leave only the net capitalization dependent upon earnings from operation for its support. The following table has been thus constructed for a number of important railways, finally reducing this net capitalization in each case to a mileage basis for purposes of comparison. These roads are arranged in an ascending scale, with reference to this last figure—net capitalization per mile—which is the basis for all subsequent calculations:

A matter of extraordinary difficulty has been the treatment of corporations "held jointly" by several different systems. These are usually terminal companies in the larger cities. The Chicago & Western Indiana Railroad Company, for instance, operates some 48 miles of line and is capitalized at \$33,750,000. It is owned jointly by the Atlantic Coast Line, the Erie, the Wabash, the Grand Trunk and the Rock Island. It would seem as if properly the proportionate share of its total capitalization held by each participating road should be an allowable deduction from the total outstanding securities of that road in determining net capitalization. The data for doing this, however, aside from the statistical labor involved, are not available in many cases. And what, from the point of view of principle, is even more important, if this were done, the proportionate division of income to each participant would need to be likewise made. Inasmuch, however, as the earnings of these companies, thus jointly held, are not usually included in the statements of individual systems, it seems fairer to eliminate them entirely. Otherwise, at a later point in our calculations, as will appear, we should be taking account of their capital issues, while still neglecting to include their earnings. Therefore, in the case of all these jointly held companies—such again as the St. Louis Terminal Association and the Richmond-Washington Company—their mileage roughly totaled, and the aggregate of their security issues (given separately in a column in our table) have in each case been eliminated entirely. This procedure is radically different from the method properly adopted in the Report on Intercorporate Relations, which, as has been said, sought to determine, not the particular, but the general capitalization of the entire railway net. The deduction of the total rather than the proportionate capitalization of these jointly held companies, from the total outstanding capitalization of each participating system, in order to ascertain net capitalization, obviously over-corrects the error. It weighs the results on the side of conservatism, making the capitalization of each participating road appear less than it should be. Strong companies which own all their own terminals, instead of dividing ownership with other roads, are made to appear more heavily capitalized by comparison than they should. And, from the operating point of view, it is absurd, of course, to eliminate these terminal companies at all. Where would the New Haven and Boston & Albany roads be without the Boston

assets are \$17,100,000 marketable securities; this includes \$7,500,000 Railroad company debentures sold to the Railway company to cover the loss on the sale of St. Louis & San Francisco stock and the retirement of collateral trust bonds secured on this stock. These bonds, of course, if they are ever to be sold to the public, will have to be guaranteed by somebody—presumably the railway company.

Unusual interest attaches to Rock Island affairs this year, because of the much-discussed transactions that have taken place in Rock Island stock. When the Frisco was divorced, B. F. Yoakum and his associates retired from the board of directors of the Rock Island Company and W. H. Moore and D. G. Reid were left presumably in undisputed control. In July, when it was announced that Kuhn, Loeb & Co. had taken over stock bought by the Pearson-Farquhar syndicate, it was understood that these holdings included a large block of Rock Island stock. Later it was announced that Phelps, Dodge & Co., who control the El Paso & Southwestern, had bought from Kuhn, Loeb & Co. this block of Rock Island preferred stock, amounting to about 20 per cent. of the total outstanding. Just why this firm, which has been identified with copper mining and smelting properties rather than with railways, should have arranged to acquire a considerable minority interest in Rock Island stock is really hard to understand. The investment cannot conceivably make any return in dividends in the near future. It may, of course, be considered an investment which Phelps, Dodge & Co. feel that they are justified in making without present return, in the hope that in time developments of the country and the development of the Chicago, Rock Island & Pacific Railway will make it profitable. There are also advantages to be gained by the El Paso & Southwestern through a closer relationship with the Rock Island.

The following table shows the operation of the C. R. I. & P. in 1910, compared with 1909:

	1910.	1909.
Average mileage operated.....	5,074	5,036
Freight revenue.....	\$42,218,880	\$39,175,053
Passenger revenue.....	19,378,174	17,883,379
Total operating revenue.....	66,220,579	61,184,887
Maint. of way and structures.....	10,673,387	9,051,830
Maintenance of equipment.....	8,459,746	7,511,880
Traffic.....	1,795,262	1,441,215
Transportation.....	25,193,579	22,945,052
Total operating expenses.....	48,069,369	42,413,495
Taxes.....	2,876,701	2,300,865
Operating income.....	15,274,509	16,400,527
Gross corporate income.....	15,497,741	16,611,998
*Net corporate income.....	4,747,841	6,166,281
Dividends.....	3,743,272	3,930,019
Surplus.....	1,004,609	2,236,212

*After the subtraction of \$72,583 in 1910, and \$16,577 in 1909, for betterments on leased lines.

NEW BOOKS.

Power Signaling in Great Britain, British Colonies, Belgium, France and Italy., Report by L. Weissenbruch and J. Verdeyen to the International Railway Congress. Printed in the *Bulletin* of the Congress, for July, 1910, page 3319. Brussels, Belgium.

Power signaling in the countries named is the subject, though not the title, of a full and careful report (Report No. 4) which was prepared as above for the congress held last summer. Mr. Weissenbruch is director of safety appliances of the Belgian state railways, and Mr. Verdeyen is assistant to Mr. Weissenbruch. The subject which was allotted to these gentlemen was the general one of improved centralization of switch and signal operation, but, as the authors observe in their introductory note, there is no improvement to be noted except in power signaling, or, as they would call it, "fluid-operated cabins"; and so they confine themselves to this. The report fills 40 pages of the *Bulletin* and contains a succinct history of what has been done in this field, in Europe, beginning back with the water-pressure system of Bamber and Verwey. The salient features of this and the later systems: the M. D. M. system of the Northern of France, the Westminster, the Taylor, the Webb & Thompson, the Deane & Redery, the Siemens & Halske, the Siemens Brothers and others, are carefully described, with drawings. Mention is made of A. H. Johnson's system, which was installed experimentally on the Metropolitan Railway of London

Terminal Station.² Yet the capital of \$14,590,000, representing it has been eliminated from our calculations altogether, and, worse than that, this total capitalization has been deducted from each participant. The main plea in extenuation, however, is that greater error would result from any other course.

What shall be had of this procedure, as applied to other jointly held companies, than mere terminal associations? The Chicago, Indianapolis & Louisville (Monon) is jointly owned by the Louisville & Nashville and the Southern Railway. At the date of our calculations the Chicago & Alton was jointly held by the Union Pacific and the Rock Island. Other notable instances of roads in this class are the San Pedro, Los Angeles & Salt Lake and the Colorado Midland. The maximum of bewildering complexity in ownership appears in the Little Kanawha Syndicate or the Southwestern Construction Company.* A number of different roads are interested in the former, but the Southern Railway owns about 40 per cent. of its capital stock. In this case, as in many others in this class, such substantial investments appear in our tables and are duly accounted for under the head of "Minority Holdings" or investments "Outside the System." To deduct them again from gross capitalization, as jointly held companies, is undoubtedly duplication. Yet how can it be avoided; and if it could be, would it materially affect our conclusions?

The answer is positive. The exclusion of such jointly held

as frequent at normal instances. The prime fact is that for any definite financial conclusions as to the relative burden of capitalization of individual properties are permissible, a number of important considerations must be taken into account. Most of these are purely technical and involve detailed information as to physical facts. In the first place, the above figures are based upon miles of line and not upon miles of track. Systems like the Pennsylvania, largely double tracked and in part four tracked, cannot fairly be compared with single-track lines. This company recently reported 4,877 miles of extra and siding track in addition to its 3,679 miles of first track. Here is a possible error in comparisons of over 100 per cent., unless the additional cost of such trackage be added to that of "roadway" or of "main line." Careful allowance for such differences should always be made. The physiography of the country must be known. The low capitalization of the Northwestern, St. Paul or Atchison systems, built across open plains, by comparison with the Union Pacific or the Denver and Rio Grande, constructed across the Rocky Mountains, is partly accounted for on that ground. No comparison of capitalization is fair until the density of population is known. This has compelled enormous expenditures for abolition of grade crossings in the Eastern States, an expense not imposed upon roads in the West and South. Nor is a comparison of capitalization of two roads in the same region fair until expenditures for this purpose are

CAPITALIZATION, JUNE 30, 1906.

United System	Mileage*	Total Outstanding	Holdings Within System	Minority Holdings in Other Systems	Misc. Investments (Approx.)	Jointly Held (Approx.)	Net Capitalization per Mile
United States	216,894	\$18,227,196.000	\$5,075,702.000	\$479,510,000†	\$164,302,000	\$58,050	\$58,050
C. & M. & St. Paul	7,244	251,131,000	13,899,000		1,116,000	12,800,000	30,800
Chicago & North Western	7,631	291,304,000	25,673,000		2,661,000	7,000,000	31,900
Missouri Pacific	6,885	514,872,000	169,597,000	37,155,000	8,658,000	67,000,000	33,700
Illinois Central	5,700	481,689,000	162,036,000		2,000,000	93,000,000	39,400
Seaboard Air Line	2,858	217,291,000	73,067,000		123,000	26,000,000	40,700
Southern Railway	9,176	779,393,000	137,976,000		6,969,000	196,000,000	47,500
Chicago, Rock Island & Pac.	14,594	1,510,310,000	696,172,000	580,000	15,285,000	133,700,000	50,000
Atchison, Topeka & Santa Fe	9,442	809,700,000	308,200,000		14,800,000	9,000,000	50,600
Boston & Maine	3,340	212,759,000	26,084,000	33,000	700,000	1,000,000	55,000
Great Northern	6,097	484,738,000	118,343,000	490,000	13,776,000	8,500,000	57,600
Southern Pacific	9,733	1,092,597,000	458,909,000		55,095,000	8,500,000	58,600
Union Pacific	7,665	937,006,000	264,051,000	136,789,000	30,590,000	8,900,000	64,800
Northern Pacific	6,549	509,422,000	44,206,000		18,500,000	20,000,000	65,000
Denver & Rio Grande	2,782	248,408,000	87,871,000		7,440,000	242,000,000	82,000
New York Central	8,730	1,068,173,000	215,232,000	61,705,000	16,500,000	36,600,000	84,500
Pennsylvania	10,045	1,674,416,000	437,195,000	126,472,000	76,806,000	163,600,000	86,400
Norfolk & Western	1,886	185,662,000	17,165,000	24,900	1,754,000		88,000
Great Western	1,410	188,374,000	54,592,000		800,000	6,300,000	90,000
Wabash	2,609	315,550,000	54,900,000		19,100,000	105,000,000	92,500
New Haven	2,755	430,659,000	118,007,000	57,250	37,400,000	35,000,000	96,000
Baltimore & Ohio	4,600	865,847,000	294,062,000	31,486,000	7,400,000	42,700,000	106,000
D. C. & W.	1,034	134,915,000	11,981,000	1,851,000	4,569,000	6,800,000	115,000
Reading	2,288	531,522,000	115,791,000	2,686,000	25,500,000	4,500,000	169,000
Erie	2,373	565,706,000	109,427,000	3,006,000	9,101,000	43,600,000	169,000

*Owned, less jointly held. †Holdings, outside the system.

companies makes little difference in the final result for most railways. This is particularly true of the Union Pacific and the New York Central. For others like the Reading and the Atchison, the net capitalization is actually increased by elimination of jointly held corporations. For some few roads, notably the weaker companies, this factor is of greater moment. The net capitalization per mile of the Wabash company was brought down by eliminating jointly held companies from \$119,000 to \$92,000 per mile. The Illinois Central's capitalization came down from \$52,000 to \$39,400 per mile. There can be no doubt that in any detailed computation ownership of the jointly held companies should be apportioned; and allowance for them made. In this case, however, it seemed fairer to the few companies detrimentally affected to rule them out. And this at a considerable expenditure of statistical labor has been done, in order to be on the safe side.

Turning now to our table of figures, the most surprising feature is the wide range of capitalization, from \$30,800 per mile for the St. Paul road to nearly six times that figure in the case of the Erie Railroad. Nor is any broad classification of systems possible. The granger roads and those of the less densely populated regions seem to be in a general way relatively low in capitalization; while the great trunk lines and the coal roads are heavily laden with stocks and bonds. Yet exceptions are almost

known. The New Haven has abolished nearly all its grade crossings. The Boston & Maine still has thousands of highways unguarded. Entirely apart from the relative proportions of duplicate trackage, always in favor of the New Haven road, this difference deserves consideration. The value of terminals must, of course, be distributed over the whole line. Roads like the Pennsylvania, New York Central, Northwestern or Illinois Central, with enormous holdings of real estate in the primary centers of population, are in a class by themselves. Railways either tapping no very large cities, or, if so, relying upon rented property or trackage rights, lack one of the principal bases for a heavy capitalization.

Yet further allowance must be made before drawing final conclusions as to capitalization. It makes a great difference as to the age of the property and the conditions under which it was promoted and built. All the pioneer roads had to sell bonds at heavy discount in order to secure funds. These debts maturing at par, the charge for discount on bonds may have been a heavy item of initial cost. The Western Pacific, financed during the panic of 1907, did not realize, it was alleged, over \$40,000,000 in cash from the sale of \$50,000,000 of bonds at par. Here is an expense of \$10,000,000 to be charged to cost of construction. On the other hand, the Pacific Coast extension of the St. Paul system was financed by sale of its own stock to its own shareholders at par. The only additional construction cost was the

*Report on Intercompany Relations, p. 26.

interest on the investment during the period of construction, before earnings began to come in. The only offset for these heavy expenses of pioneer roads is the fact that they are not only seasoned properties, but enjoy all the advantages of appreciation of real estate values incident to the growth of the country. Surely the land grant roads have received full compensation for the heavy expenses of financing in the early days from this source.

It is equally important to consider the structure of the system. The Chicago Great Western is nearly all main line, such as it is. Its capitalization figures are not reduced by much lightly built branch mileage, as is the case with the Southern system. The Louisville & Nashville and the Queen & Crescent Route both serve the same territory in large measure; yet the former has an intricate network of branches on its trunk, while the latter is a single direct through line, with almost no feeders. Or again one system may be held together by leases, while another actually owns its roads in fee simple. This feature undoubtedly helps to explain the high capitalization of the New Haven system, by comparison with its neighbor, the Boston & Maine. And then finally, of course, full details are needed as to the relative worth of the rolling stock. Many thousands of dollars per mile of line, more or less, may profitably be invested in this way without seemingly affecting operation. The difference between two sys-

purely private point of view, the aspect of the investor in shares of the parent Boston & Maine Company, the capitalization of \$26,000 per mile is the basis of all calculations; inasmuch as the larger part of the system is held together by guaranteed rentals. The capitalization of the present company is based upon the surplus earnings of these lines above their fixed rents. From the standpoint of the public, which bears the aggregate burden of the rates, the figure of \$55,000 is the significant one. The Boston & Maine in its individual capitalization as a parent company has provided for only 51 per cent. of the capital stock of the Maine Central, this being the proportion which it owns. But the shipping and traveling public are concerned with the entire capitalization of both the parent and subsidiary lines, allowance for duplication being properly made. Yet this method of calculation does not always enhance capitalization, as in the preceding instance. Sometimes it may actually reduce it. This is true of the Northwestern system. This new mode of computation reduces its average capitalization by about \$3,500 per mile. There can be no doubt, however, that substantially different results follow from this mode of computation; and it is believed that these results, if compiled with great care for each company, especially if market price for securities instead of par could be used, would be entitled to greater weight for all purposes of comparison of road with road, or in connection with

System June 30, 1906	Mileage	Net Capitaliz'n	Per Mile of Line.		Charges, Taxes and Guaranteed Rentals	Ton Miles Freight Traffic (Density)	Earnings Train Mile	Net		Charges, Taxes, to Net
			Gross Earnings From Operation	Net Earnings From Operation				Capitaliz'n.	Net Earnings	
St. Paul.....	6,961	\$30,800	\$8,000	\$2,760	\$850	670,000	\$2.42	8.9	30.4	
North Western.....	7,453	31,000	8,500	2,860	860	1,094,000	2.32	9.2	30	
Mo. Pacific.....	6,275	33,700	7,100	2,270	1,830	749,000	2.32	6.7	80	
Illinois Central.....	5,628	39,400	10,500	3,530	1,620	[1,448,000]	[1.96]	9	46	
Seaboard.....	2,511	40,700	6,050	1,630	1,700	368,000	2.17	4	73	
Southern.....	7,515	47,500	7,274	1,840	1,510	527,000	1.90	3.8	82	
Rock Island.....	14,200	50,000	7,380	2,500	1,860	600,000	[2.28]	5	74	
Atchison.....	8,433	50,600	9,370	3,360	1,260	693,000	2.87	6.6	37	
Boston & Maine.....	3,241	55,000	11,600	3,820	3,070	[1.85]	[1.85]	6.9	80	
Great Northern.....	5,196	57,600	8,000	4,100	1,770	835,000	4.25	7.1	43	
Southern Pacific.....	9,459	58,600	11,800			784,000	3.29			
Union Pacific.....	8,122	64,800	11,200	6,500	1,400	[1,293,000]	[3.84]	10	21	
Northern Pacific.....	6,323	65,000	9,830	4,800	1,150	971,000	3.09	7.4	24	
D. & R. G.....	2,477	82,000	7,900	3,170		435,000	2.85	3.8		
N. Y. Central.....	8,221	81,700	22,700	5,550	3,500	[2,545,000]	[2.45]	6.5	68	
Pennsylvania.....	10,754	86,400	22,000	7,200	3,050	[4,742,000]	[3.14]	8.3	42	
Norfolk & Western.....	1,853	88,000	15,300	5,300	1,800	2,704,000		6.0	34	
Great Western.....	1,475	90,000	7,500	2,500	1,200	1,065,000		6.8	48	
Wabash.....	2,517	92,500	10,000	3,240	3,040	1,180,000	1.59	3.5	93	
New Haven.....	2,603	96,600	23,100	8,400	4,000	990,000	3.40	8.7	47	
Baltimore & Ohio.....	4,029	106,000	19,200	7,700	3,300	2,660,000	2.35	7.2	43	
D. L. & W.....	957	115,000	34,100	17,700	11,600	1,568,000		15.4	65	
Rio Grande.....	2,126	169,000	19,000	7,000	4,500	1,587,000	2.30	4.1	64	
Erie.....	2,150	169,000	22,060	6,680	5,250	2,764,000	2.71	3.9	78	
United States.....	216,004	58,950	10,300	3,500	1,750	982,000	2.07	6	50	

tems will appear only when the items of expenditure for rental of equipment or interest on car trust securities are compared.

The foregoing comments upon the intricacies of railway finance suffice to show why new modes of calculation of net capitalization are imperatively demanded. The customary method of figuring mileage capitalization is to divide the sum of stock and funded debt issued by the miles of line. Such a calculation considers the finances only of the parent company. It was suitable to old-fashioned, simple railroad organization. But in a complicated group of owned, leased and controlled roads it fails to give a true representation of the state of affairs. Nor are the figures for one road in any wise fairly comparable with those of another, differently organized financially. How great a difference this present mode of determining capitalization may be from the one customarily employed may be illustrated by the case of the Boston & Maine Railroad Company. Its nominal capital stock and funded debt, as of June 30, 1906, amounted to \$60,200,000, or \$26,000 per mile for 2,287 miles of line operated directly. Our figure for the entire group with a mileage of 3,360 in the Boston & Maine system was \$55,000 per mile of line. This wide difference of upward of 100 per cent. is due to the fact that our calculation comprehends the capitalization of each separate unit in the system, such as the Boston & Lowell, capitalized at \$49,000, the Maine Central at \$12,000, and the Fitchburg Railroad, capitalized at \$105,000 per mile. From a

the discussion of overcapitalization or rate regulation than those currently quoted.

The next step in our analysis is to compare earning power with true capitalization. A comparative exhibit of this sort is afforded by our second set of figures. The mileage in each system is approximately the same as in the preceding table of net capitalization, from which, in fact, the results as to capitalization are brought forward. This purports to be no more than a rough calculation, for the technical difficulties of exact comparison are very great. The results are, of course, as of June 30, 1906, that being the date of the official statistics used in computing capitalization. Many important changes in railway grouping have since occurred, such, for example, as the readjustment of railway investments in the anthracite coal roads, the development of later Union Pacific and New Haven finance, and the reorganizations of 1907. Moreover, even for the given date, it is extremely difficult to compute results for the systems exactly as classified in the official Federal report used for computing net capitalization. Many roads within a system, held together by ownership of a bare majority of stock, report financial results separately. It has been necessary to piece these together. But the larger units have alone been taken into account.

An attempt has, however, been made to piece together a sufficiently large proportion of each "system" to render the returns fairly representative. Thus, by combining the operating returns

for the Pennsylvania Railroad, the Pennsylvania Company, the Philadelphia, Wilmington & Baltimore, the West Jersey & Sea Shore, the Northern Central and the Long Island railways, a sufficient proportion of all the Pennsylvania system's mileage is comprehended to permit grafting the result upon the figures of net capitalization derived from the preceding table. Equally difficult is it to secure entire uniformity because of the different forms of accounting employed. Most of these figures have been taken from the Manual of Statistics for 1907, supplemented by examination of individual reports. The greatest ambiguity is in the treatment of fixed charges. The practice respecting sinking bonds is quite varied. The North Western regularly credits its income from "Omaha" stock against fixed charges, thus reducing them substantially. In this table taxes are included with fixed charges for purposes of comparison. Nor has it always been possible to treat rentals uniformly; but in the main it would appear that guaranteed rentals like those on the Boston & Maine system are included with fixed charges; while rentals contingent upon earnings, as in the Pennsylvania group, are excluded from the statement of fixed charges, as given. It should also be noted that these figures for earnings are those reported for parent companies. They are not compiled, as were the data concerning capitalization by aggregating the precise returns for each separate corporate unit. Jointly held terminal companies are seldom included in statements of the great systems. Undisclosed profits or losses may readily disappear in intercorporate accounting within each system. It has recently been charged that the Illinois Central has not made clear its obligations assumed in the guarantee of bonds of the Yazoo & Mississippi Valley road. It is probable, however, that the balance is heavily on the profit side; in other words, that more surplus earnings are left undivided than losses are concealed. As for the figures of traffic density, weighted averages of the component parts of each system have been computed when not reported for the system as a whole. The principal exceptions are the Pennsylvania, New York Central and Union Pacific, where only parent company results are given.

In comparing net earnings with capitalization, how does one know that the properties are being uniformly maintained out of expenditures for operation? May not some be deteriorating through postponement of proper maintenance, while others are being steadily improved by a liberal policy in this regard? A case in point is the experience of the Chicago & Alton under Hawley management. This road initiated 4 per cent. dividends in 1907, showing them, however, as barely earned. In the succeeding two years expenditures for maintenance of way dropped from \$3,120 per mile of line to \$2,494 in 1909. Had not the road been thus "skinned," as it appears, the dividends would have been far from earned. The property has not recovered from the recent Harriman piratical raid sufficiently to render such tactics safe. Yet a bold comparison of expenditures for maintenance of way and equipment per mile of line would be unfair. The need for such outlay varies more or less in proportion to the load of utilization. Maintenance, if compared, should be given in terms of density of traffic. Thus in 1907 the Union Pacific expended \$3,175 per mile of line for maintenance of way; the North Western expended only \$2,333. But the density of traffic of the Union Pacific road is 60 per cent. greater. Maintenance of way expenditure in terms of 100,000 ton-miles of freight density are only \$268 for the Union Pacific, against \$324 for the North Western, per mile of line. Despite appearances, due regard being paid to density of traffic, the North Western is pursuing the more conservative policy of the two.

The principal conclusion supported by this second table is that, as a rule, the net return upon the net capitalization of all American railways as a unit, after settlement of fixed charges, is far from excessive. From an average of 6 per cent. for the United States, this balance for interest and dividends ranges from less than 3 per cent. on the Chicago Great Western to 10 per cent. on the Union Pacific. The D. L. & W., with net earnings of 15 per cent., is abnormal, as already noted. Of course, the actual rate of return on the capital stock of parent companies

is higher than this, they being the resident holders of property after interest on bonds and subsidiary companies are paid for. But even with this allowance the rate appears not to be excessive, as inspection of the last column demonstrates. For comparison the figures for other countries are as follows:

	Capitalization Per Mile	Net Earnings Per Mile	Net Earnings to Capitalization
Great Britain, '06	\$11,000	\$4,000	3.6%
France, to C. & A., '04	\$10,000	\$4,000	4%
Germany, '09	\$10,000	\$4,000	4%
United States, '06	\$8,050	\$4,800	5.9%

This low rate of return for American railways, as a whole, being expressive of a ratio between two variables, may be due to either one of two facts. Either the earnings are unduly low, or the capitalization is too high. As to the second assumption, whatever may have been true of conditions a generation ago, it certainly does not appear that at present the capitalization is unduly high, as measured in terms of cost or physical value. And this comparison with leading European states appears to support this view, when our railway net is considered as a whole. For our capitalization per mile of line is distinctly the smallest in the list. But, on the other hand, when we take the average for the United States and line up individual companies alongside it, the ill effects of excessive capitalization in specific instances at once appear. This comparison may perhaps best be effected by putting our railway systems into typical groups, ranging in order from what may be termed financially conservative systems to unwisely ordered ones. At this point, however, it should carefully be noted that these comparisons should not always be regarded as indictments of existing managements. Nowhere than in the field of corporate finance is it clearer that the evil men do lives after them. The notorious past of some of these companies, like the Erie under Jim Fisk and Jay Gould, or the Chicago & Alton, as reorganized by the late Mr. Harriman, must be held accountable for their present financial hardships in a large measure. The difficult task of rescuing these properties from their slough of overcapitalization requires talent of a high order coupled with infinite patience.

Reasonable capitalization, from one point of view, being entirely a matter of relativity between two variables, it makes little difference whether low capitalization and modest earnings or high capitalization and rich returns be coupled up. But in either case it is imperative that the burden of fixed charges be low in order that the balance may be satisfactory. The first two groups of properties therefore at the head of the list of conservatively financed roads are both characterized by fixed charges of from \$1,000 to \$3,000 per mile; that is to say, by fixed charges absorbing less than half and ordinarily not more than one-quarter or one-third of net earnings from operation. The balance remaining, therefore, is sure to be satisfactory; that is, to say, from 4 to 8 per cent. on net capitalization. But the marked contrast between these two groups in the first class is that one is capitalized between \$30,000 and \$50,000 per mile, with earnings per mile centering about \$3,000; while the other is capitalized very much higher, at \$50,000 to \$100,000 per mile. (Baltimore & Ohio alone exceeding that figure, but its net earnings are correspondingly large, viz., from \$4,000 to \$7,000 for the same unit.) This difference in earning power is, of course, largely the result of differences in density. The granger roads all have less than 1,000,000 ton-miles of freight traffic per mile; while the second group rises to 5,000,000 ton-miles per mile of line. (The Great Northern alone has a density more closely allied to that of the granger roads. Its profits result from phenomenal economy in operation.) The important point is that the relativity between the two variables is such that the net earnings stand to capitalization at between 6 and 10 per cent.; and that the fixed charges to be deducted are relatively moderate in amount.

Fixed charges, it will be noted, on the Delaware, Lackawanna & Western are enormous—\$11,600 per mile of line. This is more than twice the fixed charges on the Erie. But earnings are likewise so phenomenal, more than twice those of the Pennsylvania or New Haven systems, that, while fixed charges absorb two-thirds of net revenue, a substantial balance remains. This

balance focussed on the small capital of the parent company explains the phenomenally high market price of its securities.

	Capitalization	Per Cent. Net	Per Cent. Fixed
	Per Mile	to Capitaliz'n.	to Net Earnings
CLASS I.—Group A:			
Northwestern	\$31,000	9.2	30
St. Paul	30,800	8.9	30.4
Illinois Central	39,400	9	46
Atchison	50,600	6.6	37
Group B:			
Great Northern	\$57,500	7.1	43
Union Pacific	64,800	10	21
Northern Pacific	65,000	7.4	24
Norfolk & Western	88,000	6.2	34
Pennsylvania	86,400	8.3	42

The prejudicial effect of a heavy burden of fixed charges may next be demonstrated by segregating in a second class the companies thus characterized. But at the same time the systems in this class all enjoy ample or high net earnings. In other words, while heavily burdened, they possess sufficient earning power in normal times to support it. The real test of this group is applied in times of depression. Under these circumstances the stability of the surplus after fixed charges is apt to be endangered. By way of contrast, the Pennsylvania, in the preceding group of roads with low fixed charges, having financed its new improvements by stock issues instead of bonds, witnessed during the depression of 1908 a decline of gross earnings of \$52,400,000, while reducing its net earnings after fixed charges by only \$2,971,000. The Union Pacific, having followed the same policy, is equally impregnable financially.

	Capitalization	Per Cent. Net	Per Cent. Fixed
	Per Mile	to Capitaliz'n.	to Net Earnings
CLASS II.			
Boston & Maine	\$55,000	6.9	30
New York Central	84,500	6.5	63
New Haven	96,600	8.7	47
Baltimore & Ohio	106,000	7.2	43
Reading	169,000	4.1	64

Among these five companies, fixed charges (including fixed rentals) consume between \$3,000 and \$4,000 per mile; that is to say, from 40 to 80 per cent. of net earnings. This is a burden of fixed charges approximately twice as great as in the first class. But, on the other hand, the rate of their earnings, sometimes attaining nearly \$8,000 per mile, a comfortable balance usually remains, nevertheless. Systems in this class are commonly so financed that this balance after fixed charges and rentals, while seemingly small, is focussed upon a parent company, in itself modestly capitalized. The result is that a normal rate of return is thereby established. This point has already been illustrated by the case of the Boston & Maine. But the peculiarity of several of these companies is the fluctuating nature of this rate of return. Alternately fat and lean balances follow changes in industrial property. On the other hand, the fixity of the return upon much of the capitalization concentrates the growth for future years upon a small basis of capital stock. The financial potentialities of some of these companies may be very great. Yet for the present they do not afford the guarantee of steady returns, possessed by the groups of roads in the first class, as fortified by the advantage of low fixed charges.

Most of the companies in this group, it should be observed, are financially strong by reason of heavy density of traffic, high rates or both, giving them an ample earning power per mile of line. But in the case of other companies not in the enjoyment of such high earnings, the disadvantage of proportionately heavy fixed charges is very clear. Nor is it possible to overcome this disability readily even by maintaining the total capitalization upon a low basis. This may be shown by the following group of roads, assignable to a third general class. These are capitalized

	Capitalization	Per Cent. Net	Per Cent. Fixed
	Per Mile	to Capitaliz'n.	to Net Earnings
CLASS III.			
Seaboard	\$10,500	4	78
Missouri Pacific	33,500	6.7	80

at less than \$50,000 per mile, with earnings proportionately low, but they are at the same time saddled with fixed charges which absorb three quarters or more of their net earnings. Low earning power, whether resulting from low density as on the Seaboard, or from low rates applied to a fair density of traffic as

on the Missouri Pacific—and high fixed charges are a dangerous combination, even with modest capitalization.

Railways in the fourth class, as respects their financing, are characterized by abnormally high capitalization, ranging from about \$50,000 per mile of line on the Rock Island system to over three times that figure on the Erie Railroad. This absolutely high capitalization is not by itself their main claim to distinction; inasmuch as several properties in the preceding class were capitalized above \$100,000 per mile. The prime characteristic is a distorted relativity between capitalization and earning power. But it must be firmly grasped that it is this relativity and not the absolute volume of capital outstanding which is of moment. The Reading, capitalized nearly thrice as heavily as the Southern and with fixed charges equally greater, earns \$7,000 net per mile, as compared with \$1,800 on the Southern. But in both cases capitalization is so huge by comparison with earnings that a negligible balance remains for distribution. Net earnings from operation to meet fixed charges usually in this class of roads yield less than 4 per cent. on capitalization. Obviously not much balance can be expected after fixed charges are paid out of this. At this point, however, one may note a further subdivision of the roads in this fourth class. The first group (A), heavily

	Capitalization	Per Cent. Net	Per Cent. Fixed
	Per Mile	to Capitaliz'n.	to Net Earnings
CLASS IV.—Group A:			
Chicago Great Western	\$90,000	2.8	48
Rock Island	50,000	5	74
Group B:			
Southern	\$47,500	3.8	82
Wabash	92,500	3.5	93
Reading	169,000	4.1	64
Erie	169,000	3.9	78

capitalized in proportion to earning power, is somewhat more favored in respect of fixed expenses; less than half of net being devoted thereto on the Chicago Great Western. Strongly contrasted therewith is another group (B), even more heavily capitalized both absolutely and in terms of revenue power; and, moreover, utterly swamped by fixed charges, which absorb as much as nine-tenths of the relatively scanty income. All the roads in this group (B), whether with high or low fixed charges, may assuredly be characterized as overcapitalized from every point of view. Entirely apart from every consideration of value of the physical property, even the criterion of reasonable earning power in relation to capital issues, utterly fails. Indefensible financing is clearly expressed in the market value of their junior securities. In most instances the causes of financial impotence lie buried in the past. Present managements appear to be striving manfully to rescue them from collapse. But the difficulty is enormous. Factors which on conservatively financed roads make for prosperity, on roads of this class become almost unsupportable burdens. Thus, even growth of traffic, entailing as it does the necessity for heavy capital outlay, brings no relief. For, there being no adequate surplus earnings over fixed charges to draw upon, there is no recourse except to issue more securities. The one road in this group somewhat more favored than the rest is the Reading. Product of scandal and fraud of a generation ago, it is nevertheless true that its tangible assets of undeveloped coal lands are of great value. Its potential strength has, however, always been its actual weakness. Staggering for a generation under a burden of debt incurred in order to acquire a future monopoly of this indispensable commodity, its general traffic, together with its large share of the hard coal trade conducted at monopoly prices, seem likely to carry it on to a successful issue. Time, which with its ever-recurring interest periods so preys upon its fellows in this financial class, must ultimately prove its salvation. But in the meantime the public is taxed to pay interest upon the value of the coal supply of the indefinite future.

The foregoing analysis of the finances of individual systems has, it is hoped, firmly established the fact that reasonable capitalization is entirely an affair of proportionality. Mere absolute figures can afford little index as to financial status, either from the point of view of the investor or the public. A modest capital issue per mile of line may represent an improper fiscal policy; while sound warrant for heavy capitalization may be at hand.

MARVIN HUGHITT.

The retirement last week of Marvin Hughitt from the presidency of the Chicago & North Western and his election as chairman of the board of directors was an interesting event in the history of railways in this country. Mr. Hughitt was almost, if not quite, the dean of the presidents of large American railways. He became president of the Chicago & North Western in 1887. Sir William C. Van Horne did not become president of the Canadian Pacific until 1888. L. P. Ripley did not become president of the Santa Fe until 1896. Alexander J. Cassatt was not elected president of the Pennsylvania Railroad until 1899. James J. Hill became president of the St. Paul, Minneapolis & Manitoba in 1881, about a year before Mr. Hughitt was elected president of the North Western) and was elected president of the Great Northern in 1889, but he retired some time since from the duties of the presidency to those of the chairmanship. The only man who is now president of a large American railway and who was president before Mr. Hughitt was elected president of the North Western, it is believed, is Milton H. Smith of the Louisville & Nashville. But Mr. Smith's service has not been continuous. He was president of the Louisville & Nashville from 1884 to 1886, was vice-president from 1886 to 1891, and was then again made president.

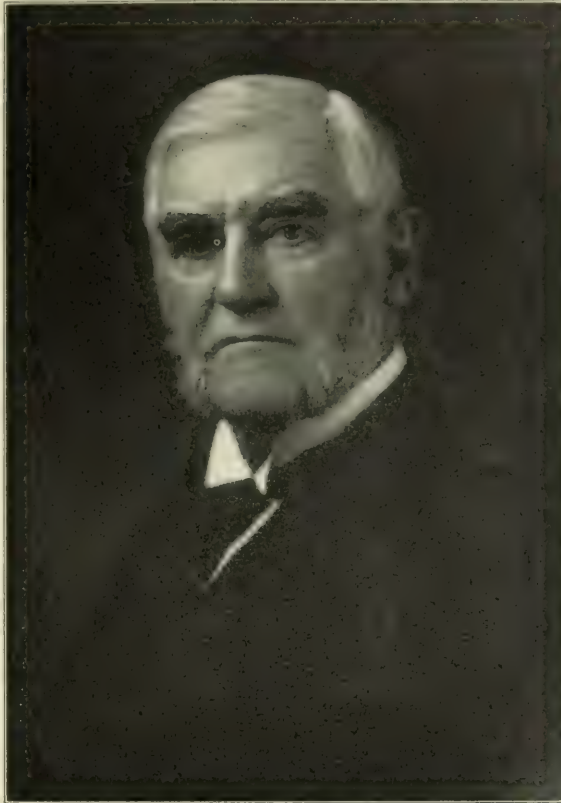
Mr. Hughitt's resignation to assume the less active, but hardly less responsible, duties of the chairmanship of the board is in accordance with a precedent which has been set within very recent years by a number of railway presidents, including James J. Hill, George B. Harris, of the Burlington, and Oscar G. Murray, of the Baltimore & Ohio. W. H. Newman also recently retired to a place on the New York Central's board; and J. T. Harahan has confirmed a report that he will soon retire from the presidency of the Illinois Central to become chairman of its board. The changes in the presidencies of large railways have come so fast lately that it is evident the younger generation will soon be responsible for their management.

Mr. Hughitt's career stands out as one of the most successful in the annals of the railways of this country. He will always be recognized as one of the most conscientious and able of railway managers. When he became president of the Chicago & North Western in 1887 it operated a total mileage of less than 4,000 miles. This did not include the Chicago, St. Paul, Minneapolis & Omaha, which in 1887 had a mileage of 1,340 miles. Mr. Hughitt was president of the latter road for five years before 1887. In 1910 the North Western operates 7,629 miles, and the Chicago, St. Paul, Minneapolis & Omaha, 1,739 miles. Mr. Hughitt retired from the presidency of the Chicago, St. Paul, Minneapolis & Omaha two years ago and was succeeded by William A. Gardner, who now succeeds him on the North Western.

The increase in the mileage of the North Western system con-

vinced that a rather clear idea of the development which took place in the property under Mr. Hughitt's management. He is sometimes referred to as a "conservative" railway manager. A better statement would be, in the parlance of modern politics, that he has been a "conservative progressive." There has been nothing sensational about his methods, but they have been constantly progressive, and in the very best sense of that word. He has apparently had two ideals. One has been to make such extensions and improvements as would develop the maximum traffic and enable it to be handled with the maximum economy, thereby making the property as profitable as possible to those who invested their money in it; and the other has been to give the public the very best service that it was possible to render. Perhaps the latter ideal occupied the foremost place in his mind. In any event he has succeeded in realizing both ideals in a pre-eminent degree. His conservatism is illustrated by the fact that

he never allowed himself to be tempted into building an extension to the Pacific coast. The North Western for years has had very satisfactory through traffic arrangements with the Union Pacific and other Harriman lines. It has delivered a good deal of business to them, and they have delivered a good deal to it. If it had built to the coast it would have become a competitor of, instead of a connection with, the Harriman lines, and it is questionable if it would have been as profitable for it to have entered into the Pacific coast competition as it has been for it to maintain its present traffic arrangements. On the other hand, Mr. Hughitt has shown an unflagging perseverance in building extensions and branches everywhere in the North Western's immediate territory. A consequence of this steady, but never sensational, development has been that the road has never been to any considerable extent burdened by unprofitable branches. Hardly a railway in America has a finer dividend record. It has never failed to pay a dividend in any year since 1878. From 1887 (when Mr. Hughitt became president) to 1894, it paid 6 per cent. on its common



Marvin Hughitt.

stock. In 1895 it paid 4 per cent.; from 1896 to 1899 it paid 5 per cent.; in 1900 it paid 6 per cent., and since then it has regularly paid 7 per cent. Its ability always to meet its obligations to its bondholders and stockholders has been due both to its conservative but steady development and to the fact that its securities have never been the subject of manipulation.

While the road has been constantly strengthened by strategic extensions to every part of its territory, millions have been spent both from earnings and from capital to put it in fine physical condition. It has been double-tracked from Chicago to Omaha, from Chicago to Milwaukee and most of the way from Chicago to St. Paul and Minneapolis. Its equipment, roadway and structures have been kept in excellent condition. It has an exceptional mileage of block signals, and is to-day universally recognized, mainly as a result of Mr. Hughitt's management of it, as one of the best railways in the world.

Its service to the public has been such as only such a railway is able to give. When the Wisconsin Railway Commission finished its hearing on the passenger-rate question about three and a half years ago, one of the commissioners remarked that the only criticism he had to make of the North Western was that the service it rendered was too good; that it gave the public really more than the public could in reason ask. The large suburban business of the company at Chicago has been a thing in which Mr. Hughitt has taken special interest and pride.

Some time ago the Wells street station in Chicago became inadequate properly to take care of the 45,000 or more people who pass through it daily. It was in keeping with Mr. Hughitt's policy that, as a new station was needed, one should be built which should gratify the civic pride of the people of Chicago and should serve the road's needs for years to come. The new North Western passenger station and terminals, which are nearing completion, will, it is estimated, have a capacity for handling 250,000 people a day, and are a splendid monument to Mr. Hughitt's civic spirit. The inception of the station, the planning for it, and the carrying out of the plans were all his.

Mr. Hughitt's disposition to give the public a square deal, and even more than a square deal, has manifested itself in innumerable ways. It is not generally known that he was one of the very small minority of railway presidents who five years ago favored President Roosevelt's plan to give the Interstate Commerce Commission the power to substitute reasonable rates for those which it found unreasonable.

While he has been a man of many and important works he has been and still is a man of very few words. Anybody who has any business with him can see him at his office, and is received and treated with the courtesy traditionally characteristic of a "gentleman of the old school." But as Falstaff said of himself that he not only was witty, but was the cause of wit in others, so it might be said of Mr. Hughitt that he is not only brief, but he is the cause of brevity in others. When he has summed up a situation in his crisp, concise way, there is not much more to be said.

He does not entirely dislike publicity, but he hates to have it overdone. When he has allowed himself to be quoted in the press his statements always have been very brief, and the consequence is that while his name is known to people throughout the country, his views on public questions, including even regulation of railways, are not widely known.

Mr. Hughitt says emphatically that while he has retired from the presidency of the North Western he has not retired from active work, but that the position to which he has been elected is one with rather comprehensive duties and authority, and that he expects to devote himself to them in much the same way that he has devoted himself to the duties of president.

Mr. Hughitt was borne in Genoa, N. Y. He began railway work in 1856, with the St. Louis, Alton & Chicago, now the Chicago & Alton, as superintendent of telegraph and trainmaster. In 1862 he became a superintendent on the Southern division of the Illinois Central. While he was holding this position the government called on the road to move a large detachment of troops at a time when traffic was heavy. Mr. Hughitt himself took his place at the dispatcher's key and performed the task without interference to traffic. Immediately after the troop had been moved, the government ordered that they be transferred back from whence they had come. Although he had been at the key 36 hours Mr. Hughitt stayed at it for 36 hours more, and finished the job. Soon after he was appointed general superintendent of the Illinois Central. In 1870 he went with the Chicago, Milwaukee & St. Paul as assistant general manager. The next year he became general manager of Pullman & Palace Car Company, and in 1872 was appointed general superintendent of the Chicago & North Western. He became general manager in 1876, vice-president and general manager in 1880 and has been president since 1887.

What is perhaps his strongest characteristic is one which it is

rather hard to formulate. Reserve and self-reliance each come close to expressing it. He does not like to act with other people or other companies in the management of his own business. This independence and confidence has no tinge of obstinacy. While quick in his decisions, he is equally quick to see the value of the other man's opinion. This quality of his has kept the North Western independent and free from any agreement binding its policy or management. Its contracts with the Harriman Lines are purely traffic agreements, and its financial relation to the New York Central is not an inter-company relation, but is only owing to the fact that the Vanderbilt family have individual holdings in the stock of the North Western.

The reserve he has in his official work is also evident in his personal relations with other men. He does not gossip, particularly about other people and other railways; he is always a diplomat. Somehow he fixes in his own mind the status of every one with whom he comes in contact; and if the man is worthy of trust, he goes to almost any length in trusting him. He does not make mistakes in these judgments. This personal reserve adds dignity to his attractive personality, and he is the more popular for it.

The list of offices he has filled shows only operating positions, but he was a general superintendent at a time when every department of a road reported to that officer; so he had opportunities, not now given to operating officers, of learning the details of traffic and other departments of railroading. That he took full advantage of these opportunities is sure, for he knows how to concentrate. He goes right to the bottom of a subject, getting into his hands everything that pertains to it, draws his conclusions or takes action, and then throws the work back over his shoulder and is ready for something else.

WILLIAM A. GARDNER.

William A. Gardner, vice-president of the Chicago & North Western in charge of operation, has been elected to succeed Marvin Hughitt as president. Mr. Gardner already was president of the Chicago, St. Paul, Minneapolis & Omaha. He now becomes the administrative head of the entire North Western system. Mr. Gardner's promotion marks the achievement of an ambition of many years. He has long ranked among the very leading railway operating executives of the United States. It is understood that he has had inviting offers to leave the North Western, by the acceptance of which he could have become the president of a large railway system before this. But all of his railway career, except a short part of it when he was a boy telegraph operator, has been on the North Western. He has seen it grow from a system of 2,000 miles to one, including its subsidiaries, of almost 9,500 miles. He has risen step by step through all grades of the operating department. He knows the road as perhaps no other man except Mr. Hughitt knows it. He knows and loves the North Western and the North Western knows and loves him. Not unnaturally, therefore, he preferred to stay and take his chances with it.

No one who knows him or is familiar with his career will question that he will at once step into the front rank of American railway presidents. His life has been spent in the operating department. But he is much more than an operating man. He is a many-sided man of affairs and many-sided men are the kind needed to manage American railways under present conditions. It used to be that if a railway president were an honest man and an able and experienced executive, he had all the qualifications needed. His executive ability and experience made sure that the property would be well operated; his honesty made sure that the stockholders would receive all to which they were entitled. That day is past. The modern railway president, in order to make a first-rate success, must be not only an honest and able executive but also a student and a diplomat, a railway statesman. Mr. Gardner measures up to these requirements.

That he is a diplomat is shown by the fact that he is per-

usually extremely popular with newspaper men, lawyers, men and public men who know him, and also with the officers and employees of the North Western, from the top to the bottom, although he has always courageously and vigorously defended the right of the railways to the same sort of public protection that is given to other commercial concerns, and has been a firm disciplinarian in dealing with all his subordinates. The public likes him because, while vigorously defending the right of the railways, he has always frankly conceded and tried to give to the public everything to which it is entitled. The employees like him because, while a firm disciplinarian, he is a just and kindly one; and every man feels he can get from him a square deal. "I have always tried to be a good subordinate," he said in a newspaper interview after his election as president. A good subordinate is pretty apt to have good subordinates. Then, Mr. Gardner has an uncommonly attractive personality. He can refuse a request from a community or from employees and leave a better feeling than many men would leave if they granted it.

He is a good student, both of books and of men. He was one of the earliest among railway officers to recognize the fact that the roads must submit to reasonable regulation. He has been one of those who have seen most clearly that in order to create a more favorable public sentiment toward the roads it is as necessary to reduce the number of things in railway administration that are not defensible as to defend skilfully and courageously those things that are defensible. His utterances on public questions have been infrequent, but they always have been effective. He doesn't pose as an after-dinner speaker, but there are few busy railway men who can make as witty and entertaining a post-prandial talk. His testimony in the recent hearings before the Interstate Commerce Commission at Chicago in the rate advance cases was an extraordinarily strong statement of the case of the railways on both economic and practical grounds. No man could have given it who had not been a sound student as well as a hard-working and keen-thinking railway executive. It was not only a strong argument, but it was illuminated by numerous epigrams which epitomized the railway case in a nutshell. When counsel who was cross-examining him called attention to the North Western's large surplus as evidence that its rates were high enough, he replied: "The surplus expresses an efficient administration as well as a remunerative rate. If the position were swept away that efficient administration produces a surplus as well as high rates, there would be no incentive for efficient administration." When reference was made to the fact that the railway exercises the right of eminent domain and it was contended that for this reason the road's earnings may properly be held down to a lower basis than those of a commercial concern, he replied: "The exercise of the right of eminent domain, while it may give the power to regulate railways, does not render

the North Western immune from the ordinary commercial rule when we undertake to better roads." He knew how the commission was to argue and how to fight back on increasing the amount of expenditures for its operation as maintenance, and replied, "The physical condition of a railway is like a case of typhoid fever; it never stands still, but always gets better or worse." "If prospective business demands greater expenditures for up-keep, we shall have to make them."

As the operating executive of the North Western, it has been his duty largely to carry out Mr. Hughitt's policy of developing the strategic possibilities of the road and the possibilities of better and more economical operation, and at the same time, in co-operation with the traffic department, to give the public the best practicable service. How well he has done his part is indicated by the present excellent physical condition

of the road, the service that it gives and its financial results. Perhaps no other railway management has learned better the lesson of the blockade of traffic four years ago than did the management of the North Western. The thing most needed to enable the railways better to handle their growing traffic is improvement in terminals; and during the last few years very extensive enlargements and improvements have been made by the North Western in its various terminals, particularly in those at Milwaukee and Chicago. In both these cities it has built outer belt lines to take as much of its through traffic as possible outside of the city limits. It has made and is still making large additions to, and improvements in, yard facilities, particularly at Chicago.

Mr. Gardner is only 51 years old. He was born at Gardner, Ill., and began railway work in 1872 as a telegraph operator on the Chicago & Alton at Le-mont, Ill. Six years later he went to the Chicago & North Western as a clerk and was later made operator in the office of the superintendent. For five years from 1885 he was assistant superintendent of the Wisconsin division and was then made superintendent. He was appointed assistant general superintendent in October, 1896, and three years later was made general manager. In January, 1906, he was elected vice-president, and became president also of the Chicago, St. Paul, Minneapolis & Omaha in October, 1907.

He is a slender, gray man of a nervous temperament. While, perhaps, there cannot be said to be very much iron in his constitution, there is a deal of steel in it, and he knows how to take care of himself, which is often better than having an "iron constitution." He is a fast, systematic, tireless worker, and under him the North Western will have a public-spirited, efficient, progressive administration.



William A. Gardner.

The Chilean Government has 1,677 miles of railway completed and 1,346 miles under construction, while private interests have 1,920 miles completed and 106 under construction.

BRIDGE AND BUILDING CONVENTION.

The twentieth annual convention of the American Railway Bridge and Building Association was held in Denver, Colo., October 18 to 20. The following subjects were taken up in committee reports:

PROTECTING EMBANKMENTS AGAINST CURRENTS

E. L. Loftus (Q. & C.), Chairman of Committee.—In many instances serious washouts occur because ordinary trestles have been built where there should have been larger clear waterways. In well-driven pile bent trestles the earth may be scoured from around the piling, and cause the bridge either to be washed away, or the flow of water retarded and a washout occur at the approach of the trestle or other point, and frequently rise to flow entirely over the roadbed on either side of the structure. A stream may overflow and fill in the land on the upper side of the road, and if this condition is allowed to continue a few years it may become necessary to raise the track in that vicinity, particularly if the soil is of a sandy nature. It is often the case that culverts are placed under roadbed sufficiently large to carry the water, but they become choked with drift and the fill is washed out. Such danger can be obviated by making the opening larger, and, of course, any brush or obstruction at or near the mouths of culverts or trestles should be removed as often as such accumulations occur. When several panels of a trestle are washed out and it is desired to pass trains quickly, a good plan is to point piles and work them into the soil with cant hooks. When all the piles have been set and braced, place sash near the grade and jack them in. After all of the bents have been placed in this manner, with the track standing sufficiently high to allow for settling, run empty cars over the structure to settle it, and then block up. Then run over the loads, after which allow the engines to cross, but the first engine should not move faster than ten miles per hour. Work done in this manner will require close attention until piles can be driven. Frequently such a temporary structure can be built and traffic resumed before a pile driver can reach the defective point. The piles for this temporary structure can sometimes be cut from woods near the washout.

When a low fill is washed out and the track is not turned over, it can readily be lined back to its original bed without taking it apart; but, if the track is turned over it is cheaper to first remove the ties from the rail. In that event have the ties placed on the roadbed and the rail moved to one side by lifting it with a large force and dropping it upon the ties without uncoupling.

Where the overflow occurs frequently the track should be raised above the danger line. Until this can be done the trestle should be securely anchored and the track ballasted with heavy stone or slag. If it is not possible to secure either kind of ballast, a Bermuda sod is very good. The track also should be anchored at such points. This can be done by driving piles alternately 30 ft. apart. A very cheap and effective way is to bore holes near the ends of the ties alternately 30 ft. apart, and drive a 1¼-in. bolt into the roadbed, leaving the nut on the upper side. The work of driving can be done from a push car.

A wash or slide may occur at the side of a fill or near the mouth of an opening. Such trouble is frequently due to the manner in which water is permitted to strike the opening, and it can frequently be obviated by changing the current. Should it not be practicable to change the water course where it runs parallel with the roadbed it may be riprapped with heavy stone. In such a case it is a good plan to dig a good foundation 2 ft. below the surface, begin the wall in the ditch and run it up at a slope of 2 to 1. The bottom of the ditch or channel should be floored with heavy stone. Such construction will frequently answer the purpose of a concrete wall and can be built much cheaper. A wall should be used at the ends of all trestles that are subject to wash. In cases where slides have occurred, caused by the current undermining the roadbed, and rock cannot be secured, it is advisable to drive piling at the lower edge of the fill and begin a wall of timber well under ground. Timber of

12-in. x 12-in. size should be placed on the side of the piling nearest the track. This construction will hold securely until the timber decays.

If the earth is of prairie formation it is subject to cracking during dry weather, and when the rains begin the water is absorbed by the cracks, and if the fill is inclined to slide, from any cause, it is more liable to do so after heavy or continuous rainfall. This can be prevented by ballasting and spreading the ballast to the slope from the ends of the ties to the outer edge of the fill. A spread of 4 to 6 in., to retain the moisture, is required. The cracks will not occur where the sun is kept from the earth. Clay or soil of a sandy nature will answer when ballast cannot be obtained. If the fill is of a sandy nature the entire embankment is inclined to wash, but if a spread of 4 in. of cinders be placed on the fill to the edge of the slope, on either side of the ties, the bank will not wash at all on top and not nearly so badly on the sides. The falling water, being absorbed by the cinders, does not flow down the sides of fills with such force.

After the track is placed back on the roadbed and trains begin to move, the pile driver should begin work to replace temporary trestles. Slag or stone should be used to ballast the track and fill up small washes, but if neither stone nor slag is available the next best material with which to surface is clay. The timber used for cribbing should be removed as the track is surfaced.

Where heavy drifts of debris accumulate against a trestle or piers a derrick car with a wrecking crew can be used advantageously; in fact, much more satisfactorily than an engine with block and fall. In removing drift to relieve a structure it is sometimes advisable to use dynamite. Where heavy washing or scouring is being done by the currents and rock is not available, use bags of sand freely, as they can frequently prevent bad breaks in the roadbed.

There are cases where nothing in the way of a temporary trestle would be advisable, and piles must be driven with extension drivers from both directions. Where there is no water to interfere, frame bents should be erected in addition to driving piles; but if plenty of 12 x 12 timber and cross ties are at hand cribbing can be used to advantage. The foundation for cribbing should be built of 12 x 12 timbers or stringers, and placed so as not to interfere with the driving of piles after the traffic has been resumed. This can be quickly and effectively done by building pens. Bents can then be driven between the pens. Again, if there are enough long 12 x 12 pieces, use them after getting the foundation timbers in. This can be done quickly, particularly if the timbers are handled with a derrick car.

When a bridge is found to be settling, due to scour under a pier, it is necessary to drive a bent on either side of the pier as quickly as possible. After getting two bents in on either side and the bridge seated on the timbers and bolted, the trains can be passed with safety until the pier is reset. If it is not possible to drive piles, place false bents until the settling can be stopped, after which drive the piling as directed. Sand bags or stone dropped around the pier frequently prove beneficial.

Should a wash or slide occur on one side of the roadbed, where the bank is still good on the opposite side, and the track cannot be lined over far enough to carry the trains, drive piles eight feet apart near the rail and place a 12 x 12 timber on the piles longitudinally under the rail, to support the track.

The New Orleans & Northeastern has used piles for protecting the embankment along the shore of Lake Pontchartrain against storm waves from the lake. The road was originally on a pile trestle, which was later filled by means of a floating dredge which was operated on the opposite side of trestle from the lake. The material used in filling was composed of shells, sand and marshy soil.

The protecting piles vary in length from 26 to 40 ft., depending on the depth of the water. They are driven about 16-in. centers, and on a line 100 ft. from center of the main track. Spacing the piles 16 in. centers allows 4 to 6 in. between the

piles from the surface of the water to the bottom of the water. The storm, beat more or less sand and shells between the piles and material filling has resulted. In addition, the space below the waves to break, and part to go through, whereas a solid wall would cause the waves to fall back and undermine.

The piers are cut off 8 ft. above low water. The driving is done with a "creeper," or land driver, and the overhang is about 18 ft. Every 18 ft. two outside piles are driven and temporarily capped to carry the driver. The cost for driving is 15 cents per foot of pile. Some of these pile butts show "cat faces," or scars, from cutting for turpentine. These are very rich and resinous, and extend down 2 ft. and over, and as the piles in the water are always wet, but little decay has resulted in some fifteen years.

Considerable trouble has been experienced with sliding embankments of the Yazoo Canal along the tracks of the Alabama & Vicksburg, at Vicksburg, Miss. This embankment is about 40 ft. above zero water and apparently has a sub-drainage during the low stage of the river, causing the bank to slide. A method for stopping the slide, suggested by an engineer of the United States government, was to drive piling close together in rows, these rows being at least 50 ft. apart; but this method failed. Later it was decided to drive piling in a manner similar to that of foundation work, spacing the piles from 4 to 6 ft. apart in all directions, which stopped the slide altogether. For this work a floating pile driver equipped with a No. 1 Vulcan steam pile hammer was used, weighing 10,500 lbs. The piles were driven with the butt ends down, which offers more resistance and strength at the bottom of the slide where it is most needed. The driving of 40 or 50 piles constituted a day's work.

H. Rettinghouse (C. & N. W.).—Experience on the Missouri river has shown that the driving of piles does not remedy the sliding of embankments, in many cases apparently aggravating the trouble. The only method applicable to such conditions is to use willow mattresses, woven with wire, laid on the bank and extending down into the water, loaded with rock.

William Spencer (C. & N. W.).—The C. & N. W. uses rip-rap of heavy stones with the cracks filled in with small pieces. The company gets its stone at the quarries at a cost of 40 to 60 cents a ton and it costs 25 cents a ton to place it.

J. M. Staten (C. & O.).—Along the James river we have had considerable trouble with washing out on a fill 2 to 8 ft. high. We remedied this by driving two small chestnut piles about 10 ft. long into the embankment at intervals of 30 ft. The piles were driven near the ends of a tie and directly under it, the tie being removed during the operation. When the piles are in place the tie can be relaid, and a 1-in. hole bored through the tie and into the pile. Into this hole is dropped a $\frac{3}{8}$ -in. drift bolt from 18 to 24 in. long. The bolt hangs loose, allowing the track to move up and down freely under trains, but is absolutely prevented from moving horizontally, as is the case in a washout. We have experienced no trouble in keeping the track in surface and line.

Mr. Scribner (St. L. S. W.).—We sometimes build a guard cut into the stream to divert the current where a bank is being scoured.

J. N. Penwell (L. E. & W.).—In many places where slight scouring is feared the planting of a few willows or other suitable trees on the bank will form an efficient protection.

Mr. Humphrey (C. R. I. & P.).—In places where silt overlies quicksand, after a season of high water the quicksand flows out into the stream to fill in the holes left by the scouring of the high water and the bank above the quicksand falls noticeably. In this case surface protection does no good and we have been unable to devise a means of preventing the trouble.

CAST IRON PIPE CULVERTS.

A. A. Page (B. & M.), Chairman of Committee.—A large number of requests for information were sent to the members and 87 replies were received. A large number would take great care in putting in a substantial foundation for the pipe, using old bridge timber for grillage and a cradle, or a concrete founda-

tion the whole length of the pipe. A concrete pier under two joints, thus practically avoiding the danger of pulling apart. Various methods were suggested for repairing broken pipe or joints that were pulled apart, some using rods with turn-buckles, or with a long thread, to draw the pipes together. Many, however, advocated digging the pipe up and relaying, or digging down to the joint and repairing with concrete.

The following are among the letters received:

W. C. Cushing (Penna. Lines).—In placing cast iron pipe 24 in. or more in diameter, build under each joint a block of concrete, 12 in. thick, 24 in. wide, and 48 in. long, parallel with the track. The pipe should be laid in position before the concrete is placed, so that it will get a good bond on the hub of the pipe. The ground around the pipe, for its full length, should be carefully tamped. We recommend that where pipes are put in under tracks in service the stringers supporting the track be left in place for several months, until the ground has become well settled around the pipe, before the full weight is thrown on it.

In slips, the best method of holding the pipe in place is to carry the small concrete piers to the bottom of the slip, if this is not too deep. In cases where the slips have been deep, we have driven pile foundations, three piles in a row, spaced 2 ft. on centers, parallel with the track, and spaced 4 ft. center to center parallel with the pipe. The top of the piles were concreted and the pipe laid on the concrete. Where a culvert in a slip was treated as above, in 1907, no movement has since occurred, either in the pipe or in the slip.

M. M. Barton (P. R. R.).—I have laid one 4-ft. and one 6-ft. (diameter) cast iron pipe in 12-ft. sections in the bed of the drainage canal, where there was a soft mud or muck bottom. In these cases we constructed a raft of old trestle timber the entire length of the culvert, with a bolster or cradle spiked on the raft for the pipe to rest in and keep it in line. We then floated the raft in place under the roadway, anchoring it to the pile trestle bents which support the track. After it was secured in position we laid the pipe at low tide and followed with the fill. The 4-ft. pipe has been in about seven years and the 6-ft. pipe more than three years, and both are in good condition.

R. G. Develin (P. R. R.).—On the mountains, or where our pipe culverts have much of a fall, we clamp them together with three clamps, these being about $3 \times \frac{3}{4} \times 16$ in., bolted to the pipe on the inside. We do not put any clamps on the bottom of the pipe, as we want to leave the bottom surface as smooth as possible. We have been doing this for some years and have had no trouble with our pipes pulling apart.

B. F. Gehr (P., C. & St. L.).—My experience with laying cast iron pipe in soft ground is to place a cement pier just back of each bell; and, if under a heavy fill, also at the center of the pipe section, on a uniform grade. If the soil is such that it is necessary to build cement piers and there is still fear of settling a small amount under the track, it is well to leave the line of pipe crowning in the center. In addition, holes may be drilled in ends of the pipe and $\frac{3}{4}$ -in. rods may be run through from the inside and bent over on the outside. I would use four clamps at each joint for a 3-ft. pipe and more or less according to the size of the pipe. This arrangement will prevent the sections from pulling apart.

A good method of repair when pipes are pulled apart is to draw them together with a steamboat ratchet or screw buckle.

W. Renton (B. & O.).—We had one pipe culvert with pile foundation settle to one side on account of soft ground on that side. We had to uncover it and couple up the pipe, which was 36 in. in diameter, and after we got it in place we used a $2\frac{1}{2}$ -in. rod 60 ft. long, running it through the pipe and anchoring it at each end. Another culvert settled and the pipe pulled apart. We put it back to place on a concrete foundation, buried it in concrete, and have had no trouble with it since that was done.

We have laid cast iron pipe culverts in soft ground on timber foundation, 10 or 12 ft. wide and the full length of the pipe. We generally use for this purpose second-hand bridge timber. Water covering the timber prevents decay.

D. B. Taylor (B. & O.).—The method I have used in clamp-

ing the pipes together is by using a hoop shape made either of round or flat iron, size $1\frac{1}{4}$ in. for 24 to 36-in. pipe, with three or four eyes in this, equal distances apart, placed on the extreme upper end of the culvert. Have this hoop shape made the exact size of the large part of the bell end of the pipe, and then similar hoops made to be placed below each of the bell ends of all the lower joints, to fit the outside of the pipe neatly, with six to eight eyes in them for the rod connections. The rods have threaded ends with nuts, to be tightened with a wrench and equally adjusted.

R. H. Reid (L. S. & M. S.).—Where we have placed iron pipe in extremely soft ground we have sometimes driven piles on both sides of the culvert line, capping these piles crosswise under the pipe, just back of the bell, so as to form a two-pile bent under each 12-ft. section of iron pipes; or, if the conditions warrant, we put two bents of two piles each under each section of pipe and place the pipe on saddles, the saddles being cut out to fit the curve of the pipe. We then fill in carefully over the pipe. In addition to this, where we have found it necessary, we have placed iron rods entirely through the pipe on the inside, with hooks over each end of the pipe with one or two turnbuckles in the rod for drawing them up tight.

In other cases of soft ground where the conditions have not been bad enough to require pile bents, we have placed old ties or old bridge stringers for saddles and have laid the pipe directly on them, clamping the pipe together with rods, as above mentioned. In one or two cases we have drilled holes in the pipe near the end and fastened the sections together with iron straps bolted through these holes. Where pipe culverts have pulled apart in soft ground, it is generally necessary to dig out one or two sections at each end, depending upon conditions, and close up the joints by resetting the pipe; and, if conditions seem to require it, place the iron rod clamp through the pipe culvert, as above noted. These methods have given general satisfaction and are still in use.

C. A. Stelle (W. & L. E.).—We have, on different occasions, used two methods. One has been in use for some time at Fremont, where the filling is settling next to the river. In this we have put a $1\frac{1}{4}$ -in. rod through the 48 ft. of 24-in. pipe and a heavy iron bar at each end. We then screwed the sections together. This was done several years ago and the plan has been successful, although once the thread on the rod stripped and allowed the pipe to part. We, however, replaced this rod, and have had no further trouble.

At several other places on our line where the pipe had been placed on soft ground, I have used, in one instance, old car sills, laying about three of these sills in the bottom of the ditch, and placing the pipe on the same, thus providing against one section dropping below the other in case of pulling apart. This method has been successful in two instances, and in a third instance I have used 12 x 12-in. timbers with good results.

J. P. Canty (B. & M.).—It has been our practice when installing iron pipe under tracks to drive two rows of plank sheeting parallel to line of culvert and about 12 in. farther apart than the outside diameter of the bell end of the pipe between which, after excavation has been made to proper depth, a floor of concrete about 6 in. thick is laid. Upon the latter the cast iron pipe is placed, and the space outside of the pipe, between it and sheeting, is filled with concrete. We also cover the pipe on top to depth of 6 in. with concrete. The culvert pipe is thereby enclosed in a concrete casing that is square on the outside, the dimensions being about 12 in. greater than outside diameter of the pipe. As an additional precaution the plank sheeting is sometimes left in place.

With concrete laid on these culverts, the foundations of which are carried about 3 ft. 6 in. below the bottom of the culvert opening, we have had no trouble. The length, height and thickness of head walls, well, of course, depend upon the height of the fill behind the same. Cases where pipe were broken under the track or pulled apart have not bothered us, as I now can recollect, except in places where there have been comparatively low fills. In these situations we simply put temporary

stringers under rails, resting on the earth at the ends, of sufficient size to carry the load for the opening desired, and after excavating down to the pipe, relaid it as outlined above. In deep fills, where extremely long piles would be necessary to make an opening down from the track for such cases, I would advise tunneling from the end of culvert, if it was not possible to remedy the trouble from the inside of culvert pipe.

C. S. Knickerbocker (N. Y., O. & W.).—It has been our practice to put rods the entire length of the culvert, inside the pipe, and the same on the outside, to prevent the iron pipe from pulling apart. In this case, of course, the ends are enclosed in concrete, which is part of the parapet wall.

F. L. Stuart (Erie).—While it is true that no pipe should be put in where the foundations are so soft that it is liable to pull apart, in unimportant work the risk is sometimes taken, on the score of economy. In such cases I think the plan which offers the most hope of holding the pipe together is to lead the joints, put in a gravel foundation, build head walls and tie them together independently of the pipe. My idea is that the tying of the head walls would give some play to the pipe, whereas if clamps were put on at each joint they virtually make a girder of the entire pipe, and a settlement of the embankment will break this girder much sooner than it will open up the pipe with the head walls tied together.

Thomas L. Dunn (Maine Central).—I have put in very few pipe culverts on concrete or masonry foundations. In putting them in on soft ground I have generally laid the pipe on timber, making a solid bed of ordinary second-hand cedar cross ties 8 ft. long. Such a bed is more elastic than masonry, and I think the pipes are less liable to pull apart. Ordinarily, too, when laying pipe culverts in soft ground the earth is very wet and the timber therefore lasts indefinitely. In two or three instances where pipes have pulled apart, I have simply had the pipes jacked up to grade and thickened up the timber bed under them. Then if they were pulled apart more than 2 or 3 in. I have had a short piece of pipe put in and made connection with a sleeve. If pipes were pulled apart but 2 or 3 in., I would put a belt of concrete around the pipe.

G. A. Wright (Illinois Traction System).—About the best thing to prevent pipe from pulling apart that I know of is to fill the chime of the bell end with good, rich cement mortar, well packed in. This will hold the sections together under ordinary conditions. I have found it necessary, in some places, to put rods from end to end, with strong hooks to reach over the ends of the pipe and turnbuckles to draw them up tight. In some places where one or two joints have been added to the pipe already laid to widen the bank for second tracks or sidings, I have placed these rods on the inside of the pipe. These pipes added for wider fills I have found the hardest ones to hold to place, as the new fill generally slides down the slope of old one and carries the pipe with it.

As to repairing them when pulled apart, I have pulled them back with a heavy chain and steamboat ratchet. In some cases I have found it necessary to excavate down to the top of the pipe and alongside to about the center of diameter, before being able to move them. The rods used were made up in 12-ft. lengths, and these sections were coupled together with welded eye. Old bridge rods were utilized for the material.

A. S. Markley (C. & E. I.).—After laying pipe in place fill the bell around the spigot end of the pipe full of grout made of one part cement and three parts sand. Care should be taken that the grout is well mixed and stirred up while pouring, so that the sand and the cement will not separate. Care should also be taken that a clay roll or pipe jointer is held firmly against the bell of the pipe, to prevent the grout from escaping through an open seam. This method has been our practice for the past ten years and has proved very successful. Previous to using this method, in a good many cases, joints of pipe would partly separate, more particularly those on the outer ends of high banks, until the head on the spigot end of the pipe would pull apart sufficiently to engage in the groove in bell end. In some cases, very rarely, the ends of the pipe will pull out of the bell,

disconnecting the joint. Where the ground was soft and the pipe likely to settle irregularly and out of line, the cement caking not being likely to hold, I have put three rods of about 1 in. diameter, depending on size of pipe, between free ends of pipe, with turnbuckles in the center of each rod, on the inside of pipe, to pull the section firmly together before filling. The rods are divided at equal distances apart. It is advisable the joints can be grouted, as above explained. After the pipe has thoroughly settled to a firm foundation the rods can be removed.

The only successful way of repairing pipe that is pulled apart under heavy banks is to dig them out and reset them. Under light banks, with open joints near the ends, I have jacked the ends up in line and pulled them together with crab and block and fall, either by anchoring the same at opposite ends of the pipe or by using jacks instead. Where the pipe has crushed under heavy banks I have lined them with one row of brick, laid rollerways, in cement mortar. This was done where the pipe was sufficiently large to take care of the water after lining. In one case this was done under a 60-ft. bank, and a 36-in. pipe flattened 3 in. out of true shape. This happened ten years ago and the pipe is still in good condition. In this case the pipe was broken under the center of the bank. At ends of the pipe, where it was undisturbed, no brick was placed. Where the brick terminated a sloping offset of cement mortar was put in to prevent drift, etc., from lodging against it. No trouble has been experienced in consequence of the installation of these brick.

Lee Jutton (C. & N. W.).—In repairing an open joint in a cast iron pipe culvert when the distance from base of rail to the bottom of the culvert is 5 ft. or less, the pipe should be dug out and relaid, at the same time providing a good foundation. When it is not advisable to do this, the joint can be repaired with concrete and cement. To do this the dirt should be taken out, as much as possible, under and around the pipe at the open joint and the space thus formed filled with concrete, finishing on the inside with cement mortar. If the waterway can be reduced at the culvert to be repaired, then a 6-ft. length of pipe having no bell may be put inside to cover the open joint. The difference in diameter between the two pipes should be enough to allow 2 or 3 in. of concrete to be placed between them. At the upstream end of the short length, the concrete should be tapered off, so that there will be no abrupt obstruction to the water.

J. D. Moen (C. & N. W.).—In my opinion, the manner of making repairs would be governed altogether by conditions. If the pipe is large enough for a man to work inside—say 36 in. or over—and the aperture is not too great, it might be cleaned out properly and filled with cement concrete. In cases where the pipe has pulled apart and either end has not settled below the line of the other section, a steel jacket might be fitted tightly on the inside to prevent any leaking or wash. If repairs are made with concrete, as mentioned above, it, of course, would be difficult to fill the upper part of the aperture.

J. M. Caldwell (C. I. & L.).—To repair pipe when it has pulled apart, I use old boiler iron bent to the diameter of the pipe, placing two pieces, with flanges, at the top side of the pipe and bolting them together through the flanges. We have discontinued using ordinary cast iron pipe and now have cast iron pipe in 3-ft. lengths, with a lock joint. This lock joint prevents the pipe from pulling apart.

The discussion brought out little additional information regarding handling cast iron pipe, but attention was drawn to some substitutes for cast iron. Regarding the use of concrete pipe culverts on the Southern Pacific, G. W. Rear said:

When an expensive foundation is necessary an iron pipe should not be used. We use concrete pipe in 3-ft. lengths up to 36 in. in size. For larger sizes we build concrete arches in place. We find we can put in four or five concrete pipes for the cost of one cast iron pipe. We do not use any reinforcing bars unless the pipe is large enough to be built in place. We make four sizes in stock, 12 in., 24 in., 30 in., and 36 in., all without reinforcement. We do not use concrete pipe unless it

is 3 ft. or more from the tip of the pipe to the base of rail. We use a 1 1/2 in. or 1 3/4 in. thickness of concrete and set it out at least 30 days before laying. The pipe is removed bell and spigot included in the thickness of the wall. We prefer to use good parapet walls to make the water go through the pipe and not through the encasement. If concrete pipe sections are used joints can be cemented from the inside.

In regard to the use of concrete pipe on other roads the following points were brought out:

Mr. Rettinghouse.—We are trying an experiment on 8-ft. lengths of concrete pipe and find it can be made and placed for about one-half the cost of cast iron pipe for 48-in. size and about two-thirds the cost for 36-in. size. The greatest objection to cast iron pipe is its uneven strength. Pipe for drainage is second-class material unfit for pressure work. Data should be collected to allow specifications to be drawn to insure an even quality of pipe for drainage purposes.

A. E. Killam (Intercolonial).—We use both cast iron and concrete pipe, but in soft ground always put a concrete foundation under either type. We allow concrete pipe to season one year before laying and have had no failures. Some pipes are in service in climates having a temperature as low as 50 deg. below zero, but even in these extremes we have had no cracking due to water freezing in cracks.

The use of corrugated iron pipe for railway work was condemned by several members on account of its liability to rust and mechanical destruction. Lock-joint pipe was also declared unsatisfactory by many, for in soft ground the locking feature is declared to be inadequate to support the load.

BUILDINGS AND PLATFORMS FOR SMALL TOWNS.

C. H. Lake (M. R. & B. T.), Chairman of Committee.—Where but a small amount of freight or passengers are handled, it would seem that a combination freight and passenger station should be used. The platform should be less than a foot above the rail and not less than 10 nor more than 16 feet wide. The length should be governed by the maximum length of train scheduled to stop at that town. A small platform on level with a car floor may be desirable, inside, or at the end of the freight room, but should not be near enough the track to endanger passengers or employees.

The station should, wherever practicable, be placed on the side of the track nearest the town. When, as is usually the case, the station is located near a street that crosses the track it should, if practicable, be located so far from such street that the local passenger trains scheduled to stop there do not obstruct the street. At stations where such street or highway exists, the waiting-room end of the station should be toward the street or road and the freight room at the far end. This will overcome, in a large measure, the danger of passengers walking or stumbling over freight left lying on the platform at or near the freight room.

For stations where but a small amount of freight is handled, a house track back of the station is not desirable. Where, however, a large amount of freight is received, as is occasionally the case in small towns and on busy roads, and considerable time would be lost by local freight trains getting out of the way of other trains, a track back of the station is desirable. With such an arrangement merchandise freight received in large quantities may be unloaded by the station or other forces into the freight rooms, and local freight train crews may be unloading while waiting for through trains to pass.

Elevators, coal bins, cotton and broom corn platforms, stock pens and such structures may then advantageously be located along the side track, but far enough from the station or other important buildings as not to endanger them should they take fire.

Ordinarily, section hand car and tool house should be placed next to the main track and outside the side-track limits. Much time is frequently lost by section workmen being prevented from leaving their tool houses by trains standing on the main or side track within the side-track limits.

Coal bins, coal boxes, privies or other out-buildings must

be located to suit the general conditions of the town, climate and surroundings. In northern climates it is probably best to store the coal in a bin partitioned off in the freight room. If this is not practicable, an outside building or covered box may be used. A coal house adapted to the needs of a station in Dakota would be out of place in Florida.

As to the materials of which a station platform may be built, our attention has been called to the use of locomotive or ash-pan cinders, in a manner that is serviceable, neat in appearance and on a scale of cost that is appropriate for buildings of cheap or moderate construction. Cinders soon pack down hard and make a good surface to walk upon, and one that will keep dry under foot. By the use of a curbing next to the track, the cinders can be retained at the desired grade. On some of the roads or at stations where cheap construction is suitable such curbing is made by using old sway braces, with split pile butts for stakes. To provide a smooth surface for trucking to and from the trains, old bridge stringers are laid flush with the top of cinder surface, in two lines parallel with the track, and at the proper distance therefrom to permit loaded trucks to be pulled alongside the trains.

The discussion was confined almost entirely to the advisability of providing a freight track behind the station. It was pointed out that such a track is dangerous because it may be used for a passing track, and it is objectionable because cars may be left standing on it and thus cut off the access to the freight room. On the other hand it is desirable because it allows freight to be unloaded without blocking the main track or interfering with passengers. It was decided to refer the subject back to the committee for further consideration. The model plans presented with the report were not accepted.

SUPERELEVATION ON BRIDGES.

J. P. SNOW (B. & M.), Chairman of Committee.—Superelevation of the outer rail for curves on bridges may be obtained by one of the following general schemes, or a combination of two or more of them:

1. By building the masonry bridge seats out of level or by using beveled shoes of different heights under the bridge bearings, as in Fig. 1.

2. By building the stringers or girders supporting the ties so that their tops will be out of level (Fig. 2).

3. By capping the trestle bents, either pile or frame, out of level or the equivalent of using a tapered cap, a tapered shim on a level cap or by tilting a framed bent on inclined footings (Fig. 3).

4. By tapering the ties, as in Fig. 4.

5. By shimming under the ties, as in Fig. 5.

6. By shimming under the high rail, as in Fig. 6.

Thirty replies were received to a large number of circulars sent out by the committee, and the first five of the methods above received approximately equal numbers of advocates. No. 6 has no supporters.

Ballast-floor bridges are not here specifically considered. They solve the question of superelevation at once, without special consideration; although for bridges of this class on curves some provision should be made to prevent trackmen or the action of trains from throwing the rails from their exact prescribed position, else there may be trouble from improper clearance.

In Fig. 1 the girders are inclined from the vertical. For moderate elevation it is advocated by twelve replies. Some doubt the advisability of this inclination, on account of the action of the live load, but one thoroughly competent engineer considers that the girders in this position support the loads more comfortably to the calculations. It is likely that high-speed trains will strain the transverse bracing less, and slow trains more, than if the girders were vertical.

Several object to sketch "a," on account of the difficulty of building the masonry. If of concrete, however, such difficulty is not apparent. Many advocate securing part of the elevation in this way and the balance by the ties. Several replies class this

scheme as bad practice. It is, of course, out of the question for truss spans.

2. Thirteen replies favor the scheme in Fig. 2. A few object to it on account of dapping the ties across the grain. Cases are numerous where ties have split when so dapped, necessitating bolts. The scheme is applicable to deck and through girders as well as to truss bridges.

3. The method shown in Fig. 3 applies only to timber trestles, either pile or frame. Fifteen approve one style or other of this figure. A few object to "a" as difficult framing or as being unsightly. Plans "b" and "c" require an excess of timber, and "c" furnishes a bad joint for inducing decay. Plan "d" is advocated by only one reply. The purpose of this style seems to be to secure square framing.

The committee is not a unit on this matter, but those having

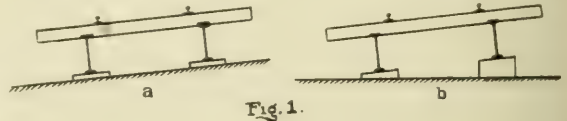


Fig. 1.

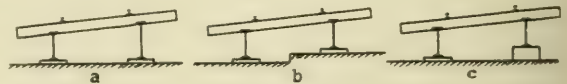


Fig. 2.

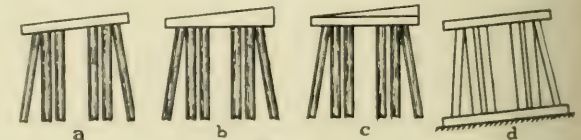


Fig. 3.

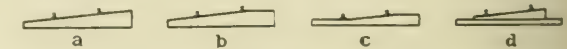


Fig. 4.

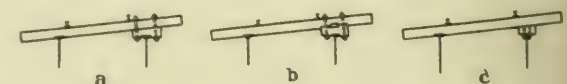


Fig. 5.

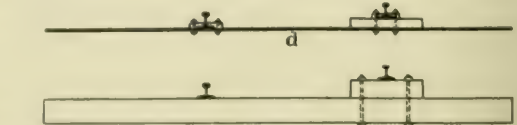


Fig. 6.

Superelevation on Bridges.

the largest number of trestle bridges prefer style "a" and experience no difficulty in its use.

Seventeen expressed approval of some style of tapered tie (Fig. 4). All should have a certain minimum depth under the low rail equal to the standard for the stringer spacing in use.

Several members object to tapered ties of any kind, holding that the regular stock size for straight-line bridges should be used in all cases to simplify labor and material carried for repairs. Style "b" allows the use of a smaller stick than "a" for a high elevation and is just as efficient. Style "c" is the standard on the Boston & Maine road for metal bridges. It is somewhat expensive, in that it has to be added to shape; but bridges on curves are of no great length, and the labor item for a given

timber is hardly appreciable. Its advantage is that the depth at the heel end is not reduced too much for properly holding the ground timber, and that the low rail is not cantled away from the ties, as it is on all other inclined ties. Style "f" is advocated as very simple as a good method on a double-track deck with one tie. The shim is 8 feet long and is well bolted to the tie.

6. Nine adjacent shims under the ties (Fig. 5). Several object to these on account of their getting out of place, etc. Plan "b" was used by the Baltimore & Ohio, when 16-in. timber was in style. Plan "a" does not give sufficient elevation and can hardly be subject to this objection. Style "c" is advocated by some and objected to by others. It is a longitudinal timber as wide as the girder flange and bolted thereto. Style "d" is used on solid plate-floor bridges without ties. It is objectionable on block signal lines, as perfect insulation is uncertain, which necessitates cutting the bridge out of the circuit, so that a car on the bridge or a broken rail on it would not put the signal at danger.

6. The scheme as portrayed in Fig. 6 received no support among the replies, except for temporary work.

All the schemes shown except No. 3 apply to metal bridges. It is well agreed that timber bridges of all kinds should have the stringers placed in a plane parallel to that of the rails. In the case of trestles, it is the opinion of the committee that there is no valid objection against framing the caps to the proper inclination to receive the regular standard straight-line tie. In timber stringer bridges resting on masonry, tapered wall plates should be used.

For metal bridges any of the schemes described will give good service if the fitting of the ties to the bridge and of the bridge to the masonry is perfect, so that no movement will occur. The simpler these fittings are the more certain it will be that good fits will follow. To secure favorable conditions of simplicity, the masonry should be level, and the lower face of the tie should be parallel to the plane of the top flanges of the stringers. These conditions reduce us to "b" of Fig. 1, or to Fig. 4. Our replies indicate that not over 4 in. superelevation should be obtained by scheme 1; hence if more is required it should be obtained wholly by 4 or by a combination of 1 and 4.

After a short discussion a resolution was passed declaring the sense of the association to be that superelevation should be obtained as shown in Fig. 3 "a" for pile trestles and frame bents; as in Fig. 1 "a" for I-beam and deck plate girder spans of medium length if concrete bridge seats are used; as in Fig. 1 "b" for I-beam and deck plate girder spans of medium length if masonry bridge seats are used; and as in Fig. 4 "a," "b" or "c" for through truss and girder spans and for long deck plate girder and deck truss spans.

WIRE GLASS.

E. E. Wilson (N. Y. C. & H. R.), Chairman of Committee.—From a total of sixty-five circulars sent to members of the association who have in hand the erection and maintenance of buildings in which wire glass is or could be used, the committee received fourteen replies. Of the fourteen replying nine reported that they do not use wire glass at all; two use it partially; two use it extensively, and one reports having stopped using it. Owing to the incompleteness of our information, we do not feel that we are in a position to make any recommendations on the subject.

Wire glass costs about 50 per cent. more than plain glass. It is less liable to do damage after being broken, on account of the wire preventing pieces from falling. Plain glass with a wire netting hung underneath, to prevent pieces of broken glass from falling, is not efficient, as the netting may rust away so quickly that its renewal is quite an item of expense.

Large sizes of wire glass are not economical; first, because of the additional cost of large sizes; second, because of the additional chance of large sizes being broken. Sizes 24 in. x 36 in. in skylights and sizes 36 in. x 40 in. in doors and partitions are economical sizes.

The gas and smoke from locomotives, because of the influence on the metal framework of train sheds and skylights of roundhouses, is the primary cause of the breaking of much glass. Contraction and expansion of metal frames is also a serious cause of breakage where glass is tightly fitted to the frames. Glass set horizontally or at an angle breaks more readily than glass set vertically. Wooden bars for frames or sash are preferable to steel, on account of the effect of gases on steel bars; also there is less liability of breakage by expansion and contraction where wood is used. It is not practicable to use wire glass in roundhouse doors and windows, but it can be used in skylights and monitors of roundhouses, in train sheds and in roofs of shops and in station buildings.

Wire glass windows and partitions in buildings will withstand extreme heat without breaking and falling out, and thus prevent the spreading of fire to some extent. Several fire chiefs from the larger cities have recommended that it be used wherever possible to do so.

Below are three of the letters received:

H. H. Pollock (P., C., C. & St. L.).—As almost all glass around engine houses and shops is broken by flying pieces of steel, such as rivet heads, etc., I do not think wire glass would reduce the cost of maintenance, for it would certainly break under such conditions. We aim to use small size glass around our engine houses and shops, so that when a missile goes through the damage is small. Glass such as we use will cost about 4 cents per light.

George W. Andrews (B. & O.).—We use a large amount of wire glass in buildings on this system, principally in skylights of train sheds, warehouses, stations, etc. Our main office building in Baltimore has all windows in the fourteen stories of polished wire glass, the sizes used running anywhere from 18 in. square up to 24 x 60 in. The glass used is both rough, ribbed and polished; usually rough or ribbed on skylights and polished in doors and windows.

I consider it practicable to use wire glass in any opening where glass may be required. It is not economy to use it for all purposes, as the glass costs practically double that of plain glass.

We have experienced a great deal of trouble with wire glass, caused by cracks due to expansion and contraction, the cracks very often causing leaks, especially in skylights.

I believe this could be overcome in a great measure by allowing more space between the skylight bars, thus giving the glass room to expand.

My recommendation in this matter would be to use wire glass in all skylights and in all buildings that it is desired to make fire-resisting. I do not think it would be economy to put it in buildings of a temporary character or in frame buildings, other than in skylights, as first mentioned.

M. M. Barton (Penna.).—We use wire glass in train shed skylights and monitors, pier shed skylights and in buildings where fire protection is deemed necessary. We use the rough glass for skylights and monitors, and polished article in doors and windows of buildings.

Rough wire glass 22 or 24 in. wide by 72 to 90 in. long and $\frac{3}{8}$ in. thick costs 22 cents per square foot. This is used in skylights on train sheds, piers and freight houses. Rough glass (not wire) of same dimension sizes costs 13 cents per square foot. Polished plate of same dimensions costs 48 cents per square foot. None of this glass will hold an even thickness. Variations of 1-32 to 1-16 in. are frequent. Polished, wire and common plate glass in the trade is listed $\frac{1}{4}$ in. thick, but varies the same as does the $\frac{3}{8}$ in. thick rough. Polished $\frac{1}{4}$ in. thick wire glass, in sizes up to 18 in. x 24 in., costs 40 cents per square foot. Rough glass 23 in. x 23 in. by 1 in. thick in use on veranda over sidewalks, Broad Street Station, costs 70 cents per square foot. Florentine glass used in elevator door shafts and partitions, also figured rolled glass $\frac{1}{8}$ in. thick with a variation of 1-32 in. costs 12 to 15 cents per square foot. These prices are based on 1909 net quotations. At present there has

been a sharp advance in the price of all glass, especially polished wire and plate, which have advanced 40 to 60 per cent.

It is practicable to use wire glass in roundhouse doors and windows, but I do not approve of its use for this purpose.

It is economical to use in windows and partitions where the glass is vertical, panes not over $\frac{3}{4}$ in. thick and in sizes up to 18 in. x 24 in. When this size is exceeded the cost advances 75 to 80 per cent.

Since the liability to breakage in wire glass is less than it is with plain glass, I believe the cost of maintenance is less than it is with the plain glass.

Mr. Clark.—In some places we are compelled by city ordinances to use wire glass for skylights, but it is not economical for windows and doors.

Mr. Staten.—We have used wire glass for train shed roofs and had trouble with leaks. They were stopped by stuffing them with any material convenient, and the result was very unsightly.

Mr. Rettinghouse.—The use of wire glass in roundhouses is advisable if wooden brads are used to hold it in instead of putty, which falls out easily and causes a large percentage of the breakage.

Mr. Cahill.—Putty must be used on horizontal surfaces to make watertight joints. The objections to putty can be decreased if the sashes are well primed before putting to prevent the dry wood absorbing all the oil from the putty.

HOOPS FOR WATER TANKS.

T. E. Weise (C., M. & St. P.), Chairman of Committee.—The committee received a very generous response to the inquiries sent out and the replies show a wide range as to experience and opinion.

Four styles of hoops are being used for tanks of 50,000 to 100,000 gallons capacity: (1) flat hoops, (2) square hoops, (3) round hoops, (4) segmental hoops, also variously designated as half round, half oval, or half elliptical.

Until quite recently flat hoops were used almost universally for tanks of all sizes. There are many who advocate this style as the best for the tanks under consideration, claiming that they have a more uniform bearing on the staves, do not crush the fiber of the wood, and if properly put on and cared for will outlast the staves. The Illinois Central cites an instance in which they took down a 100,000-gallon tank with flat hoops, that had been in service 16 years. The hoops and also those portions of the staves under the hoops were found in perfect condition, and the tank was again erected at another location without any substitutions.

The experience of other members of the association has been quite to the contrary. Flat hoops have been removed after a comparatively short service, badly corroded on the inside and with the staves under the hoops badly decayed. Location of the tank is quite a factor in the life of a hoop. If located at a terminal, perhaps next to an engine house or a clinker pit, the hoops will deteriorate rapidly. There are also instances in which the kind of water in the tank is especially injurious to the hoops, and location near salt water is also a severe test. In some cases the decay of the staves under the hoop seemed to be directly due to the rusting of the iron.

It is quite generally recommended that flat hoops be given two coats of graphite, applied at intervals before erection and that the staves also be painted at least one good heavy coat on the outside. Taking off the hoop and cleaning them on the inside is considered an expensive operation and impracticable.

Flat hoops are the standard on the Ill. Cent., the I. S. & M. S., the I. P. & W., the Mich. Cent., the P. C. C. & St. L., the Cent. of Ga., the M. & St. P. & S. S. M., the C. & S., the C. & N. W., the E. & M., the New Eng., the International, the N. Y. C. & H. R., the N. K. & T., the P. & I. E., the Florida East Coast, and numerous other.

There is great variation in the dimensions of flat hoops. In thickness, they run from $\frac{1}{8}$ in. to $\frac{3}{8}$ in. and in width from 4 in. to 6 in. Some roads use a uniform thickness and

vary the width, some use a uniform width and vary the thickness, while others use various widths and thicknesses. There is also much variation as to spacing, but for obvious reasons the wider and thicker hoops are placed near the bottom of the tank and the narrower and lighter ones toward the top, placing the lower hoops quite close together and widening the space as they approach the top.

On the Florida East Coast all the hoops are of the same size, namely, $\frac{3}{8}$ in. x 3 in., and the lower six hoops are put on in pairs.

In recent years it has not always been easy to obtain wrought iron flat hoops, and therefore steel hoops are used. Steel hoops are found to be quite brittle, and quite often break while being tightened, or as the result of the swelling of the tank, or on account of unusual weather conditions. The most serious objection is that they corrode more easily than wrought iron.

Galvanizing of steel hoops lengthens their life, but does not eliminate the brittleness, and many claim that the galvanizing covers surface defects that would otherwise cause the rejection of the material. When galvanized hoops are used, they should be inspected before and after galvanizing.

Round hoops have come into use only within the last few years and seem to be proving very satisfactory. Wrought iron is considered the best material and is more easily obtained in this form than in the flat shape. Mild steel is sometimes used, in the round hoop as well as in the flat hoop, but the same objection of brittleness is present.

One argument in favor of the round hoop is that fully 90 per cent. of its surface is exposed to view; deterioration is more easily discovered and painting is more effective. With the flat hoop, at least 40 per cent. of its surface is next to the staves and practically inaccessible.

A number of railways, such as the P. & R., the M. & St. L., the L. & N., the W. & L. E., the C., M. & St. P., and the L. E. & W., are using round hoops exclusively in the construction of new tanks. The M. & St. L. is also using round hoops in repairing old tanks, either by adding them to make the tank safer or substituting them for worn out flat hoops.

It is claimed that because the round hoop has less bearing surface on the stave it crushes into the fiber and not only weakens the stave, but induces decay. Others who have had experience say that if the hoop is properly put on there is no appreciable crushing of the fiber.

The round hoop forms a ledge or pocket on the upper side which allows the accumulation of dirt, cinders and moisture. Some claim that this is not a serious matter because the sun and wind evaporate the moisture before harm can result. It is also claimed that where flat staves are used the hoop does not touch the center of the stave and moisture is not retained. This may depend on whether the wood is soft or hard; some tanks have been examined that showed no such drainage space. On the W. & L. E. it is the practice to calk the round hoops with oakum and fill the top space with roof cement to shed water and also to protect the hoops.

The committee received no report from any railway that is using square hoops as a standard. The Illinois Central has one tank equipped with hoops $\frac{3}{4}$ in. x 2 in., which may be called square hoops for all practical purposes, that have been in service for about 20 years, and the hoops, which are of wrought iron, show no great sign of deterioration.

E. L. Loftin, of the Vicksburgh, Shreveport & Pacific, writes that his company uses steel tanks entirely, but that a great many wooden tanks with square hoops are used in that part of the country. The hoops are from $1\frac{1}{2}$ in. square to $\frac{3}{4}$ in. square, put on in three sections, with lugs similar to those used with round hoops.

The segmental hoop has one flat side and does away with the objection to the round hoop of crushing into the wood and of collecting and holding dirt and moisture. It has all the advantages of the flat hoop, with the added one of being narrower for the same strength, and, because it is heavier at the center,

it is not weakened so quickly by corrosion. The N. Y. C. & H. R. has used half round hoops for tanks on some divisions. The Southern Indiana built a 30 ft. x 30 ft. tank with segmental hoops the past summer and is well satisfied with it. Material of this section is a standard shape and is carried in stock, hence it does not have to be specially rolled.

Flat and segmental hoops are fastened or brought together by pairs of lugs made of either cast or malleable iron. In some cases the lugs are riveted to the ends of the hoops, while in others they are clamped on by a wedge, which is assisted by a slight kink near the end of the hoop. The pair of lugs is then brought together by either one or two bolts or, more properly speaking, rods with nuts at each end, and in this way the hoop comes into proper contact with the tank.

Another form of lug that does away with the riveting is in use on the Michigan Central. In this method the hoop is bent to fit a hole in the lug castings, which are clamped together with U-bolts.

K. Peabody, of the N. Y. C. & H. R., tells of one style of lug in use on that road that is rather interesting. The hoops are bent back on themselves and welded. Through the hoop thus formed, a vertical iron rod $2\frac{1}{2}$ in. in diameter is passed. Each end of this rod is drilled for a $1\frac{1}{8}$ in. bolt. Two such bolts with 6 in. thread on each end are used to tighten the hoops. This method prevents any cocking up of the lug.

Segmental hoops are riveted to cast iron lugs. As used by the Southern Indiana, the hoop is bent up around a rounded portion of the lug and a hole is punched through it so that the bolt passes through both lug and hoop.

Square and round hoops are brought together by very simple lugs made up of a single casting having two lateral holes through which the threaded ends of the hoops are passed and fastened with nuts at opposite sides. The hoop is brought into the required contact with the tank by tightening these nuts. This simple lug and the way in which it is applied is one of the arguments in favor of the round hoops. The lug adopted by the L. & N. as its standard is the style generally used.

It is the usual practice in tanks from 20 ft. to 30 ft. in diameter to have the hoops in three sections, although there is some difference of opinion as to what is best. The C. & S., the L. E. & W., and the P. & L. E. use two sections. The Mich. Cent. and the W. & L. E. use four sections for tanks 30 ft. in diameter. There are others who apply the lower and heavier hoops in four sections, and those above in three and sometimes two sections.

The two-section hoop is difficult to erect, and by using more sections the stress on the staves can be more uniformly distributed.

It is quite generally recommended that the tank should have one or two good coats of paint on the outside before the hoops are applied, and that the hoops should have one good coat of mineral or graphite paint on the inside, and two coats if practicable. The outside of the hoop should be painted with the same kind of paint, and as frequently as the remainder of the tank, at intervals varying from three to five years.

So many factors enter into the durability of tank hoops, such as material, kind of water in tank, proximity to engine terminals, manufacturing plants, salt water, etc., that the decision as to which hoop is best to use must be very largely a matter of personal judgment and familiarity with local conditions.

C. A. Lichty (C. & N. W.).—There is no doubt that the wrought iron hoop is much better than the steel one; and considering its length of life it is also more economical. The material is more important than the shape.

Mr. Clark.—The Baltimore & Ohio has adopted the wrought iron hoop and will not accept anything else.

James Dupree (South. Ind.).—The thin flat hoop and the round hoop expose too great a surface and therefore corrode more quickly. The thin hoop has the advantage that it fits the

tank closely. The round hoop is compact and easily handled. But the advantage of the flat hoop is slight because it does not fit close enough to exclude water, and the advantages of the round hoop are outweighed by the fact that it crushes the wooden staves and catches water and dirt. The half round or segmental hoop is compact, does not expose so much surface as the other forms, and does not hold water or dirt. The flat hoop should have a life as great as that of the wooden tub.

After some further discussion a motion was passed recommending the flat wrought iron tank hoop for all sizes of tanks.

FIREPROOF OIL HOUSE

G. W. Rear (S. P.) Chairman of Committee.—The storage should be of sufficient capacity to permit of emptying tank cars or barrels promptly and with as little labor as possible. The delivery of oil should be in charge of the regular storekeeper and be issued on requisition, so that it can be properly accounted for. This method of handling tends greatly to economy in its use. Consequently it is necessary that the oil house shall be near enough to the general store to permit of having the delivery pumps or faucets in the storeroom; and while it is possible to pump the oil a considerable distance, it is seldom possible to place the oil house at any great distance from other buildings, as the usual layout of terminal provides very cramped space for the necessary buildings.

The committee believes that buildings can be built and systems of handling devised which will permit the oil house to be placed anywhere that may be convenient without increasing the fire hazard.

The building itself should be of fireproof construction, designed especially for the handling and storage of oil, and should be equipped with facilities for filling cans and barrels for shipment to small stations, and for the unloading of oil received.

The storage room should be underground, if possible, and should have concrete walls, floor and ceiling. The second floor and roof should be of fireproof construction, but may be of concrete, brick or steel frame, with galvanized iron roof and walls, as may be desired. The fill boxes, pumps and drip pipes should be on this second floor.

The oil should be stored in suitable tanks of such a size as will permit of prompt unloading, whether delivered in tank cars or barrels. This permits cars to be released and barrels or drums to be returned without delay, and greatly reduces the loss from leakage.

The tanks should be dust-proof and should be placed low enough to permit emptying oil into them by gravity. If the drainage will not permit placing the tanks below the ground level, it will generally pay to elevate the receiving track.

The tanks should be made of open hearth steel with lap riveted seams and well calked. No substituted for calking, such as red lead paste, paper felt, etc., should be permitted, for in time they will dry or crumble and fall out, leaving a leak.

Before the tanks are put to use air pressure should be applied, to make sure that they are tight; and manholes with removable covers should be provided so that the tanks can be inspected or cleaned.

Indicators should be provided to show quantity contained; in gallons or otherwise.

The tanks should be equipped with suitable automatic vents to allow air to escape or be drawn in when filling or emptying, and those used for volatile oils, especially gasoline, benzene, naphtha, etc., should have a special vent pipe run to the outside of the building and to a sufficient height to insure against evaporation. This will permit gases to escape in case of excessive heat, thus removing all possibility of explosion.

It is probably best practice to bury tanks containing gasoline, benzene and naphtha, in the ground, or place them in a special vault outside of the regular oil house.

Where tank cars are used, supply pipes should be furnished leading from the cars to the tanks, a separate pipe being used for each kind of oil. These pipes should be permanently con-

nected to the tanks and equipped with flexible connections to attach to cars. These flexible connections should be arranged so that they can be swung out of the way when not in use, and should be equipped with caps or valves to keep dirt and air out when not in use. Steam pipes for heating the oil in the cars may be necessary, and if so, should be provided.

If the terminal point furnishes oil to smaller stations, steel barrels or drums should be used, and separate pumps or faucets should be provided for this service; but the committee is of the opinion that the best method of supplying oil to small stations is by a supply car equipped with tanks of sufficient capacity, and by pumping the oil through hose direct to the tanks in the local oil house. This method is in use on several large roads, and they report a large saving from loss by waste and leakage, which is bound to occur in shipping oil in cans or barrels.

For making small deliveries of oil to engines, mechanics, etc., the best method is to use an automatic measuring pump, one having a continuous meter being the best. Several very reliable pumps for this purpose are on the market.

For filling barrels or large cans the oil can be handled by hand or power pumps, or by the use of compressed air. While it has generally been believed that the use of compressed air for handling illuminating oils is objectionable, on account of deterioration caused by moisture in the air, there is a strong opinion on the part of storekeepers and practical men that the use of air does not deteriorate the oil for practical purposes. Several roads use air pressure in some part of the handling of all their oils, and seem convinced that if there is any deterioration it is not to such an extent as to be noticed by the ordinary observer. Air pressure is of particular advantage in handling oil from supply cars, as the air can be taken from the train pipe, and other power is not likely to be available.

The Atchison, Topeka & Santa Fe has a combination store and oil house at Topeka, Kan., 50 ft. x 150 ft., with 31 tanks in the basement, varying from 220 to 10,000 gallons capacity. It has a covered platform 20 ft. wide along one side of the building, the entire length. The house is built of fireproof construction throughout. The basement walls and floor are of concrete, and the main floor of reinforced concrete. The system of handling oil is described as follows:

"From our new oilhouse at Topeka is handled the entire supply of lubricating and illuminating oils for the Santa Fe system. We have a storage capacity of 150,000 gallons, which includes paints and oils such as raw and boiled linseed oil, turpentine, etc. We have 31 storage tanks with 31 long distance self-measuring pumps of the S. F. Bowser make. In fact, the plant complete was installed by the Bowser people. We also have seven steam pumps with which oil is transferred from one tank car to another. All of our oil on the Santa Fe system is handled in tank car lots with one or two exceptions. We have storage tanks of sufficient capacity for two or three months' stock at practically all of our terminals.

"With this new improved oilhouse and storage plant at Topeka it enables us to transfer oil from Union Tank Line cars to our own at Topeka, thereby cutting out the mileage and per diem charges on foreign cars. Under the old system the Union Tank Line cars were sent to the farthest point, Richmond, Cal., on our system or south to El Paso and Galveston, and by the time the car was returned home we had from \$25 to \$35 charges covering the car. We have cut out this extra expense and have 25 cars of our own in service for handling of headlight, mineral seal, signal, engine, car and valve oil. We can transfer 200,000 gallons in ten hours at this plant.

At the outside terminals we have what is known as the combination oil and storehouse. We have discontinued building the old style oilhouses separate and distinct from the storehouse; instead, we build a concrete basement under the storehouse platform ranging from twenty to one hundred feet away connected up with the Bowser long distance self-measuring pumps, placing the pumps in the end of the storehouse so that the man loading the material and supplies can also take care

of the oil department as well. By this arrangement we have eliminated the first cost of the oilhouse and have reduced the cost of handling by reason of the combination which does away with the special men that would have to be employed to take care of the oilhouse, which means one during the day and one at night. We might say from \$90 to \$100 per month represents decrease in handling by reason thereof.

"The delivery of oil to stations is handled from the supply car direct. We have storage tanks at each station based on their issues and the stock is replenished monthly from the supply car which is equipped with a hose connection so that we can fill the storage tank in two or three minutes. By this system we do away with the two, five and ten-gallon cans. This system seems to be very satisfactory indeed by reason of cutting out entirely of local shipments.

"We have the Bowser system of self-measuring and metering pumps at all points and since their installation we have been able for the past two years to show a slight overage in each of the different grades of oil. Prior to this time we were, at the end of each year, from one to three per cent short."

The report was accepted with the recommendation that the subject be continued next year.

REGULARITY AND SAFETY.

Mr. Rettinghouse read a paper on "Regularity and Safety," which followed closely the outline of an address given by Ralph C. Richards, general claim agent, Chicago & North Western, advocating greater safety for railway employees. Mr. Richards' article appeared in the *Railway Age Gazette* of September 2.

NEXT YEAR'S REPORTS.

The subjects for committee reports for 1911 include the following, which are carried over:

Best Method of Numbering Bridges.

Buildings and Platforms for Small Towns.

Sash, Size and Kind of Glass That Is Not Economical for Roundhouses and Shop Buildings.

Plans of Fireproof Oil Houses.

In addition to these, the following new subjects will be considered:

Best Method of Fireproofing Frame and Trestle Bridges.

Derricks or Other Appliances for Handling Heavy Material in Supply Yards.

Pumping Engines, Best Kind and Ones Most Economical to Use, Gasolene, Oil or Electric.

Records of Bridges, Buildings and Other Structures Showing Cost of Construction and Maintenance.

Concrete Tank Construction and Recent Developments and Suggestions.

Advisability of Using Brick Veneer for Station Buildings.

Roofs and Roof Coverings.

It was decided to hold the next convention in St. Louis, Mo., October 17-19, 1911.

The exhibits, which were in the lobby of the hotel, included the following:

Alfing Manufacturing Co., Chicago.—Door hangers, fixtures, asphalt, ready coating. Represented by W. D. Jameson.

Harry H. Harrett—Samples Arrowhead and Protection roofing.

Barnett Manufacturing Co., New York.—Barnett specifications. Represented by L. P. Sibley, William S. Rubcock, Harry E. Nichols.

Philip Coca Co., Cincinnati.—O. Samples Carey's roofing, standard and roofing paints. Represented by I. P. Stange, John I. Motow.

Paul Dickson, Inc., Chicago.—Designs of smoke stacks, chimneys and ventilators. Represented by L. A. Meador.

Eastern Granite Roofing Co., New York.—Samples of Granite, Tisbest and Fireproof roofing. Represented by H. Homing, C. F. Burrows.

Fairbanks, Morse & Co., Chicago.—No. 19 gasolene hand car, No. 36 section motor car, three Barrett jacks. Represented by C. W. Kelly, Edward M. Fisher, J. T. Grant.

H. W. Johns-Manville Co., New York.—Samples Ruberoid and J. M. asbestos roofing. Represented by F. M. Gilmore, P. C. Jacobs.

The Leamon Co., Chicago.—Samples Roofrite rubber roofing, Polar Bear insulating paper and paints. Represented by Thomas Leamon.

Luitweiler Pumping Engine Co.—Model Luitweiler deep well pump. Represented by E. D. Williams.

Otto Gas Engine Works, Chicago.—Designs coal chutes, water softening plants, pumping plants. Represented by O. C. Lashby, R. E. Garvey.

Scraper Railways Equipment Co., Pittsburgh, Pa.—Samples Monarch mica ash and mica in fire coating. Represented by F. Payson Smith.

Straight Scale Co.—Model straight track scale. Represented by William M. Walsh.

TRAIN ACCIDENTS IN SEPTEMBER.

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of September, 1910. This report is intended to include usually only those accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. It is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation:

Date.	Road.	Place.	Cause of Accident.	Kind of Train.	No. persons reported killed.	
					Kil'd.	Inj'd.
1.	W. & A. L. E.	Run Junction	bc.	P. & P.	2	3
2.	C. & A. & St. L.	Brighton	xc.	P. & P.	1	12
3.	P. & N. O.	Carroll	xc.	P. & Ft.	2	0
4.	P. & N. O.	Holt, Mo.	bc.	P. & Ft.	1	19
5.	M. & O.	Beach Ridge	bc.	Ft. & Ft.	1	0
6.	I. & M. & St. L.	Westfield	xc.	P. & Ft.	0	5
7.	C. & M.	Delaware	xc.	Ft. & Ft.	1	2
8.	M. & C.	St. Charles	xc.	Ft. & Ft.	2	0
9.	S. & A. & P.	St. Charles	xc.	Ft. & P.	2	19
10.	C. & N. & R.	Hampton	bc.	P. & Ft.	3	0
11.	Chic. & St. P.	Cannon Junction	xc.	Ft. & Ft.	1	3

Deraillments.

Date.	Road.	Place.	Cause of derailmt.	Kind of train.	No. persons reported killed.	
					Kil'd.	Inj'd.
1.	St. L. & San Fran.	Frederick's Bayou	ms.	Pass.	0	1
2.	Boston & Albany	Riverside	ms.	Pass.	1	6
3.	Illinois Cent.	Council Hill	brakeshoe.	ms.	1	8
4.	Great Northern	Coram	ms.	Pass.	2	15
5.	Chicago R. & N. W.	Avondale	ms.	Pass.	1	2
6.	H. & V.	Lamont	b. rail.	Pass.	3	12
7.	L. & N.	Pocomo, Ky.	ms.	Pass.	2	0
8.	Norfolk & West'n.	Delorme	ms.	Ft.	2	1
9.	N. O. & S.	Noame	d. switch.	Pass.	1	1
10.	St. L. & San Fran.	Olathe	boiler.	Pass.	2	0
11.	St. L. & San Fran.	Comant	d. track.	Pass.	1	30
12.	Chic. & N. W.	Clayton, Kan.	flood.	Pass.	16	13
13.	Del. & West'n.	Utica	derail.	Pass.	1	0
14.	Northern Pac.	Missoula	boiler.	Ft.	1	0

Other Accidents.

Date.	Road.	Place.	Cause of Accident.	Kind of Train.	No. persons reported killed.	
					Kil'd.	Inj'd.
1.	Gulf & Int.	Seabreeze	boiler.	Ft.	1	1
2.	M. & T.	Coteyville	boiler.	Pass.	2	0

The worst disaster in this record, that at Clayton, Kan., on the 23d, was due to a very unusual flood, caused by a cloudburst which occurred some distance from the line of the railway. This accident was reported in the *Railway Age Gazette* of September 30. All of the men of the train crew were killed except the rear brakeman and the porter.

The collision at Run Junction, Ohio, on the 6th, was caused by the running away of a locomotive. This engine, after a slight collision near Massillon, ran uncontrolled to Run Junction because it had been abandoned by its engineman.

¹ Abbreviations and marks used in Accident List: rc, Rear collision—bc, Butting collision—xc, other collisions—b, Broken—d, Defective—unf, Unforeseen obstruction—unx, unexplained—derail, Open derailing switch—ms, Misplaced switch—acc. obst., Accidental obstruction—malice, Malicious obstruction of track, etc.—boiler, Explosion of locomotive on road—fire, Cars burned while running—P, or Pass., Passenger train—F, or Ft., Freight train (including empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly destroyed by fire—Dagger, One or more passengers killed.

Two of the accidents of this month happened to trains on which were stops in the road. At Bensenville, Ill., on the 12th, the superintendent of motive power of the road was killed; while at Delorme, W. Va., on the 13th, the president and the general manager of the road had narrow escape when their special train ran off the track and wrecked the station building at Delorme. In this case a road fireman of engine and the locomotive runner were killed and the station agent was severely injured.

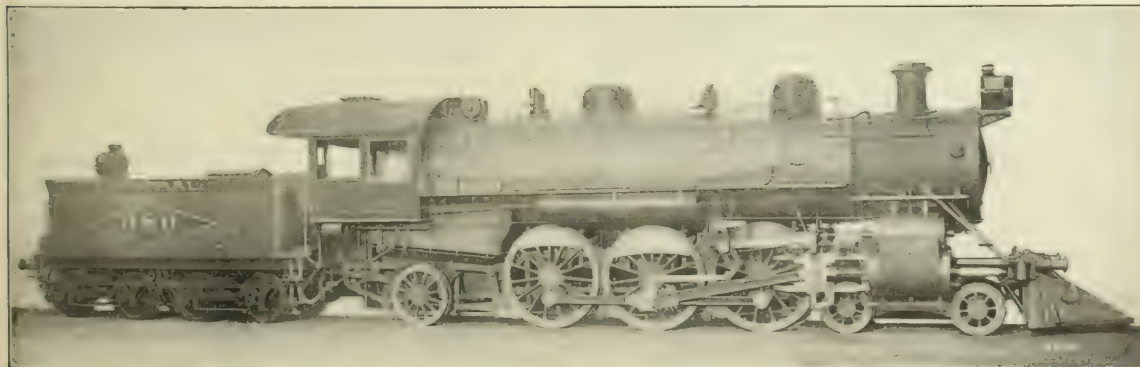
The trains in the butting collision at Holt, Mo., on the 14th met on a high trestle, but fortunately neither the engine nor any of the cars fell through. The westbound train was No. 1 of the Rock Island road, which uses the Burlington tracks at this point. All of the passengers injured were in the smoking car of the Burlington train, which fell down a bank. It is said that a moment after the Burlington train had passed Holt, the agent discovered that it had no right to the road and he spent considerable time telephoning to farmers along the line in the hope of stopping the train, but he accomplished nothing.

The collision at Beech Ridge, Ill., on the 18th, was due to the non-delivery of an order to one of the trains, and the telegrapher was arrested on a criminal charge. The reports say that testimony was presented at the coroner's inquest to the effect that this telegrapher had been under the influence of intoxicating liquor. Another account says that this man was not the regular telegrapher at this place.

Of the 10 electric railway accidents reported in the newspapers as occurring in the United States in the month of September, four were attended with fatal results. Deraillments due to misplaced switches occurred at Detroit, Mich., and Rochester, N. Y., one person being killed in each case. Near Tipton, Ind., on the Indiana Union Traction Line, a butting collision was charged with six deaths and six injuries; and at Bluffton, on the Fort Wayne & Wabash Valley Line, in the same state, occurred the great disaster reported in the *Railway Age Gazette* of September 23, page 563. In this 42 persons were killed and seven injured. The third one of the three electric-car disasters occurring about that time, happened in October (Staunton, Ill., October 4, on the Illinois Traction System).

PACIFIC TYPE LOCOMOTIVE; CENTRAL RAILROAD OF BRAZIL.

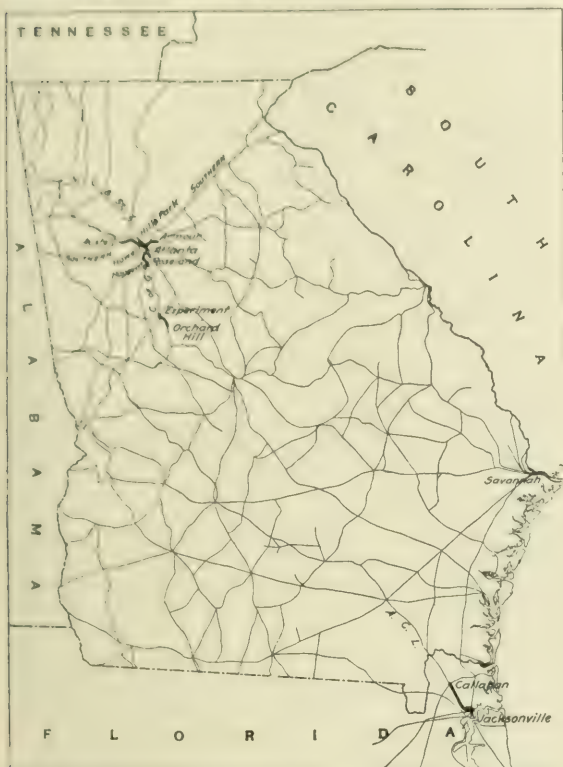
Two Pacific type locomotives, said to be the heaviest engines as yet shipped to South America by the Baldwin Locomotive Works, have recently been completed by that company for the Central Railroad of Brazil. The total weight is 189,100 lbs., of which 116,900 lbs. are on the drivers. The tractive effort is 29,130 lbs., making the ratio of adhesion 4.01. While a number of special details have been incorporated to suit the road's



Heavy Pacific Type Locomotive for the Central Railroad of Brazil.

DOUBLE TRACK RAILWAYS IN GEORGIA AND FLORIDA.

The railway map of Georgia given herewith is printed for the purpose of showing all sections of railways in the state on which there is more than one main track. The termini of the sections are as shown in the table below. In the state of Florida we can find only two places where there is a double track. One of these is on the Atlantic coast line between Callahan and Jacksonville—21 miles. This is shown on the map now presented. The other section is from Goulding to



Double Track Railways in Georgia, and Part of Florida.

Peninsula, on the Louisville & Nashville. This will be shown in connection with the map of Alabama. No map of Florida will be printed.

GEORGIA.		No. tracks.	Approx. miles.
<i>Atlantic Coast Line.</i>			
*Fairfax Junction to Union Junction.....	2	..	
*Southern Junction to Savannah.....	2	..	
<i>Central of Georgia</i>			
Atlanta to Hapeville.....	2	9	
Experiment to Orchard Hill.....	2	7	
<i>Southern.</i>			
Roseland to Austell.....	2	21	
Howell to Armour.....	2	3	
<i>Nashville, Chattanooga & St. Louis.</i>			
Atlanta, Ga., to Hills Park.....	2	5	

*Not shown on map.

RAILWAY BUILDING IN SIAM.

The southern line of the Royal Siamese State Railway is now in course of construction. With rapid work it is expected to complete the line in five years. A contract for bridges of structural steel amounting to about \$30,000 has just been awarded to a British firm, without any public tenders having been had therefor. This is sufficient material to bridge the 250 miles of rail-

way already under construction. It is estimated that structural bridge steel will be required for the remaining bridges to the value of \$15,000, but it is intimated that they will all be ordered from the same British firm. Before next June 20,000 tons of rails and 2,000 tons of fastenings such as bolts, etc., will be required, and these will probably be put to public tender. Within two years locomotives and rolling stock will be asked for.

TRANSPORTATION AND TRAFFIC IN AUSTRIA-HUNGARY.*

BY LOGAN G. McPHERSON.

Between the developing countries of northern Europe and the backward Balkan states lie Austria and Hungary, inhabited by a mixture of races whose coalescence continues to be a slow and laborious process. Of manufacturing in general, the making of glass, cotton and woolen goods and machinery, there is a good deal in Bohemia, the Austrian province that borders Germany, but the most of this country, as well as nearly all of Hungary, is devoted to agriculture, the raising of the grains and of livestock, and to the production of lumber from the extensive forests. These conditions imply a less advanced stage of industry and commerce than is to be found in Germany, France or Switzerland, and therefore a less highly developed system of transportation.

The Danube extends through Austria and Hungary to the Black Sea. The Moldau is also a principal river of Austria; in Hungary are the Tisza, the Drava and other rivers. Of all of these a marked characteristic is that they carry but little sediment in suspension. Both countries, especially Hungary, of which nearly one-half during an earlier geological era was a great lake, were long subject to frequent and excessive inundations from overflows. These have been prevented and facilities for navigation enhanced by the regulation of the streams, that is, by the building of rigid walls to confine their currents and by the making of cuts through bends to render the channels less tortuous.

The first expenditure in the line of such improvement seems to have been upon the Moldau as early as 1640. Further expenditures, of which there is no definite record, were made upon one river and another during the next two hundred years, but a comprehensive plan for the improvement even of the Danube was not entered on until 1860, four years after the tolls on that river had been abolished by the treaty of Paris. The rivers in both Austria and Hungary are now nearly all regulated.

The principal river improvement in Hungary has been the clearing of the channel of the Danube at Orsova through a series of formidable rocks known as the Iron Gates, which caused rapids and cataracts that were a menace to navigation.

There has not been a great deal of canal construction in either country. A canal was built through Vienna from one point on the Danube to another point in 1867, and in one or two places access to the Adriatic was facilitated by the construction of canals. A canal projected to connect the Moldau with the Danube has been completed to a length of 56 miles, and another from Parkowitz to Melnik for a distance of 80 miles. In Hungary the Francis Canal was built between 1840 and 1850, but is now little used. The only really serviceable canal in this country at this time is that with a reach of 88 miles connecting the Danube and the Tisza. It occupies the channel of a very old canal whose resuscitation has cost about \$40,000 a mile. During the 40 years beginning with 1867 the Hungarian government appropriated over \$48,000,000 for the improvement of waterways and over \$5,250,000 for the maintenance of existing construction. In 1908 it voted an additional \$39,000,000 to be used in yearly instalments of \$1,500,000. Dykes in the lowlands, constructed by associations of landowners at a cost of about \$71,000,000, have been placed under government supervision which grants them an annual subsidy of about \$1,200,000. At this time only

*A preliminary report to the National Waterways Commission.

about 50,000 acres of Hungary remain subject to serious floods, and the various cuttings have reduced the total length of the rivers by 1,065 miles.

The total length of rivers and canals in Austria navigable for steamers is 830 miles, for barges and rafts an additional 3,370 miles, and for rafts only an additional 2,400 miles, or 6,600 miles in all. In Hungary 1,924 miles are navigable for steamers and an additional 1,165 miles for small boats and rafts. Steamers along the Tisza, the connecting canal and the Danube carry grain from Hungary to Vienna, but have little return loading, obtaining only a small share of Austrian and German manufactures for Hungary, the Balkan States and Turkey. By far the greater use of the tributary streams of both countries is for the conveyance of rafts of logs and lumber. The only ports of either country are on the Adriatic, Trieste in Austria and Fiume in Hungary, and these are accessible only by rail.

Neither Austria nor Hungary charge tolls for the use of the inland waterways, with the exception that Hungary by international agreement is permitted to charge tolls for the use of the channel made by it through the Iron Gates, which is of benefit to the commerce not only of Hungary but to that of Austria and the Balkan states. In Austria the entire capital, expenditure and expense of maintenance was formerly borne by the national government, but now it compels the cities and the provinces to participate. In Hungary the entire capital and maintenance expenditure is borne by the state. Moreover, the two national lines of steamers on the Danube receive an annual subsidy of 800,000 florins (\$400,000) each, for which their only obligation is to devote the boats to the use of the government in time of war. The canal in Hungary connecting the Tisza and the Danube is, however, controlled by a private company under the supervision of the government. It charges tolls which permit it to pay $1\frac{1}{2}$ per cent. interest to the bondholders. A transport tax charged in Hungary on the rivers and canals was maintained by the government for a period of about 16 years, but the revenue was turned into the general budget. This aroused complaint from the water carriers, which led to the abolition of the impost. The boats that ply on the streams of both countries are mostly paddle-steamers and modern barges owned principally by companies.

Many projects for the extension of canals have been discussed for several years, both in Austria and Hungary, and definite plans and estimates have been made for certain of the projects. The whole matter is subject to the exigencies of politics and buffeted one way and another as one party or another comes into power.

The first concession for a steam railway in Austria was given on March 4, 1836, for a line from Vienna to Galicia, which was opened in 1837. The next concession was in 1839 for a line from Vienna to Raab and Glogchwitz. These were built by private capital, but the concessions reserved the right to the state to take over and work the lines. By 1840 90 miles had been placed in operation, which did not prove profitable, and requests were made on the state for assistance. The government perceiving that private capital could not be relied on for building an adequate railway system, adopted, on December 19, 1841, a program for the construction of a network of state railways. This comprised a line from Vienna by way of Prag to the Saxon frontier at Bodenbach, and another from Vienna to Trieste on the Adriatic. The construction of small short lines was left to private companies.

The operation of the private lines continued to be unprofitable. The state extended aid by the purchase of shares, incurring an expense for this purpose that by the end of 1848 amounted to 26,000,000 florins (\$13,000,000). The government thereupon adopted the policy of taking over all of the lines. This brought heavier burdens than anticipated. The receipts of the railway taken over did not meet expectations, and the political situation, in which a factor was the necessity of obtaining money for general purposes, led to a further alteration in the railway status. Under the belief then held that projected lines would be carried

to completion more rapidly by private companies, a new law was enacted on September 14, 1854, which lengthened the duration of the concessions from 50 to 90 years, but also retained for the government a large share of influence in the administration.

A number of new companies were formed, largely by the aid of foreign capital, and in 1858 the state lines, aggregating at this time 1,488 miles, were taken over by the private companies. Notwithstanding the financial crisis of 1857 and the depression caused by the war of 1859, the railways of Austria rapidly extended until the commercial crisis of 1873 not only brought an end to the subscription of private capital for further construction, but involved the existing lines in great pecuniary difficulties. A number of derelict concessions were canceled, construction under way was abruptly terminated, and the private companies made heavy demands for assistance, which the government was obliged to grant. The following years were a period of transition. The unwillingness of financial circles to participate in railway operations and the necessity of constructing useful lines, as well as the constant effort to ameliorate the bad condition of the workmen, caused the commencement of a new era of direct participation by the state in construction and operation. In 1876 it entered on the construction of a number of small lines, and was soon obliged to take over several private lines that were hopelessly involved. This policy has continued until in 1906, when of the 13,388 miles of railway in Austria the state operated 67.95 per cent.

In Hungary the first railway was built in 1846, but development was not rapid. The first construction was by private companies, but the state had given guarantees of which it was called on to perform to such an extent that nationalization was here also entered on, and it has continued with even greater progress than in Austria. Of the 12,951 miles in Hungary in 1908, 83.5 per cent. were worked by the state. In these percentages given in either country as of lines worked by the state are included both the lines owned directly by the government and the lines operated by it on behalf of private companies. Concessions for new lines are still made in either country, but under strict requirements, and they are not being availed of except for lines of secondary importance.

The following memoranda as to the operation of the railways of Austria and Hungary is taken mainly from the report of the Board of Trade Railway Conference of England, which has made expert investigation of the status of the railways of several countries of the continent.

"The state railways in Austria are under the control of the minister of railways, an office first instituted in the year 1896, previous to which the railways were a separate department of the ministry of commerce. The minister is not a permanent official as in Prussia, but is appointed by and changes with the government. In Hungary, on the other hand, the head of the state railway is a permanent official responsible to the minister of commerce.

"Common to both countries are the regulations appertaining to the transportation of passengers and goods and the regulations for the conduct of traffic, both of which correspond to the regulations issued under a similar title in Germany.

"The financial control is in the hands of the state financial department, whose budget, as far as its railway estimates are concerned, must be prepared in conjunction with the railway authorities."

In Austria the executive administration is decentralized through 13 "Directions." In Hungary, under the permanent official, known as the president, are the officers in working control of the nine districts. Matters of general importance must be discussed in general conference with the ministry. In Hungary the finance minister is represented at the conferences.

The jurisdiction of the state over private railways covers construction, maintenance, the type and amount of rolling stock, passenger and goods tariffs, time tables and, in the case of guaranteed lines, large financial control.

There are advisory councils, similar to those of Germany, in both Austria and Hungary, but their influence is not important, the final determination of all questions resting with the ministry.

The records of the finance department in Austria show that the railways produce an annual deficit, but it is claimed that the advantages to the trade of the country from the low price of transportation have been vast. Additional revenue, however, is imperatively required. The raising of the tariffs would appear to offer the most ready means, but this is inopportune. The state lines have resorted to certain subsidiary charges, and increases are proposed in the stamp duties on waybills. These projects have all been violently opposed by the shippers, but the finance ministry insists that the expenditure of the state railways ought at least be covered by their receipts.

The conditions in Hungary are entirely similar. The government a few years ago proposed a general raising of the tariffs, but met with such a storm of opposition that the matter had to be deferred. In both Austria and Hungary there is urgent need of extensions and improvements of the railways and in both countries political influence is extremely strong because of the various nationalities concerned, great pressure being brought to bear on the party in power by the people of each province in behalf of their own interests. With such demands the ministry is very often obliged to comply. The difficulties arising from the federation of so many nationalities is instanced by the fact that any new rule or regulation has to be published in seven different languages.

The tariffs in both Austria and Hungary are complicated, but the system of tapering rates is common to all the railways. The primary tariff scheme, broadly speaking, is similar to that of Germany, but there are many intricacies.

The "Ausnahme," or exceptional tariffs, are more liberal in their application than those of Germany, modifications from the regular tariffs being made because of the "competition between two or more railways with respect to traffic to or from the same district; competition with waterways and landways; competition for the purpose of securing traffic for a special port; competition of several districts of production for one specific district of consumption; to counteract the disadvantages of geographical situation; to assist the agricultural and general industry to secure new markets with a view toward insuring a continuous and increasing traffic."

It would seem obvious that this greater liberality in Austria and Hungary in the way of "Ausnahme" tariffs is due to the fact that the rail traffic has been largely developed by private companies which have adjusted their tariffs to meet commercial conditions, and that because of the slower progress of governmental control these practices have not been transformed into that rigidity which is characteristic of Germany. In Austria and Hungary experimental rates are also accorded, largely under agreements to pay rebates on shipments that exceed a certain specified quantity. Special rates are given on traffic for export, but as a rule the ordinary tariff rates apply on import traffic.

As the railways of neither Austria nor Hungary make collection or delivery of hipments, "spediteurs" exist in both countries as in Germany. A very large percentage of the traffic passes through their hands, and every inducement is given them by the rail authorities. The principle of "lumping" small shipments to obtain the carload rate is permitted and encouraged.

In both Austria and Hungary, as in Germany, are supplementary charges consisting of stamp taxes on waybills and other forms; charges under certain conditions for loading and unloading, for transferring goods, for crantage, for weighing, and for counting the packages in a wagon load; and in Austria there is a station charge in addition to the terminal charge specified in the regular tariffs.

As in Germany, the railways take refuge behind the cast iron stipulations of the waybills, settlement of claims for goods lost or damaged in transit being very difficult and in most cases impossible to obtain.

The state control has reduced competition between the rail-

ways of both countries to a minimum. There is, however, a certain competition with the waterways over whose rates the government exercises no control. In winter when the waterways are closed to traffic, there is an increase in the rail rates on certain traffic for which, in summer, the railways compete with the waterways. In Hungary the railways have been so successful in competing with the waterways that the water-carrying interests have petitioned the Hungarian government to so revise the railway tariffs that this competition will be ineffective.

To meet the low rates which the German state railways make to induce traffic from the interior for the Levant to move by way of Hamburg, the Austrian railways make a special reduction to secure such traffic by way of Trieste.

In both Austria and Hungary in many places the zone system is adopted for passenger traffic. This is a tapering tariff which radically decreases between one zone and another, the extent of the respective zones being from about 100 to 200 miles.

This system was first introduced in Hungary in 1889 for the express purpose of building up the capital of Budapest, the tapering scale not applying from any interior station by way of Budapest to a further interior station. The object was to induce the people of the interior of Hungary to visit the capital with frequency and to make purchases there. It undoubtedly has contributed in great measure to the desired purpose, but it has had a disastrous effect on the revenues of the railways, who have sought to increase their receipts by the imposition of a transport tax on passengers and luggage which amounts to 18 per cent. of the transportation charge. For the same reason the zone system was proposed for freight traffic, but the project did not meet with successful operation, and it has been nearly abandoned.

On certain lines in both Austria and Hungary a passenger, on the payment of a fixed charge for a certificate known as "Legitimation" may thereafter purchase tickets at half the ordinary fares. This Legitimation charge for first class is \$64; for second class, \$38; for third class, \$24.

It is useless to attempt a comparison of the traffic by rail and that by water in these countries. The statistics, especially those of the waterways, are admittedly not in a high state of development.

UNLOADING COAL WITH BALLAST SPREADER.

The Atchison, Topeka & Santa Fe is using a novel method of unloading coal for winter storage in its Chillicothe, Ill., yards. Two parallel spur tracks were laid adjoining the coaling station and the coal is being dumped on these tracks from Hart convertible cars. A switch engine and three trainmen are employed in handling the cars to be dumped, and from 40 to 50 laborers in raising the track by filling in the coal. The most novel feature of the work consists in the use of an ordinary ballast spreading car to plow the coal from the track. The switch engine picks up one of the 40-ton dump coal cars, couples it to the spreading car and pushes them down to the end of the spur track. The center dump doors are opened and the engine backs out, the coal dropping down on the track and being pushed over the rails by the ballast plow. This operation is repeated until the coal is piled on each side of the track as high as the plow will push it. Then the laborers are brought on and the track raised above the level of the coal. The use of two tracks allows the track-raising gang to work on one track while dumping is going on on the other. Mexican laborers were available for the track raising, as they are employed extensively on construction work along the line. Four of them ride on the car which is being dumped and push the coal through the doors with long poles. In an average day's work of 10 hours, it is possible to unload from 1,200 to 1,500 tons of coal by this method, making a low per ton cost. In case the coal is needed during the winter, a steam shovel is used to load it on cars to be run up in the coaling station in the usual way. The width of the pile is such that a shovel can clean it up with one cut.

General News Section.

The Minnesota, St. Paul & Sault Ste. Marie will open, on the 6th of November, its line between Duluth and Winnipeg, by way of Moose Lake, Bemidji and Plummer.

The semi-annual meeting of the Central and Western Association of Car Service Officers was held at Des Moines, Iowa, on October 22. Various subjects relating to the proper handling of cars were discussed and a dinner was given in the evening.

The first passenger train over the new bridge across the Rio Grande at Brownville, Tex., was run on October 20. The train bore a party of officers of the Kansas City, Mexico & Orient, who, with a large number of visitors from the East and from Europe, were bound for the City of Mexico.

The Pennsylvania will shortly have available for use on its lines east and west of Pittsburgh and Erie 1,988 solid steel passenger train cars. This includes some 600 Pullman parlor and sleeping cars, as well as a large number of suburban coaches such as the company's shops are just beginning to turn out.

Lawyers of a large number of prominent railways met in New York this week to discuss the interpretation of the Mann-Elkins act, and to confer on the question of testing the constitutionality of this law. The conference was called by Mr. Stone, of the Louisville & Nashville, and it continues the discussion that was begun at Portsmouth, N. H., last summer.

In a fire at East St. Louis on October 20 the freight house of the Chicago & Alton, together with other buildings adjoining, was completely destroyed; total loss estimated at \$500,000. The flames were spread by the explosion of ten tank cars filled with oil, making the fire uncontrollable for a considerable time. There was also a large loss at the Baltimore & Ohio freight house.

The Northern Pacific will issue no more passes in Montana except to employees. This is owing to a recent decision of the Supreme Court of that state in the case of Johns, riding on a pass, who was thrown from a sleeping car berth and received injuries. He sued the road, and was awarded \$25,000 damages, the court holding that the road had violated the law in allowing him to ride free and that he was, therefore, not bound by the usual provision on the pass.

J. T. Harahan, president of the Illinois Central, stated at Chicago last week that he expects to retire under the pension system of the road on or before January 12, 1911. Mr. Harahan was born at Lowell, Mass., on January 12, 1841, and, therefore, on January 12, 1911, he will have reached the maximum of 70 years, at which retirement is provided for by the pension regulations of the Illinois Central. It is understood that the place of chairman of the board will be created and that Mr. Harahan will be appointed to it.

E. P. Griffith, superintendent of telegraph of the Erie Railroad and chairman of the committee in charge of the project to erect a monument at Turner, N. Y., to commemorate the first telegraphic train order, has sent out a circular inviting subscriptions. This proposition was laid before the readers of the *Railroad*, by *Carleton* in connection with the last annual meeting of the Association of Railway Telegraphic Superintendents. Mr. Griffith says that architects' sketches have been submitted showing that a suitable monument can be made for \$3,000. The Erie is now building a new station at Turner and it is proposed that the monument shall stand on or near the site of the old station. Contributions should be sent to J. B. Taltavall, 253 Broadway, New York City.

The progress which has been made in the art of flying since Wilbur Wright first flew, in 1903, is illustrated by the tournament which has been held during the past week at Belmont Park, near New York City, where the exhibitions have been carried out with a regularity approximating that of a horse race, and where four aeroplanes have been in the air at the same moment during the greater part of the exhibition, which is from 1:30 p.m. to about five o'clock. At times the reporters have counted ten machines flying at once. For the first five

days the program was adhered to quite closely, except on one day when the wind blew at 35 miles an hour and higher. Up to the end of the fifth day no important records had been broken, and no bones were broken, either. One slight accident was reported. On Tuesday Ralph Johnstone, in a Wright biplane, rose to a height of 7,303 ft. (1.38 miles), and other men had been nearly as high on preceding days. On Tuesday also, Orville Wright, using a new biplane (the smallest in the world), made the circuit of $2\frac{1}{2}$ kilometers (1.55 miles) in 1 minute, 26 seconds, which is said to be within two seconds of the best time ever made over such a course. This was an informal trial, early in the morning. James Radley flew to Hicksville and back (20 miles out and back) in 19 minutes, 48 seconds.

From the Wall Street Journal.

"As advertised," the annual meeting of stockholders of the Northern Pacific Railroad Co. was held this afternoon [October 20]. The entire attendance at the meeting was the proxy committee of one. He cast a ballot for Temple Bowdoin, David Crawford Clark, Stephen Baker, E. A. Gay, H. P. McCullough, A. H. Gillard, P. P. Hamilton, W. B. Horn, Samuel E. Kilner, Charles W. King, Charles MacVeagh, Francis L. Stetson and John F. Talmage, who composed the old board of directors. On counting the vote he found these men elected.

The Northern Pacific Railroad Co. was succeeded by the present Railway after the foreclosure in 1896. A few of the old stockholders declined to pay the assessment required for an exchange of shares of the old company for those of the new, and when the reorganized road grew prosperous, they attempted to realize something on their shares. They maintained that in the reorganization, title to the Railroad Company's land grants did not pass to the Railway. Attempts were made to secure legislation in Congress declaring this the case and the matter was carried through several courts, being decided in favor of the reorganized company in each instance. For the past three years holders of the old stock have made no effort to compel the Northern Pacific to buy their stock or reimburse them in other ways.

The Railways and the Woolen Trust.

On clothes manufactured in New England and sent to Chicago the railway freight would be $3\frac{1}{4}$ cents, and the advance proposed by the roads is exactly three-quarters of a cent on each suit.

Of course this is an addition to the cost of production, using that phrase in its widest sense. Such a sum, trifling in a single article, becomes appreciable spread over the individual's entire year's expenditure, and is positively enormous when applied to all the articles of consumption of a population of ninety million people. Having said this, it must be admitted that, badly as the railways bungled their own case in the freight rate hearings the pleas of the shippers were to a great extent distinguished by the most insufferable cant. So far as the ultimate consumer is concerned, he only enters into the calculations of the shipper in regard to the extent to which he can be held up. As we have shown, the unconscionable railways take $3\frac{1}{4}$ cents of the cost of his suit of clothes at Chicago. The tariff-protected woolen trust is enabled to take three hundred times that amount out of the consumer's pocket, by selling him something which he would not dream of accepting in that state of free competition which he demands for the railways.—*Wall Street Journal*.

Despatching by Telephone on the L. & N.

The Louisville & Nashville has just completed the installation of telephone train despatching and message circuits on its Knoxville division. There is a despatching circuit from Knoxville to Corbin, 105 miles, and one from LaFollette to Etowah, 111 miles, and a message circuit from Corbin to Etowah, 163 miles. This last has 36 stations. The equipment is all from the Western Electric Company. The cost of equipping this division was \$36,000. The power furnished for operating the selectors and ringing the bells is obtained from motor generator sets. These

sets are operated directly from the primary sources of power available, and on alternate days, so that the sets are always in an operating condition. They are arranged so that it is possible to connect all of the offices to either the train wire or the message circuit. There are test panels at all stations, making it possible to patch the despatcher's line with parts of the message circuit in case of trouble. Work trains on this division will be equipped with portable telephone sets and "fish poles" so that the conductor can at any time get in immediate touch with the despatcher.

Some History of Telephone Train Despatching.

The New Orleans & Northeastern, as early as 1883, used the telephone for operating trains. This was on a grounded iron wire about 100 miles long. Other roads using the telephone for controlling train movements previous to 1907 are: Huntingdon & Broad Top Mountain since 1883, 45 miles; New York & Pennsylvania Railway since 1896, 57 miles; Chicago, Kalamazoo & Saginaw since 1890, 56 miles, and Lake Erie, Alliance & Wheeling, 100 miles. The telephone has been used in manual block signaling on the freight line of the Pennsylvania between Columbia and Parkesburg since 1906.

The New York Central was the first to install the Western Electric improved equipment in October, 1907, on the main line between Albany and Ponda, 44 miles. Others were: The Chicago, Burlington & Quincy, December, 1907, Aurora to Mendota, 46 miles; Aurora to Galesburg, 125 miles; Aurora to Clyde, 28 miles. These Burlington installations were all double track, but reverse movements were made, and next that company equipped a single-track section between Aurora and Savanna, 106 miles. Following these pioneers others rapidly adopted the telephone and now we have the following list of roads, each having telephone circuits covering over 1,000 miles. These figures include in most cases equipment installed and under construction both on train and message circuits:

	Miles.
Atchison, Topeka & Santa Fe.....	6,088
Lake Shore & Michigan Southern.....	2,000
Pennsylvania Railroad (East of Pittsburgh).....	1,407
New York Central (including Boston & Albany).....	1,255
Cleveland, Cincinnati, Chicago & St. Louis.....	2,500
Illinois Central.....	2,100
Canadian Pacific.....	1,694
Great Northern (will eventually have).....	6,000
Chicago, Milwaukee & St. Paul.....	1,300
Louisville & Nashville.....	1,261

In addition to these there are 47 roads which have one or more telephone train despatching circuits in operation, making the total length of road covered approximately 35,000 miles. The Lackawanna is the only road that has installed telephone and selector equipment over practically its entire system. This road, out of a total of 957 miles, has equipped 933, on which there are 271 stations.—From a paper by G. K. Heyer.

Precautions Against Fire at Pennsylvania Station.

A firewall stretching across Manhattan island from Ninth to Seventh avenues has been completed by the construction of the Pennsylvania station and adjacent buildings. The full fire protection system of the station has just been put into operation and insurance engineers say a conflagration such as was experienced in Baltimore and San Francisco is now an impossibility in that part of Manhattan.

The Pennsylvania station covers over 28 acres, with three levels below the main floor, the lowest being 36 ft. below the street line. About three miles of piping, weighing 425 tons, was used, and there are 117 hose connections, 24 roof hydrants and 12 flush hydrants. The plans provide for maintaining 12 standard fire streams, or 3,000 gallons a minute. There are two 1,500-gal. Blake pumps in addition to the 16-in. suction from two storage tanks, having a total capacity of 75,000 gals. The pumps and tanks are in the station service plant, a separate building on the south side of 31st street. The supply pipes throughout are carried in pipe subways which encircle the entire station area. The pipes are carried on transverse cast iron hangers supported from steel girders, readily accessible for inspection or repairs.

In the track level area there are 23 hose connections on train platforms and 12 fire hydrants in the yard west of the station building. Hand chemical extinguishers have been provided in the corridors of the upper floors and at other points throughout the station, comprising in all 75 three-gallon extinguishers. In addition, there will be 33 extinguishers of the non-freezing

type placed in column recesses on the track level floor, where freezing conditions may exist. For the station building there will be in addition to the equipment specified a 100-ft. road hose carriage and a 60-gal. chemical engine. The total equipment of 2½-in. fire hose for the station exceeds 15,000 ft.

A complete closed circuit fire alarm system covers the entire station and service plant. There are in all 20 boxes of the non-interfering successive type, wired in loops of 10 stations each, recording on three gongs, located under main concourse, yardmaster's office and station service plant. The fire brigade organization comprises 25 men, divided into three companies.

For the tunnel alarms (for transmitting signals indicating fire and for cutting off current to the power rails) there are 116 boxes divided into six circuits, each box having two levers, one marked "Power" and the other "Fire," the "Power" lever automatically cutting off all power current in the section directly affected. This signal consists of two rounds of the box number. The "Fire" lever also automatically cuts off the power current and is indicated by four rounds of the box number.

The watchmen's service is recorded on two portable watchman's clocks from 38 stations, and provides for hourly tours. At the present time there are two watchmen.

History Condensed (and ex Parte).

The governor of Texas, replying to a telegraphic inquiry from the governor of Idaho last week, said: "Railway commission law is entirely beneficial to Texas. Railway mileage has increased from 10,110 to 13,855 under commission regulation. About 740 new miles built during the year ending June 30, 1910. Largest construction in our history. Rebates and discriminations practically unknown. Progress of state materially advanced by railway commission."

Launching of the Olympic.

The new White Star steamship Olympic, 882 ft. long, was launched at the yard of Harland & Wolff, Belfast, Ireland, on October 20. The Titanic, a sister ship, will be launched next February. These vessels, nearly 100 ft. longer than the Mauretania, have 45,000 tons register, 66,000 tons displacement, and a beam of 92 ft. They are designed to make a speed of 21 knots an hour.

Grade Crossings in New York.

The New York Public Service Commission, Second district, proposes to secure the abolition of as many highway crossings in the state during the current year as can be abolished within the appropriation which was made by the last legislature for this purpose—\$350,000. This appropriation means the expenditure of \$1,400,000, approximately, for this work. The commission now has on its docket 17 applications for the elimination of crossings; and there are 38 more applications which will be taken up as soon as the legislature makes a further appropriation.

The Boston & Maine and the New Hampshire Legislature.

In an address at Concord, N. H., last week, President Charles S. Mellen, referring to the future policy of the Boston & Maine in that state, said: "We will not interfere in any way with the election of members of the legislature or of other public officers. We shall not give or offer to any public officer, directly or indirectly, any consideration which shall tend to influence him in the performance of his public duties. We shall do away with the lobby, in the sense in which that term is commonly used. We must, however, employ the ablest talent we can secure to present to the legislature our views upon pending legislation affecting our company. I find two great lawsuits in progress between our company and your state officials. The first is the rate case [heretofore reported]. The second is the tax suit. The railway should pay its full tax under the law, but its taxes should be assessed as are other taxes in the state, on the same basis of valuation. * * * It is my opinion that the present taxes would never have been assessed had not prejudice and a desire to punish had a greater influence than a desire to be just."

The New York Journal of Commerce, commenting on the foregoing, says: "This is a salutary state of mind which is the apparent result of a long contest in New Hampshire, to which

at least two popular novels have been devoted by a well known writer sojourning at Cornish. It has produced an example that other railways in other states would do well to follow. If they will withdraw their corrupting influence from politics and refrain from subtle methods of affecting legislation and administration, it will go far toward disarming that hostility of which they have been complaining."

Strike on Missouri Pacific.

The members of the boilermakers, blacksmiths and pipemen's unions employed on the Missouri Pacific and the St. Louis, Iron Mountain & Southern went on a strike on October 21. These employees struck out of sympathy with the machinists who had already struck. When the machinists went out their foremen went with them. A. W. Sullivan, general manager of the Missouri Pacific and the Iron Mountain, gave out a statement on October 20, in which he said that "there were now no material differences between the Missouri Pacific and the machinists except over the reinstatement of the foremen." The machinists insisted on their reinstatement, which was refused. Mr. Sullivan added:

"The right of the railway company to select its officers of whatever rank, including foremen, is one which cannot be relinquished to a labor organization, while the company is held to responsibility for the safety and efficiency of its service.

"The action of the other labor organizations to coerce the railway company into compliance with the machinists' demands by threats of a sympathetic strike, in violation of their contract agreements, entered into since the machinists' strike was declared, cannot be permitted to influence the company in its determination to maintain control of its business through its own official organization."

Representatives of the employees in a public statement said that if the trouble with the Missouri Pacific and Iron Mountain is not adjusted within a reasonable time they will take steps to "bring to bear the influence of all members who are employed on the railways known as the Gould lines." Of course, this is a threat to cause a strike on the other Gould lines.

Forest Fire Losses.

A rough estimate of the fire loss in the national forests in Montana and northern Idaho, made by the Department of Agriculture, puts the total amount of timber killed or destroyed in this one district at: over six billion board feet, while the area burned over is put at over 1 1/4 million acres. A large part of the losses on the Coeur d'Alene, Clearwater, and Lolo forests were due to what became practically one great fire. The burn is shown on the forest service maps as extending in a north-westerly and southeasterly direction from north of Wallace, Idaho, to a point some 30 miles southwest of Missoula, Mont., or nearly 100 miles. At its widest point this burn has a width of about 40 miles, but its shape is very irregular. It was really a union of a number of separate fires, driven to fury by the fierce hurricane of August 26. To the west of the Idaho-Montana boundary in the region of this fire lies a very inaccessible mountainous country, into which, on account of the absence of trails and of forage, it was almost impossible for forces of fire fighters to penetrate. When the hurricane arose it drove the fires upon the parties which were hewing a way towards them, forced these parties to seek refuge wherever it could be found, and swept down upon the forests where the fires were up to that time generally well in hand. The extensive losses are ascribed to the combination of hurricane and lack of means to get to the fires, and put them out before the storm came. On the forests which were best equipped for controlling fires the present activity is regarded as a demonstration of the efficacy of the fire fighting methods employed, even under highly adverse natural conditions. Forester Crooks believes that, as usually happens in the case of big fires, there will be found to be considerable areas of young timber within the regions now mapped as entirely burned over. There will be an enormous quantity of fire-killed timber, both on the national forests and on private lands, to be shipped off as soon as possible, since if not marketed quickly it will not be worth cutting at all.

Since the amount to be harvested from government lands is doubtless greater than can be marketed in any event, and since it is better for the country that the timber should be utilized than that it should go to waste in the woods, the price at which

it will be sold will be lower than would be asked for the timber under ordinary circumstances.

If the six billion feet were a total loss, and if its stumpage value were put at the average price at which national forest timber was sold last year, it would be the equivalent of a money loss of about 17 million dollars. It is believed that his year's fires either burned up or killed between 1 and 2 per cent. of the total stand of national forest timber. At the present rate of cutting from the national forests, six billion feet is equal to 12 years' supply; but it is less than one-sixth of a single year's cut in the entire country.

A Motor Trip Through the Alps.

There has been begun and in part already put in operation what seems likely to be one of the most attractive mountain routes in the world, wholly in the French and Maritime Alps, beginning at Evian, on the south shore of lake Geneva about the middle of its length, and extending southward, over and among the mountains, to the Mediterranean at Nice, a distance of 345 miles, passing a little to the east of Mont Blanc, by Albertville and Briançon, which are the eastern termini of railways penetrating the Alps. A large part of this long mountain road has been built heretofore in separate sections. From Evian to Albertville, 87 miles, was operated this year. The vehicles are motor cars, each with seats for 14, which will take four days for the trip, the passengers spending the nights at Albertville, Briançon and Beauzever. This will make an extraordinarily attractive journey for those who leave the Riviera for the north in the spring.

American Association of Railway Surgeons.

The annual meeting of the American Association of Railway Surgeons was held at Chicago last week. The following officers were elected: President, Dr. A. R. Mitchell, Lincoln, Neb., succeeding H. C. Fairbrother, of St. Louis; vice-presidents, Dr. G. W. Gale, Jr., St. Louis; Dr. C. B. Quinn, Macomb, Miss., and Dr. I. K. Gardner, New Hampton, Iowa; treasurer, Dr. H. B. Jennings, Council Bluffs, Iowa; secretary, Dr. Louis T. Mitchell, Chicago. It was decided among other things to appoint a committee to urge improved sanitation along the right-of-way of railways, in cars and in stations. This committee will be expected to co-operate with state boards of health and with municipal authorities. It will consist of five members and will be expected to direct its attention to the abolition of the common drinking cup, to securing the cleaning of filthy stations, to eliminating the dust-raising whisk broom of the Pullman porter, etc. It will also use its influence to induce railways to quit housing laborers in abandoned freight cars along the right-of-way, which practice, it is said, is a breeder of disease. The movement, however, will have particularly in view the protection of the health of passengers. Dr. J. W. Price, oculist of the Rock Island lines at Memphis, Tenn., presented a paper describing experiments conducted by him to ascertain the extent to which locomotive engineers need spectacles. He strongly advocated the use of spectacles by engineers when the slightest defect of the eyes develops. He said that the prevalent use of goggles by automobilists should teach railway men the advantages to be derived from using some form of protection for their eyes. He expressed the opinion that the railway managements are not sufficiently careful to see that the eyes of engineers are as perfect as they should be in the interest of safety.

Canadian Society of Civil Engineers.

At the meeting of the electrical section held on October 27, an address was given by P. W. Sothman, M. Can Soc. C. E., entitled "Talk on the Hydro Electric Power Commission's 110,000 Transmission System."

American Railway Association.

The fall meeting of this association will be held at the Planters Hotel, St. Louis, November 16. Reports will be presented by the Committees on Transportation, on Maintenance, on Relations between Railways, on the Safe Transportation of Explosives and Other Dangerous Articles, and on Electrical Working

MEETINGS AND CONVENTIONS.

Traffic News.

The following list gives names of secretaries, dates of next or regular meetings and places of meetings.

AIR BRASS ASSOCIATION.—J. M. Nelles, 33 State St., Boston, Mass.
AMERICAN ASSOCIATION OF FREIGHT OFFICERS.—A. G. Thompson, Scranton, Pa.; next meeting June 22, 1911, Niagara Falls, N. Y.
AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Hall, Boston, Mass.; next meeting, St. Paul, Minn.
AMERICAN ASSOCIATION OF LOCAL FREIGHT AGENTS' ASSN.—G. W. Dennison, Penn. Co., Toledo, Ohio.
AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew Bldg., Cleveland, Ohio.
AMERICAN RAILWAY ASSOCIATION.—W. T. Allen, 24 Park Place, New York.
AMERICAN RAILWAY BRICK AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Chicago; Sept. 19, 1911, St. Louis, Mo.
AMERICAN RAILWAY ENGINEERING AND MAINTENANCE ASSN.—E. H. Fitch, Michigan Bldg., Chicago; March 21-22, 1911, Chicago.
AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; May 6, 1911, Detroit, Mich.
AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony Building, Chicago.
AM. RAILWAY TOOL FORMERS' ASSN.—O. T. Harwood, Bloomington, Ill.
AM. SOCIETY OF FUELING MATERIALS.—Prof. E. Marburg, Univ. of Penn., Phila.
AM. SOCIETY OF CIVIL ENGINEERS.—W. Hume, 230 W. 57th St., N. Y.; 1st and 3d Wed., except July and August, annual, Jan. 18-19, 1911, New York.
AM. SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Hauser, 13 Park Row, New York.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., New York; annual, Dec. 6-9; New York.
AMERICAN FURBER RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; April 26, 1911; New Orleans, La.
ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; May, 1911; Montreal, Can.
ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Colegrove, I. C. R. R., Chicago.
ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston.
ASSN. OF TRANS. AND CAR ACC. OFFICERS.—G. P. Conard, 24 Park Place, N. Y.; Dec. 13-14, Chicago; June 20-21, 1911, Cape May City, N. J.
CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. of month, except June, July and Aug.; Montreal.
CANADIAN SOCIETY OF CIVIL ENGS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays; Montreal; annual, last week January.
CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month; Chicago.
CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
ENGINEERS' SOCIETY OF PENN.—E. R. Dasher, Box 704, Harrisburg, Pa.
ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton Bldg., Pittsburgh; 1st and 3d Tues.; annual, Jan. 17, 1911; Pittsburgh.
FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R.R., Richmond, Va.; 20th annual, June 21, 1911; St. Paul, Minn.
GENERAL SUPERINTENDENTS' ASSN. OF CHICAGO.—H. D. Judson, 209 Adams St., Chicago; Wednesday preceding 3d Thurs.; Chicago.
INDIANAPOLIS RY. AND MECH'L CLUB.—B. S. Downey, C., H. & D., Indianapolis, Ind.
INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; next convention, Omaha, Neb.
INTERNAT'L RY. FUEL ASSN.—D. B. Sebastian, La Salle St. Station, Chicago; May 15-16; Chattanooga, Tenn.
INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.
INT. RY. MASTER BLACKSMITHS' ASSN.—A. L. Woodworth, Lima, Ohio.
INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels, 1911.
IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
MASTER CAR BUILDERS' ASSN.—J. W. Taylor, Old Colony Bldg., Chicago.
MASTER CAR AND LOCO. PAINTERS' ASSN. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass.
MAINTENANCE AND MATERIALS OF WAY ASSN.—Walter E. Emery, P. & U. Ry., Peoria, Ill.; Oct., 1911; St. Louis.
ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago; Oct. 25 and 26; Hotel Chamberlin, Old Point Comfort, Va.
SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. R. Ry., Montgomery, Ala.
SOUTHERN & SOUTHWESTERN R.R. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs.; Jan., Mar., July, Sept. and Nov.; Atlanta.
TOLEDO TRANSPORTATION CLUB.—L. G. Macomber, Woolson Spice Co., Toledo; 1st Sat.; annual, May 6, 1911; Toledo.
TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; 1st Sat. after 1st Wed.; annual, Dec. 13; Buffalo.
TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.
TRAFFIC CLUB OF PITTSBURGH.—T. S. Walters, Oliver Building, Pittsburgh; meetings monthly; Pittsburgh.
TRAIN DESPATCHERS' ASSN. OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 20, 1911; Baltimore.
TRAINING ENGINEERS' ASSN.—W. O. Thompson, N. Y. C. & H. R. E., Buffalo.
WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg; 3d Monday, except June, July and August; Winnipeg.

Fourteen organizations of printers and engravers of printer at Chicago have sent resolutions to the Interstate Commerce Commission urging an early decision in the freight rate advance cases because the suspension by the commission of the rates proposed by the railways has prevented the publication of the tariffs and thereby thrown many printers out of employment.

The Lehigh Valley, which has a ticket office in the Hudson Terminal at Church and Cortlandt streets, New York City, for the convenience of passengers who cross the river by the Hudson Tunnel, is to have an office also in the Thirty-third street station of the tunnel road. Thirty-third street is the present northern terminus of the tunnels, and the station will be opened November 10.

The railways of Ohio have postponed their proposed increase in freight rates until February 1, 1911. This is a second postponement, the first having been until November 1, pending the investigation by the Interstate Commerce Commission. The Ohio railroad commission rejected the new tariffs when presented last summer. It will await the finding of the federal commission before resuming the inquiry.

The City Council of Cincinnati has directed the city solicitor to take action of this kind, but it is to be remembered that the to secure reductions in freight rates on the Cincinnati Southern Railway. This litigation, which originated in a decision of the Interstate Commerce Commission, has now reached the United States Circuit Court. It is rare, if not unheard of, for a city to take action of this kind, but it is to be remembered that the city of Cincinnati is peculiarly interested in the Cincinnati Southern, having been the principal capitalist and promoter in the construction of the road.

An agreement has been reached by representatives of the principal western railways and shippers of vehicles and agricultural implements for a readjustment of rates and minimum weights on these commodities. Under this agreement the railways are to raise the rate from Chicago to points in the southwest from 79 to 85 cents, and, on the other hand, are to reduce substantially the minimum carload weight, the new minimums ranging from 10,000 lbs. for cars 36 ft. 6 in. long to 20,000 lbs. for cars 46 ft. 7 in. long. The minimums have been so high in the past that shippers have complained that they could not load them into cars of ordinary sizes.

The traffic department of the Southern Railway reports that shipments of apples from points on lines of that company in Virginia will this year be at least twice as heavy as last year, when nearly 100,000 barrels were sent out. The farmers in the valley of Virginia expect this year to take in half a million dollars for apples, the best grades bringing about \$3 a barrel. Five years ago the crop was not one-fifth that of this year, and ten years ago shipments were only fragmentary. This remarkable growth has resulted from increased intelligence, care, spraying and cultivation. All this is in a territory separate from the Piedmont section, where apples have been the principal crop for many years.

The Pennsylvania has issued passenger tariffs to its new station in New York City from stations in New Jersey within 32 miles. All of the rates—single trip tickets, 50-trip family tickets and season tickets—are higher than those to the ferry terminals in New York City, now in effect, and the monthly ticket rates are \$5 higher, which seems to indicate that the company does not wish to encourage the use of the new station by regular suburban passengers—or at least not to the detriment of through business. From Newark, nine miles, the present single ticket rate to the Manhattan termini, including the Hudson tunnel terminal at Church street, is 17 cents; to the new station it will be 27 cents. From New Brunswick, 31 miles, the present rate is 78 cents; to the new station 86 cents. Fifty-trip tickets from Newark are increased from \$6 to \$11; from New Brunswick, increased from \$27 to \$32. Monthly tickets from Newark, \$6; to the new station, \$12; New Brunswick, \$12; to the new station, \$18.

At a hearing on the application of the Buffalo, Rochester & Eastern which was given by the New York State Public Service Commission last week, C. H. Ewing, of the New York Central,

gave elaborate statistics of the movement of freight over that road. Of the refrigerator cars ordered by fruit shippers in western New York in the month of September 95 per cent. were furnished on time, and 99.81 per cent. were furnished on the day wanted or on the next day. The actual time of the special daily fruit trains from that region to the markets averaged, for September, 29 hours 53 minutes to New York on schedules averaging 29 hours 33 minutes. A shipper having complained that it took 10 or 12 days to carry his fruit to New York City, Mr. Ewing produced records to show that only two of the cars sent by the complainant took as long as six days, and these were delayed by storms. The New York Central runs freight cars out of Buffalo in the evening, which arrive at Rochester and Syracuse the next morning, and at Schenectady the second day. As a whole, the fast freight trains of the New York Central arrive at destination a little ahead of time.

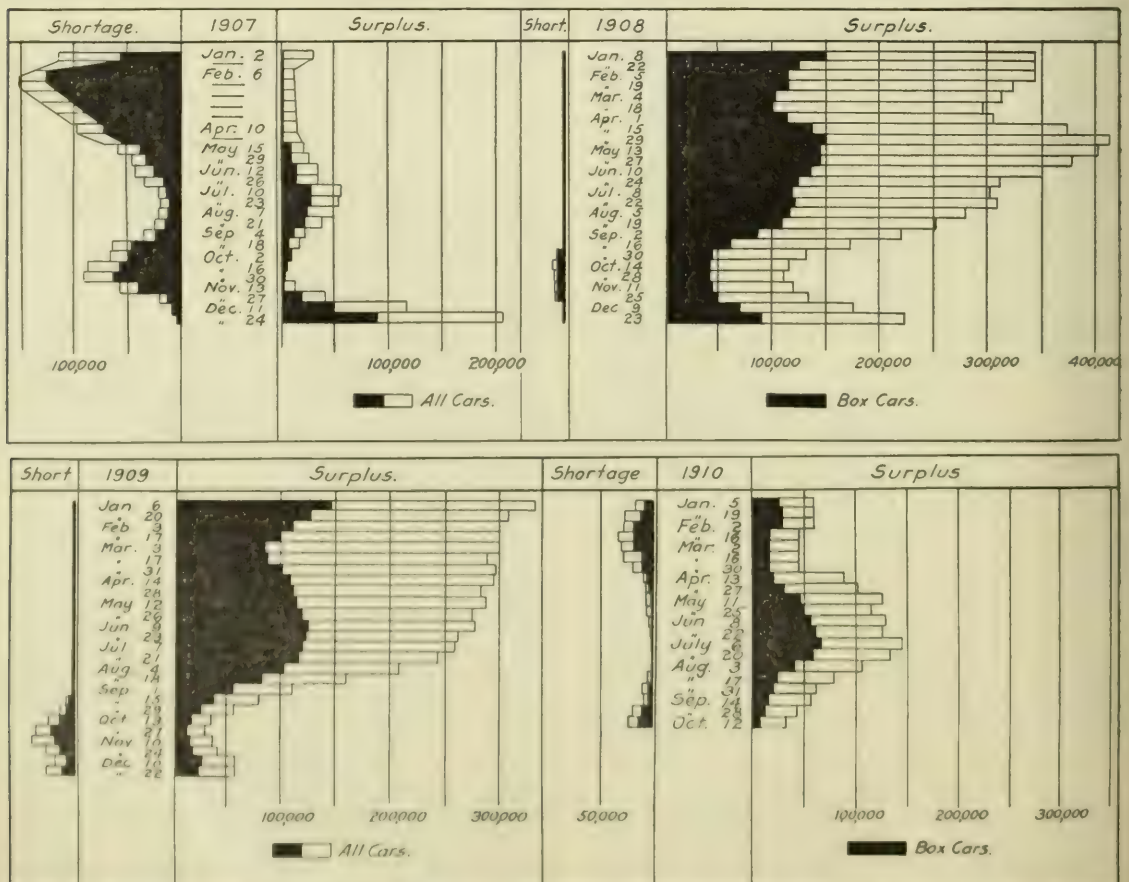
P. W. Coyle, commissioner of the Traffic Bureau of the Business Men's League of St. Louis, issued a statement on October 18, calling attention to the fact that the denial by the United States Supreme Court of the motion for rehearing in the Missouri river rate case will cause a complete change in the adjustment of rates from eastern points to points on the Missouri river and to Denver. While the rate between the Mississippi and Missouri rivers on goods moving from Atlantic seaboard points was reduced from 60 to 51 cents (first class) the local rate between the Mississippi and Missouri rivers is left at 60 cents. Mr. Coyle calls attention to the fact that this places St. Louis at a relative disadvantage of 9 cents per 100 lbs., and adds: "We assume that the carriers or the Missouri railroad and warehouse commission will eliminate this high differential by the establishment of the 51-cent rate to apply on all

shipments handled between the Mississippi and Missouri rivers. This, it appears to us, must be the logical result of the establishment of the commission's rates." The Interstate Commerce Commission, in its decision in the Missouri river rate case plainly indicated that it did not think the rates between the Mississippi and Missouri rivers should be reduced locally, the principle on which the decision was made being that the through rate, ordinarily, should be less than the sum of the locals. It was pointed out at the time the decision was rendered that the Missouri railway commission could easily upset the Interstate Commerce Commission's adjustment by making the reductions locally which the Interstate Commission said should not be made. Mr. Coyle's statement evidently is the first move in the direction of getting these reductions made. If this move is successful it will simply mean that the relations between the rates will be the same as they were before the Interstate Commerce Commission acted, the only difference being that the railways will get less revenue from the business.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 81 giving a summary of car shortages and surpluses by groups from May 26, 1909 to October 12, 1910, says:

"The surplus decreased 8,734 cars, bringing the total down to 39,735. The surplus of box cars decreased 3,288, coal and gondola 1,837 and miscellaneous 2,300 cars. The decrease in the latter item is made up largely of coke cars in groups 2 (Eastern) and 3 (Middle), and stock cars in groups 8 (Middle Western), 9 (Southwestern) and 10 (Pacific). The decrease in box surplus, while quite general, is particularly noticeable in the



Car Surpluses and Shortages in 1907, 1908, 1909 and 1910.

West, the surplus of this class in group 10 (Pacific) having been practically wiped out, with shortages on the increase.

"The total shortage is 29,119 cars, an increase of 2,478. The box car shortage totals 12,153, now being in excess of the reported surplus. There is also a slight increase in the coal car shortage, which is still chiefly in groups 4 (Middle Atlantic) and 8 (southern). Group 4 (Middle Atlantic) reports a considerable shortage of box cars, as do also the groups in the western section of the country."

transportation consists of two kinds of tickets not originally issued for a joint trip.

The Nebraska railway commission has extended the date when its order requiring the railways of Nebraska to pay higher switching rates to the Omaha Union Stockyards Company shall go into effect from October 24 to December 1. Counsel for the railway company contend that the commission has no power to make the roads absorb the higher switching charges, and the commission does not want its order to go into effect until it knows whether

CAR SURPLUSES AND SHORTAGES.

			Surpluses					Shortages				
			Coal,		gondola and hopper.		Other trucks.	Coal,		gondola and hopper.		Other trucks.
Date	No. of roads.		Box.	Flat.			Total.	Box.	Flat.			Total.
Group 1—October 12, 1910	8		400	122	129	343	994	627	175	453	25	1,220
" " " 17, 1910	24		1,038	79	1,509	6,291	8,917	366	9	292	114	782
" " " 13, 1910	23		1,809	300	336	1,988	4,436	310	2	635	54	995
" " " 12, 1910	10		18	95	423	210	806	2,351	245	2,965	59	4,796
" " " 11, 1910	17		0	11	185	675	851	1,181	392	1,217	46	3,139
" " " 12, 1910	20		5,040	572	1,551	2,116	9,239	242	0	446	397	1,985
" " " 7, 1910	1		18	76	2	33	129	162	0	144	254	560
" " " 12, 1910	14		31	42	237	1,285	1,595	1,492	51	72	6	1,581
" " " 8, 1910	9		245	173	101	336	855	719	29	193	59	991
" " " 12, 1910	10		156	446	1,511	2,850	4,963	2,153	260	76	400	2,889
" " " 11, 1910	3		41	173	30	253	497	2,317	45	9	242	2,697
Total	131		8,856	2,085	6,034	16,760	33,735	12,153	1,199	5,433	1,634	29,419

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia, and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.

The accompanying table gives car surpluses and shortages by groups for the latest period covered by the report, and the charts show total surpluses and shortages, bi-weekly, in 1907, 1908, 1909 and 1910.

INTERSTATE COMMERCE COMMISSION.

The Interstate Commerce Commission has issued an order directing that when a tariff is filed by a railway, including both increases and reductions in rates, the reductions may go into effect on one day's notice but the increases will be suspended for the usual time necessary for investigation.

Hearings and Suspensions of Tariffs.

The Interstate Commerce Commission will give a hearing in New York City November 16 on complaints against the commutation ticket rates to New York which last summer were increased by the Pennsylvania and other roads.

The Interstate Commerce Commission on Monday last suspended grain traffics which had been issued by the railways of the Northwest to go into effect November 1. The commission deemed it proper to require the railways to prove the reasonableness of the increases proposed. The suspension is until March 1, and the roads interested are the Chicago & North Western, the Chicago, Milwaukee & St. Paul and the others in that region. Eighty-six participating carriers are named as defendants. A general tariff of the Chicago & North Western between points in Illinois and points in Wisconsin was suspended at the same time, complaint being made of the abolition of important commodity rates.

STATE COMMISSIONS.

The Nevada State Railroad Commission has ordered large reductions in the freight rates on lumber to go into effect November 20. An example is the rate from Goldfield to Verdi, where the reduction is from \$13 a ton to \$8 on the higher grades of lumber and to \$5 on the lower grades.

The State Railroad Commission of Pennsylvania has notified all the railways of the state that the rule about through checking of baggage which has recently been adopted by the Pennsylvania is to be prescribed by the commission for observance by all railways of the state. This rule is to the effect that a passenger holding transportation through to a point on another road may have his baggage checked through, even though his

the higher charges will have to be paid by the trunk line railways or the shippers.

The New York State Public Service Commission, Second district, has authorized all steam roads to suspend until February 1, 1911, tariffs containing general increases in freight rates which would otherwise go into effect November 1. The commission previously made an order authorizing the postponement of these increases from August 1 to November 1. This action in New York state follows action in interstate business taken by the Interstate Commerce Commission, pending investigation of general rate advances by that commission.

The Indiana railway commission has ordered H. F. Houghton, general superintendent of the Big Four, to supply it with data regarding the ages and service records of telegraph operators employed by that road, and Mr. Houghton has informed the commission that, on the advice of counsel, he will not furnish the information. The commission has indicated that it will try to get the Marion county court to compel Mr. Houghton to supply the information. The order of the commission was issued in connection with its investigation of a wreck at Brightwood, Ind. Mr. Houghton furnished the desired information regarding the telegraph operators who were in any way concerned with the Brightwood accident, but refused to give information about other operators. It is charged by the commission that the Big Four and other railways are employing men as telegraph operators who are too young and inexperienced.

Railway Building In British India.

An effort is being made by the business men of Karachi to secure the sanction of the Indian government to the extension of the meter gage railway from Hyberabad to Karachi. This railway now extends from Hyderabad, Sind, to Jodhpur, Rajputana, but through freight from Rajputana to Karachi does not use this line to any great extent on account of the necessary transfer at Hyderabad to the broad gage, and the high charges of the broad-gage road for the short haul from Hyderabad to Karachi. It is believed that much larger trade will result between Rajputana and Karachi if this extension is allowed, and it would furnish Karachi with an additional line of communication with the interior, this being necessary on account of frequent damage to railway lines because of floods which occur during the wheat seasons. Communications have already been interrupted for three days during the present season, while three or four years ago all freight traffic with the interior was cut off for a period of 34 days.

REVENUES AND EXPENSES OF RAILWAYS.

(See also review of October 7, 14, and 21.)

MONTH OF AUGUST, 1910.

Mileage	Operating expenses—			Net operating expenses (on debit)	Outside operations, net	Operating income (on loss)	Income (on loss) last year
	Freight	Trans- portation	General				
347	\$21,000	\$12,000	\$23,800	\$56,800	\$9,437	\$66,237	\$6,554
419	12,100	10,100	20,400	42,600	14,000	56,600	36,078
486	10,000	8,000	18,000	36,000	11,000	47,000	34,000
554	8,000	6,000	14,000	28,000	9,500	37,500	17,896
621	6,000	4,000	10,000	20,000	8,500	28,500	13,141
688	4,000	2,000	6,000	12,000	7,000	19,000	8,433
755	2,000	1,000	3,000	6,000	6,000	12,000	5,780
822	1,000	500	1,500	3,000	6,000	9,000	4,297
889	500	250	750	1,500	6,000	7,500	3,500
956	250	125	375	750	6,000	6,750	3,100
1,023	125	62	187	375	6,000	6,375	2,900
1,090	62	31	93	187	6,000	6,187	2,700
1,157	31	15	46	93	6,000	6,046	2,500
1,224	15	7	23	46	6,000	6,023	2,300
1,291	7	3	11	23	6,000	6,011	2,100
1,358	3	1	5	11	6,000	6,006	1,900
1,425	1	0	2	5	6,000	6,002	1,700
1,492	0	0	1	2	6,000	6,001	1,500
1,559	0	0	0	1	6,000	6,000	1,300
1,626	0	0	0	0	6,000	6,000	1,100
1,693	0	0	0	0	6,000	6,000	900
1,760	0	0	0	0	6,000	6,000	700
1,827	0	0	0	0	6,000	6,000	500
1,894	0	0	0	0	6,000	6,000	300
1,961	0	0	0	0	6,000	6,000	100
2,028	0	0	0	0	6,000	6,000	0
2,095	0	0	0	0	6,000	6,000	0
2,162	0	0	0	0	6,000	6,000	0
2,229	0	0	0	0	6,000	6,000	0
2,296	0	0	0	0	6,000	6,000	0
2,363	0	0	0	0	6,000	6,000	0
2,430	0	0	0	0	6,000	6,000	0
2,497	0	0	0	0	6,000	6,000	0
2,564	0	0	0	0	6,000	6,000	0
2,631	0	0	0	0	6,000	6,000	0
2,698	0	0	0	0	6,000	6,000	0
2,765	0	0	0	0	6,000	6,000	0
2,832	0	0	0	0	6,000	6,000	0
2,899	0	0	0	0	6,000	6,000	0
2,966	0	0	0	0	6,000	6,000	0
3,033	0	0	0	0	6,000	6,000	0
3,100	0	0	0	0	6,000	6,000	0
3,167	0	0	0	0	6,000	6,000	0
3,234	0	0	0	0	6,000	6,000	0
3,301	0	0	0	0	6,000	6,000	0
3,368	0	0	0	0	6,000	6,000	0
3,435	0	0	0	0	6,000	6,000	0
3,502	0	0	0	0	6,000	6,000	0
3,569	0	0	0	0	6,000	6,000	0
3,636	0	0	0	0	6,000	6,000	0
3,703	0	0	0	0	6,000	6,000	0
3,770	0	0	0	0	6,000	6,000	0
3,837	0	0	0	0	6,000	6,000	0
3,904	0	0	0	0	6,000	6,000	0
3,971	0	0	0	0	6,000	6,000	0
4,038	0	0	0	0	6,000	6,000	0
4,105	0	0	0	0	6,000	6,000	0
4,172	0	0	0	0	6,000	6,000	0
4,239	0	0	0	0	6,000	6,000	0
4,306	0	0	0	0	6,000	6,000	0
4,373	0	0	0	0	6,000	6,000	0
4,440	0	0	0	0	6,000	6,000	0
4,507	0	0	0	0	6,000	6,000	0
4,574	0	0	0	0	6,000	6,000	0
4,641	0	0	0	0	6,000	6,000	0
4,708	0	0	0	0	6,000	6,000	0
4,775	0	0	0	0	6,000	6,000	0
4,842	0	0	0	0	6,000	6,000	0
4,909	0	0	0	0	6,000	6,000	0
4,976	0	0	0	0	6,000	6,000	0
5,043	0	0	0	0	6,000	6,000	0
5,110	0	0	0	0	6,000	6,000	0
5,177	0	0	0	0	6,000	6,000	0
5,244	0	0	0	0	6,000	6,000	0
5,311	0	0	0	0	6,000	6,000	0
5,378	0	0	0	0	6,000	6,000	0
5,445	0	0	0	0	6,000	6,000	0
5,512	0	0	0	0	6,000	6,000	0
5,579	0	0	0	0	6,000	6,000	0
5,646	0	0	0	0	6,000	6,000	0
5,713	0	0	0	0	6,000	6,000	0
5,780	0	0	0	0	6,000	6,000	0
5,847	0	0	0	0	6,000	6,000	0
5,914	0	0	0	0	6,000	6,000	0
5,981	0	0	0	0	6,000	6,000	0
6,048	0	0	0	0	6,000	6,000	0
6,115	0	0	0	0	6,000	6,000	0
6,182	0	0	0	0	6,000	6,000	0
6,249	0	0	0	0	6,000	6,000	0
6,316	0	0	0	0	6,000	6,000	0
6,383	0	0	0	0	6,000	6,000	0
6,450	0	0	0	0	6,000	6,000	0
6,517	0	0	0	0	6,000	6,000	0
6,584	0	0	0	0	6,000	6,000	0
6,651	0	0	0	0	6,000	6,000	0
6,718	0	0	0	0	6,000	6,000	0
6,785	0	0	0	0	6,000	6,000	0
6,852	0	0	0	0	6,000	6,000	0
6,919	0	0	0	0	6,000	6,000	0
6,986	0	0	0	0	6,000	6,000	0
7,053	0	0	0	0	6,000	6,000	0
7,120	0	0	0	0	6,000	6,000	0
7,187	0	0	0	0	6,000	6,000	0
7,254	0	0	0	0	6,000	6,000	0
7,321	0	0	0	0	6,000	6,000	0
7,388	0	0	0	0	6,000	6,000	0
7,455	0	0	0	0	6,000	6,000	0
7,522	0	0	0	0	6,000	6,000	0
7,589	0	0	0	0	6,000	6,000	0
7,656	0	0	0	0	6,000	6,000	0
7,723	0	0	0	0	6,000	6,000	0
7,790	0	0	0	0	6,000	6,000	0
7,857	0	0	0	0	6,000	6,000	0
7,924	0	0	0	0	6,000	6,000	0
7,991	0	0	0	0	6,000	6,000	0
8,058	0	0	0	0	6,000	6,000	0
8,125	0	0	0	0	6,000	6,000	0
8,192	0	0	0	0	6,000	6,000	0
8,259	0	0	0	0	6,000	6,000	0
8,326	0	0	0	0	6,000	6,000	0
8,393	0	0	0	0	6,000	6,000	0
8,460	0	0	0	0	6,000	6,000	0
8,527	0	0	0	0	6,000	6,000	0
8,594	0	0	0	0	6,000	6,000	0
8,661	0	0	0	0	6,000	6,000	0
8,728	0	0	0	0	6,000	6,000	0
8,795	0	0	0	0	6,000	6,000	0
8,862	0	0	0	0	6,000	6,000	0
8,929	0	0	0	0	6,000	6,000	0
8,996	0	0	0	0	6,000	6,000	0
9,063	0	0	0	0	6,000	6,000	0
9,130	0	0	0	0	6,000	6,000	0
9,197	0	0	0	0	6,000	6,000	0
9,264	0	0	0	0	6,000	6,000	0
9,331	0	0	0	0	6,000	6,000	0
9,398	0	0	0	0	6,000	6,000	0
9,465	0	0	0	0	6,000	6,000	0
9,532	0	0	0	0	6,000	6,000	0
9,599	0	0	0	0	6,000	6,000	0
9,666	0	0	0	0	6,000	6,000	0
9,733	0	0	0	0	6,000	6,000	0
9,800	0	0	0	0	6,000	6,000	0
9,867	0	0	0	0	6,000	6,000	0
9,934	0	0	0	0	6,000	6,000	0
10,001	0	0	0	0	6,000	6,000	0
10,068	0	0	0	0	6,000	6,000	0
10,135	0	0	0	0	6,000	6,000	0
10,202	0	0	0	0	6,000	6,000	0
10,269	0	0	0	0	6,000	6,000	0
10,336	0	0	0	0	6,000	6,000	0
10,403	0	0	0	0	6,000	6,000	0
10,470	0	0	0	0	6,000	6,000	0
10,537	0	0	0	0	6,000	6,000	0
10,604	0	0	0	0	6,000	6,000	0
10,671	0	0	0	0	6,000	6,000	0
10,738	0	0	0	0	6,000	6,000	0
10,805	0	0	0	0	6,000	6,000	0
10,872	0	0	0	0	6,000	6,000	0
10,939	0	0	0	0	6,000	6,000	0
11,006	0	0	0	0	6,000	6,000	0
11,073	0	0	0	0	6,000	6,000	0
11,140	0	0	0	0	6,000	6,000	0
11,207	0	0	0	0	6,000	6,000	0
11,274	0	0	0	0	6,000	6,000	0
11,341	0	0	0	0	6,000	6,000	0
11,408	0	0	0	0	6,000	6,000	0
11,475	0	0	0	0	6,000	6,000	0
11,542	0	0	0	0	6,000	6,000	0
11,609	0	0	0	0	6,000	6,000	0
11,676	0	0	0	0	6,000	6,000	0
11,743	0	0	0	0	6,000	6,000	0
11,810	0	0	0	0	6,000	6,000	0
11,877	0	0	0	0	6,000	6,000	0
11,944	0	0	0	0	6,000	6,000	0
12,011	0	0	0	0	6,000	6,000	0
12,078	0	0	0	0	6,000	6,000	0
12,145	0	0	0	0	6,000	6,000	0
12,212	0	0	0	0	6,000	6,000	0
12,279	0	0	0	0	6,000	6,000	0
12,346	0	0	0	0	6,000	6,000	0
12,413	0	0	0	0	6,000	6,000	0
12,480	0	0	0	0	6,000	6,000	0
12,547	0	0	0	0	6,000	6,000	0
12,614	0	0	0	0	6,000	6,000	0
12,681	0	0	0	0	6,000	6,000	0
12,748	0	0	0	0	6,000	6,000	0
12,815	0	0	0	0	6,000	6,000	0

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Charles H. Humphreys, transfer clerk of the New York, New Haven & Hartford, has been appointed assistant secretary, with office at New Haven, Conn., succeeding Arthur F. Clark, promoted.

Richard H. Aishton, general manager of the Chicago & North Western at Chicago, has been elected vice-president in charge of maintenance and operation, with office at Chicago, succeeding W. A. Gardner. Mr.

Aishton was born at Foxcroft, Ill., in June, 1860. He was educated in the public schools at Foxcroft and began railway work in 1878 as an assistant with an engineering corps on the Chicago & North Western. He remained in the engineering department until 1895, being promoted consecutively to rodman, division engineer, roadmaster and superintendent of bridges and buildings. He was then transferred to the operating department, first as trainmaster, and was later promoted to assistant superintendent, superintendent and general superintendent. He was appointed assistant general manager in 1902, and four years later was made general manager. Mr. Aishton is chairman of the General Managers' Association of Chicago.

F. B. Sheldon, assistant to the president and chief engineer of the Hocking Valley at Columbus, Ohio, has been elected president of the Kanawha & Michigan, with office at Columbus, succeeding Nicholas Monsarrat, deceased.

Maxwell Evarts, general attorney of the Union Pacific at New York, has been appointed general counsel of the Union Pacific, the Southern Pacific, the Oregon Short Line and the Oregon Railroad & Navigation Co., with office at New York.

J. T. Harahan, president of the Illinois Central, stated recently that he expects to retire under the pension system of the road on or before January 12, 1911. It is understood that the place of chairman of the board will be created and that Mr. Harahan will be appointed to it.

W. J. Souder, auditor and purchasing agent of the St. Paul & Des Moines, with office at Des Moines, Ia., has resigned to engage in other business. T. S. Ford has been appointed to succeed Mr. Souder, and will have the title of assistant auditor until the next meeting of the board of directors.

Richard A. Jackson, general counsel of the Great Northern at St. Paul, Minn., has been elected vice-president in charge of legal affairs, with office at St. Paul. Mr. Jackson was president of the Rock Island Company from April, 1909, to January, 1910. His photograph and a sketch of his life were published in the *Railway Age Gazette* of June 18, 1909.

Marvin Hughitt, president of the Chicago & North Western, has retired to become chairman of the board of directors. W. A. Gardner, vice-president in charge of maintenance and operation, has been elected president, succeeding Mr. Hughitt. (See sketches of Mr. Hughitt and Mr. Gardner published elsewhere in this issue.) Samuel A. Lynde, general attorney at Chicago, has been elected vice-president in charge of legal and financial departments, succeeding E. E. Osborn, retired on account of ill health. Richard H. Aishton, general manager at Chicago, succeeds W. A. Gardner.

Samuel A. Lynde, general attorney of the Chicago & North Western at Chicago, has been elected vice-president, in charge



R. H. Aishton.

of legal and financial matters, of the North Western and the Chicago, St. Paul, Minneapolis & Omaha, with office at New York City, succeeding T. E. Osborn, retired on account of ill health. Mr. Lynde was born December 14, 1865, at Rock Island, Ill., and graduated from Harvard College in 1887. He read law in Chicago and was admitted to the bar in 1892. Since 1892 he has had more or less to do with railway legal work, having been consulted at different times with the following roads: Chicago & Western Indiana, Grand Trunk and Chicago & Eastern Illinois. He was appointed general attorney of the Chicago & North Western in 1901, which position he held continuously until his recent election.

Operating Officers.

W. E. Shipp has been appointed an assistant superintendent of the Houston & Texas Central, with office at Ennis, Tex.

I. H. Dillie, a chief dispatcher of the Missouri Pacific, has been appointed a trainmaster, with office at Atchison, Kan., succeeding W. H. Broughton, resigned.

J. E. Hood, trainmaster of the Chicago, Milwaukee & Puget Sound, at Alherton, Mont., has been appointed superintendent of the Rocky Mountain division, with office at Three Forks, succeeding F. M. Melin, resigned.

John A. McGrew, inspector maintenance of way of the Delaware & Hudson at Albany, N. Y., has been appointed superintendent of the Saratoga and Champlain divisions, with office at Albany, succeeding A. T. Benjamin, resigned.

G. W. Lillie has been appointed an assistant superintendent of the Oregon Short Line, with office at Pocatello, Idaho, succeeding C. M. Hoffman, resigned. He will have charge of mechanical matters and have supervision over the Pocatello shops and roundhouse.

William D. Cantillon, assistant general manager of the Chicago & North Western at Chicago, has been appointed general manager, with office at Chicago, succeeding Richard H. Aishton, elected vice-president, and W. E. Morse, general superintendent at Chicago, succeeds Mr. Cantillon. Samuel G. Strickland, assistant general superintendent at Chicago, has been appointed general superintendent of the lines east of the Missouri river, excepting the Minnesota and South Dakota divisions, with office at Chicago; and Chester T. Dike, engineer and superintendent of construction at Pierre, S. Dak., has been appointed general superintendent of the Minnesota and South Dakota divisions.

William David Cantillon, assistant general manager of the Chicago & North Western at Chicago,



W. D. Cantillon.

who has been appointed general manager, with office at Chicago, succeeding R. H. Aishton, elected vice-president, was born August 5, 1861, at Janesville, Wis. He received a common school education and began railway work as a freight brakeman on the Chicago & North Western in 1875, and he was promoted in the operating department as follows: To conductor, trainmaster, assistant superintendent, superintendent and assistant general superintendent. He was appointed general superintendent, with office at Chicago, in July, 1902, and in January, 1906, was appointed assistant

general manager of the lines east of the Missouri river, which title he held until his recent promotion to general manager.

Albert Ewing, trainmaster of the Atchison, Topeka & Santa Fe at San Marcial, N. M., has been appointed trainmaster of the Missouri division, with office at Marceline, Mo., succeeding F. E. Summers, promoted. F. J. Mackie succeeds Mr. Ewing

on the Rio Grande division. H. E. Fell has been appointed an assistant trainmaster on the Colorado division.

Samuel George Strickland, who has been appointed general superintendent of the Chicago & North Western, with office at Chicago, was born August 15, 1859. He received his education at collegiate institute and grammar schools at Port Hope and Peterboro, Ont., and began railway work in 1877 as a telegraph operator on the Canadian Pacific. In 1878 he went to the St. Paul, Minneapolis & Manitoba, now the Great Northern, as a telegraph operator. The next year he went to the Chicago, St. Paul, Minneapolis & Omaha as telegraph operator, and he was then successively promoted to agent, general agent, chief clerk to general superintendent, superintendent of terminals, trainmaster, superintendent and general superintendent. He was appointed assistant general superintendent of the Chicago & North Western in 1908, from which position he has now been promoted to general superintendent, succeeding W. E. Morse.

Willis E. Morse, general superintendent of the Chicago & North Western at Chicago, has been appointed assistant general manager, with office at Chicago, succeeding William D. Cantillon, promoted. Mr. Morse was born September 27, 1864, at Belvidere, Ill. He received a high school education and spent a year at Wayland University. In December, 1881, he began railway work with the Chicago & North Western as a telegraph operator, and during the three years following held various positions in station service. He was then made train dispatcher, was appointed a trainmaster in 1889, and four years later he became assistant superintendent. For four years from 1897 he was superintendent of several different districts, becoming general superintendent of the lines east of the Missouri river in January, 1906, from which position he is now promoted to assistant general manager.



W. E. Morse.

C. H. Ewing, who was recently appointed superintendent of the Atlantic City Railroad, with office at Camden, N. J., as previously announced in these columns, was born May 28, 1866, in Chester county, Pa., and began railway work August 1, 1883, as a rodman on the Philadelphia & Reading, since which time he has been consecutively to March 1, 1890, transitman and assistant engineer. He was appointed assistant supervisor in March, 1890, and was made a supervisor in September of the following year. In October, 1892, he was appointed division engineer, and in August of the following year he was appointed chief engineer of the Central New England Railway, Poughkeepsie Bridge Route, remaining in that position until August, 1902, when he was appointed division engineer of the Philadelphia & Reading. In May, 1905, he was appointed engineer maintenance of way of the same road, which position he held at the time of his recent appointment as superintendent of the Atlantic City Railroad.

Traffic Officers.

Charles R. Dassell has been appointed a traveling freight agent of the Central of Georgia, with office at Cincinnati, Ohio.

J. A. Stafford has been appointed traffic manager of the Fort Worth Belt Railway at Fort Worth, Tex., succeeding J. W. Carter, assigned to other duties.

W. S. Blair, soliciting freight agent of the Kansas City Southern at St. Louis, Mo., has been appointed assistant general agent, with office at Dallas, Tex.

T. F. Scruby, agent of the Missouri Pacific at Winfield, Kan., has been appointed traveling freight agent, with office at Wichita, Kan., succeeding W. F. Bellairs, promoted.

George F. Thomas, assistant general freight agent of the Chicago Great Western at St. Paul, Minn., has resigned to become secretary and treasurer of the Moore Patent Car Co.

H. M. Brooks has been appointed a commercial agent of the Cincinnati, Hamilton & Dayton, with office at Birmingham, Ala., succeeding V. E. Whitaker, resigned to accept service elsewhere.

V. E. Whitaker, commercial agent of the Cincinnati, Hamilton & Dayton at Birmingham, Ala., has been appointed general agent of the Atlanta, Birmingham & Atlantic, with office at Birmingham.

E. D. Staggs, recently appointed assistant claim agent of the Trinity & Brazos Valley at Teague, Tex., has been appointed assistant claim agent of the Denver & Rio Grande, with office at Denver, Colo.

W. P. Lindsay, district passenger agent of the Missouri, Kansas & Texas at St. Paul, Minn., has been appointed district passenger agent, with office at Pittsburgh, Pa., in charge of the new passenger agency established there.

H. E. Lounsbury, general agent in the freight department of the Southern Pacific at Portland, Ore., has been appointed an assistant general freight agent of the Southern Pacific and the Oregon Railroad & Navigation Company, with office at Portland. J. H. Mulchay succeeds Mr. Lounsbury.

J. H. Harper has been appointed a general agent of the Kansas City, Mexico & Orient, with office at St. Louis, Mo., a new office. H. B. Furlong has been appointed a traveling freight agent, with office in New York City, and W. T. Dunne is appointed a traveling freight agent, with office at Chicago. R. G. Taylor has been appointed a contracting freight agent at Chicago.

H. B. Rox, agent of the Union Line, Pennsylvania Lines West, at Ironton, Ohio, has been appointed agent at Birmingham, Ala., and George W. Koonce succeeds Mr. Rox. John T. Wray, traveling freight agent of the Pennsylvania Lines at Louisville, Ky., has been appointed agent of the Union Line at Atlanta, Ga., and George H. Fyler is appointed agent at New Orleans, La. George Crank has been appointed traveling freight solicitor, with office at San Antonio, Tex. These appointments are effective November 1.

William P. Garside, traveling freight and passenger agent of the Atchison, Topeka & Santa Fe at El Paso, Tex., has been appointed traveling freight and passenger agent, with office at Mexico City, Mex. G. H. Donart succeeds Mr. Garside. J. C. Batham has been appointed a traveling passenger agent, with office at Des Moines, Iowa. A. A. Betts, soliciting freight agent of the Santa Fe, Prescott & Phoenix, has been appointed a traveling freight and passenger agent of that road, and H. B. Kohl has been appointed a traveling passenger agent, with office at Prescott, Ariz.

Engineering and Rolling Stock Officers.

W. S. Boyce has been appointed a roadmaster on the Middle division of the Atchison, Topeka & Santa Fe, with office at Newton, Kan.

M. O'Laughlin has been appointed a roadmaster of the Rock Island Lines, with office at Little Rock, Ark., succeeding Pat Daily, resigned. He will have charge of the territory from Haskell, Ark., to Eldorado (sub-division 53), and from Tinsman to Crossett (sub-division 53A).

C. M. Hoffman, assistant superintendent of the Oregon Short Line and the Southern Pacific Lines east of Sparks at Pocatello, Idaho, in charge of mechanical matters, has been appointed superintendent of motive power of the St. Louis, Brownsville & Mexico, with office at Kingsville, Tex., succeeding John Nicholson, resigned.

OBITUARY.

Gen. Thomas T. Eckert, who was vice-president of the Western Union Telegraph Company from 1881 to 1892 and was president from the last named date until 1902, died at his summer home in Long Branch, N. J., October 20, at the age of 85. General Eckert was born in Ohio and was engaged in telegraph line construction as far back as 1853. He held important places in the military telegraph service during the War of the Rebellion.

Railway Construction.

New Incorporations, Surveys, Etc.

ATLANTIC, TOPEKA & SANTA FE.—Trains are now operating over the new cutoff from Fullerton, Cal., east via Placenta to Richfield.

BALTIMORE & OHIO.—The report of this company for the year ended June 30, 1910, shows that much of the work previously undertaken was completed during the year, and work on the uncompleted improvements has been vigorously prosecuted. The more important work carried out during the year included the new double-track bridge over the Susquehanna river; the viaduct known as bridge 68, at Cumberland, Md., which was widened and reinforced to carry heavier rolling stock, and a connection, including a bridge over the Monongahela river, was constructed between Hayswood, W. Va., on the Monongah division, and Lumberport, on the Ohio river division. The new double-track drawbridge over the ship canal at Indiana Harbor, Ind., has also been completed, and a number of new passenger stations at various places were put up during the year. The work now under construction, most of which it is expected will be finished during the present fiscal year, includes a change of line and grade reduction, Concord, Del., to Wilmington, 1.1 miles, including a stone viaduct, to replace the steel bridge over Brandywine creek; additional third-track, Sir John's Run, W. Va., to Great Cacapon, about five miles. When this work is finished there will be a continuous third-track from Hodgeville to Orleans Road, about 34 miles; construction of 1.5 miles of siding near Bond, Md.; extension of third-track from Swanton, Md., eastward 2.5 miles; revision of line and change of grade between Hutton, Md., and Corinth, W. Va.; extension of third-track from west of Terra Alta, W. Va., to Rodemer, about four miles, including elimination of tunnels at McGuire's and Rodemer. This work will complete the third-track from Rowellsburg to Terra Alta. A change of line and reduction of grade is being made between Blaser, W. Va., and West End, about four miles, including construction of new double-track tunnel about 4,250 ft. long between Tunnelton and West End. The existing Kingwood tunnel, operated in conjunction with this line, will give three tracks and afford necessary relief where the traffic heretofore has been restricted by the single-track gauntlet through Kingwood tunnel. Work is under way on the construction of third-track from West End to Hardman, six miles, including an open cut for three tracks, in place of Murray's tunnel; extension of third-track between Foley, Pa., and Mance, and Sand Patch and Keystone, about five miles; extension of second-track and additional passing sidings between Rockwood, Pa., and Somerset; extension of Quemahoning branch from Jenner, Pa., to a connection with the Somerset & Cambria branch at Somerset, nine miles; construction of second-track in open cut, including elimination of single-track gauntlet, 1,500 ft. through tunnel at Bakerstown, Pa., thereby making second-track continuous from Sand Patch tunnel to Hamler, Ohio, on the Chicago division; extension of second-tracks with grade revisions, additional passing sidings and yard tracks between Wheeling, W. Va., and Lorain, Ohio, and the construction of 21 miles of second-track between Wellsboro, Ind., and McCools, on the Chicago division. With the completion of this work there will remain only 86 miles of single track on the Chicago division. Additions and extensions of yard and terminal facilities are being carried out at various places. The renewal and strengthening of bridges to carry heavier rolling stock and the elimination of grade crossings is also being carried out. The bridges on the line from Philadelphia to Grafton and on the Pittsburgh and Chicago divisions will be completed during 1910, and the rest of the work as early as possible. Grade crossings are being eliminated in the cities of Baltimore, Md., Columbus, Ohio, and Chicago. The work at Baltimore and at Chicago will extend over a period of years; at Columbus it is expected that the work will be finished during the following fiscal year. See report of this company elsewhere in these columns.

BIRMINGHAM & NORTHWESTERN.—An officer writes that the prospects of building this line are good, and that contracts will be let about January 1, 1911. The plans call for a line from Dyersburg, Tenn., southeast via Friendship, Stokes, Alamo, Bells,

Fruitvale or Gadsden and other towns in Madison county, to Jackson, about 45 miles. The work will include a 1,200 ft. trestle. The line will carry coal, timber, grain, cotton and products, as well as live stock. R. M. Hall, president, Dyersburg.

BRITISH COLUMBIA & ALASKA.—This company, which was organized to build from Vancouver, B. C., north via Lytton, along the Fraser river to Fort George, thence following the Stewart river to Port Conley, and along the valley of the Skeena river, the Stickeen and Teslin, to Dawson, will apply for incorporation to the Canadian parliament at its next session. J. Wolkenstein, president, Seattle. (Aug. 5, p. 262.)

BRITISH COLUMBIA SOUTHERN.—This company will apply to the parliament of Canada for an extension of time to build lines as follows: From a point near Michel, B. C., to Kananaskis, Alb.; from the Elk river and the Upper Kootenay river to the 49th parallel and the Tobacco Plains; from a point on the Lower Kootenay river to New Westminster, B. C., and Burrard Inlet, with a branch to Nelson, via Salmon river; from Michel creek to Martin creek; from a point on the main line about 36 miles west of the eastern boundary of British Columbia, southerly and easterly, not exceeding 10 miles, and such branch lines from its main line and from the line between Fort Steele and Golden as may be authorized.

CANADIAN PACIFIC.—This company will apply to the parliament of Canada at its next session for an extension of time to build the following lines: Lanigan, Sask., to Prince Albert; Wilkie, northerly and westerly towards the Battle river, thence southerly to a connection with the La Combe branch of the Calgary & Edmonton Railway; from Outlook to a junction with the La Combe branch of the Calgary & Edmonton; from Estevan, northwesterly to Forward, on the Weyburn branch; from a point in Township 6, 7, 8 or 9, Range 30, W., westerly to Lethbridge, Alb.; from a point north of Teulon, Man., to a point between Marsh Point and the north boundary of Township 25, Man.

CHICAGO, BURLINGTON & QUINCY.—An officer writes regarding the reports that an extension is to be built from Mexico, Mo., west to Kansas City, that at the present time the company has no serious intention of building the extension.

CHICAGO, MILWAUKEE & PUGET SOUND.—An officer writes that contracts have been let to H. C. Henry, White building, Seattle, Wash., for building the Idaho & Western, from Dishman, Wash., east via Liberty Lake Junction and Post Falls to Coeur d'Alene, about 35 miles. Maximum grades will be 0.5 per cent. and maximum curvature six degrees. There will be a steel bridge over the Spokane river, and docks at Coeur d'Alene.

CHICAGO, ROCK ISLAND & PACIFIC.—The report of this company for the year ended June 30, 1910, shows that the line between Amarillo, Tex., and Tucumcari, N. Mex., where it joins the main line to the southwest, has been completed. The new line is laid with 60, 65 and 70-lb. rail and provides a short route from Memphis, Tenn., via New Mexico and Arizona, to southern California. The distance from Memphis to Tucumcari is 873.72 miles over this line. New station buildings have been put up at Vega, Tex., Adrian, Glenrio and at Endee, N. Mex., and San Jon. On the completion of the new line the C. & R. I. & P. discontinued the operation of trains over the Fort Worth & Denver City Railway, from Amarillo to Dalhart, 82.06 miles. The traffic rights were therefore relinquished. (See report of this company elsewhere in these columns.)

CINCINNATI, HAMILTON & DAYTON.—Double-tracking work is said to be under way on the main line south of Toledo, Ohio, on a section of 28 miles, also between Hamilton and a point several miles east of that place.

DAKOTA, KANSAS & GULF.—An officer writes that the prospects of building this line are fair, but that it has not yet been determined when contracts for the work will be let. The projected route is from Beloit, Kan., northwest via Ionia, Lebanon and Franklin, Neb., to Kearney, about 120 miles. W. H. Mitchell, president, Beloit, and F. T. Burnham, general attorney, 316 Dwight building, Kansas City, Mo. (July 15, p. 142.)

FOSTORIA & FREMONT (ELECTRIC).—An officer writes that this company is now building from Fostoria, Ohio, northeast via Amsden, Kansas, Burgoon and Havens to Fremont, 21.4 miles. Grading is 90 per cent. finished and track laying is to be started about November 1. The line parallels the Lake Erie & Western, and traverses a rich agricultural district. It will provide a connection between the Western Ohio Railway and the Lake Shore Electric. F. D. Carpenter, president, and J. W. S. Riegler, chief engineer, Findlay, Ohio.

FOX & ILLINOIS UNION.—Incorporated in Illinois, with \$25,000 capital and office at Aurora, Ill. The plans call for a line from Yorkville, Ill., north to Morris, with a connecting line west to Dwight, and an extension south to Sandwich. The incorporators include: J. Meredith, J. Rhodes, H. H. Evans, F. M. Zimmerman and R. C. Putnam, all of Aurora.

GRAND RIVER, MEEKER & SALT LAKE.—Incorporated in Colorado, with \$10,000,000. The plans call for a line from the junction of the Denver & Rio Grande and the Colorado Midland, to be known as Chapman, on the Grand river, in Garfield county, west to Salt Lake City, Utah, about 300 miles. Some of the right-of-way has been secured. A contract is said to have been given to the Meeker-Rangely Construction Co., Denver, to build the line. The incorporators include: A. Muller, W. D. Lippitt, A. Friedman, W. P. Simmington and J. T. McClure, all of Denver.

IDAHO & WESTERN.—See Chicago, Milwaukee & Puget Sound.

KENTUCKY-TENNESSEE TRACTION.—An officer writes that it is expected to have surveys finished by December 1 for an electric line from Hopkinsville, Ky., southeast via Salubria Sulphur Mineral Springs, Pembroke and Trenton to Guthrie, on the Louisville & Nashville, about 25 miles. It is the intention to extend the line south to Nashville, Tenn., and later from Hopkinsville north to the coal fields of Christian and adjoining counties. The line may be extended to Evansville, Ind., on the Ohio river. About 80 per cent. of the grants of private rights-of-way, 40 ft. wide, have been secured from property owners between Hopkinsville and Guthrie. It is expected that contracts for building and equipping the line will be let before January 1, 1911, and all the work carried out within 12 months. Charles Van den Burgh, associated with M. C. Forbes and N. Cathier, all of Hopkinsville; J. W. Cross, Pembroke; W. J. Dickinson, Trenton, and R. F. Warren, Guthrie, are interested.

MAINE ROADS.—The town of Skowhegan, Me., has voted to subscribe for \$15,000 stock of a company which proposes to build a 12-mile line through Cornville to Athens. It is expected that the line will cost about \$200,000. H. D. Eaton, Waterville, is the promoter.

MANITOBA & NORTHWESTERN.—Application will be made to the parliament of Canada for an extension of time to build the following lines: From Yorkton, Sask., to Prince Albert; from Russell, Man., to the northern or western boundary of Manitoba; from a point between Portage la Prairie and Arden to the northern or western boundary of Manitoba; from some point between Westbourne and Beautiful Plains, northwesterly towards Lake Dauphin or Duck mountains; from a point between Theodore, Sask., and Insinger, to a point in Township 42, Range 18 or 19, W., second M., or Range 16 or 17.

MILWAUKEE WESTERN ELECTRIC.—The stockholders have taken steps to secure funds for building from Milwaukee, Wis., northwesterly via Beaver Dam to Dodgeville, with a branch from Sussex, via Pewaukee to Waukesha, in all about 80 miles. C. A. Chapman, Inc., Chicago, are the engineers. (Sept. 16, p. 510.)

MEXICAN RAILWAYS OF MEXICO.—Surveys have been made, right-of-way secured and land granted to build, for soon to build a branch from Alamo, Coahuila, Mex., north to Las Vigas, on the Rio Grande, opposite Del Rio, Tex., about 80 miles. Bids will also be asked for soon to build a bridge over the Rio Grande for the joint account of this company and the Kansas City, Mexico & Orient, to connect with the line of the K. C. & M. & O., now under construction from San Antonio, south to Del Rio. These improvements will provide a new route for traffic between the United States and Mexico. (July 1, p. 154.)

NEW YORK, PHILADELPHIA & NORFOLK.—An officer writes that a large amount of money is being spent for improvements on

this line, and that double-tracking work is now under way. About 44 miles of the double-track is now in operation. A new station has been opened at Greenbush, Va., and the freight yard at Cape Charles has been enlarged.

NEW YORK ROADS.—An officer of the Syracuse Railroad Construction Co., Syracuse, N. Y., writes that the question of building a line from Geneva, N. Y., to Port Gibson, is under consideration, but that no decision has yet been reached to carry out the work.

NORFOLK & WESTERN.—An officer writes that contracts have been let for work on the line from Cedar Bluff, Va., on the Clinch Valley district, northwest to Canebrake, W. Va., on the Dry Fork branch, 15.5 miles, as follows: Rinehart & Dennis, 2.35 miles; Walton & Co., 2.6 miles; P. J. Millett, 2.9 miles; A. M. Valz, 1.76 miles, and W. O. Lipscomb, 1.84 miles, a total of 11.45 miles, to cost about \$1,800,000. Work is already under way on the remaining four miles. Contracts are also let for construction of the North Fork branch of the Tug Fork branch on two miles to the Vaughan Construction Co., and on 2.3 miles to Carpenter & Boxley, a total of 4.3 miles, to cost \$380,000.

NORTHERN PACIFIC.—The report of this company for the year ended June 30, 1910, shows that the Oregon Trunk Railway is now building from a point near Clarke, Wash., on the Spokane, Portland & Seattle, south across the Columbia river, and up the Des Chutes valley to Bend, Ore., 156 miles. Second-track work has been finished from Lake Park, Minn., to Glyndon, 26.83 miles, with the exception of about one mile at Stockton. Grading work for second-track and a change of line and grade from St. Cloud, Minn., to Rices, 14.79 miles, will be finished this year and part of the track laid. The second-track between Philbrook, Minn., and Staples, 6.3 miles, and slight grade revision work will be finished by November 1, with the exception of one bridge, which will be double-tracked during 1911. In North Dakota grading has been finished and some of the second-track laid between Bloom and Jamestown, 4.99 miles. Grading is under way from Pingree, N. Dak., to Wilton, 92.5 miles, and will be finished this fall. No track or bridge material will be put in place during 1910. Grading is finished except for some small slides and deep cuts where no track is laid on the Missouri River Railway (Mandan North Line), 53 miles. From Mandan, N. Dak., north to Sanga, track has been laid on 28 miles. Completion of the work has been postponed until 1911. On the Missouri River Railway (Mandan South Line), 72 miles, grading is about finished and track has been laid from Mandan, south to Mile Post 42. No track will be laid beyond that point for the present. The Western Dakota Railway has been finished to Mott, N. Dak., 90 miles. Grading has been finished on the Glendive East Line, from Glendive, Mont., northeasterly along the Yellow Stone river, 55 miles, and piers for abutments of bridge across Yellow Stone river will be finished during 1910. The bridge will not be put up or any track laid until 1911. Grading is finished for second-track and change of line and grade between Huntley, Mont., and Billings, and eight miles of track will be finished and ready for operation during 1910. The line from Billings to Laurel, 15.36 miles, and the Shields River Valley Railway 23 miles, have both been put in operation. It is expected that the second-track work will be finished from Missoula to De Smet, 7.92 miles, by December 15, and all the work on the Bitter Root extension to be carried out during 1910, 2.76 miles, has been finished. Second-track work will be finished this fall from Spokane, Wash., to Wins, 4.4 miles, and from Wins to Marshall similar work has been finished on 2.38 miles and the line is now in operation. Grading and track laying is finished on the Connell Northern Railway, from Connell, Wash., to Adrian, 62 miles, but the line will not be put in operation until 1911. Grading has been finished on the Ritzville branch, 18 miles, and part of the track will be laid in 1910. Investigation is being made of the character of the material along the Point Defiance line between Tacoma, Wash., and Tenino but the work will not be begun until 1911. From Tenino to Vancouver second-track and grade changes are being carried out to provide the double-track main line with low curvature and low grades for joint use of the Northern Pacific, the Great Northern and the Union Pacific. The grading, bridging and track laying has been finished and the line is operated as double-track between Tenino and Chehalis, 11.5 miles. Grading between Chehalis and Kalama will be finished by November 15, as well as considerable of the track and bridge work. Double-track has

been completed on new line and grade and is now being operated from Klamath to Vancouver, 28.5 miles. In Oregon work has been finished and second track is now in operation from North Portland to Portland, 3.76 miles. See report of this company elsewhere in these columns.

OKLAHOMA RAILWAY.—According to press reports from Lawton, Okla., T. L. Packer, Oklahoma City, is back of a project to build from Wichita Falls, Tex., north to Lawton, about 55 miles.

OREGON SHORT LINE.—An officer writes that work is now under way by the Utah Construction Co., Ogden, Utah, on a line from Montpelier, Idaho, westerly five miles to Ovid, thence southerly, 4.5 miles, to Paris. Maximum grades will be 0.3 per cent. and maximum curvature 6 degrees. There will be six or seven pile trestles over Bear river. The line will carry agricultural products and live stock. (July 22, p. 174.)

TEXAS TEXAS TEXAS FARMER & GULF. Contract is said to have been given to a construction company of Portland, Ore., for grading 100 miles from Farwell, Farmer county, Tex., south. The plans call for a line from Farwell, southeasterly to the center of Bailey county, thence south to a connection with the Texas & Pacific, about 200 miles. It is understood that the company will build shops at Farwell. M. J. Healy, Texico, N. Mex., may be addressed. (June 10, p. 1438.)

ST. FRANCIS COUNTY RAILWAY.—Incorporated in Missouri, with \$250,000 capital, to build a line connecting with the St. Louis, Iron Mountain & Southern at De Lassus, Mo., north via Farmington, to Esther. The incorporators include: W. M. Horlan, P. Giessing, E. Klein and W. R. Long.

SOUTHERN PACIFIC.—Incorporation has been asked for by a company to build from Mojave, Cal., northwesterly to Bakersfield. The line will go over the Tehachapi mountains. An incorporator is quoted as saying that it was necessary to form a new company to determine whether it will be more profitable to build a new line at a lower grade over the mountains, than to double-track the existing line between these two places. The directors include E. E. Calvin, W. R. Scott and William Hood.

SPOKANE, PORTLAND & NORTHERN.—Incorporation has been asked for in the state of Washington by this company, with a capital of \$10,000,000 and office at Spokane, Wash. The plans call for a line from Spokane, west to Bridgeford, thence north, crossing the Columbia and the Okanogan rivers to the international boundary near Nighthawk. A. M. Dewey, E. P. Spalding, S. A. Skinner, G. D. Needy and A. B. Lee, all of Spokane, are incorporators.

STUTTGART & RICE BLUFF.—An officer writes that work is now under way from Du Valls Bluff, Ark., south to Stuttgart, about 20 miles. Track has been laid on about three miles. H. Dalhoff, Little Rock, has the contract. The line will haul coal, timber, rice, hay and live stock. G. C. Lewis, president, Du Valls Bluff; D. A. McRea, chief engineer, Little Rock.

UNION TERMINAL RAILWAY.—Work will soon be started on a terminal railway system to connect Rockport, Tex., with the proposed deep water harbor and town of Port San Antonio; also on a line from the latter place to Navy City. An extension will eventually be built to Aransas Pass. C. T. Hoff, president, Rockport; W. H. Vernon, first vice-president; S. B. Rorenson, second vice-president, and W. D. Newberry, secretary.

VANDALIA RAILROAD.—Surveys have been completed between Indianapolis, Ind., and St. Louis, Mo., for improvements to be made to include straightening the track, eliminating grades and constructing 25 miles of double-track between Effingham, Ill., and East St. Louis. The largest piece of work will be cutting down the big hill at Greenup. An entirely new right-of-way will be used.

WATERLOO, CEDAR FALLS & NORTHERN (ELECTRIC).—An officer is quoted as saying that plans have been made to extend this line from Cedar Falls, Iowa, southwest to Dike, Grundy county, about 10 miles. The line is ultimately to be extended to Grundy Center and Marshalltown.

WILLAPA HARBOR & COAST LINE.—Incorporated in the state of Washington, with \$10,000,000 capital and office at Southbend, Wash., to build from Portland, Ore., north via Southbend, Wash., and North River to Tacoma. A number of branch lines are also to be built. J. L. Myers, J. W. Kleeb and F. H. Brown, all of South Bend, are directors.

Railway Financial News.

AUDUBON, LUGER & COMPANY.—Hedberg, Inc. voted to buy the Chicago, Wheaton & Western.

BALTIMORE & OHIO.—See discussion of the annual report of this company elsewhere.

BOSTON & MAINE.—Stockholders are to vote November 2 on the question of increasing the capital stock by the issue of \$10,663,700 new stock. The proceeds of the sale of this stock are to be used for additions and improvements.

CHICAGO & ALTON.—Brown Brothers & Co., New York, have sold \$722,000 5 per cent. Chicago & Alton equipment bonds, dated October 1, 1919, and maturing 10 per cent. annually, beginning October 1, 1911.

CHICAGO, INDIANAPOLIS & LOUISVILLE.—Potter, Choate & Prentice, New York, are offering the unsold portion of \$3,000,000 refunding mortgage 4 per cent. bonds of the Chicago, Indianapolis & Louisville of 1910-1947 at 95, yielding about 4 1/4 per cent. on the investment.

CHICAGO, ROCK ISLAND & PACIFIC.—Stockholders are to vote December 15 on the question of taking over the Chicago, Rock Island & El Paso, which is a subsidiary. The El Paso runs from Bravo, Tex., to Santa Rosa, N. M., 112 miles.

See discussion of the annual report of this company elsewhere.

GRAND RAPIDS & INDIANA.—This company has passed the semi-annual dividend usually declared at this time. Dividends have been paid at the annual rate of 3 per cent. since 1901. The company is controlled by the Pennsylvania Company, but is operated independently. A circular issued to the stockholders says that although gross earnings to September 30 showed a fair increase, as compared with previous year, operating expenses, taxes and other payments have so far increased as to leave the company without any net income applicable to dividends. The circular lays the blame of this condition in part on the recent national and state legislation.

GRAND TRUNK.—Application is to be made to the Canadian Parliament for permission to buy the Montreal & Southern Counties Railroad. This is a new electric road which runs from Montreal across Victoria Bridge to St. Lambert.

NEW YORK, WESTCHESTER & BOSTON.—The New York Public Service Commission, Second district, has authorized the New York, Westchester & Boston to issue \$5,000,000 first mortgage 5 per cent. bonds of 1904-1954. The bonds are to be sold at not less than par.

NORTHERN PACIFIC.—See discussion of the annual report of this company elsewhere.

ORANGE & NORTH WESTERN.—See St. Louis & San Francisco.

PITTSBURGH, SHAWMUT & NORTHERN.—Kidder, Peabody & Co., Boston, are offering \$1,500,000 Pittsburgh, Shawmut & Northern 5 per cent. receiver's certificates of August 1, 1910-1915, at 96 3/4, yielding about 5 1/4 per cent. on the investment. The values of the properties in the receiver's hands aggregate, it is estimated, \$25,000,000, of which \$3,000,000 is the value of equipment.

RUTLAND.—W. K. Vanderbilt, Jr., George F. Baker and W. H. Newman have been elected directors, succeeding H. McK. Twombly, deceased, and Olin Merrill and Robert T. Paine, 2d, retired.

ST. LOUIS & SAN FRANCISCO.—The Texas Railroad Commission has granted permission to the Orange & North Western to issue \$1,067,000 bonds on the thirty miles of road from Orange, Tex., to Newton. The bonds are to be deposited under the New Orleans, Texas & Mexico division mortgage of the St. Louis & San Francisco.

WABASH-PITTSBURGH TERMINAL.—The Wallace Protective Committee has refused the request of the Chapin Protective Committee to return the \$450,000 bonds owned by the Colonial Trust Co. of Pittsburgh. The question of the return of these bonds will be taken to the courts as a test case. The bonds were deposited with the Wallace Committee in May, 1908, under a five-year agreement; but the Chapin Committee takes the position that as two and a half years have passed with no action by the Wallace Committee, that committee has forfeited its rights.

Supply Trade Section.

The Panama Railroad is offering for sale six locomotives which are now in use on the Isthmus of Panama. Wendell L. Simpson, assistant purchasing officer, New York.

The McKee Motor Car Company, Omaha, Neb., delivered on its own wheels and under its own power, a 70-ft. motor car to the Southern. The car traveled over the Wabash, C., N. O. & T. P. and Southern.

The Isthmian Canal Commission will receive bids until November 14 for electrical material, including fittings, fixtures, insulating material, line material, tools, wire, electric and steel cable, etc. (Cir. No. 611.)

Geo. F. Thomas, assistant general freight agent of the Chicago Great Western at St. Paul, Minn., has resigned to become secretary and treasurer of the Moore Patent Car Company, owners of a design of refrigerator cars.

The Chicago offices of the T. H. Symington Company, Baltimore, Md., will on November 1 be moved from the Railway Exchange to 623-625 People's Gas building. In addition to its journal boxes, this company also handles the Farlow draft gear.

G. S. Vickery, chief draftsman of the frog and switch department of the Pennsylvania Steel Company, Steelton, Pa., has been appointed acting superintendent of the department, succeeding Mr. Reinohl, whose death was noticed in these columns last week.

Crerar, Adams & Company, Chicago, will move into their new warehouse and office, located at 239-259 E. Erie street, corner Fairbanks court, on November 1. This company has been located at the corner of Fifth avenue and South Water street continuously since 1858, with the exception of a year following the Chicago fire, and in that location have become well known as distributors of railway supplies. The new warehouse is large, fireproof, equipped with the latest devices for prompt handling of material, and will allow the company to carry a much larger stock and better handle its growing business.

The Northern Engineering Works, Detroit, Mich., is completing an addition to its crane erecting shop. The new building is approximately 160 ft. x 60 ft., of fireproof structural steel and brick construction, with steel sash. Three cranes and two overhead trolley-runs will serve the floor. Electric and pneumatic hoists will be used. The machinery has been installed and the building will be occupied this month. A new storage yard for structural steel has been arranged for alongside the addition and is covered by a 60-ft. span, three-motor electric Northern gantry crane of special construction. The company reports the largest demand in its history for its electric cranes and other products.

The Lemac Carriers Company and the Ryan Car Company have appealed to the United States Circuit Court of Appeals for the Seventh Circuit from the decision of Judge Kohlsaat, of the circuit court at Chicago, in which Judge Kohlsaat enjoined the Lemac Carriers Company and the Ryan Car Company from alleged infringing on a patent obtained by F. X. Mudd, general manager of the Live Poultry Transportation Company, for improvements in poultry cars. (See *Railway Age Gazette*, October 21, page 762.) The Lemac Carriers Company and the Ryan Car Company have filed bonds, and pending the decision of the United States Circuit Court of Appeals, the enforcement of the decision of Judge Kohlsaat is suspended, so that no injunction is in force at the present time, nor can the injunction be enforced, of course, unless the decision of the lower court shall be upheld.

Charles E. Randall, railway representative of Manning, Maxwell & Moore, New York, died in Buffalo, N. Y., on October 22, at the age of 69. On account of the death of his father, Mr. Randall began work when but 14 years old, becoming an apprentice in the Taunton Locomotive Works. At 25 he took a position at chief engineer on a steamboat. Several years later he entered the employ of the Hartford Steam Boiler Works, at East Boston, Mass., where he remained until 1879. On June 1, 1881, he became mechanical engineer and salesman for the Hancock Inspirator Company, with which work he has been connected since that time. When Manning, Maxwell & Moore,

purchased the Hancock Inspirator Co., in 1900, Mr. Randall became associated with this company, and has represented its allied industries, The Ashcroft Manufacturing Company, The Consolidated Safety Valve Company, The Hayden & Derby Manufacturing Company and The Hancock Inspirator Company. The funeral was held at Boston on October 25.

RAILWAY STRUCTURES.

BANGOR, ME.—The Railroad Commission of Maine has issued a certificate of necessity to the Maine Central for taking land needed to carry out improvements. The company proposes to enlarge the upper part of the yard alongside the main line to Bangor and the branch line to Skowhegan.

CHICAGO.—The Pennsylvania has secured property south of Polk street, between Stewart avenue and the Chicago river, for an extension of the company's freight terminal. The reported price paid for the site is \$1,800,000.

COEUR D'ALENE, IDAHO.—See Chicago, Milwaukee & Puget Sound under Railway Construction.

DETROIT, MICH.—A contract has been given to the Detroit Bridge & Steel Co. for putting up a steel and concrete bridge to be 315 ft. long over the Michigan Central tracks at 14th street in Detroit. The improvements will cost \$32,275.

EAST ST. LOUIS, ILL.—The Clover Leaf-Alton freight houses were burned October 20. The loss included a number of loaded freight cars. The estimated value of the property destroyed is \$500,000.

GUELPH, NEV.—An officer of the San Pedro, Los Angeles & Salt Lake writes that on the line which is being built on higher ground than the existing line between Guelph, Nev., and Crestline, there will be 15 steel bridges, each from 150 ft. to 300 ft. long, and eight tunnels.

HANNIBAL, MO.—The pattern and saw shops of the Chicago, Burlington & Quincy were burned October 23. Three workmen were injured and an estimated loss of \$100,000 is reported.

MEXICO CITY, MEX.—The shops of the National Railway of Mexico were partially burned on October 16, due to a boiler explosion. The loss is estimated at \$200,000.

NEW YORK.—The new station of the Hudson & Manhattan at Broadway and 33rd street, in the borough of Manhattan, will be opened for traffic on November 10. The new station will have five entrances from the street, one on the northwest corner of Broadway and 32nd street, three under the elevated stairs and one through the Gimbel store property. There are 12 staircases leading from the Concourse to the track platforms below.

OAKLAND, CAL.—The Southern Pacific is building a new power plant at the West Oakland yards for use in connection with the proposed electrification of the Oakland and Alameda line.

PHILADELPHIA, PA.—An officer of the Philadelphia & Reading writes that contracts have been let for work between Somerset street and Trenton avenue, on the Richmond branch, as follows: For masonry and embankment work, to John McMenamy, Philadelphia, at \$117,425, the work to be completed within 300 days, and for the bridges ready for ballast, to the American Bridge Co., at \$125,428, the work to be finished within 175 days.

SAN BERNARDINO, CAL.—The Atchison, Topeka & Santa Fe will put up a recreation hall in connection with the shops at San Bernardino, to cost \$5,000.

SAN DIEGO, CAL.—The Atchison, Topeka & Santa Fe has given a contract for a new station at Delmar, near San Diego, and will commence work early next year on new freight sheds at San Diego.

SOMERSET, PA.—It is understood that the ordinance to permit the Baltimore & Ohio to make improvements in Somerset will be passed. The plans call for building a new passenger station.

TEXAS CITY, TEX.—The Texas City Transportation Company has announced its intention of building 10 miles of additional yard tracks, a new steel and concrete warehouse 100 ft. by 750 ft., a new fireproof station at Tenth street and Tenth avenue, N., and a fireproof office building at the docks.

Late News.

The items in this column were received after the classified departments were closed.

B. H. De Costa has been appointed a traveling freight agent of the Central of Georgia, with office at New York, effective November 1.

The Pan American Railway is said to be in the market for 500 freight cars, including flat, box, dump and gondola cars, not at passenger cars and also a number of locomotives. This item is not confirmed.

The Oregon & Washington expects to open for operation January 1, 1911, a branch from Cosmopolis, Wash., south to Brooklyn, in Pacific county, 30 miles. The line is being built through a heavy timber section.

Alfred Craven, deputy engineer of the New York Public Service Commission, First district, at New York, has been appointed engineer in charge of subway construction, succeeding George S. Rice, resigned.

The Greenbrier, Cheat & Elk River has started work on a line from Bemis, W. Va., to Webster Springs, about 75 miles. The work includes piercing an 800-ft. tunnel. S. E. Slaymaker, president, 200 Fifth avenue, New York.

The Interstate Commerce Commission in an opinion by Chairman Knapp in the case of Chicago Car Lumber Co. v. Louisville & Nashville, has awarded reparation on four carload shipments of railway ties between Tennessee Ridge, Tenn., and Louisville, Ky. (19 I. C. C., 438.)

The Fairburn & Atlanta Railway & Electric Co. has grading work finished and will let contracts soon to complete a line from College Park, Ga., to Fairburn, 10.5 miles. There will be one steel bridge, 81 ft. long. W. T. Roberts, president, and L. W. Roberts, chief engineer, Atlanta.

A contract is said to have been given by the Northwestern Pacific to the Utah Construction Co., Ogden, Utah, for building 32 miles of line between Willits, Cal., and Eureka. The contract calls for heavy railway construction, including 11 tunnels, varying in length from 200 ft. to almost a mile.

The Oberlin, Hampton & Eastern has given a contract to the Williams Brothers Co. to build from Oberlin, La., southeast to Hampton, nine miles. The line may eventually be continued east to Eunice. It is expected to have the track laid during 1910. W. B. Williams, president, Oberlin, and O. L. Reiszner, engineer, Le Compton.

The Texas, Oklahoma & Eastern has been incorporated in Oklahoma, with \$200,000 capital, to build from Valliant, Okla., east through a timber section to Mountain Fork river, 30 miles. H. Dierks, H. L. Dierks, A. E. Hart, J. S. Kirkpatrick, all of Kansas City, Mo.; S. B. McCartney, Bismarck, and J. H. Crook, Idabel, Okla., are interested.

The Indiana Railroad Commission is to investigate the possibility of a car shortage. "One reason for the shortage," says Chairman Wood, "is the fact that under a ruling of the Interstate Commerce Commission a railway is compelled to pay only 25 cents a day for a car belonging to another company which it appropriates to its own use. The roads have found it cheaper to pay the nominal sum than to build cars, while they do not relish the idea of building cars for their own use when they are likely to be seized by another company and used for an indefinite time at the price set out in the ruling. It seems to me that it will be necessary to readjust the ruling in the interest of better shipping facilities."

The Interstate Commerce Commission in an opinion by Commissioner Clements has decided the case of the Southern Cotton Oil Co. v. Atlantic Coast Line Railroad et al. Crude cottonseed oil shipments were made into Savannah, Ga., on local rates from points in Georgia and Alabama, there refined and then reshipped on balance of through rates from various points of origin to ultimate destinations. Between the inbound and the outbound movements the rates had been advanced 2 cents per 100 lbs., and defendants applied on these shipments the higher

through rates in effect at time of reshipment. On complaint that the higher charges were unlawful, it is held that the legal rates applicable on these shipments were the rates in effect at the time of the initial movement. Reparation awarded. (19 I. C. C., 431.)

The Missouri, Kansas & Texas has filed application with the Texas Railroad Commission to take over and operate as a part of its system the Texas Central, which it recently acquired. It is proposed to do this under a five-year lease as an actual merger of the two companies cannot be done except by enactment of the legislature. The official recognition of the two roads as being under the same management will make the single line rate apply over the connecting roads instead of the joint line rate as at present. This would mean a large saving to the shippers. In its application to the commission the Missouri, Kansas & Texas agrees to follow the policy of the former owners of the Texas Central of extending that line west through the lower Panhandle to Roswell, N. Mex., a distance of about 350 miles, and to complete the branch line that is being now built from De Leon to a point 40 miles west of there.

In regard to the threatened coal famine in Chicago, President Ogara, of the Ogara Coal Co., the largest shippers of Illinois coal, says: "Organizations of consumers have fought tooth and nail to prevent the railways from receiving a just increase of 10 or 15 cents a ton on coal. The result is that the consumer will have to pay from \$2 to \$3 instead of 10 cents a ton more than last year. The railways were discouraged by the attitude of shippers and consumers, and few of them have spent a dollar for new cars or facilities for handling coal. Hundreds of cars have been discarded since last winter, and the railways will not be able to furnish the coal demanded with the first turn of cold weather. We have been short about 50 cars a day of our orders and expect worse conditions. I look for coal to be higher this winter than any year since the famine of 1902-3, when prices doubled in two months. Perhaps the consumers will be willing next year to let the railways earn a profit on their Illinois business."

At the annual meeting of the stockholders of the New York, New Haven & Hartford Wednesday the number of directors was increased from 25 to 27. The three new directors are T. DeWitt Cuyler, of Philadelphia, a member of the Pennsylvania board; A. S. May and A. E. Clark. The directors were empowered to pension employees for long and efficient service. A resolution was approved concerning the purchase by the company of the Berkshire Railroad Company at a cost of \$1,887,725. The purchase of the New Haven & Northampton for \$984,000 and the purchase of the Rhode Island & Massachusetts Railroad for \$191,700 was also approved. President Mellen in explaining why the stockholders were asked to vote on the question of pensions said the board had been granting pensions from time to time and believed that the pension system tends to give better service and secure more faithful performance of duties by employees. A doubt, however, has been expressed as to whether or not the directors can legally vote such pensions.

Shippers began introducing testimony at the western rate advance cases Wednesday. H. C. Wallace, editor *Iowa Farmer*, testified that farmers are unable to make enough money earn reasonable interest. Counsel for railways on cross examination made Mr. Wallace admit that Iowa land had been largely increasing in value, that farmers buy automobiles and are receiving high prices for crops. The point was also brought out that farmers lived off their farms and that what Mr. Wallace meant was they were not able to earn interest after paying all family expenses. Shippers put on the stand H. G. Wilson, transportation commissioner of the Kansas City Commercial Club; W. P. Trickett, transportation commissioner of the Minneapolis Board of Trade, and E. J. McVann, transportation commissioner of the Omaha Chamber of Commerce. Mr. Wilson and Mr. Trickett said that railways formerly gave large rebates which they do not give now, and that if they were able to prosper when they were giving rebates they ought to prosper now when they are not giving them. John Barton Fayne, counsel for the Chicago Great Western, asked Mr. Trickett specific cases of rebating. After considerable cross examination Mr. Trickett said he would get advice of counsel and answer the question regarding specific cases later.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The *Mintah Railway*, Philadelphia, Pa., has ordered one consolidation locomotive from the Baldwin Locomotive Works.

CAR BUILDING.

The *Pennsylvania* has ordered 40 all-steel passenger cars from the American Car & Foundry Company.

The *Bingham & Garfield*, McCormick building, Salt Lake City, Utah, will soon be in the market for several hundred steel ore cars.

The *Hawley Lines*, reported in the *Railway Age Gazette* of June 17 as figuring on 8,000 freight cars, are now receiving revised prices on this equipment.

The *Norfolk & Western*, reported in the *Railway Age Gazette* of September 30 as being in the market for 500 fifty-ton hopper cars, will build this equipment in its own shops.

The *Louisville & Nashville*, reported in the *Railway Age Gazette* of September 16 as being in the market for 100 ballast cars, has ordered this equipment from the Rodger Ballast Car Company.

The *Hudson & Manhattan*, reported in the *Railway Age Gazette* of September 30 as being in the market for steel subway cars, has ordered 30 of these cars from the Pressed Steel Car Company.

The *Lehigh Valley* has ordered 40 all-steel vestibule passenger coaches from the Pullman Company. They are to be delivered in March and April of next year. Two combination baggage-library-buffet cars, each 75 ft. long and containing chairs for 23 passengers, have also been ordered from the Pullman Company.

IRON AND STEEL.

The *Norfolk & Western* is said to be in the market for 15,000 tons of 100-lb. rails for 1911 delivery.

The *Atchison, Topeka & Santa Fe* has ordered 600 tons of bridge steel from the American Bridge Company.

The *Baltimore & Ohio* has ordered 400 tons of bridge steel from the McClintic-Marshall Construction Company, and 200 tons from the American Bridge Company.

General Conditions in Steel.—While rail orders have been small, prospective business is beginning to show up. It is understood that a large number of railways are just now making up estimates for 1911 requirements. Four railways, the Atchison, Topeka & Santa Fe, the Pennsylvania, the New York Central and the Harriman Lines will, it is said, consume in the neighborhood of 500,000 tons. Generally, the outlook for the steel companies is much brighter than it has been for the past six months. The quarterly statement of the United States Steel Corporation, as of September 30, shows net earnings of \$37,365,187, which is in excess of the estimated \$37,000,000.

SIGNALING.

A correspondent at Spokane writes:

The Washington Water Power Company has just installed on its suburban electric railway between Spokane and Cheney and Medical Lake, Wash., 27 miles, a complete system of automatic electric block signals and an automatic stop. If the stop signal is disregarded, an iron bar, lowered with the semaphore, will break a glass tube on the top of the leading car and apply the brakes. The signals, which are three-position upper-quadrant with top-post mechanism, are controlled by track circuits with overlaps. Instead of remaining at "safety," the lights in the signals, which show green for clear and red for stop, are taken to and from power in independent electric.

The Great Northern is to equip 27 miles of its line with electric train staffs. This installation will be an extension of the train staff operation through the Cascade tunnel, which has been in effect several years. The terminus of the line now to

be equipped are Leavenworth and Skykomish. There will be 17 block sections and 34 staff instruments. Thirty-two of these will have permissive attachments and at 16 stations there will be staff cranes, by means of which staffs will be taken up by trains without reducing speed. There will be home and distant approach signals at every station, by which the operator will have complete control of the movement of trains into the side tracks, this arrangement being similar in principle to that which is in use on the Southern Pacific, and which was described in the *Railway Age Gazette* of May 21, 1909.

The second regular meeting of the Chicago Signal Club for October was held on October 24. Hibbard S. Greene, of the Nungesser Electric Battery Company, read a paper on "Dry Batteries for Ignition Service" and in the discussion following, many important points regarding the preventing of battery failures on motor cars were brought out. Mr. Lavarack led a discussion on "Detector Track Circuits vs. Detector Bars." The next meeting will be held November 14 and the subjects for discussion will be "The Relative Merits of Series and Shunt Circuits for Side Track Protection," and "The Mercury Arc Rectifier for Charging Signal Storage Batteries." W. E. Foster, of the Ingalls-Shepard Forging Company, will read a paper on "Standard Specifications for Mechanical Interlocking." It was decided to invite all supply men to every regular meeting instead of to alternate meetings, as has been the custom.

Carborundum File.

The carborundum file is the latest carborundum product designed to assist in and quicken operations for railway shop men. It is made to do the same work as the steel file on all kinds of castings and metal pieces. It is claimed that it will outlast the



Carborundum File.

steel file, and that it is very useful for touching up case-hardened parts and removing scale from the hard metal.

The carborundum file is a rectangular solid block, 13 in. long, 1½ in. wide and 1½ in. thick. Carborundum, as is well known, is a hard and sharp abrasive material. Every grain or grit in the file is so hard and sharp that the results from using a file made from such material can be readily appreciated.

This file may be obtained from hardware dealers, or from the Carborundum Company, Niagara Falls, N. Y.

FOREIGN RAILWAY NOTES.

The total length of the running track of the railways of the United Kingdom at the end of 1909 was 39,622 miles, and the total length of sidings was 14,350 miles. At the end of 1908 the length of running track was 39,316 miles.

At the end of 1909 the length of line in Great Britain (in equivalent of single track) operated solely by electricity was 201½ miles, and some 229½ miles were being operated partly by electricity. The corresponding lengths of line at the end of 1908 were 204½ and 200½ miles respectively. The total quantity of electrical energy used in 1909 was 253,294,628 Board of Trade units.

The proposed railway to connect the Pacific coast with the Upper Ucayali river is to be commenced shortly, according to a report on the trade of Iquitos, Peru. It will start from Cerro de Pasco, to which point a railway already exists, and reach the river at a point called Pucallpa, about four days above Iquitos by steamer. Vessels of about 250 to 300 tons, but of light draught, can reach this point at any time of the year. It is understood that the engineers who made the initial survey encountered fewer difficulties than they had anticipated, and that they have hopes of completing the line in three years. They have now returned to Lima to complete arrangements and intend starting work at both ends as soon as possible. The contracting firm is a United States one and the estimated cost of the railway is \$13,900,000.

ANNUAL REPORTS.

BALTIMORE & OHIO RAILROAD COMPANY—EIGHTY-FOURTH ANNUAL REPORT.

Office of the Baltimore & Ohio Railroad Company,
Baltimore, Md., Sept. 22, 1910

GENERAL INCOME ACCOUNT OF THE BALTIMORE & OHIO RAILROAD, YEAR ENDED JUNE 30, 1910, IN COMPARISON WITH THE YEAR ENDED JUNE 30, 1909.

For the year ended June 30, 1910, the Baltimore & Ohio Railroad Company:

The president and directors herewith submit report of the affairs of the company for the year ended June 30, 1910.

The statements following show the operations of the properties of the company, including the States United Railway Company, the Staten Island Free Ferry Railway Company and the Baltimore & Ohio Chicago & North Western Railroad Company, and cover 4,434.39 miles of road.

OPERATING RESULTS FOR THE YEAR ENDED JUNE 30, 1910,
COMPARED WITH THE YEAR ENDED JUNE 30, 1909.

	1910	1909	Increase.
Miles of road operated	4,434.39	4,434.39	*25.51
From freight traffic.....	\$69,408,112.08	\$58,865,111.83	\$11,053,000.85
From passenger traffic.....	14,488,880.09	13,651,338.28	934,341.81
From express traffic.....	1,715,150.97	1,523,017.99	191,539.58
From transportation of mails.....	1,170,815.73	1,250,966.47	*79,122.82
From operations other than transportation.....	1,327,126.42	1,038,936.69	289,689.73
From operations other than transportation.....	787,827.16	688,885.52	98,941.94
Gross earnings.....	\$88,901,252.37	\$76,412,856.28	\$12,488,396.09
Expenses:			
For maintenance of way and structures.....	\$11,661,109.75	\$9,694,559.96	\$1,966,549.79
For maintenance of equipment.....	10,373,775.93	11,810,507.06	4,563,268.87
For traffic expenses.....	1,877,203.56	1,717,388.14	159,815.42
For transportation expenses.....	29,738,992.09	26,346,969.16	3,392,022.93
For general expenses.....	1,682,419.46	1,594,566.55	87,862.91
Total expenses.....	\$61,333,800.79	\$51,163,980.87	\$10,169,819.92
Percentage of expenses to earnings.....	68.99	66.96	2.03
Net earnings from operation.....	\$27,567,451.58	\$25,248,876.41	\$2,318,575.17
Outside operations:			
Total revenue.....	\$1,262,148.72	\$1,150,593.67	\$111,555.05
Total expenses.....	1,861,782.42	1,689,843.03	171,939.39
Net revenue.....	†\$599,633.70	†\$539,249.36	†\$60,384.34
Total net revenue.....	\$26,967,817.88	\$24,709,626.05	\$2,258,191.83
Taxes accrued.....	2,469,964.17	2,271,575.72	198,388.45
Operating income.....	\$24,497,853.71	\$22,438,050.33	\$2,059,803.38

*Decrease. †Deficit.

The operated mileage for the year was 4,434.39 miles, as against 4,459.90 miles in 1909, the difference being due to a revision of statement of first track mileage to conform more closely to the classification required by the Interstate Commerce Commission, there being no practical change in the mileage as operated, compared with previous year.

The gross earnings from rail operations were \$88,901,252.37, an increase of \$12,488,396.09, or 16.34 per cent.

The earnings from freight traffic increased \$11,053,000.85, or 18.94 per cent. The tons of freight carried were 62,797,745, an increase of 11,587,584, and the total ton mileage was 13,024,583,527, an increase of 1,975,802,682, or 19.76 per cent. The average freight earnings per ton per mile were .577 cents, compared with .581 cents the previous year, a decrease of .004 per cent.

The earnings from passenger traffic were \$14,488,885.09, an increase over preceding year of \$934,341.81.

The total number of passengers carried was 21,107,120, an increase of 1,210,568, and the total passenger mileage was 763,448,769, an increase of 42,690,027. The average earnings per passenger per mile were 1.897 cents, as against 1.880 cents in 1909.

Earnings from express traffic increased \$191,539.58. There was a decrease of \$79,122.82 in receipts for facilities furnished and transportation of mails. This was principally due to reductions ordered in rates of pay. The average freight earnings per ton per mile were .577 cents, compared with .581 cents the previous year, a decrease of .004 per cent.

Operating expenses for the year were \$61,333,800.79, an increase of \$10,169,819.92, or 16.34 per cent.

The maintenance expenditures, road and equipment, show an increase of \$6,580,118.66.

Transportation expenses increased \$3,392,022.93; other increases being \$159,815.42 in traffic expenses and \$87,862.91 in general expenses.

Tables herewith show the expense items in detail and more particularly the sub-accounts making up these increased expenditures, which were largely incident to increased volume of traffic handled during the year, the more liberal maintenance expenditures rendered practicable by the increased earnings and the increased rates of pay which were effective for a portion of the year.

The general income account of the company for the year is made upon the same consolidated basis indicated above as to operations and includes the various properties, component parts of the system, the fixed charges of which have heretofore been assumed, and the capital assets and liabilities now taken up in the company's balance sheet. Upon this basis the income account for the year ended June 30, 1910, after payment of taxes, interest on funded debt and other charges, shows net corporate income to have been \$16,247,587.03. From this, however, should be deducted expenditures for betterments necessary to meet changed conditions and to maintain the earning capacity, but of a character not heretofore capitalized, \$415,760.61, leaving a final balance of \$15,831,826.42. The dividends of 4 per cent. on the preferred and 6 per cent. on the common stock aggregated \$11,474,212.79, showing surplus earned over dividends for the year of \$4,357,613.63.

	1910	1909	Increase.
Total operating revenue.....	\$88,901,252.37	\$76,412,856.28	\$12,488,396.09
Total operating expenses.....	61,333,800.79	51,163,980.87	10,169,819.92
Net operating revenue.....	\$27,567,451.58	\$25,248,876.41	\$2,318,575.17
Outside operations:			
Total revenue.....	\$1,262,148.72	\$1,150,593.67	\$111,555.05
Total expenses.....	1,861,782.42	1,689,843.03	171,939.39
Net revenue.....	†\$599,633.70	†\$539,249.36	†\$60,384.34
Total net revenue.....	\$26,967,817.88	\$24,709,626.05	\$2,258,191.83
Taxes accrued.....	2,469,964.17	2,271,575.72	198,388.45
Operating income.....	\$24,497,853.71	\$22,438,050.33	\$2,059,803.38
Other income:			
Rent:			
Joint facilities—total receipts.....	\$405,521.00	\$548,172.58	*\$52,651.58
Miscellaneous receipts.....	466,973.88	500,527.68	*\$33,553.80
Dividends on stocks owned.....	1,541,777.41	1,453,851.62	87,925.79
Interest on bonds owned.....	202,968.26	205,899.90	*\$2,931.64
Other interest.....	1,381,863.42	526,076.40	855,787.02
Western Union Telegraph Company annuity.....	60,000.00	60,000.00	
Miscellaneous income.....	68,794.04	52,788.77	16,065.27
Total other income.....	\$4,217,898.01	\$3,347,256.95	\$870,641.06
Gross corporate income.....	\$28,715,751.72	\$25,785,307.28	\$2,930,444.44
Deductions from gross corporate income:			
Rent:			
Hire of equipment—net balance.....	\$437,653.06	\$210,137.95	\$227,515.11
Joint facilities—total payments.....	853,377.04	923,990.05	*70,613.01
Miscellaneous rents—total payments.....	170,268.43	146,098.50	24,199.93
Interest on funded debt.....	10,644,867.67	10,180,463.05	464,404.62
Other interest.....	353,002.16	587,420.01	*\$234,417.85
Other deductions account subsidiary lines.....	8,966.33	1,192.00	7,774.33
Total deductions from income.....	\$12,468,164.09	\$12,049,301.56	\$418,862.53
Net corporate income.....	\$16,247,587.03	\$13,736,005.72	\$2,511,581.31
Deduction for additions and betterments expended during the year.....	415,760.61	549,572.24	*\$133,811.63
Balance net corporate income.....	\$15,831,826.42	\$13,186,433.48	\$2,645,392.94
Balance net corporate income.....			*\$15,831,826.42
Dividend payments:			
Preferred—March 1, 1910, 2%.....	\$1,177,418.80		
Sept. 1, 1910, 2%.....	1,177,260.09		
Common—March 1, 1910, 3%.....	\$4,559,125.06		
Sept. 1, 1910, 3%.....	4,559,412.84		
Amount to credit of profit and loss, June 30, 1910.....	\$18,120,681.37		
Add sundry adjustments due to incorporating subsidiary lines, deferred interest and other items, net credit balance.....	898,805.33		
Amount to credit of profit and loss, June 30, 1910.....	\$23,377,100.33		

*Decrease. †Deficit.

NOTE.—For purpose of comparison, the income account of 1909 has been restated, by eliminating debits and credits account of interest on bonds and dividends on stocks of own issue, in treasury, to accord with ruling of Interstate Commerce Commission.

The general balance sheet, table 2, is presented for this year in the form prescribed by the order of the Interstate Commerce Commission, effect of June 15, 1910. This change prevents the showing of parallel comparisons with the general balance sheet of the preceding year.

There has been, however, an increase in the total footings, compared with June 30, 1909, of \$78,593,661.85.

The principal changes in liabilities are as follows:

Increase in common stock of \$41,000, issued in exchange for like amount of Ten Year Gold Convertible Debenture 4 per cent. bonds of the company. Increase in Mortgages and secured debt of \$3,041,014.36, due to issue of \$40,000,000 Three Year Gold Secured Notes; the issue under provisions of the First Mortgage of \$1,000,000 Four Per Cent. Bonds, and \$12,041,014.36, the net increase incident to taking into the General Balance Sheet the funded debt of Subsidiary Lines, viz.: \$19,689,100, interest payments on which have heretofore been assumed, but principal had not been taken up in Capital Liabilities, less \$7,644,079, account Pittsburgh Junction & Middle Division Bonds, heretofore carried as liability, contra the deposit of these bonds with the Trustee of the Pittsburgh, Lake Erie & West Virginia Mortgage.

Increases are also shown in Working Liabilities, chiefly due to issue of ten million dollars One Year Four Per Cent. Notes; in "Appropriated Surplus," wherein \$10,965,168.91 represents net amount restored to this account and charged to Cost of Road and Equipment, as elsewhere explained in more detail, and in Profit and Loss Account, due to items incident to incorporating Subsidiary Lines, and to sundry adjustments under the revised classification.

The principal changes in assets are as follows:
Increase in cost of road, \$38,864,766.84; due to charges in taking up subsidiary line assets, \$19,689,100, per contra, funded debt assumed; new

construction during the year, \$5,549,819.56; charged to construction account against the "Appropriated Surplus for Improvements," years 1900-1907, \$19,481,329.26; less credits, account equipment B. & O. S. W. R. R., formerly, \$163,335.50.

Increase in cost of equipment, \$18,582,581.41, due to transfer to this account equipment of the Baltimore & Ohio Equipment Company, the Baltimore & Ohio Southwestern Railroad and other subsidiary companies, \$23,643,843.63; new equipment acquired during the year, \$9,013,021.59, less credits incident to revaluation, and equipment put out of service, \$8,025,802.30, and less reserve for depreciation, \$6,045,981.51.

The further increase of \$21,146,314.10 occurs in securities and working assets, due principally to increase of \$36,400,614.93 in cash and loans and bills receivable, the latter representing the unexpended balance of your \$40,000,000 Three Year Gold Notes, less transfer to "Property Investment," Baltimore & Ohio Equipment Company equipment, \$16,988,317.50, and sundry other adjustments to conform to new classification.

IMPROVEMENTS CHARGED TO INCOME.

In the last annual report reference was made to charges to income during the period from July 1, 1899, to June 30, 1909, for capital improvements aggregating \$21,540,230.68. Of this sum \$19,481,329.26 has been charged to cost of road, and accounts credited, viz., equipment accounts, more particularly referred to under caption equipment, \$8,516,160.35, and appropriated surplus, additions to property, \$10,965,168.91.

ADDITIONS TO ROAD AND EQUIPMENT.

Much of the country dependent as yet upon your lines for transportation is rich in natural resources, and there is every indication that the already large industrial development will be greatly extended. Aside from the possibilities referred to, it became evident during the year that in order to handle satisfactorily the business already offering, it was essential to make immediate provision for additional equipment and other facilities. To meet this situation your board authorized the purchase of 284 locomotives and 15,000 freight cars, approximate cost of which is \$23,000,000, and various improvements, more particularly referred to elsewhere in this report, the expenditures for which, estimated at about \$20,000,000, will extend over eighteen to twenty-four months. To better care for the increasing passenger traffic, authority was given for the purchase of 26 locomotives and 70 pieces of passenger train equipment of modern design and equipped for electric lighting, which system of lighting has now been introduced on through trains. Table 14 shows such of this equipment as was delivered during the year.

To make payment for equipment as acquired and to meet construction expenditures as work progresses, it was necessary to issue additional securities. The company issued its Ten Million Dollar, One Year Four Per Cent. Gold Notes, due March 10, 1911. Subsequently an issue of fifty million dollars of Four and One-Half Per Cent. Three Year Gold Coupon Secured Notes, due June 1, 1913, was authorized. Ten million dollars of these notes are reserved to retire the one year notes referred to, and the remaining forty million were sold, and proceeds are available for the contemplated expenditures for equipment and construction.

CONSTRUCTION AND BETTERMENTS.

Much of the work previously undertaken was completed during the year, and the remainder, together with extensive additional work undertaken, has been vigorously prosecuted. The improvements started during the year are in pursuance of a general scheme for the betterment of the line to facilitate the handling of traffic and render the operations more effective and economical. In addition to the present conditions, it has been necessary to undertake extensive work for the elimination of grade crossings, more particularly in the cities of Baltimore, Md.; Columbus, Ohio, and Chicago, Ill.; also to continue the rebuilding and strengthening of bridges on the system for heavier power.

Some of the more important improvements completed during the year were: The new double-track bridge over the Susquehanna River, completed and in use January 5, 1910.

The viaduct, known as Bridge 68, at Cumberland, referred to in previous report as being widened and reinforced to carry heavier power, finished in November, 1909.

To relieve the Wheeling Division and facilitate the handling of traffic westbound, a connection, including bridge over the Monongahela River, was constructed between Haywood, W. Va., on the Monongahela Division, and Lumberport, W. Va., on the Ohio River Division. This work was undertaken in March, 1910, and line opened June 14, 1910.

The new double-track draw bridge over the ship canal at Indiana Harbor was completed.

New station buildings were completed at Lottie, Pa.; Fairpoint and Warren, Ohio, and Gary, Ind. In the last mentioned being owned and operated jointly with the Lake Shore & Michigan Southern Railroad Company.

Following is shown some of the more important work now under construction, most of which it is anticipated will be completed during the next fiscal year.

Additions to Track and Betterment of Road.

Change of line and grade reduction, Concord to Wilmington, Del., 1.1 miles, including stone viaduct, replacing steel bridge, over Brandywine Creek.

Additional third track, Sir John's Run to Great Cacapon, about 5 miles, giving continuous third track from Hedgesville to Orleans Road, about 34 miles, and the installation of automatic block signals, rendered necessary by the increased density of traffic on the Cumberland Division.

Construction at Elkville, Md., of new bridge to relieve westbound movement of road and sidings, 2 1/2 miles eastward from Swanton, but use of sidings and freight trains.

Removal of line and change of grade to obviate use of helpers between Hutton and Corinth.

Extension of third track, from West of Terra Alta to Redmen, about 4 miles, including elimination of tunnels at McGuffee and Redmen. This will complete the most track from Roadsburg to Terra Alta and will be used by eastbound freight trains.

Change of line and reduction of grade between Besser and West End, about 1 miles, including construction of new double track tunnel, about 1,200 feet in length. Sidings 1 mile and West End Road. The existing line is used for freight and passenger service, with one main line and one sidings track and sidings necessary exist where the traffic heretofore has been carried by one main line and sidings through the existing tunnel.

Construction of third track, West End to Harpers, 4 miles, including an open cut of these tracks, in place of "Main & Branch" which will permit use of Main & Branch line presented by tunnel construction.

Extension of third track, between Filler and Marion and Sand Patch and Extension approximately 1 mile, to aid movement on Sand Patch grade.

Extension of second track and additional passing sidings between Rockwood and Summit, proposed to increased traffic on Somerset & Cumberland Branch.

Extension of Conowingo Branch R. R. 2 miles, from Lanes to connection with the Somerset & Cumberland Branch at Lanes, to aid the coal traffic offered by operations in this field. The line also develops additional coal territory.

Construction of second track in open cut, including elimination of single-track gantries, 1,500 feet, through tunnel at Bakerscross, Pa., thereby making second track continuous from Sand Patch Tunnel to Hamler, on the Chicago Division.

Extensions of second tracks with grade revisions, additional passing sidings and yard tracks between Wheeling and Lorain, to meet requirements in handling the heavy business on this portion of the line during the lake season.

Construction of 21 miles of second track between Wellsboro and McCools, on the Chicago Division, necessary on account of existing traffic. With the completion of this work there will remain only 86 miles of single track on the Chicago Division.

Additions and Extension of Yards and Terminal Facilities.

Brunswick, Md.—New roundhouse, extension of engine tracks and engine pits to handle additional power now required on this division.

Grafton, W. Va.—Extension of terminal, including new receiving and forwarding yards, necessary for the present business and to provide for increase.

Tunnel, W. Va.—New receiving and forwarding yard, with small engine house, Wye; engine tracks and ash pits necessary in conjunction with new Lumberport connection, to relieve the Wheeling Division of part of the westbound business from Fairmont Region.

Benwood, W. Va.—New roundhouse, with requisite tracks, water supply and power plant to replace facilities which had become inadequate on account of increase in size of power.

Somerset, Pa.—Receiving and forwarding yards, with scales, small engine house, turntable, ash pits, engine track, etc., to facilitate the classifying and weighing of coal from the Somerset Region.

Lorain, Ohio.—Additional storage yard for 500 cars and reconstruction and additions to the ore handling facilities at this port.

Chicago Junction, Ohio.—New eastbound and westbound yards, where existing facilities were inadequate for the increased business.

The Renewal of Bridges and Elimination of Grade Crossings.

Progress was made during the year on the general plan for the renewal and strengthening of such bridges as are not of sufficient capacity to carry the heaviest locomotives. The bridges on the line from Philadelphia to Grafton and on the Pittsburgh and Chicago Divisions will be completed in 1910; remainder of program will be carried out as promptly as conditions permit. This plan makes possible the use of the heaviest power where needed and the handling of maximum loads.

Work has begun on elimination of grade crossings in the cities of Baltimore, Md.; Columbus, Ohio, and Chicago, Ill. That at Baltimore and Chicago will extend over a period of years; that at Columbus will be finished during the following fiscal year.

The aggregate expenditures for construction and betterments for the twelve months have been \$5,549,819.56, which, in accordance with the classification prescribed by the Interstate Commerce Commission, has been charged to "Property Investment, Road."

EQUIPMENT.

Rolling Equipment.

The equipment of the entire system is shown in table 14 of this report. The book value of all equipment at June 30, 1909, was..... \$70,849,029.40. During the year there was added to the equipment the following:

166 locomotives,	44 passenger cars,	
7,023 freight cars,	2 work cars,	
at a cost of		8,963,819.78
The title to 163 locomotives and 7,000 freight cars is in the Baltimore & Ohio Equipment Company		
		\$79,812,849.18

During the year the following equipment was put out of service through condemnation, wreck, fire and sale, viz.:

17 locomotives,	17 passenger cars,	
3,892 freight cars,	304 work cars,	
having a book value of		\$876,596.92
which amount was charged to operating expenses (less salvage charged to material account) and credited to capital account equipment.		

There was charged to operating expenses and credited to reserve for accrued depreciation..... \$1,931,401.41 representing depreciation for fiscal year of equipment owned.

During the year a Committee of Officers of the Operating, Mechanical and Accounting Departments, appointed to appraise the rolling equipment of the company, reported the book value at June 30, 1909, as higher than the appraised value by \$5,161,160.35.

On recommendation of the executive officers and approval of the board, this amount was charged to appropriated surplus and accounts credited, viz.:

To capital account equipment.....	\$7,141,713.23
To reserve for accrued depreciation	\$1,374,447.07
	8,018,310.30

Making book value of rolling equipment at June 30, 1910 \$71,794,588.98

Marine Equipment.

The book value of all equipment at June 30, 1909, was..... \$1,110,076.49

During the year there was added to the equipment the following:		
1 tug boat,	2 cat floats,	1 launch,
at a cost of		49,201.81
		<hr/> \$1,159,978.30

Sale was made of the tug boat "Cyclops," having a book value of

which amount was charged to operating expenses (less salvage from sale) and credited to capital account equipment,	6,999.10
--	----------

Making book value of marine equipment at June 30, 1910..... \$1,152,284.30

Summary.

Valuation rolling equipment, June 30, 1910.....	\$71,794,588.98
Value of floating equipment, June 30, 1910.....	1,152,284.30
Total book value	\$72,946,873.18
Less reserve for accrued depreciation (see Equipment).....	6,048,981.31
Net value of equipment	\$66,897,843.67

CHICAGO TERMINAL.

Negotiations were conducted during the year whereby your company acquired the south side yard, the Chicago, and the freight and passenger facilities of the Chicago and North Western Railway for a number of years. The owner, ship is through the Baltimore & Ohio Chicago Terminal Railroad Company, all the stock of which is owned by your company, the former having purchased at auction, sale January 6, 1910, all of the property and fran-

Chicago Terminal Transfer Railroad Company, recently received by the Chicago Terminal Transfer Railroad Company, and freight terminal facilities and other improvements on the city of Chicago, and approximately 101 miles of railway property, all of which are owned and the same are held under permanent lease.

The Chicago & Ohio Chicago Terminal Railroad Company was made a corporation, dated April 1, 1910, to carry on authorized issue of \$10,000,000 first mortgage 4 per cent bonds, due April 1, 1960, and guaranteed by the Chicago & Ohio Chicago Terminal Railroad Company, the remainder being held in the hands of the Chicago & Ohio Chicago Terminal Railroad Company.

INSURANCE FUND.

A summary of the operations for the year ended June 30, 1910, and a statement of the assets and liabilities, as compared with previous year, are given in table 1.

RELIEF DEPARTMENT.

The report of the Relief Department for the twelve months ended June 30, 1910, is published, as customary, for distribution to members. The department has continued to carry on the relief, savings and pension fund, all of which are given in table 2 of this report.

OFFICIAL CHANGES.

Mr. D. R. Moore, manager of passenger traffic since 1897, having died October 12, 1910, the position was abolished and that of general traffic manager, both passenger and freight traffic, created. Mr. C. S. Williams, formerly manager of freight traffic, being appointed thereto, effective December 1, 1910.

Mr. H. D. Bulkley, connected with the service since 1888 and its comptroller since 1892, having died on November 25, 1910, Mr. George W. Booth, formerly assistant comptroller, was appointed comptroller, effective December 1, 1910.

Effective January 15, 1910, the position of chairman of the board having been created, Mr. Oscar G. Murray was elected thereto.

Mr. Daniel Willard was elected president, vice Mr. Oscar G. Murray, effective April 1, 1910.

Effective April 1, 1910, the Northwest District was created, including the lines west of Chicago Junction, Ohio, and Mr. F. C. Batchelder, formerly general superintendent of the Main Line District, was appointed general superintendent thereof.

Mr. F. E. Blaser, formerly superintendent of the Cumberland Division, was appointed general superintendent of the Main Line District, vice Mr. F. C. Batchelder, promoted.

Effective April 11, 1910, Mr. A. M. Kinsman, having requested that he be relieved of the duties of chief engineer, was appointed consulting engineer.

Mr. A. W. Thompson, formerly chief engineer, was appointed consulting engineer, vice Mr. A. M. Kinsman, promoted. Mr. Earl Stinson, formerly engineer, was appointed consulting engineer, vice Mr. A. W. Thompson, promoted.

Effective April 16, 1910, the position of Western freight traffic manager having been created, Mr. O. A. Constans, formerly general freight agent, Pittsburgh, Pa., was appointed thereto.

Mr. D. G. Gray, formerly division freight agent, Pittsburgh, Pa., was appointed general freight agent, Pittsburgh, Pa., vice Mr. O. A. Constans, promoted.

Effective May 1, 1910, Mr. H. B. Voorhees, formerly superintendent of the Philadelphia Division, was appointed an additional assistant to the president.

Mr. Robert Finney, formerly general superintendent of the Pittsburgh District, was appointed general agent at Pittsburgh, Pa.

Mr. W. C. Lorce, formerly general superintendent of the Wheeling District, was appointed general superintendent of the Pittsburgh District, vice Mr. Robert Finney, transferred.

Mr. U. B. Williams, formerly superintendent of the Monongah Division, was appointed general superintendent of the Wheeling District, vice Mr. W. C. Lorce, transferred.

Effective May 10, 1910, Mr. J. T. Carroll was appointed superintendent of motive power, Pittsburgh District.

Effective June 1, 1910, Mr. H. L. Bond, Jr., second vice-president and general counsel, was, at his own request, relieved of the office of second vice-president.

Effective July 1, 1910, Mr. George H. Campbell, formerly general superintendent of the New York Division, was appointed an additional assistant to the president.

Mr. John G. Walber, formerly general superintendent of transportation, was appointed assistant general manager.

Mr. C. W. Galloway, formerly general superintendent of transportation, was appointed general superintendent of transportation, vice Mr. John G. Walber, promoted.

Mr. C. C. F. Bent, formerly general manager of the Baltimore & Ohio Southwestern, was appointed general superintendent, New York Division vice Mr. George H. Campbell, promoted.

The president and directors take pleasure in acknowledging the faithful and efficient services of the officers and employees during the past year.

By order of the board,

DANIEL WILLARD,
President.

GENERAL BALANCE SHEET—YEAR ENDED JUNE 30, 1910.

ASSETS.		LIABILITIES.	
Property investments:		Stock:	
Real and equipment—		Capital stock—	
Investment to June 30, 1907—		Common stock..	
Road	\$203,192,086.29	{ Held by company....	\$236,401.16
Equipment	62,942,416.61	{ Not held by company	161,912,442.20
Investment since June 30, 1907—			\$152,148,843.36
Road	\$11,033,358.36	Preferred stock..	
Equipment	10,004,408.57	{ Held by company....	\$1,108,695.30
General expenditures	29,746.94	{ Not held by company	58,875,258.70
			\$59,983,954.00
Reserve for accrued depreciation—Cr. (Equipment)....	\$287,202,016.77		\$212,132,797.86
	6,048,981.51		86,990.61
Total	\$281,153,035.26	Total	\$212,219,787.97
Securities—		Mortgage, bonded and secured debt:	
Securities of proprietary, affiliated and controlled companies—pledged—		Funded debt—	
Stocks	\$43,122,870.20	Mortgage bonds..	
Funded debt	126,740,878.87	{ Held by company....	\$1,144,650.00
Miscellaneous	5,905,583.01	{ Not held by company	228,921,430.00
			\$230,066,080.00
Securities of proprietary, affiliated and controlled companies—unpledged—		Bonds	\$5,048,360.00
Stocks	\$7,984,352.47	{ Held by company....	44,951,640.00
Funded debt	1,330,024.21	{ Not held by company	\$50,000,000.00
			\$40,098,000.00
Total	\$185,083,708.76	Plain bonds, deb-	
Other investments—		entures and notes { Held by company....	\$50,000,000.00
Miscellaneous investments—		{ Not held by company	\$40,098,000.00
Physical property	\$3,790,645.34		\$40,098,000.00
Securities pledged	46,673,284.00	Miscellaneous fund-	
Securities unpledged	3,477,472.44	ed obligations { Held by company....	\$1,145,057.06
		{ Not held by company	\$321,309,137.06
Total	\$53,941,401.78		\$321,309,137.06
Total property and other investments.....	\$520,178,145.80	Total capital liabilities.....	\$321,309,137.06
Working assets:		Working liabilities:	
Cash		Loans and bills payable.....	
Securities issued or assumed held in treasury—(Book Value).		Traffic and car service balances due to other companies..	
Stocks	\$1,226,346.00	Audited vouchers and wages unpaid.....	
Funded debt	6,192,939.77	Miscellaneous accounts payable.....	
		Matured interests, dividends and rents unpaid.....	
Marketable securities—		Working advances due to other companies.....	
Stocks	\$896,121.49	Total	
Funded debt	867,468.64	Total	
		Total	
Loans and bills receivable.....	39,629,892.89	Accrued liabilities not due:	
Traffic and car service balances due from other companies.....	402,951.31	Unmatured interest, dividends and rents payable.....	
Net balance due from agents and conductors	2,575,896.52	Total	
Miscellaneous accounts receivable	8,871,782.06	Deferred credit items:	
Materials and supplies	7,526,259.81	Liability on account of provident funds.....	
		Other deferred credit items.....	
Total	\$79,945,609.92	Total	
Deferred debit items:		Appropriated surplus:	
Advances—		Additions to property { Prior to June 30, 1907.....	
Working funds	\$169,465.30	{ Since June 30, 1907.....	
Other advances	60,000.00	Reserves from income or surplus—	
		Invested in other reserve funds.....	
Cash and securities in sinking and redemption funds	286,000.32	Total	
Cash and securities in insurance and other reserve funds	1,075,472.59	Profit and loss:	
Cash and securities in provident funds	99,167.20	Balance	
Other deferred debit items.....	379,274.71	Grand total	
Total	\$2,069,380.12	The above general balance sheet presents an accurate statement of the accounts of the company, as of June 30, 1910.	
Grand total	\$602,193,135.84	G. W. Booth, Comptroller.	

PASSENGER TRAFFIC STATISTICS.

THE BALTIMORE & OHIO RAILROAD SYSTEM.

	(Compared with 1969.)	
Increase.	Decrease.	

	1910.	Increase.	1911.
.....	4,434.39	25.51	

Miles of road.....	4,434.39	25.51
Passenger earnings.....	\$14,485,585.09	\$934,346.81
Per cent. of total earnings.....	16.29	1.4
Number of passengers carried.....	21,107,120	1,910,368
Number of passengers carried one mile.....	763,448,759	42,690,027
Average miles each passenger was carried.....	36.17	.06
Number of passengers carried per mile of road.....	4,760	299
Number of passengers carried one mile of road.....	172,165	10,556
Passenger earnings per mile of road.....	\$3,266.65	\$228.19
Average earnings from each passenger (cents).....	68.63	.52
Average earnings per passenger per mile (cents).....	1.897	.017
Average number of passengers per train.....	47	1
Passenger train mileage (excluding special express trains).....	15,291,913	132,491
Passenger train mileage per mile of road (excluding special express trains)....	3,448	49
Passenger earnings per train mile (cents).....	94.73	5.34
Passenger train mileage (including special express trains).....	16,151,340	330,170
Passenger train mileage per mile of road (including special express trains)....	3,642	95
Passenger train earnings—all sources.....	\$17,872,589.44	\$1,066,284.49
Passenger train earnings per mile of road—all sources..	\$4,030.45	\$262.14
Passenger train earnings per train per mile—all sources (cents).....	110.66	4.43
Note.—Figures for 1909 recast, for purpose of comparison, to include Affiliated and Controlled Lines.		

Fiscal year ended June 30, 1910.

cars, 2 passenger motor cars, 3,869 freight train cars and 2 service cars, except that 4 mail cars are due in February, 1911.

There were located along the Rock Island Lines during the fiscal year, according to the records of the industrial department, 193 new industries, estimated to have cost nearly \$15,000,000, to employ over 8,700 men and to ship 26,520,000 carloads of revenue freight.

Changes in industrial side tracks are as follows: Eleven built to coal and 88 to private industries, also two mine tracks and 33 tracks to

During the year automatic block signals were installed and placed in

operation from Muscatine, Ia., to Eldon, Ia.; from St. Joseph, Mo., to Rushville, Mo.; from Iowa City, Ia., to Neola, Ia.; from West Liberty, Ia., to Linn Junction, Ia., and from Irving, Tex., to Dallas, Tex.—388.2

signals was \$430,795.55. The total expenditure to June 30, 1910, for the construction of block signals was \$968,192.22, which figures include the cost

The telephone system of train dispatching was installed during the year 1910. On Jan. 20, 1910, the telephone system was

on 1,146.3 miles of road, and at June 30, 1910, the telephone system was in use on 1,602.1 miles of your railroad, representing a total expenditure of \$162,557.16, which figures include the entire cost of the poles, wire, etc.

During the year the expenditures for maintenance of your property have been larger than for preceding years. Attention is invited to detailed in-

Your company expended \$933,042.05 during the year for construction of plant and equipment and improved terminal facilities. These figures cover new facilities and improvements.

Attention is called to the continued increase in taxes, amounting to 1.2 per cent, as computed with an increase of \$480,969.76

\$106,826.12, or 26.08 per cent, as compared with an increase of \$106,805.88, or 26.87 per cent, last year, making 1910 taxes \$1,086,805.88 higher than those of 1908, an increase of 60.72 per cent. Of this year's increase \$144,000.00 was due to the new Federal excise tax on net income, the

992-42 is an account of the new fiscal year. The remainder consists of increases in taxes in various States, only a small portion of which is occasioned by the construction of new lines.

Your company's advances during the year 1909, in connection with the construction of the Tinto & Burgos Viquez Railway \$102,100.00, and operating deficit of the Tinto & Burgos Viquez Railway \$102,100.00, making the total advances to June 30, 1910, \$2,339,992.74, of which \$697,247.69 was reimbursed out of the proceeds of bonds of the Colorado Fuel & Iron Company, and \$1,642,745.05 was outstanding advances.

Advances during the year for Houston, Tex., terminals were \$147,883.80, making the total advances to June 30, 1910, \$450,985.96. First mortgage bonds of \$1,000,000 were received during the year.

On January 1, 1940, there was placed in effect a pension system, which provided that the pension of an employee should be based on his years of faithful service, his

provides that employees, who after long years of faithful service have reached an age when they are unequal to the performance of their duty, will be retired and receive from your company monthly incomes during the remainder of their lives, based on the last ten years' income.

Remember, if their lives, based on their salary for the last ten years, are presented retroactively and the entire length of continuous service with your company. By this pension system your company hopes to hold up and

the company's welfare and a desire to remain in and devote their best effort to the company's service. The total cost to your company for pensions paid to the employees during the operation of the system for the six months ended

and the expense of administration of the system for the six months ending 30.1.10 has been \$1,041.64, and it is estimated that this system will cost approximately \$20,000 during the ensuing fiscal year.

As mentioned in last year's report, because of the supervision of comparative accounts by the Interstate Commerce Commission, it is considered unnecessary to procure the certification of these accounts by an independent firm.

auditor.
October 24, 1910

By order of the Board of Directors,
H. C. Moyer,
President.

ROOPE, T. I. AND H. E.

CONDENSED GENERAL BALANCE SHEET - JUNE 30, 1919 AND COMPARISON WITH PREVIOUS YEAR

Assets	1910	1909	Increase or Decrease	Liabilities	1910	1909	Decrease or Increase
Property investment				Total capital liabilities	\$303,002,000.00	\$276,525,000.00	\$26,477,000.00
Land and buildings, 100,000,000	\$261,884,414.41	\$261,884,414.41					
Investments, 100,000,000	6,604,400.00	6,604,400.00	\$19,102,000.00				
Real estate owned and purchased	28,009.84	28,108.31	*111,991.50				
Patent, trademark and copyright	\$26,911,792.49	\$26,911,402.19	\$19,037,300.30				
Notes							
Securities of property (city, street and utility bonds, etc.) and interest at nominal value	\$ 00	2,902.00	*\$1,909.00				
Securities of property owned and interest at nominal value	9,019,834.25	9,596,479.53	*576,645.28				
Advances to property owners, bonded and bonded companies for construction, equipment and improvements	5,511,717.39	4,868,809.14	642,908.25				
Miscellaneous assets	1,739,696.55	2,066,152.87	*326,456.32				
Total property investment	\$297,228,043.68	\$278,447,935.73	\$18,775,107.95				
Working assets							
Cash, 100,000,000	\$4,541,460.59	\$3,851,068.00	\$690,392.59				
Securities owned and owned, held in treasury	4,227.50	1,373.17	2,854.33				
Marketable securities....	17,081,146.72	12,382,882.86	4,698,263.86				
Loans and bills receivable	596,515.11	1,018,349.05	*421,833.61				
Traffic and car-service balances due from other companies	290,506.92	260,751.59	38,755.33				
Net balance due from agents and conductors	1,142,880.35	992,598.61	150,281.74				
Miscellaneous accounts receivable	2,889,530.25	2,222,866.20	666,664.05				
Materials and supplies....	6,224,132.74	5,703,346.81	520,785.93				
Other working assets....	1,540,956.20	1,244,593.56	296,362.64				
Total working assets	\$34,320,356.71	\$27,677,829.85	\$6,642,526.86				
Unmatured interest, dividends and rents receivable	\$392,302.46	\$233,323.16	\$158,979.30				
Deferred debit items:							
Advances	\$1,534,707.44	\$1,632,990.44	*\$98,283.00				
Rents and insurance paid in advance	151,382.30	117,915.23	3,467.07				
Special deposits (see notes)	7,798,005.43	59,781.76	7,738,223.67				
Other deferred debit items	1,433,345.22	785,861.26	647,483.96				
Total deferred debit items	\$10,917,440.39	\$2,617,551.69	\$8,299,888.70				
Grand total	\$342,853,143.24	\$308,976,640.43	\$33,876,502.81	Grand total	\$342,853,143.24	\$308,976,640.43	\$33,876,502.81

* Decrease.

Note.—1910 figures include \$7,637,573.99 contract consideration for new trust equipment not delivered. Cash is on deposit with trustees and is included in "Special deposits" under "Deferred debit items."

Note: In stating the assets and liabilities of the companies forming the Rock Island Lines, the holdings of The Chicago, Rock Island and Pacific Railroad Company in bonds and capital stock of the auxiliary line, together with loans between the various companies, have been eliminated from the liabilities and a like reduction made in the assets pertaining thereto; the figures shown, therefore, represent the book value of the assets and the liabilities without duplication.

INCOME ACCOUNT

INCOME ACCOUNT
YEAR ENDED JUNE 30, 1910, COMPARED WITH PREVIOUS YEAR

	1909-10	1908-09	Increase or Decrease Amount	Pr. Ct.
Average mileage operated	8,043.59	8,026.38	17.21	.21
Revenue from transportation:				
Freight	\$42,218,880.84	\$39,158,053.16	\$3,060,827.68	7.82
Passenger	19,378,174.27	17,883,378.99	1,494,795.28	8.36
Mails	1,448,435.51	1,429,829.62	18,605.89	1.30
Express	1,925,456.61	1,626,931.53	300,525.08	18.46
Miscellaneous	774,380.24	720,280.57	54,099.67	7.51
Total transportation revenue	\$65,747,116.47	\$60,818,473.87	\$4,928,642.60	8.10
Revenue from operations other than transportation	473,462.47	866,413.08	107,049.39	29.22
Total operating revenue	\$66,220,578.94	\$61,184,886.95	\$5,035,691.99	8.23
Operating expenses:				
Maintenance of way and structures	\$10,673,387.02	\$9,061,830.36	\$1,621,556.66	17.91
Maintenance of equipment	8,455,745.72	7,512,888.55	942,857.17	12.55
Traffic expenses	1,795,262.39	1,441,214.58	354,047.81	24.57
Transportation expenses	25,195,578.74	22,848,052.39	2,347,526.35	10.27
General expenses	1,949,395.04	1,659,590.59	289,804.45	17.47
Total operating expenses	\$48,069,368.91	\$42,513,495.41	\$5,555,873.50	13.07
Net operating revenue	\$18,151,210.03	\$18,671,391.54	\$520,181.51	2.79

	1909-10	1908-09	Increase or Decrease Pr. Ct.
Taxes	2,876,700.67	2,270,864.55	605,836.12 26.68
Operating income	\$15,274,509.36	\$16,400,526.00*	\$1,126,017.63 6.87
Outside operations (debit balance)	\$155,891.29	\$146,201.11	*\$9,690.18 6.63
Hire of equipment (debit balance)	1,171,066.25	812,116.05	*358,950.20 44.20
Other income	1,550,189.36	1,769,788.05	380,401.31 32.52
Total	\$223,231.82	\$211,470.89	\$11,760.93 5.56
Total income	\$15,497,741.18	\$16,611,997.88*	\$1,114,256.70 6.71
Interest	\$9,129,874.61	\$8,861,223.05	\$268,651.56 3.03
Rentals	1,547,402.01	1,567,966.93	*20,564.92 1.31
Betterments on leased lines	72,583.48	16,577.16	56,006.32 337.85
Total charges	\$10,749,860.10	\$10,445,767.14	\$304,092.96 2.91
Balance of income (avail- able for dividends) ..	\$4,747,881.08	\$6,166,230.74*	\$1,418,349.66 23.00
Dividends	3,743,272.00	3,930,018.75	*186,746.75 4.75
Balance surplus (carried to credit of profit and loss)	\$1,004,609.08	\$2,236,211.99*	\$1,231,602.91 55.08

* Decrease.

Dividends Declared During Year Ended June 30, 1910:	
Dividend No. 117, 1¼ per cent. paid October, 1909.....	\$1,810,005.25
Dividend No. 118, 1 per cent. paid January, 1910.....	748,675.00
Dividend No. 119, 1¼ per cent. paid April, 1910.....	935,938.75
Dividend No. 120, 1 per cent. paid July, 1910.....	748,752.00
Total, 5 per cent.....	\$3,743,372.00

PROFIT AND LOSS	
Credit balance, June 30, 1909.....	\$1,767,260.51
Surplus for year ended June 30, 1910.....	\$1,004,609.98
Interest prior to current fiscal year on advances for construction.....	171,912.62
Sundry adjustments not affecting current year's income.....	25,976.95
	\$1,202,498.65
Loss:	
Discount on bonds issued and sold, commission and premium on loan made, and loss on lands sold...\$996,710.74	
Depreciation on:	
Tracks removed ... \$59,439.00	
Structures sold, removed or destroyed 93,181.24	
Equipment sold, dismantled or destroyed 597,662.62 680,232.86	1,676,943.60
	474,444.05
Credit balance, June 30, 1910.....	\$17,292,815.56

EXPENDITURES FOR ADDITIONS AND BETTERMENTS YEAR ENDED JUNE 30, 1910	
Right of way and station grounds.....	\$154,434.78
Widening cuts and fills.....	192,919.03
Protection of banks.....	12,179.10
Grade revisions and changes of line.....	16,914.71
Bridges, trestles and culverts.....	149,652.45
Increased weight of rail.....	197,258.08
Improved frogs and switches.....	9,515.97
Track fastenings and other materials.....	48,513.31
Ballast.....	495,641.24
Additional main tracks.....	1,499.43
Sidings and spur tracks.....	307,769.13
Terminal yards.....	146,117.06
Fencing right of way.....	20,483.79
Improvement of over and under grade crossings.....	2,847.14
Track elevation, elimination of grade crossings, etc.	73,851.42
Interlocking apparatus.....	37,645.23
Block and other signal apparatus.....	457,710.62
Telegraph and telephone lines.....	124,120.98
Station buildings and fixtures.....	346,490.62
Shops, engine houses and turn tables.....	167,359.47
Shop machinery and tools.....	36,261.87
Water and fuel stations.....	223,606.18
Grain elevators and storage warehouses.....	37,660.50
Dock and wharf property.....	20.35
Electric light and power plants.....	2,687.60
Miscellaneous structures.....	416.22
Interest and commissions.....	51,371.42
	\$3,311,942.84
Equipment:	
Steam locomotives.....	\$89,515.82
Passenger train cars.....	29,630.78
Freight train cars.....	4,513.43
Work equipment.....	12,982.26
	136,642.29
Total additions and betterments.....	\$3,448,585.13

Figures in *italics* denote credits.

ROCK ISLAND LINES. MAINTENANCE OF WAY AND STRUCTURES—REMARKS.

YEAR ENDED JUNE 30, 1910.

The following is a comparative statement of miles of the first track main lines (as distinguished from branch lines) owned or leased, not including trackage rights, which are used in the rail and ballast tables on preceding page:

	June 30, 1910.	1909.
Chicago, Ill., to Colorado Springs, Colo.....	1,063.03	1,063.92
Davenport, Ia., to Dallas, Tex. (via Kansas City).....	833.61	833.57
Herington, Kan., to Santa Rosa, N. M.....	526.92	526.59
Burlington, Ia., to Minneapolis, Minn.....	307.58	307.58
Altamont, Mo., to Nor. Topeka, Kan. (via St. Joseph)	137.96	138.09
McFarland, Kan., to Belleville, Kan.....	103.19	103.19
Memphis, Tenn., to Tucumcari, N. M. (to six miles west of Ontario, Tex., in 1909).....	869.87	799.16
Biddle, Ark., to Eunice, La.....	292.40	292.52
St. Louis, Mo., to Kansas City, Mo.....	283.90	283.97
Total.....	4,418.46	4,348.59

Improvements to roadway have been made as follows:

Ties were renewed to the extent of 2,602,978 or an average of 343 per mile of first, second and third main track owned and leased; of these ties 2,200,278 were treated with creosote.

Track miles of new ballast.....	184.30 miles
Track miles rebalasted.....	281.71 miles
Miles of roadbed widened to standard width.....	212.58 miles
Road miles of new right of way fence built.....	26.94 miles
Linear feet, transversely to track, of iron pipe culverts built.....	3,920 feet
Linear feet, transversely to track, of iron pipe culverts built.....	6,130 feet
Linear feet of timber bridges or trestles replaced with steel, concrete or masonry bridges.....	794 feet
Linear feet of bridges and trestles filled.....	360 feet
Linear feet of iron or steel bridges replaced with heavier structures.....	9,475 feet
Linear feet of new pile trestles built.....	1,320 feet
Linear feet of new pile trestles built.....	1,581 feet
Linear feet of new steel bridges built.....	141 feet

The following table shows the aggregate length and nature of bridges for June 30, 1910, compared with previous year:

Bridges.	Total (feet)	Kind of bridge and length (in feet)			
		Steel and iron	Combination (wood and iron)	Wooden Trestles	
Main track, June 30, 1910.....	521,879	147,616	620	3,093	2,449 368,101
Per cent. of total length.....		28.29	.12	.59	.47 70.53
Main track, June 30, 1909.....	527,403	146,571	566	4,052	2,570 373,644
Per cent. of total length.....		27.79	.11	.77	.49 70.84

The average expense of maintenance of way and structures per mile of first, second and third main track owned and leased during the past fiscal year was \$1,372.85, as against \$1,145.58 last year.

All the rail relaid during the year has replaced lighter weight and a corresponding increase in metal has been made in appliances.

MAINTENANCE OF WAY AND STRUCTURES—REMARKS

YEAR ENDED JUNE 30, 1910

COMPARATIVE STATEMENTS OF RAIL IN MAIN AND BRANCH LINES OWNED OR LEASED AS OF JUNE 30, 1909, AND 1910.
OF JUNE 30, 1909 AND 1910

Rail	Total Miles Owned or Leased	Weight Per Yard and Miles of Each Weight			
		Re-rolled	60 and under	52 and under	
1910					
Main Lines:					
First track.....	4,418.46	5.20	1,089.46	2,032.17	208.50
Second track.....	267.31		148.85	118.46	69.16
Third track.....	9.43			9.43	665.48
Total.....	4,695.20	5.20	1,238.31	2,140.63	78.59
Per cent. of main lines.....		.11	26.38	45.59	1.67
1909					
First track.....	4,348.59	5.20	870.60	2,193.74	129.69
Second track.....	267.92		103.32	161.70	131.00
Third track.....	9.43			9.43	700.52
Total.....	4,625.94	5.20	973.92	2,264.94	139.69
Per cent. of main lines.....		.11	21.07	48.99	2.81
Branch Lines:					
First track.....	2,983.49		34.86	367.98	338.44
Second track.....	14.90		5.02	1.99	303.55
Total.....	3,000.29		29.88	265.97	353.54
Per cent. of branch lines.....		1.00	8.80	11.78	10.12
1909					
First track.....	2,983.64		23	364.26	341.38
Second track.....	14.93			1.93	203.12
Total.....	2,998.56		23	366.14	343.50
Per cent. of branch lines.....		.01	11.55	8.89	9.77
1910					
Total track.....	7,005.59	5.20	1,268.19	2,400.60	298.50
Per cent. of total track.....		.07	16.48	31.77	2.71
1909					
Total track.....	7,626.63	5.20	974.15	2,524.58	1,994.69
Per cent. of total track.....		.07	12.78	33.31	1.70

BALLAST IN MAIN AND BRANCH LINES

Year	Material	Total		Total of Ballast and Material Used				Total or Dirt
		Quarried or Crushed	Rock	Clay	Gravel	Cinder	Total	
1909	Main Lines	1,118.46	1,211.27	491.71	1,357.81	411.25	3,478.64	41.47
	First track	267.81	16.10		222.00		262.40	1.90
	Second track	9.43			9.43		9.43	
	Total	4,095.20	1,227.37	491.71	1,599.14	436.65	2,745.57	41.47
1909	Branch Lines			10.47	33.87	9.30	79.78	29.22
	First track	4,548.50	1,194.94	460.51	1,363.84	370.30	3,299.59	1,049.60
	Second track	9.43	16.10		217.00	29.65	262.24	2.78
	Total	4,623.04	1,121.13	460.51	1,599.27	399.35	3,571.26	1,051.78
1910	Main Lines							
	First track	2,985.40	118.95	39.83	625.11	271.31	1,046.29	1,939.29
	Second track	14.90				14.90	14.90	
	Total	3,000.30	118.95	39.83	625.11	286.21	1,061.10	1,939.29
1910	Branch Lines			1.03	20.83	9.54	35.36	64.64
	First track	2,988.04	105.13	16.08	624.62	290.66	1,036.49	1,947.15
	Second track	14.92			.65	14.27	14.92	
	Total	2,998.56	105.13	16.08	625.27	304.93	1,051.41	1,947.15
1910	Branch Lines			.54	20.85	10.17	35.06	64.94
	First track	7,695.59	1,346.32	522.54	2,215.25	722.86	4,806.97	2,888.62
	Second track		17.49	6.79	28.79	9.39	62.46	57.54
	Total	7,691.60	1,226.26	476.59	2,215.54	704.28	4,622.67	2,998.93
1910	Branch Lines			6.25	29.07	9.24	60.65	39.35
	First track							
	Second track							
	Total							

INTEREST ACCRUED.
YEAR ENDED JUNE 30, 1910, COMPARED WITH PREVIOUS YEAR.

Description of Debt	Rate Cent.	Amount		Increase	Decrease
		1909-10	1908-09		
<i>The Chicago, Rock Island and Pacific Railroad Company:</i>					
First and refunding mortgage gold bonds	4	\$3,283,310.67	\$2,934,520.00	\$348,790.67	
First mortgage bonds	6	750,000.00	750,000.00		
General mortgage gold bonds	4	2,463,240.00	2,463,240.00		
Gold bonds of 1902	4	527,880.00	587,640.00		\$59,760.00
Extended two year notes, paid April 1, 1909	6		270,000.00		270,000.00
Equipment gold notes	4½	214,500.00	243,750.00		29,250.00
Equipment notes, series B	6	25,500.00	32,464.47		6,964.47
Equipment gold bonds, series C	4½	100,794.90		100,794.90	
Equipment gold bonds, series D	4½	14,952.56		14,952.56	
Miscellaneous interest		199,896.72	142,121.08	57,775.64	
<i>Burlington, Cedar Rapids and Northern Railway Company:</i>					
Consolidated first mortgage bonds	5	550,000.00	550,000.00		
First mortgage bonds—Cedar Rapids, Iowa					
Falls and Northwestern Railway Company	5	95,250.00	95,250.00		
First mortgage bonds—The Minneapolis & St. Louis Railroad Company	7	10,500.00	10,500.00		
<i>Rock Island and Peoria Railway Company:</i>					
Consolidated first mortgage bonds	6	27,000.00	27,000.00		
<i>Choctaw, Oklahoma and Gulf Railroad Company:</i>					
General mortgage bonds	5	275,000.00	275,000.00		
First mortgage gold bonds—Choctaw and Memphis Railroad Company	5	176,224.76	176,250.00		25.24
Consolidated mortgage gold bonds	5	270,550.00	270,550.00		
First mortgage gold bonds—Little Rock Bridge Company	6	14,100.00	15,300.00		1,200.00
Equipment trust notes, series B	5		312.50		312.50
Equipment trust notes, series C	4½	7,425.00	17,325.00		9,900.00
<i>Rock Island, Arkansas and Louisiana Railroad Company:</i>					
First mortgage gold bonds	4½	123,750.00		123,750.00	
Total interest...		\$9,129,874.61	\$8,861,223.05	\$268,651.56	

ROCK ISLAND LINES. PASSENGER TRAFFIC AND PER MILE OF ROAD STATISTICS.

Year Ended June 30, 1910, Compared with Previous Year.	1909-10.		1908-09.		Increase.	Decrease.
	1909-10.	1908-09.	1909-10.	1908-09.		
<i>Passenger Traffic:</i>						
Revenue per passenger mile...	\$0.0191	\$0.0188	\$0.0003			
Revenue per passenger.....	.962	.954	.006			
Revenue per train mile (excluding mail, express, etc.)	1.025	1.039		.004		
Revenue per train mile (including mail, express, etc.)	1.226	1.234		.008		
Revenue per car mile (cars carrying passengers).....	.276	.266	.010			
Revenue per mile of road (exclud. mail, express, etc.)	2,409.14	2,228.08	181.06			
Revenue per mile of road (includ. mail, express, etc.)	2,869.56	2,651.14	218.42			
Number of passengers per train mile	54.31	55.34		1.03		
Number of passengers per car mile (cars carrying passengers)	14.46	14.11	.35			
Average distance carried (in miles)	50.47	50.83		.36		
Number of cars per train....	5.10	5.16		.06		
Average miles of revenue passengers per mile operated.	126,360	118,695	7,666			
<i>Per Mile of Road:</i>						
Total operating revenue....	\$8,232.71	\$7,622.97	\$609.74			
Operating expenses	5,976.11	5,296.72	679.39			
Net operating revenue....	\$2,256.60	\$2,326.25	\$69.65			
Taxes	357.64	282.92	74.72			
Operating income	\$1,898.96	\$2,043.33	\$144.37			
Outside operations (debit balance)	19.38	18.21		1.17		
Hire of equipment (debit balance)	145.59	101.18		44.41		
Other income	192.72	145.74	46.98			
Total income	\$1,926.71	\$2,069.68	\$142.97			
Interest	1,135.05	1,104.01	31.04			
Rentals	192.38	195.35		2.97		
Betterments on lines leased from other companies*...	9.01	2.07	6.94			
Total charges	\$1,336.44	\$1,301.43	\$35.01			
Balance of income (available for dividends)....	590.27	768.25		177.98		
Betterments on lines leased from other companies, per mile of the leased roads so improved†	393.88	89.96	303.92			

*Used average miles operated same as for other computations.

†Covers Keokuk and Des Moines Railway and Little Rock and Hot Springs Western Railroad.

ROCK ISLAND LINES. FREIGHT TRAFFIC STATISTICS. YEAR ENDED JUNE 30, 1910, COMPARED WITH PREVIOUS YEAR.				
	1909-10.	1908-09.	Increase.	Decrease.
Revenue per ton mile.....	\$0.092	\$0.094	.....	\$0.002
Revenue per ton.....	2.203	2.284	.....	.081
Revenue per train mile.....	2.380	2.490	.....	.110
Revenue per car mile (excludes caboose car miles).....	.0992	.1024	.....	.0032
Revenue per mile of road.....	5,248.76	4,878.67	370.09	.....
Number of tons per train mile—revenue freight.....	257.43	264.55	.....	7.12
Number of tons per train mile—company freight.....	39.51	36.19	3.32	.....
Number of tons per train mile—all freight ..	296.94	300.74	.....	3.80
Number of tons per loaded car mile—revenue freight.....	15.07	15.15	.....	.08
Number of tons per loaded car mile—company freight.....	2.31	2.97	.24	.....

	1909-10.	1908-09.	Increase.	Decrease.
Number of tons per loaded car mile—all freight.....	17.38	17.32	.16	.....
Number of cars per train—loaded.....	17.06	17.44	.....	.38
Number of cars per train—empty.....	6.89	6.84	.05	.....
Number of cars per train all.....	23.95	24.28	.....	.33
Average haul per ton—revenue freight (in miles).....	238.28	242.68	.....	4.40
Average haul per ton—company freight (in miles).....	117.37	111.90	5.47	.....
Average haul per ton—all freight (in miles).....	209.55	212.76	.....	3.21
Average ton miles of revenue freight per mile operated.....	567,792	518,394	49,398	.....

NORTHERN PACIFIC RAILWAY COMPANY—FOURTEENTH ANNUAL REPORT.

OFFICE OF THE
NORTHERN PACIFIC RAILWAY COMPANY,
ST. PAUL, MINNESOTA,
September 28, 1910.

To the Stockholders of the

NORTHERN PACIFIC RAILWAY COMPANY.

The following, being the Fourteenth Annual Report, shows the result of the operation of your property for the fiscal year ending June 30, 1910:

INCOME ACCOUNT.

Revenue From Transportation:

	1909.	1910.	Increase or Decrease.
Freight	\$47,073,305.13	\$48,758,736.25	\$1,685,431.12
Passenger	17,330,608.06	21,333,312.84	4,002,704.78
Other revenue from transportation	3,416,101.72	3,671,816.80	255,715.08
Totals	\$67,820,014.91	\$73,763,865.89	\$5,943,850.98
Revenue from operation other than transportation	640,732.30	761,960.30	121,228.00
Total operating revenue	\$68,460,747.21	\$74,525,826.19	\$6,065,078.98
Per mile (average)	\$12,071.46	\$12,927.67	\$856.21
Operating Expenses:			
Maintenance of way and structures	\$7,847,050.35	\$10,842,955.20	\$2,995,904.85
Maintenance of equipment	7,845,689.35	8,992,137.09	1,146,447.74
Traffic expenses	919,199.03	1,036,403.62	117,204.59
Transportation expenses	20,305,621.20	24,045,197.09	3,739,575.89
General expenses	1,102,444.72	1,070,712.33	\$31,732.39
Totals	\$38,020,004.65	\$45,987,405.33	\$7,967,400.68
Per mile (average)	\$6,703.94	\$7,977.24	\$1,273.30
Net operating revenue.....	\$30,440,742.56	\$28,538,420.86	*\$1,902,321.70
Per mile (average).....	5,367.52	4,950.43	*417.09

Operating Expenses:

Maintenance of way and structures

Maintenance of equipment

Traffic expenses

Transportation expenses

General expenses

Totals

Per mile (average)

Net operating revenue.....

Per mile (average).....

Sleeping, parlor, observation, dining and cafe cars and restaurants

Total net revenue.....

Taxes accrued

Per mile (average).....

Operating expenses

Other income.....

Dividends and interest on securities, interest on deposits and miscellaneous.....

Rentals received

Loss on equipment

Gross income.....

Deduct:

Reserve fund

Interest on funded debt.....

Interest and commissions

Dividends on stock.....

Taxes

Net operating revenue.....

Ratio of operating expenses to total operating revenue.....

Ratio of taxes to total operating revenue.....

*Decrease.

MILEAGE OPERATED.

Changes in mileage operated during the year are as follows:

	Miles
Jan. 31, 1910. Northern Pacific Railway, Junction to Williston, Minn.	22.90
Jan. 31, 1910. Northern Pacific Railway, Junction to Williston, Minn.	79.08
Jan. 31, 1910. Northern Pacific Railway, Junction to Williston, Minn.	21.82
Total additions.....	119.75
Deductions:	
Oct. 31, 1909. Main line to Washington transferred to Chicago	1.35

Jan. 31, 1910. Red River Branch in Minnesota shortened. .87
June 30, 1910. Main Line in Oregon—North Portland to Goble—leased to Astoria & Columbia River R. R. Co. 35.15
June 30, 1910. Corrections by line changes and rechainning 1.56

Total deductions

Net additions

Mileage operated June 30, 1909.....

Mileage operated June 30, 1910.....

Average mileage operated during the year.....

EARNINGS.

FREIGHT BUSINESS.

Freight revenue was \$48,758,736.25, an increase of \$1,685,431.12, or 3.58 per cent, over the previous year.

5,418,084.365 tons of revenue freight were moved one mile, an increase of 158,591.705 tons one mile, or 3.01 per cent, over the previous year.

The rate per ton per mile increased from .00895 to .00900.

The revenue train load decreased from 434.59 to 429.28 tons. The total train load, including company freight, increased from 520.71 to 523.65 tons.

PASSENGER BUSINESS.

Passenger revenue was \$21,333,312.84, an increase of \$4,002,704.78, or 23.10 per cent, over the previous year.

Mail revenue was \$1,032,891.12, a decrease of \$30,165.73, or 2.84 per cent.

Express revenue was \$1,573,000.11, an increase of \$159,442.04, or 11.28 per cent.

Excess baggage and miscellaneous passenger revenue was \$333,463.62, an increase of \$22,934.67, or 7.40 per cent.

The total revenue for persons and property carried on passenger trains was \$24,272,672.69, an increase of \$4,154,965.71, or 20.65 per cent, over the previous year.

The number of passengers carried was 9,639,994, an increase of 1,285,288 over the previous year, and the number of passengers carried one mile was 976,772,093, an increase of 209,332,628, or 27.28 per cent.

The miles run by revenue passenger trains was 12,574,907, an increase of 3,003,475, or 31.38 per cent.

The rate per passenger per mile was .02184, and .02258 last year.

OPERATING EXPENSES.

CONDUCTING TRANSPORTATION.

The charges for transportation expenses were \$24,045,197.09, an increase of \$3,739,575.89, or 18.42 per cent, of which \$1,973,532.66, or 9.72 per cent, consisted of labor.

Passenger train mileage for the year increased 31.38 per cent, over the previous year, which also necessarily entailed a large increase in transportation expenses.

MAINTENANCE OF EQUIPMENT.

The charges for maintenance of equipment were \$8,992,137.09, an increase of \$1,146,447.74, or 14.61 per cent.

LOCOMOTIVES.

Total number of locomotives on active list June 30, 1909..... 1,393

Additions:

Purchased:

Switch locomotives..... 25

Pacific type passenger locomotives..... 44

Mikado type freight locomotives..... 40

Mallet type freight locomotives..... 11

Total..... 120

Deductions:

Sold..... 8

Scrapped..... 5

Total number on active list June 30, 1910..... 1,430

In addition to those on active list, there are 30 locomotives held for sale; four engines having been sold or dismantled during the year.

Total locomotives owned..... 1,430

HAULING CAPACITY.

	Number	Tractive power	Total weight of engines	Total weight of engines
Assignment June 30, 1909.....	1,393	39 1/2 300	1,710,000	222,500,000
Added during fiscal year.....	120	4 5/8 300	21,875,000	28,743,000
Total.....	1,413	44 1/12 300	1,928,000	251,243,000
Sold and dismantled.....	13	2 1/2 300	1,075,000	1,500,000
Total.....	1,400	43 7/12 300	1,926,500	250,163,000

Note.—On account of several compound engines being changed to simple, the weights and tractive powers for assignment as of June 30, 1909, do not show the same total as was shown in annual report for 1909.

The following statement shows the character and the condition of the locomotives of the company on June 30, 1910:

Class (Assignment)	Owned June 30, 1909	Abandoned and sold	Added	Owned June 30, 1910	Average Weight of Locomotives without tender (Tons)		Average Locomotive Horse Power
					Total	The Trainers	
Steam locomotives	3		3	3	27.60	26.32	10,800
Gas locomotives	183	2	21	206	60.64	60.64	23,369
Electric locomotives			9	9	68.30	68.30	26,500
Gas locomotives	183	2	13	193	51.38	44.14	18,155
Gas locomotives	183	2	13	193	88.77	75.68	37,440
Gas locomotives	183	2	13	193	77.51	68.27	34,800
Gas locomotives	183	2	13	193	44.80	28.46	13,880
Gas locomotives	183	2	13	193	79.46	59.48	26,115
Gas locomotives	183	2	13	193	49.00	75.00	38,500
Gas locomotives	183	2	13	193	84.39	43.83	21,550
Gas locomotives	183	2	13	193	111.82	70.58	31,275
Gas locomotives	183	2	13	193	102.25	76.75	33,000
Gas locomotives	183	2	13	193	130.35	101.68	46,300
Gas locomotives	183	2	13	193	170.70	150.72	64,940
Gas locomotives	183	2	13	193	218.98	201.90	89,540
Gas locomotives	183	2	13	193	63.32	63.32	29,230
Gas locomotives	183	2	13	193	86.66	68.07	30,334

Class	Number	Per cent
Steam locomotives	1,182	81.18
Gas locomotives	182	12.50
Electric locomotives	92	6.32
Total	1,456	100.00
Number of locomotives equipped with superheaters	3	0.206
Number of locomotives equipped with superheaters	81	5.56

On June 30, 1909, the company owned 1,005 passenger train cars, including 108 sleeping cars, owned jointly with the Pullman Company; one June 30, 1910, 1,110 passenger train cars, including 131 sleeping cars owned jointly with the Pullman Company, a net increase of 114.

The passenger equipment of the company was in extremely active use from July 1 to December 31, 1909, and could not be shopped during that time. On June 30, 1910, of the 1,110 cars owned, 894 cars were not due in shops for two months or more.

FREIGHT EQUIPMENT.

Comparative number and capacity of freight cars:

	1909		1910		Increase or decrease
	Number.	Capacity (tons).	Number.	Capacity (tons).	
Box	23,092	789,827	24,357	880,887	1,305 91,060
Furniture	428	10,800	638	19,770	210 8,970
Refrigerator	1,432	35,025	1,562	39,675	130 4,650
Stock	2,670	62,410	2,618	61,250	*52 *1,160
Flat	8,129	269,770	8,614	291,030	485 21,260
Oil	13	345	18	475	5 130
Coal	4,982	198,985	5,193	216,955	261 17,970
Ballast and ore	842	33,680	816	32,640	*26 *1,040
Totals	41,498	1,401,442	43,816	1,542,082	2,318 141,240
Percentage					5.59% 10.08%
Aver. capacity per car.	33.8		35.2		1.4

*Decrease.

Of the total number of freight cars on the road on June 30, 1910, only 1,744, or 3.98 per cent., were in need of repairs costing \$5 per car or more. In addition to equipment shown as on hand June 30, 1910, the following have been purchased during the current year and will be delivered this autumn:

Pacific type passenger locomotives	18
Passenger train cars:	
First class coaches	9
Dining cars	4
Observation cars	11
Freight train cars:	24
Box cars, 40 tons' capacity	33
Refrigerator cars	71
Gondolas, 50 tons' capacity	24
Hart convertible ballast cars, 50 tons' capacity	348
	476

DEPRECIATION OF EQUIPMENT.

In accordance with the rules of the Interstate Commerce Commission, the following amounts have been charged to operating expenses on account of estimated depreciation of equipment, viz.:

Locomotives	\$820,121.34
Passenger cars	236,899.51
Freight cars	1,367,424.33
Work cars	43,623.05
Floating equipment	6,777.12
Total	\$2,474,845.34

MAINTENANCE OF WAY AND STRUCTURES.

The charges for maintenance of way and structures were \$10,842,955.20, an increase of \$2,905,904.35, or 38.18 per cent.

The table in the report of the Comptroller shows the distribution of this increase under the respective accounts.

The following statements give particulars of the work done and show that the property has been maintained and improved during the past year to such an extent that expenditures of equal magnitude will not be necessary during the current year.

PERMANENT WAY.

	1909.	1910.
New main line laid with 85-pound rail	3,000	2,400
New second track laid with 85-pound rail	115.54	5.33
New second track laid with new 90-pound rail	13.67	741.47
Main line relaid with new 90-pound rail	374.18	31.16
Branch line relaid with new 90-pound rail	19.00	36.06
Second track relaid with new 90-pound rail	5.34	
Second track relaid with new 85-pound rail	130.77	75.86
Sidings and spurs constructed	627.58	420.13
Track ballasted	191.70	370.00
Embankment widened		

	1909.	1910.
Cost of permanent way	522	86,088
Cost of structures	2,657	427,995
Total	3,179	514,083

On June 30, 1910, 2,419.69 miles of track were under construction. Between St. Paul, Duluth, Seattle and Portland, will have been laid with heavy steel, with the exception of the line between Brainerd and Staples, Minn., 30 miles, and a few points where changes in curvature and grade are contemplated.

During the year, 213 bridges were replaced and 114 abandoned. Forty were replaced by timber structures, and 22 permanent and 161 timber structures were replaced in permanent form, as follows:

Replaced by embankment	155 bridges, 28,823 lineal feet
Replaced by truss, girder and I-beam spans	18 " 1,550 "

Forty timber bridges, making 8,117 lineal feet, have been renewed this year. One hundred and one timber culverts were rebuilt this year—12 in temporary and 89 in permanent form.

On June 30 there were under construction on operated lines 1,255 lineal feet of steel girder and I-beam spans, 1,866 lineal feet of steel truss spans, 259 lineal feet of steel trestle, 896 lineal feet of reinforced concrete trestle, one 325-foot and one 200-foot steel draw spans and one 160-foot bascule draw span.

BRIDGES AS THEY EXISTED JUNE 30, 1910

	No.	Lineal ft. Miles.
Steel, iron, stone and concrete permanent bridges	522	86,088 16.42
Timber and combination iron and timber structures	2,657	427,995 81.06

Totals 3,179 514,083 97.48

Total length of timber structures replaced by steel bridges, embankment, or in other permanent form, from July 1, 1885, when work was commenced, to June 30, 1910, has been 118.21 miles.

BLOCK SIGNALS AND INTERLOCKING PLANT.

On account of the growing volume of business moving over the important main lines of your company, safety appliances of one kind and another have been authorized, as follows:

Minnesota	
Between Northtown Junction and St. Cloud—Automatic, electric block signals for double track	
St. Cloud—Electric interlocking plant for crossing with the Great Northern Railway	
Manitoba Junction—Interlocking plant to protect the junction of the Winnipeg line with the main line	
Staples to Dilworth—Automatic, electric block signals for double track	
Carroll, Mechanical interlocking plant for crossing with the Great Northern Railway	
Wisconsin	
Superior—Mechanical interlocking plant for crossing of this company's line with the Minneapolis, St. Paul & Sault Ste. Marie Railway	
Montana	
Hutley and Billings—Automatic signals for protection of the Yellowstone River bridge	
Laurel—Mechanical interlocking plant for the protection of the yard and the connection with the Great Northern Railway	
Billings to Livingston—Automatic, electric block signals	
Livingston—Automatic signals protecting the junction of the main line with the Yellowstone Park Branch	
Silver Bow—Mechanical interlocking plant to protect crossing with the Butte, Anaconda & Pacific Railway	
Garrison—Mechanical interlocking plant to protect junction of the Helena and Butte lines	
Garrison to Missoula—Automatic, electric block signals	
Washington	
Tacoma-Seattle—The block signals mentioned in the last report have been installed and placed in service	
Kalama to Vancouver—Contract has been let for installation of electric block signals	
Oregon	
North Portland to Portland—Contract has been let for installation of electric block signals	

Contract also has been let for suitable signals on the double track bridges over the Columbia and Willamette rivers and approaches to and connection between them.

CHARGES TO CAPITAL ACCOUNT.

Upon requisition of the executive officers, approved by the Board of Directors, expenditures have been made during the past fiscal year for:

Real estate, right of way and terminals:	
At Superior, Wis., real estate	\$1,269.14
St. Paul, Minn., real estate	10,376.00
Minneapolis, Minn., real estate	58,251.35
Laurel, Mont., terminals	9,480.72
Paradise, Mont., terminals	30,465.70
Sand Point, Idaho, terminals	14,946.69
Spokane, Wash., real estate	1,827.80
Seattle, Wash., terminals, tunnel and passenger station	13,434.37
Tacoma, Wash., real estate (credit)	72.05
Aberdeen, Wash., real estate	1,859.00

Branches, line changes, grade revisions and second main track: One-third interest in double track line Vancouver to North Portland, including bridges over Columbia and Willamette rivers (two-thirds owned by Spokane, Portland & Seattle Railway Co.)—additional charges

Edgeley-Missouri River line, North Dakota	\$70,720.95
Pingree west line, North Dakota	38,284.66
Turtle Lake extension, North Dakota	143,891.68
Glendive-Helena cut-off, Montana	21,399.87
Butte Root Branch extension, Montana	22,883.98
DeSmet to Paradise, Montana (credit)	12,864.41
White Pine Hill, Mont., grade revision	38,076.38
Ritzville-Ellensburg cut-off, Washington, right of way	72,204.60
Sunnyside Branch extension, Washington	65,209.05

\$141,343.92

Green River Branch extension, Washington..	\$10,832.12		
Gray's Harbor & Columbia River Railway....	\$84,091.84		
Surveys and right of way—North Dakota and Minnesota.....	32,840.43		
Argo to Black River, Washington, right of way and station.....	3,512.04		
Rights of way at Seattle, Wash., for change of line and new tracks.....	12,635.35		
Superior to Central Ave., Wis., second main track.....	99,907.11		
St. Cloud to Rice's, Minn., second main track.....	433.54		
Philbrook to Staples, Minn., second main track.....	76,215.93		
Wadena to Lake Park, Minn., second main track.....	21,529.76		
Lake Park to Glynndon, Minn., second main track (credit).....	96.00		
Wheatland to Buffalo, N. D., second main track.....	21,959.50		
Alta to Berea, N. D., second main track.....	45,213.57		
Bloom to Jamestown, N. D., second main track.....	1,055.52		
Huntley to Billings, Mont., second main track.....	14,135.88		
Billings to Laurel, Mont., second main track.....	141,377.73		
Livingston to Muir, Mont., second main track (credit).....	165,954.29		
West End Junction to Muir, Mont., second main track.....	42,261.16		
Bozeman to Logan, Mont., second main track.....	6,330.48		
Garrison to Missoula, Mont., second main track.....	76,498.18		
Missoula to DeSmet, Mont., second main track.....	289,053.18		
M. P. 73 to Yardley (Spokane), Wash., second main track.....	7,958.38		
Atbun to Meeker, Wash., second main track.....	453.10		
Tenino to Kalama, Wash., grade revision and double track.....	1,746.85		
Kalama to Vancouver, Wash., second main track.....	2,075,359.39		
North Portland to Portland city limits, Oregon, second main track.....	271,550.25		
	49,745.13		
Additions and betterments:			
Right of way and station grounds.....	\$104,056.85		
Water and cuts and fills.....	35,360.59		
Protection of banks.....	45,091.47		
Grade revisions and change of line.....	51,185.81		
Tunnel improvements.....	240.45		
Bridges, trestles and culverts.....	195,244.72		
Increased weight of rail.....	791,386.92		
Improved frogs and switches.....	27,076.22		
Track fastenings and other material.....	214,611.55		
Railroad.....	196,546.67		
Additional main tracks.....	37,352.04		
Sidings and spur tracks.....	292,413.25		
Terminal yards.....	162,619.26		
Fencing right of way.....	33,292.13		
Improvements of over and under grade crossings.....	6,460.00		
Track elevation, elimination of grade crossings, etc.....	54,754.29		
Interlocking apparatus.....	36,619.62		
Block and other signal apparatus.....	121,516.41		
Telegraph and telephone lines.....	62,599.30		
Station buildings and fixtures.....	513,220.36		
Shops, engine houses and turntables.....	171,932.15		
Shop machinery and tools.....	5,634.91		
Water and fuel stations.....	166,832.90		
Dock and wharf property.....	213,338.03		
Snow and sand fences and snow sheds.....	4,978.78		
Miscellaneous structures.....	50,946.46		
			4,702,717.46
New equipment.			
Locomotives.....	Total expenditure, \$2,349,416.86	Less used from reserves, \$80,189.09	Charged capital, \$2,269,227.77
Passenger train.....	1,284,959.57	93,218.92	1,191,740.65
Freight train cars and stock cars.....	3,381,254.44	964,974.18	2,416,280.26
	\$7,007,160.87	\$1,138,282.19	\$5,868,878.68
Total for the year.....			\$14,807,262.10

In addition to the above amount added to the cost of the capital stock, advances have been made to subsidiary companies as follows:			
Spokane, Portland & Seattle Railway Co.....	\$930,000.00		
Clearwater Short Line Railway Co.....	454,114.52		
Minnesota River Railway Co.....	3,052,058.09		
Western Dakota Railway Co.....	1,650,254.80		
Shields River Valley Railway Co.....	304,240.75		
Cummins Southern Railway Co.....	1,477,395.16		
Chicago & Puget Sound Railway Co.....	43,181.37		
Klamath Falls Northern Railway Co.....	12,842.03		
Hear Creek & Western Railway Co.....	18,483.20		
Missouri River Railway Co.....	1,142,500.00		
*The Elgin & International Mill Railway Co. (credit).....	5,000.000.00		
Advances for railway development in Oregon.....			
Total.....			\$11,349,337.68

*A note having been given for this item, it has been transferred to "Other Investments," in accordance with rules of Interstate Commerce Commission.

CAPITAL STOCK AND DEBT.

There has been no change in the amount of capital stock outstanding during the year.....	\$248,000,000.00
The only change in bonded debt during the year was the redemption of \$1,000,000 of bonds previously issued and matured.....	
The total indebtedness, as provided by Article 8, Section 2, of the constitution, amounting to.....	\$485,000.00

CAMAS PRAIRIE RAILWAY COMPANY.

The company, an operating company, was organized to maintain and operate the railroad owned jointly by the Northern Pacific and

partly by the Union Pacific Railroad Company between Grangeville, Idaho, on the fertile plateau back of Lewiston, and Riparia (Lewiston Junction), Wash., via Lewiston, 148.8 miles. At Lewiston Junction connection is made with the Portland line of the Oregon Railway & Navigation Company and with the Snake River line of the Northern Pacific to Snake River Junction and the Spokane, Portland & Seattle Railway to Pasco, thus forming a line of communication between the Camas Prairie, Lewiston, the Clearwater Valley, the Yakima Valley, Puget Sound and Portland.

The new company has operated the roads since December 1, 1909. The earnings on through business are retained by the owning company handling the same; the earnings on local business are applied to the maintenance and operation of the joint lines.

SPOKANE, PORTLAND & SEATTLE RAILWAY COMPANY.

The total miles operated by this company for the year ending June 30 were:			
Spokane, Portland & Seattle Railway:	Owned.	Leased.	Total.
Spokane, Wash., to Portland, Ore.....	371.95	16.85	388.80
Lyle to Goldendale, Wash.....	42.25	....	42.25
Total.....	414.20	16.85	431.05
Astoria & Columbia River R. R.:			
Portland to Astoria, Ore.....	60.30	35.15	95.45
Astoria to Seaside, Ore.....	22.80	....	22.80
Total.....	83.10	35.15	118.25

Grand total..... 497.30 52.00 549.30

The results of the operation of the Spokane, Portland & Seattle and Astoria & Columbia River roads for the year ending June 30, 1910, were:

	Spokane, Portland & Seattle Railway.	Astoria & Columbia River Railroad.	Total both companies.
Operating revenue.....	\$3,566,291.45	\$767,987.39	\$4,334,278.84
Operating expenses.....	2,386,962.08	468,361.77	2,855,323.85
Net operating revenue.....	\$1,179,329.37	\$299,625.62	\$1,478,954.99
Outside operations.....	\$3,970.80	12,541.01	8,570.71
Total net revenue.....	\$1,175,359.07	\$312,166.63	\$1,487,525.70
Less taxes.....	294,675.04	32,955.83	327,630.87
Operating income.....	\$880,684.03	\$279,210.80	\$1,159,894.83
Other income (rents, etc.) rec'd.....	381,523.18	1,767.82	383,291.00
Gross income.....	\$1,262,207.21	\$280,978.62	\$1,543,185.83
Rents, hire of equipment, etc.....	\$329,793.98	58,878.75	388,672.73
Balance.....	\$932,413.23	\$222,099.87	\$1,154,513.10

*Deficit.

Business of the Northern Pacific Railway between Spokane and points east thereof and the Gray's Harbor territory in the State of Washington and points south therefrom, including Portland, and business handled via Portland, is now commonly routed via the Spokane, Portland & Seattle Railway.

The gross earnings of that railway on business exchanged with the Northern Pacific in the year covered by this report approximated \$1,900,000.00.

During the year attention has been given to the development of business in Oregon. The Oregon Trunk Railway Company is now building a line of road from a point near Clarke, Washington, on the Spokane, Portland & Seattle Railway, southwardly across the Columbia River and up the Des Chutes Valley to Bend, Oregon, a distance of 156 miles. This road will furnish communication between the great central plateau of Oregon and the outside world.

The capital stock of the Oregon Railway Company, which owns valuable rights and terminals in Portland, and completed lines south and west of Portland to Salem, Hillsboro and Cornelius, and of the United Railway Company, which has valuable terminals and rights in and about Portland, and a line partly completed into the counties of Columbia, Clatsop and Tillamook, have been acquired.

These three enterprises, in connection with the Spokane, Portland & Seattle Railway, will enable your company to participate in the business of Central Oregon and south and west of Portland.

The construction and management of the properties are being handled by the Spokane, Portland & Seattle Railway Company, and your company, up to June 30, had advanced as its share of the investment \$5,000,000.00, shown in the statement of Construction Expenditures as "Advances For Railway Development in Oregon."

NEW LINES, DOUBLE TRACK, GRADE REVISIONS AND LINE CHANGES.

MINNESOTA.

Lake Park to Glynndon, Second Main Track, 26.83 miles.

This work has been completed, except for a sink hole near Stockwood. Until the embankment completely settles it is not expected to do any more work on this part of the grade. Double-track is now in operation for the whole distance; one mile at Stockwood is not on final grade.

Saint Cloud to Rice's, Second Main Track, Line and Grade Change, 14.79 miles.

Grading on this work will be finished by autumn, and a part of the track will be laid, the balance of the work being postponed until 1911.

Phillips to St. Nicks, Second Main Track with Slight Grade Revisions, 0.8 miles.

This work will be fully completed and ready for operation November 1st except for one bridge, which will remain as single track until 1911.

NORTH DAKOTA.

Bloom to Jamestown, Second Main Track, 4.99 miles.

Grading for this track is completed, and some of the rail laid, but the work will not be reached until 1911.

(When these three pieces of work are finished the Company will have double track between Saint Paul and Jamestown equal to 288.65 miles out of a total of 346.8 miles.)

Farley to Bismarck, 99.5 miles.

The grading for this piece of road is making good progress, and will be completed this autumn. No track or bridge material will be put in place during 1910.

Missouri River Railway (Mandan North Line), 53 miles.

Grading is completed, except for some small slides and some deep cuts where no track is laid. 28 miles of main track have been laid from Mandan south to Saenger. Completion of this line has been postponed until 1911.

Missouri River Railway (Mandan South Line), 72 miles.

Grading on this line is practically completed and track has been laid from Mandan south to main post 42. No track will be laid beyond that point in the present year.

\$79,084,606.54

NORTHERN PACIFIC RAILWAY COMPANY.
GENERAL BALANCE SHEET, JUNE 30, 1910.

ROAD AND EQUIPMENT (Northern Pacific Estate):

Cost to June 30, 1907—Road, lands, etc.	\$318,388,493.45
Equipment	37,296,670.07
	\$355,685,163.52
Cost since June 30, 1907—	
Road	\$35,078,145.73
Equipment	10,175,447.75
Land Department current assets	3,909,073.56
	49,162,667.04

Less reserve for accrued depreciation.....	\$404,846,830.56
	7,798,145.70
	\$397,048,684.86

SECURITIES:

Securities of proprietary, affiliated and controlled companies—pledged, viz.:	
This company's one-half of \$107,613,500 stock of Chicago, Burlington & Quincy Railroad Company pledged to secure payment of \$215,227,000 joint bonds made and issued by this Company and the Great Northern Railway Company to pay for said stock, costing	\$109,114,809.76
Other pledged securities....	1,256,160.74
	\$110,370,970.50
Securities of proprietary, affiliated and controlled companies—unpledged.....	2,905,330.94
	113,276,301.44

OTHER INVESTMENTS:

Advances to proprietary, affiliated and controlled companies for construction, equipment and betterments.....	\$52,127,788.32
Miscellaneous investments, securities—unpledged	4,296,991.52
	\$56,424,779.84

Total Capital Assets	\$566,749,766.14
----------------------------	------------------

WORKING ASSETS:

Cash	\$8,397,347.72
Securities issued or assumed—held in treasury	20,041,000.00
Marketable securities (other than those issued or assumed)	19,039,968.04
Loans and bills receivable	31,357.56
Traffic and car service balances due from other companies.....	1,178,421.82
Net balances due from agents and conductors	806,585.06
Miscellaneous accounts receivable	6,058,734.97
Material and supplies	9,077,900.68
	64,631,315.85

ACCRUED INCOME NOT DUE:

Unmatured interest, dividends and rents receivable	1,399,339.30
--	--------------

DEFERRED DEBT ITEMS:

Advances	\$86,121.83
Special deposits (with trustees of mortgages)	2,594,906.78
Cash and securities in Sinking and Redemption Funds	195,021.70
Cash and securities in Insurance Fund.....	5,395,891.52
	8,272,841.83
	\$641,053,263.12

CAPITAL STOCK: Common	\$248,000,000.00
MORTGAGE, BONDED AND SECURED DEBT:	
Mortgage bonds	\$190,952,500.00
Collateral Trust bonds (Northern Pacific Great Northern joint) total issue	\$215,227,000.00
Less Great Northern Railway Company's proportion	107,613,500.00
	107,613,500.00
	298,566,000.00

Total Capital Liabilities	\$546,566,000.00
---------------------------------	------------------

WORKING LIABILITIES:

Traffic and car service balances due to other companies	\$784,079.28
Audited vouchers and wages unpaid.....	8,501,797.47
Miscellaneous accounts payable	19,974.82
Matured interest, dividends and rents unpaid	1,108,574.00
Other working liabilities	665,205.41
	11,079,630.98

ACCRUED LIABILITIES NOT DUE:

Unmatured interest, dividends and rents payable	\$4,833,008.44
Taxes accrued (partly estimated).....	1,765,988.45
	6,619,596.89

DEFERRED CREDIT ITEMS:

Other deferred credit items	141,880.97
-----------------------------------	------------

APPROPRIATED SURPLUS:

Invested in other reserve funds (Insurance Fund)	\$5,395,891.52
Not specifically invested	63,552.23
	5,479,443.75

PROFIT AND LOSS.

	\$71,166,419.53
	\$641,053,263.12

NOTE.—This Balance Sheet has been made in accordance with the Form prescribed by the Interstate Commerce Commission as of June 15, 1910. It varies considerably in the grouping and arrangement of accounts from the General Balance Sheets heretofore published by this company.

PROFIT AND LOSS ACCOUNT. JUNE 30, 1910.

To	By
Balance of discount on prepayment of subscriptions to new capital stock	Balance to credit June 30, 1909, as per annual report....
Balance	Balance of Income for year ending June 30, 1910, brought down
	Balance of sundry reserve accounts.....
	Balance of sundry accounts written off.....
	For difference between par value and book value of securities issued or assumed by this company and held in treasury
	Balance to credit of Profit and Loss as per balance sheet..

MORTGAGE DEBT, JUNE 30, 1910.

(Exclusive of the Northern Pacific Great Northern Joint Bonds Outstanding)

Name	Amount outstanding	Term	Maturity	Rate	Interest payable	Amount charged monthly for
Northern Pacific Ry. Co. prior lien mortgage	\$107,321,000.00	1899	1997	4%	Jan., April, July, Oct.	\$4,000,000.00
Northern Pacific Ry. Co. general lien mortgage	60,000,000.00	1899	2047	3%	Feb., May, Aug., Nov.	1,369,717.30
Northern Pacific Ry. Co., St. Paul-Duluth Division mortgage	8,080,000.00	1900	1996	4%	June, Dec.	\$19,166.67
St. Paul & Northern Pacific Ry. mortgage	8,000,000.00	1880	1993	6%	Feb., Aug.	\$81,200.00
St. Paul & Northern Pacific Ry. first mortgage	1,000,000.00	1881	1981	6%	Feb., Aug.	30,000.00
St. Paul & Northern Pacific Ry. second mortgage	2,000,000.00	1887	1917	5%	April, Oct.	100,000.00
St. Paul & Northern Pacific Ry. first collateral mortgage	1,000,000.00	1898	1968	4%	June, Dec.	10,000.00
St. Paul & Northern Pacific Ry. Duluth & Lake Superior mortgage	210,000.00	1893	1914	6%	Jan., July	1,500.00
St. Paul & Northern Pacific Ry. Duluth & Lake Superior mortgage	300,000.00	1896	1916	5%	March, Sept.	2,500.00
Washington & Columbia River Ry. first mortgage	1,000,000.00	1896	1946	4%	Jan., July	5,000.00
Total	\$199,931,000.00					\$6,669,014.17

* Amount of bonds to treasury not included above, viz: Prior Lien bonds, \$6,110,000.00; General Lien bonds, \$7,760,000.00; Washington & Columbia River Railway bonds, \$2,480,000.00.
† Registered interest payable quarterly.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY FRIDAY TIMES IN JUNE, BY
THE RAILROAD GAZETTE (1883), 38 EDITION ST., NEW YORK.

CHICAGO: PUBLISHED BY THE
LONDON: GREEN AGENT'S CHAMBERS, WESTMINSTER.

W. H. BOARDMAN, President.
E. A. SIMMONS, Treasurer.
HENRY LEE, Secretary.
The address of the company is the address of the editors.

EDITORS.

W. H. BOARDMAN, Editor.
SAMUEL O. DUNN,
Business Editor.
HAROLD BOARDMAN,
London Editor.
R. V. WELCH,
C. L. FARRAR,
WILLIAM FORESYTH,
S. W. DUNNING,
CLARENCE DEMING,
H. B. ADAMS,
W. E. HOOPER,
E. E. LISTER,
F. W. KRAEGER,
H. H. SIMMONS.

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free.

United States and Mexico \$5.00 a year.
Canada \$6.00 a year.
Foreign Edition (London) £1 12s. (\$8.00) a year.
Single Copies 15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.
Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49 FRIDAY, NOVEMBER 4, 1910. NUMBER 19.

CONTENTS

EDITORIAL:

Editorial Notes	827
The "New Nationalism" and the Railways	828
The People as Railway Investors	828
St. Louis & San Francisco	829, 900
Union Pacific	831, 906
Chicago & Eastern Illinois	833, 908

LETTERS TO THE EDITOR	834
-----------------------	-----

ILLUSTRATED:

The Leaking Railways of the Pacific Northwest	836
---	-----

MISCELLANEOUS:

Society of Railway Financial Officers	835
Foreign Railway Notes	836, 838
Safety Appliance Standards	838

SHOP SECTION.

EDITORIALS:

Editorial Notes	839
The Car Department and the Steel Car	840
English Engine House Practice	841
Mechanical Articles During October	842

LETTERS TO THE EDITOR:	842
------------------------	-----

ILLUSTRATED:

Hot Water Bottles for Heating Passenger Cars	843
CARE AND SELECTION OF SHOP EQUIPMENT:	
Can the Efficiency of Shop Tools be Increased?	844
The Tool Question	845
Care and Maintenance of Leather Belting	847
The Care of Shop Tools	847
Smith Shop Tools and Practices	848
Manufacture, Maintenance and Distribution of Small Tools	849
Care and Maintenance of Machine Tools and Shop Equipment	851
Prevention of Pitting in Locomotive Boilers	854
Shop Kinks from the Morris Park Shops of the Long Island	855
Shop Office of the Rock Island at Silvis	856
Converted Mallet Locomotive for the Chicago Great Western	867
Welding Frames at the Wabash Shops	869
Air-Electric Hoist at the Sayre Shops	870
New Boiler Shop of the Pennsylvania at Renovo, Pa.	871
Tool Regulations	873

MISCELLANEOUS:

Apprentice Notes	842
New Uruguayan Railway Concession	872

GENERAL NEWS SECTION	875
----------------------	-----

SUPPLY TRADE SECTION	888
----------------------	-----

WE publish this week in the General News Section an index to the monthly earnings of all the roads reporting to the Interstate Commerce Commission whose figures are included in our weekly table of Revenues and Expenses of Railways. In connection with this index there are published the figures for various roads whose returns to the Interstate Commerce Commission came in too late to be included in the current months in which they belonged. The Interstate Commerce Commission requires all railways to report their revenues and expenses within a specified time after the close of each month. Some companies, how-

ever, make it impossible to get in their returns for monthly earnings on the time allowed there, and in some cases a company may not even return until after it has begun to publish the figures for the succeeding month. For other roads there has been no practice, even of having those figures at all. The supplementary table on page 127 of this page shows the monthly have made reports. With the publication of this index it becomes possible to trace the earnings and expenses of each month through the entire fiscal year. Some railways give figures for monthly earnings and expenses in their annual reports, but very few of them give as full details as are reported to the Interstate Commerce Commission. As far as we know, such a complete record of roads for each month has not before been published in any form.

THE Interstate Commerce Commission is under no great obligation to the western shippers for assistance rendered by them in getting before it facts on which it can base a decision as to whether advances in freight rates are justifiable. The testimony introduced by them at Chicago took little of the commission's time and was almost entirely worthless. The only witness they called who was able to withstand the fire of the railway lawyers on cross-examination was Governor W. R. Stubbs, of Kansas, and he succeeded in preventing his testimony from being shot to pieces only because he absolutely refused to answer the railway lawyers' questions. He put in evidence some estimates as to for what he thinks he could rebuild the railways in Kansas. His estimate of the cost of reproducing the branch lines in Kansas was \$15,000 a mile, and of the main lines \$25,000 a mile. It was promptly shown that his figures included no allowances for cars and locomotives, right-of-way or terminals, and that the railways within very recent years have actually paid a great deal more for construction work under conditions similar to those existing in Kansas than his estimates. The attorneys for the railways made two of the important witnesses for the shippers admit that they had themselves a short time ago advocated advances in freight rates. One of the witnesses sought to show that the valuation placed by General Manager Ward of the Burlington on the terminals of his road in Omaha was excessive, but on cross-examination the fact was brought out that in making his estimate he had overlooked some 113 acres of terminals. Several of the witnesses for the shippers testified that the railways formerly gave large rebates, and expressed the opinion that now that they did not give the rebates they should be able to live on the present rates. When counsel for the railways tried to get them to tell who had received the rebates and how much they amounted to, they were able to get only one specific instance where rebates had been given. The shippers thundered in the index a great deal before the hearing began about how they were going to prove that the railways were over-capitalized and were making excessive profits, but utterly failed to make any headway in establishing these things.

ONE of the pet statements repeated frequently by Governor Stubbs in his testimony was that the railways should be subjected to the same kind of regulation as national banks. As the governor was the star witness for the shippers, it is interesting to compare the financial results of the railways and the national banks. The net earnings of the railways in 1909 on their average capitalization per mile of \$59,259 were 5.7 per cent. The net earnings of the national banks in the same year on their capitalization averaged 14.3 per cent. Shippers often complain about the large surpluses that some railways have accumulated. The total capitalization of 6,788 national banks in 1909 was \$919,143,825, and their aggregate surplus was \$585,407,483, or 62 per cent. of their capitalization. The net earnings of the national banks in 1909 were 8.72 per cent. of their combined capitalization and surplus, and no longer ago than 1907 their net earnings on their combined capitalization and surplus combined were 11.21 per cent. Their dividends in 1909 amounted to 10.12 per cent. of their capital and to 6.18 per cent. of the capital and

surplus combined. We fancy that if the shippers want, as Governor Stubbs says they do, the same rule applied to railways and national banks, they will have no great difficulty in persuading the railways to come around to their view. Of course, what the critics of the railways will answer is that the railways are over-capitalized. But even if it should be conceded, for the sake of argument, that half of the railways' capitalization is water, still, on that basis, their net earnings in 1909 would have been but 11.4 per cent., or 3 per cent. less than those of the national banks. If the shippers make no better showing with the testimony they introduce in the eastern rate cases than they have in the western cases, the commission, if it shall find the proposed advances unreasonable, will have to base its findings on other grounds than any that the shippers have furnished.

THE "NEW NATIONALISM" AND THE RAILWAYS.

THE term "new nationalism," as invented and constantly repeated by its vociferous expounder, looks like a phrase that, at least for a time, will hold its prominence. It has that catching and alliterative quality that makes it easy on the tongue, and it has somewhat more definiteness than the adjective "progressive" shifted into a noun of multitude to describe a large section of a great and historic political party. It has, to be sure, its lighter or darker shade of meaning more or less based on geographical lines. It is more intense and far-reaching in the relatively radical West than in the conservative East. It means more, or is intended to mean more, in that fertile sprouting ground of "isms"—Kansas—than in New York state or New England, which are less adapted by tradition, habitude, temperament and material interests to the same crop. But the underlying idea runs through it in all states—extension of federal authority, with consequential restriction of state authority and jurisdiction. It has many forms of theory and of application, noteworthy among which, and, in fact, a focal point of some concentration, is the railway. In a sense there is a certain degree of logic in such concentration. For, with the merger of small lines into great systems, those systems have become more and more interstate instead of intrastate institutions, and thus come under the technical as well as actual purview of federal influence.

But a counter fact has not received its full share of attention. While the scope of interstate and federal authority and functions has been growing, an intrastate authority has also been expanding. Two years have hardly passed since there was what would be called commercially a "boom" in state railway and public utility commissions. It still continues, though with somewhat diminished activity; and it has been an extension not merely of powers, but of the material on which the powers have been exercised. The old function of the state commissions related to steam railways alone. It reached next to the street railway, then to a long series of public service corporations and interests, and now is including rapidly the telegraph, telephone, express, power, water and kindred corporations—almost everything that can be interpreted as having a public relation. Side by side these two large processes of blended economic and civic evolution are going on. "New stateism," if that noun may be coined offhand, is in a kind of race with the new nationalism, both of them with the railway as one objective. They are drawing nearer and nearer to a sharp meeting point; indeed have met already at such a point, for example, in demurrage. When they meet along a wider front and with, perhaps, greater pace and impetus than now, will they harmonize, will they clash, or will there be a return to one rule or the other?

The railway corporations, now under the hammer of both state and federal legislation, have a vital interest in the answer to this question. It involves something like a return to the old order of a progression to a new one, the ultimate of which may even be a radical reorganization. On the one side, there is the trend of economic evolution in a new tradition, undisturbed by the old order, constitutionally or merely constructively, and which behind some of its outward decision and what is perhaps of more

ultimate importance, set firm in the convictions of the conservative citizen who owns property, especially railway property—less firmly but still decidedly potential in the purely commercial group. On the other side is the claim of the impotency of the states to deal with interests alleged to have far outgrown them; the difficulty of securing concordant state action; the difference between the simplicities of a nation of a few millions of people and the complexities of a nation nearing a hundred millions; and finally, but not last in its meanings, the transfer of voting strength from a conservative class to an electorate much less so, in which old principles and traditions count for little, and immediate interests—often narrow and selfish—for much. State versus Nation is possibly too strong a phrase to describe such lines of division in a friction probably not far away. But at present the situation has that look, with the railway as one of the issues.

But, very fortunately for the railway, it finds in the new nationalism elements that ameliorate its perils. The railway, its regulation, revaluation, rates and the broader question of the extent of federal power may supply one issue, but they do not supply the only one. When the great and erstwhile victorious Whig party broke up, between 1848 and 1856, it could recrystallize in the latter year and win victory four years later on one great moral issue—slavery. The new nationalism and its opposition, already taking coherency and form, have, by contrast, many issues—including pre-eminently the tariff—that divide and divert the political giants and relax their impact on the railway. The issues, moreover, are most of them economic rather than moral or sentimental, and for that reason less provocative of electoral passion and unreason. The country, as a whole or even in any considerable part of it, cannot, if the railways practice due moderation, be brought up to any pitch of frenzy over an economic "issue" of freights and fares. And, even in the unlikely event of the new nationalism becoming dominant, is it not more likely to apply such lauded legislation as the Sherman Anti-Trust act to the trusts themselves rather than to the railways against which that federal statute thus far has been unduly, if not illegally, levelled?

THE PEOPLE AS RAILWAY INVESTORS.

IT is cheering to discover that at last the real public investment in the railways is beginning to draw more attention. Heretofore, in the popular view, capitalization, plant, directorates, the railway as an entity and body corporate have masked the army of direct stockholders who fundamentally are the railway corporation. But behind that body is another far greater multitude of stockholders, secondary and indirect, the stockholders once removed. The vast majority of them—more's the pity—do not realize that they are railway investors even in a remote sense. Yet through the medium of other corporations a large part of whose assets are in railway securities these secondary investors acquire a positive railway interest. Indeed, it is doubtful whether their average interest does not exceed that of a direct stockholder—or bondholder. One man holds a railway bond of \$500. Another man has his hard-earned dollars in the form of a deposit of \$1,500 in a savings bank, one-third of the assets of which is in railway bonds. Where is the real difference between the two?

There are two kinds of corporations which are the chief mediums of this secondary investment of the people in the railways: insurance companies and savings banks. Assessment and fraternal companies being excepted, the people who take out life and fire insurance—referring now to the so-called working classes—undoubtedly represent a class somewhat better off than the group of savings banks depositors. But they are practically identical in kind. It is unfortunate that the insurance returns do not annunciate the corporate investment in railways so as to give a measure of the railway interest of the policyholders. Still, from the latest returns available, one may direct attention to the \$3,380,294,000 of assets of the mutual life insurance corporations with their 25,827,406 policyholders; to the \$192,606,460

assets and 8,687,111 membership of the assurance companies, to the \$611,856,761 of assets of the mutual and stock fire companies, besides the large assets of the accident, injury and other corporations in the marine insurance group. Estimating all the assets of the insurance companies at \$1,500,000,000, the inquiry is to what proportion of them are railway securities become. At all, but a rough approximation may be reached. Under date of Jan. 12, 1909, the Insurance Department of New York State gives a list of all securities held by life, fire and casualty companies doing business in New York State and Massachusetts. The total of securities are some 13,000 in number, counting the different sets issued by the same corporations, including the municipalities. Of these the railway securities form about one-fifth. Applying that ratio to all the insurance companies, a total railway investment of about \$600,000,000 is indicated. This is undoubtedly too low. It is very much too low for the great vested insurance interests, for example, of Connecticut; moreover, the general returns for the company are incomplete. But the minimum figure is big enough to suggest the absolute vastness of the policyholder's indirect railway interest.

Coming to the savings banks, the returns are more definite, though not so recent as we could wish. The figures of the United States treasurer for 1909 give total resources of the mutual savings banks of the country as \$3,394,926,005, with \$13,125,893 invested in railway bonds alone, and with 7,204,579 depositors. About 22 per cent. of the resources were thus in railway bonds. The returns of the comptroller of the currency for the previous year for savings banks of all kinds give the smaller percentage of somewhat more than 16 per cent. in railway holdings, and 8,088,866 depositors. In the case of depositors in all savings banks returns it must, of course, be remembered that each deposit in a separate bank counts as a "depositor," which thus, in the case of multiple deposits by a single depositor, increases the total number. In the comparative returns of the comptroller of the currency may be noted the increase of savings banks investments in the railways from \$291,978,055 to \$618,193,415 in five years. Railway investments considerably more than doubled, while the resources of the savings banks increased only about one-fifth.

The total of railway investments held as security for savings bank depositors and insurance policyholders thus by one rough, (but, in such large figures, approximately correct) computation amounts in round numbers to \$1,643,000,000. Beyond lie the great investments in railways by the trust companies and by institutions of education and charity. About half, for example, of Yale University's total investment of some \$13,000,000 is in railway securities. Beyond still are the large holdings of individual investors. But, excluding these, the indirect railway investments of the people in the various intermediary holding corporations probably amount up to \$2,000,000,000 as a minimum, or, say, 15 per cent. of all steam railway stock and bonds outstanding and about 36 per cent. of the outstanding railway bonds alone.

The time has come when this huge public investment in the railway companies should stand out not only before the people, as a nation, but before the eye of the "indirect" railway investor as an individual. Hitherto the workingman has really not seen it at all. He has recognized often enough the character of the railway as a medium of labor; almost never its secondary relation to him as a small capitalist. At the very moment when he may be listening sympathetically to the utterance on the stump of some anti-railway shouter he may be a policyholder or a savings bank depositor, or both, yet utterly oblivious of his own personality as a man with a genuine railway interest—just as he is ignorant of the impact on him of certain indirect taxes. Not a great many years have passed since, in the free silver political campaign of 1896, the reasoning based on the effect on the savings banks investments of a diluted standard of the currency was an argument as effective as it was oft repeated. With jeopardy of the railway investment substituted for jeopardy of the currency the argument can fitly be repeated now.

ST. LOUIS & SAN FRANCISCO.

EVERYONE before the St. Louis & San Francisco separated from the Chicago, Rock Island & Pacific, the two roads were operated in separate departments, independently of each other, and "for the good of the service" there was a considerable rivalry between the officers and employees of the two properties as to which could make the best showing. The 'Frisco and the Rock Island are not similar enough in their geographical position, or in the nature of their traffic, to make a comparison between the two roads accurate or close, but certain statistics of each road make an interesting comparison with the other, and this is especially so this year because in December, 1909, the controlling interest in the stock of the St. Louis & San Francisco, which had been held by the Rock Island, was sold to B. F. Yoakum and associates, and joint officers were discontinued in the executive, legal, financial and operating departments. For seven months of the last fiscal year the two properties were run entirely independent. Of course, the annual report of the 'Frisco, just out, covers not only the seven months that the 'Frisco was operated independently of the Rock Island, but also the five months of joint operation.

The 'Frisco serves Kansas, Missouri, Arkansas, Tennessee and Oklahoma, and taps Texas. It will be seen, therefore, that there is no part of the 'Frisco that corresponds to the Rock Island lines running between Chicago and Colorado Springs and north thereof. The 'Frisco operates 5,071 miles, while the Rock Island operates 8,044 miles. On neither road was any considerable mileage added in 1910; in fact, the 'Frisco showed a slightly less mileage operated, due to remeasurement. Gross operating revenues amounted to \$41,200,000 for the 'Frisco in 1910, an increase of \$3,400,000, or 9 per cent., comparing with an increase of 8 per cent. in total operating revenues on the Rock Island. Per mile of road the 'Frisco earned \$8,117 in 1910 and the Rock Island earned \$8,233.

Operating expenses of the 'Frisco last year amounted to \$28,700,000, an increase of \$3,900,000 over 1909. This is an increase of 15 per cent., comparing with an increase of 13 per cent. in operating expenses on the Rock Island. Per mile of line, the operating expenses of the 'Frisco last year averaged \$5,654; on the Rock Island, \$5,976. In a normal year, the 'Frisco has a considerable advantage in having on its own lines large coal fields from which it is able to get its own fuel, while the Rock Island ordinarily has to haul its fuel for considerable distances, although it has some coal in the neighborhood of Choctaw, Okla. Last year, however, owing to the strike in the coal mines in Missouri, Kansas, Arkansas and Oklahoma, the 'Frisco was compelled to haul its coal from Indiana, Kentucky and Alabama, so that its fuel costs were more nearly comparable to those of the Rock Island than they were in previous years.

As far as division of revenue is concerned, the Rock Island and the 'Frisco are much alike. Sixty-seven per cent. of gross revenue came from freight on the 'Frisco last year, comparing with 64 per cent. from freight on the Rock Island. Freight density is also much the same on both roads. In 1910 the average ton mileage per mile of road on the 'Frisco amounted to 557,886, and on the Rock Island to 567,792. The 'Frisco showed an increase of 61,314 ton miles per mile, and the Rock Island 49,398. The average revenue per ton per mile on the 'Frisco last year was 9.8 mills, a decrease of .2 of a mill from 1909. The revenue per ton per mile on the Rock Island is somewhat lower, averaging last year 9.2 mills, which was somewhat less than it received in 1909.

As might be expected, the 'Frisco, not having any *long* through route comparable to the main line from Chicago to Colorado Springs on the Rock Island, gets a much shorter average haul of freight. This average haul in 1910 was 158.69 miles on the 'Frisco and 238.28 miles on the Rock Island. The Rock Island shows a slightly better average train load, amounting in 1910 to 257 tons, as compared with the 'Frisco's 223 tons; but on the other hand, the 'Frisco's train load in 1910 was two tons greater than in 1910, while the Rock Island's was seven tons less. The

Frisko's car loading is better than that of the Rock Island, the revenue freight per loaded car mile averaging 17 tons last year as against the Rock Island's 15 tons.

The explanation of the heavier car load is possibly to be found in the fact that a much greater proportion of the 'Frisko's traffic is products of mines and lumber than is the case with the Rock Island. The following table shows the percentage of the tonnage of each class of commodity to the total tonnage carried, and shows the percentage of increase of tonnage of each class over the previous year:

	—Frisko—		—Rock Island—	
	Percent- age of total.	Percentage of increase or decrease.	Percent- age of total.	Percentage of increase or decrease.
Products of agriculture.....	14.80	3.69	22.13	—1.03
Animal products.....	3.47	1.33	7.08	2.04
Products of mines.....	40.41	12.31	31.93	21.83
Products of forests.....	20.72	7.57	12.34	9.73
Manufactures.....	15.44	29.21	19.55	20.42
Miscellaneous and merchandise.	5.16	12.21	6.97	7.81

Returning to operating expenses, we find much the same general influences at work to increase the cost of operation on the 'Frisko as on the Rock Island; remembering, however, that the strike of coal miners affected the 'Frisko probably more closely than it did the Rock Island. The 'Frisko had an operating ratio last year of 69.66 per cent., comparing with 65.57 per cent. in 1909. The Rock Island's operating ratio in 1910 was 72.59 as against 69.48 in 1909. Transportation expenses on the 'Frisko totaled \$14,700,000, an increase over 1909 of 12 per cent., and consumed 35.70 per cent. of gross revenue. On the Rock Island transportation expenses were 10.27 per cent. higher than in 1909, and consumed 38.05 per cent. of total operating revenue. Since the ratio of freight revenue to total revenue is much the same on both roads, and since traffic density is also not widely different, a rough comparison of operating costs may be made by comparing the transportation expenses per ton mile on the two roads. Since it is impossible to separate freight and passenger expenses, the figure taken is total transportation expenses and is divided into the total ton mileage. This gives a transportation per ton mile expense of 5.2 mills on the 'Frisko and 5.5 mills on the Rock Island.

In 1910 there were large sums spent on maintenance, both of way and of equipment, on the 'Frisko, as will be seen from the table at the end of this article, showing a comparison between the operations of the 'Frisko in 1910 and 1909. The following table gives the unit costs of maintenance in 1910 and 1909 of both the 'Frisko and the Rock Island:

	—Frisko—		—Rock Island—	
	1910.	1909.	1910.	1909.
*Main line and structures per mile.....	\$1,140	\$979	\$1,374	\$1,146
Maintenance of locomotives.....	3,107	2,604	2,430	2,529
" passenger cars.....	765	612	820	801
" freight cars.....	92	51	80	68

*Per mile of main, first, second and third track.

†Includes repairs, renewals and depreciation, but no overhead charges.

One explanation why the 'Frisko's repairs per locomotive have increased so much in the past year may lie in the fact that its new shops at Springfield have very recently been put in operation; and when new shops are first put in operation there is a marked increase in the unit costs of repairs. Presumably also, of course, the 'Frisko kept its locomotives and rolling stock in better repair in 1910 than it did in 1909.

In his discussion of maintenance, President Winchell says of the 'Frisko: "Your company's property is receiving a substantial improvement in value by reason of the number of treated ties (creosote treatment) which are being put into the track. It is an increased expense, borne by maintenance charges. This work was begun late in 1907, and as of date June 30, 1910, more than 3,000,000 cross-ties had been used, at an additional cost for treatment and handling of more than \$1,000,000. The life of these treated ties is estimated at 15 years or more, or approximately two and one-half times the average life of the untreated ties, the benefit to the property in reduction of maintenance charges on this account will not be noticeable for several years."

To make a comparison of the funded capitalization of the 'Frisko and the Rock Island it is necessary to add to the bonds

of the Chicago, Rock Island & Pacific Railway Co. the funded debt of the Rock Island Co. Making this adjustment, we find that the St. Louis & San Francisco has funded debt and equipment notes and bonds outstanding at the rate of \$44,154 per mile of line owned, and the Rock Island has funded debt and equipment notes of \$41,736. The interest charges per mile of line on the 'Frisko are \$2,001; and on the Rock Island, \$1,824.

The balance sheet of the St. Louis & San Francisco indicates that the company will have to do some more financing as soon as conditions in the bond market warrant it.

On June 30, 1910, the company had \$29,990,000 current assets, which, however, includes cash on deposit to redeem \$6,000,000 bonds called for redemption. The cash in treasury and in hands of fiscal agents amounted to \$5,700,000, an increase over 1910 of \$600,000. Current liabilities totaled \$22,200,000, which includes the \$6,000,000 bonds called for redemption, but also includes \$6,000,-



St. Louis & San Francisco and Chicago & Eastern Illinois.

000 notes payable. This is an increase of \$4,300,000 in notes payable, and it seems obvious that in time these notes will have to be funded.

During the year the company sold, in all, \$37,267,871 bonds and retired \$14,689,000, leaving a net increase of \$22,578,871 in the funded debt. The 'Frisko is burdened with a large mileage of unprofitable branch lines, the financing of which has been a strain on the credit of the company; and the company now finds it costly to carry out additional financing for the improvement and betterment of its main line and branches, and for the retirement of maturing bonds and notes. In accordance with the Interstate Commerce Commission's prescribed practice, the 'Frisko charged to profit and loss in 1910 that year's proportion of the discount on securities sold, which amounted to \$489,000. In addition to this, there is carried on the asset side of the balance sheet \$9,500,000 discount on bonds carried in suspense, to be charged out in annual installments. This sum has increased since 1909 by \$1,200,000. In bookkeeping, of course, there is a distinction between carrying an account in suspense and charging the sum out to profit and loss, just as in book-

keeping this sum is shown on the asset side of the balance sheet; but, laying bookkeeping technicalities aside, this \$9,800,000 is a loss, or is part of the cost of new construction and additions and betterments, in so far as the proceeds of the bond sales were used for these purposes.

Speaking of theories, it is refreshing, after the long theoretical discussions of freight rate advances, to find some figures bearing directly on this subject given in an annual report which are based on mathematically demonstrable facts.

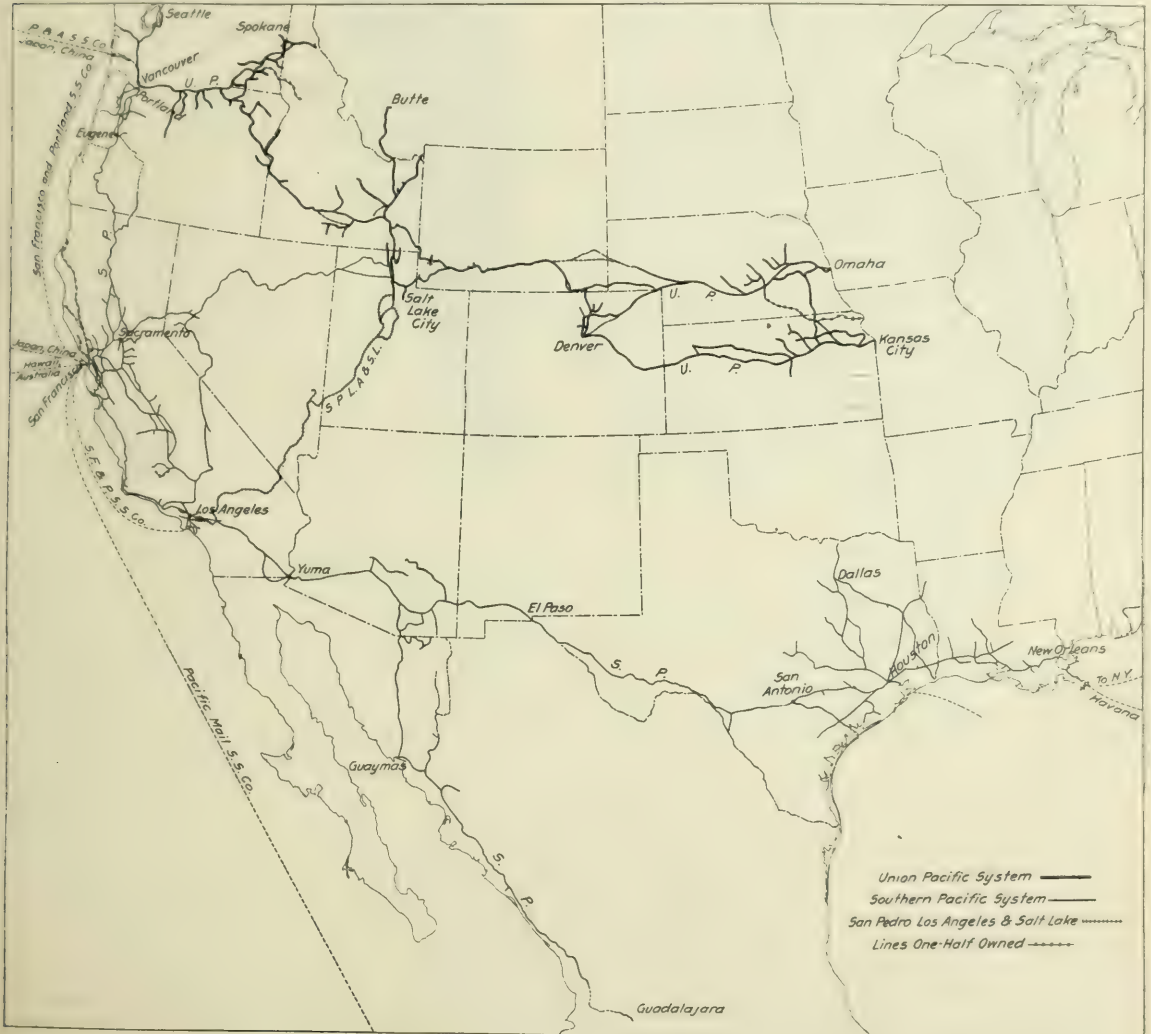
President Winchell says: "Much has been said of late respecting the obvious necessity of greater compensation for the railways per unit of service rendered. In this connection it has been frequently stated that, within the past few years, rates have already been raised and that the actual rate basis is now higher than in the recent past. Figures refute this so far as 'Frisco' is concerned. On our 1910 ton miles, if we had received the rates of 1907, our freight revenues would have been larger by \$933,729; at the rates of ten years ago, 1900, we would have had \$2,291,881 more freight earnings. Our passenger rate per mile in 1907 applied to our 1910 passenger miles would have yielded us a further increase of \$1,669,812. If the railways are to serve the public adequately, net revenues must be preserved or increased by means of better rates and not by poorer maintenance; the public cannot afford the latter method."

The following table shows the operations of the Union Pacific in 1910 compared with 1909:

	1910.	1909.
Average mileage operated	8,009	5,073
Freight revenue	\$27,643,863	\$25,262,516
Passenger revenue	10,648,949	9,693,849
Total operating revenue	38,292,812	34,956,365
Maintenance of way and structure	3,712,760	4,200,023
Maintenance of equipment	3,949,819	4,396,862
Traffic	1,146,831	872,292
Transportation	14,600,004	13,192,878
Total operating expense	13,409,414	12,700,091
Taxes	1,452,127	1,532,149
Operating income	23,431,271	20,724,125
Gross corporate income	13,811,846	13,919,772
Net corporate income	1,311,559	1,314,376
Dividends	199,742	199,742
Surplus	900,217	1,314,624

UNION PACIFIC.

IN times past the operations of the Union Pacific as a speculative investor have often held such a dramatic interest that they overshadowed the interest in the operation of the Union Pacific as a transportation plant, but this was by no means the case in the fiscal year ended June 30, 1910. The report for this year is the report of a railway company, and about the only interest that attaches to it as a report of a banking company lies in the negative information given that there has been almost no change in Union Pacific's holdings of investment stocks. The two busi-



Harriman Lines.

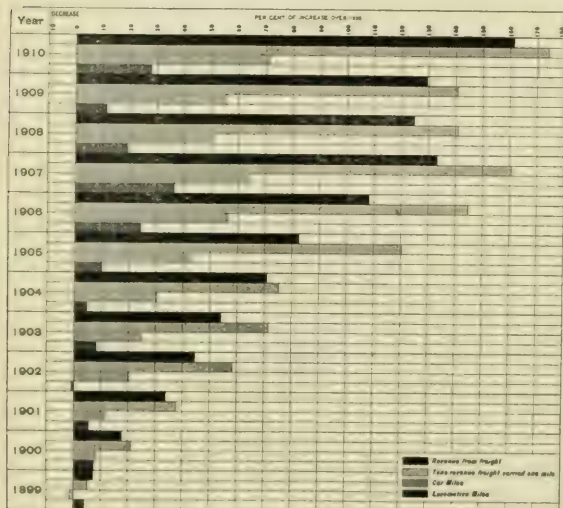
nesses, that of investor and that of railway company, are quite distinct in so far as direct earnings are concerned, and the management emphasizes this fact by declaring 6 per cent. dividends on Union Pacific common stock, payable from the earnings of the company as a transportation concern, and 4 per cent. additional, payable from the earnings of the company as an investor. But it is neither interesting nor correct to lose sight of what has been attained through the use of Union Pacific credit in building up a great system of railways and gaining a representation in the management of others. Both a study of the accompanying map, which shows the Southern Pacific as well as the Union Pacific, and even a casual reading of the testimony recently summed up in the Union Pacific and Southern Pacific merger case, show how fundamental is the connection between the operation of the transportation plant and its relation with other roads, gained through those Harriman and Union Pacific activities which might be termed "speculation."

Last year the Union Pacific earned a total surplus from both transportation and investment of \$19,800,000, as against \$17,900,000 in 1909.

In 1910 the Union Pacific carried a total of 15,300,000 tons of revenue freight and 8,300,000 passengers. On an average it

dise and miscellaneous, and 6.42 per cent. live stock and animal products. Every one knows how diversified is the Union Pacific's traffic, but comments on the company's report are incomplete if they fail to call attention to this so important fact in the operation of the road. There are ten general classes of commodities, each one of which furnishes more than half a million tons of traffic yearly to the Union Pacific. In 1910 manufactures furnished 2,100,000 tons of traffic. This is an increase over 1909 of 467,000 tons, or 28 per cent.

Passenger business increased over 1909 in even greater proportion than freight business. Last year the company handled 961,000,000 revenue passenger miles, more by 21 per cent. than was handled in 1909. The revenue per passenger per mile averaged 2.122 cents in 1910 and 2.169 cents in 1909, so that the total revenue from passenger trains was not as much greater in proportion to 1909 as was the passenger mileage. Last year the

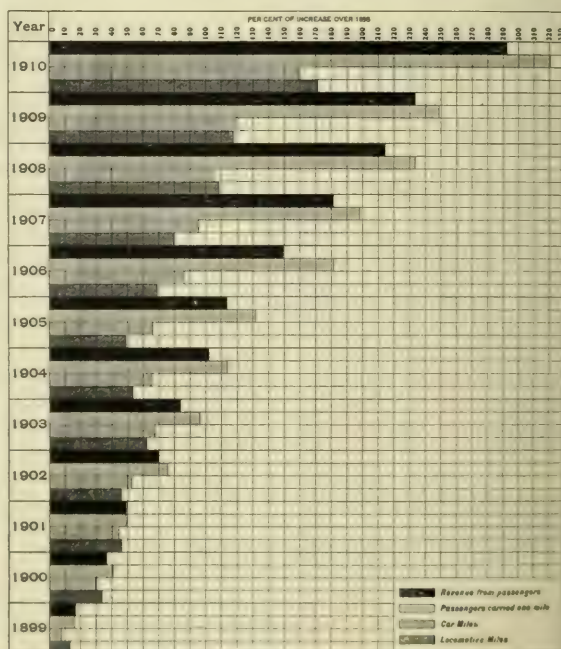


Freight Service and Traffic.

hailed each ton of freight 346 miles and each passenger 116 miles. This is an increase of 1,600,000 tons in total tonnage and 1,100,000 in the number of passengers. Stated in percentages, 1910 showed an increase of 11.56 per cent. in freight tonnage over 1909 and 15.52 per cent. in the number of passengers carried. The average haul of the Union Pacific for both freight and passengers is very long; for instance, the average haul of freight on the Great Northern, a transcontinental competitor, was 245 miles in 1910, and the average distance each passenger was carried was 78 miles.

The ton mileage of revenue freight totaled 5,997,000,000 in 1910, an increase of 13.87 per cent. over 1909, and the revenue per ton per mile was 1.924 cents, which is less by .001 of a cent than the average revenue in 1909. Total freight revenue amounted to \$61,500,000 last year, as against \$51,000,000 in 1909.

The principal changes in the character of commodities carried are decreases in the proportion of products of agriculture, products of animals and products of mines, and increases in the proportion of tonnage furnished by forest products, by manufactures and by merchandise. In 1910, 33.89 per cent. of the total tonnage carried by the Union Pacific was products of mines, 23.55 per cent. products of agriculture; 14.31 per cent. products of forests; 13.93 per cent. manufactures; 7.99 per cent. merchan-



Passenger Service and Traffic.

company earned from passenger trains \$25,300,000. This is \$3,300,000 more than was earned from the same source the year before, and the increase is about 15 per cent.

The freight and passenger traffic statistics, compared with car mileage figures, show, as has been pointed out before, that in general it is much easier to handle an increased freight tonnage with proportionately smaller car mileage increase than it is to handle increased passenger traffic. With ton mileage greater by 14 per cent. last year than the year before, the total freight car and caboose mileage totaled 441,000,000 miles, which is but 10.21 per cent. greater than the car mileage in 1909. On the other hand, with an increase of 21 per cent. in passenger mileage, passenger car miles totaled 95,300,000, or 18.33 per cent. more than in 1909. The average train load of freight in 1910 was 548 tons, which is almost exactly the same as in the year before. The percentage of loaded car mileage to total car mileage, however, was 76.30 per cent. last year, compared with 75.14 per cent. the year before.

With the greater train movement and with the increased cost of labor and also of fuel, operating expenses ran up considerably above what they were in 1909. Total operating expenses last year were \$46,900,000, which is greater by \$8,990,000 than the operating expenses in 1909. This is an increase of 23.70 per

cent, comparing with an increase in gross revenue of 14.37 per cent. Of the expenses of the rail lines, maintenance increased \$3,900,000, or 25.53 per cent., and operation \$1,800,000, or 21.37 per cent. In operation is included traffic expenses and general expenses as well as transportation expenses. The cost of maintenance of way and structures was \$9,900,000, an increase of \$2,200,000 over 1909. Judge Lovett says that the increases in these expenditures resulted principally from the expenses incident to maintaining 323 miles of additional main tracks and 78 miles of sidings, renewal of a much greater number of ties, the higher wage schedules and from charges under the rules of the Interstate Commerce Commission for property abandoned, formerly charged to profit and loss. He says that, although the charge for increase in weight of rails to additions and betterments instead of to operating expenses had been the previous practice of the Union Pacific and had resulted in a diminution of the charge for rails put in track, the cost of labor in making these renewals, which exceeded by 18.86 miles the rails put in track last year, is included in the expenses.

The following table shows the unit costs of maintenance:

	1910.	1909.
*Maintenance of way.....	\$1,185	\$1,185
†Repairs per locomotive.....	3.68	3.107
" per passenger train car.....	1.84	1.124
" per freight train car.....	.92	.93

*Per mile of all main tracks.

†Repairs only. Renewals and depreciation are excluded.

The Harriman lines spend very large sums on repairs of equipment and keep their equipment in correspondingly good condition. During 1910 there was a net increase of 46 locomotives in service, 114 passenger train cars and a decrease of 421 freight train cars in service. On June 30 there were 28.93 per cent. of the locomotives in service in thorough order; 41.71 per cent. in good order; 18.34 per cent. requiring repairs, and 11.02 per cent. in shop.

Besides the sums spent for maintenance and charged to operating expenses, the Union Pacific spent last year \$9,000,000 on additions and betterments to roadway and track; \$1,300,000 on additions and betterments to buildings, and a net sum of \$1,060,000 for new equipment—a total, after minor adjustments, of \$14,800,000.

The balance sheet, or, as the company prefers to call it, the statement of assets and liabilities, is a reflection of the conservative policy of the present management. The company had on June 30, 1910, \$75,000,000 current assets, which included \$9,100,000 cash in the treasury and \$27,450,000 demand loans and time deposits, which are, of course, cash assets. Current liabilities totaled \$23,800,000, which included \$12,800,000 dividends payable July 1 and October 1. During the year the Union Pacific loaned to the Southern Pacific \$10,900,000. The only change in funded debt and capital stock outstanding was the sale of \$4,900,000 first lien and refunding 4 per cent. bonds and the conversion of \$30,231,950 par value Union Pacific convertible bonds into common stock. These bonds are convertible at 175 in bonds for \$100 par value stock, so that through this conversion the profit and loss account of the company shows a credit of \$12,956,550.

The following table shows the operations of the Union Pacific in 1910, compared with 1909:

	1910.	1909.
Average mileage operated.....	6,292	6,062
Freight revenue.....	\$61,474,820	\$54,000,195
Passenger revenue.....	20,814,820	17,672,357
Total operating revenue.....	90,288,092	78,750,462
Maintenance of way and structures.....	9,915,482	7,682,146
Maintenance of equipment.....	9,061,519	7,434,599
Traffic.....	1,985,018	1,563,031
Transportation.....	22,505,807	17,914,909
Total operating expenses.....	46,938,900	37,945,086
Taxes.....	3,864,348	2,570,562
Operating income.....	40,024,835	38,234,814
Net income from transportation operations.....	25,993,639	23,862,008
Dividends.....	17,004,320	15,788,820
Income from investment, etc.....	19,512,051	17,736,393
Dividends payable from investment earnings.....	8,681,546	7,871,331
*Surplus.....	19,819,825	17,938,250

*Total, including both surplus from transportation and operations from investment earnings.

CHICAGO & EASTERN ILLINOIS.

THE 144 per cent. increase in total operating revenue earned by the Chicago & Eastern Illinois this year came from the nearly equal proportionate increase of tonnage of each class of commodity carried. Bituminous coal, with an absolute increase of 975,000 tons, or 17 per cent., furnished 56.86 per cent. of the total tonnage, as compared with 58.79 per cent. in 1909, while the changes in relative proportions of tonnage of other classes of commodities were much less.

Efficient operation saved 31 per cent. of the increase in earnings for net operating revenue, without skimping expenditures for maintenance. Loaded freight car miles increased from 58,580,000 to 67,930,000, while empty mileage only increased from 36,420,000 to 39,030,000. Revenue freight ton mileage was 1,993,800,000, an increase of 311,700,000, and passenger mileage was 106,700,000, an increase of 11,000,000. The revenue freight train load increased from 554.9 tons to 572.1 tons, and the average haul decreased slightly, from 166.87 miles to 164.28 miles. Revenue per ton mile fell from 0.48 cents to 0.46 cents. The income account is as follows:

Year Ended June 30, 1910, Compared with Previous Year.

	1909-10	1908-09	Increase or Decrease	
	965.68	965.68	Amount	Pr. Ct.
Operating Revenue.....				
Freight.....	\$9,258,496.30	\$8,005,582.87	\$1,252,913.43	15.7
Passenger.....	1,867,174.40	1,666,981.00	200,193.40	12.0
Mail.....	123,283.13	123,001.47	281.66	.2
Express.....	298,386.10	277,606.03	20,780.07	7.5
Miscellaneous.....	142,254.19	118,127.04	24,127.15	20.4
Total revenue from transportation.....	\$11,689,594.12	\$10,191,298.41	\$1,498,295.71	14.7
Revenue from operation other than transportation.....	60,761.47	78,320.58	-17,559.11	-22.4
Total operating revenue.....	\$11,750,355.59	\$10,269,618.99	\$1,480,736.60	14.4
Operating Expenses.....				
Maintenance of way and structures.....	\$1,158,929.36	\$994,709.67	\$159,219.69	16.0
Maintenance of equipment.....	2,043,376.45	1,663,759.23	379,617.22	22.8
Traffic expenses.....	267,411.73	210,011.47	57,400.26	27.3
Transportation expenses.....	4,096,671.24	3,635,885.77	460,785.47	12.7
General expenses.....	392,595.06	430,367.37	-37,772.31	-8.8
Total operating expenses.....	\$7,953,983.84	\$6,934,533.51	\$1,019,450.33	14.7
Net operating revenue.....	\$3,796,371.75	\$3,335,085.48	\$461,286.27	13.8
Taxes.....	362,124.30	274,114.66	88,009.64	32.1
Operating income.....	\$3,434,247.45	\$3,060,970.82	\$373,276.63	12.2
Miscellaneous income.....				
Outside operations.....	\$*16,181.03	\$*19,942.23	\$3,751.20	18.8
Hire of equipment.....	139,705.00	61,934.60	77,770.40	125.3
Other income.....	619,108.34	543,551.10	75,557.24	13.9
Total miscellaneous income.....	\$742,622.31	\$585,603.47	\$157,018.84	26.8
Total income.....	\$4,176,869.76	\$3,646,574.29	\$530,295.47	14.5
Interest.....	\$2,229,077.10	\$2,192,171.66	\$36,905.44	1.7
Rentals.....	772,002.50	759,231.69	12,770.81	1.7
Total charges.....	\$3,001,079.60	\$2,951,403.35	\$49,676.25	1.7
Available for dividends.....	\$1,175,790.16	\$695,170.94	\$480,619.22	69.1
Dividends.....	1,107,266.00	674,198.00	433,068.00	64.2
Balance transferred to profit and loss.....	\$68,524.16	\$20,972.94	\$47,551.22	226.7

DIVIDENDS DECLARED DURING YEAR ENDED JUNE 30, 1910.

Dividend No. 84, 1 1/2 per cent. on preferred stock, paid October, 1909.....	\$132,460.50
Dividend No. 85, 1 1/2 per cent. on preferred stock, paid January, 1910.....	132,460.50
Dividend No. 86, 1 1/2 per cent. on preferred stock, paid April, 1910.....	132,460.50
Dividend No. 87, 1 1/2 per cent. on preferred stock, paid July, 1910.....	132,460.50
Total dividends declared on preferred stock, 6 per cent.....	\$529,842.00
Dividend No. 23, 3 per cent. on common stock, paid December, 1909.....	\$360,890.00
Dividend No. 24, 3 per cent. on common stock, paid June, 1910.....	216,534.00
Total dividends declared on common stock, 8 per cent.....	577,424.00
Total.....	\$1,107,266.00

*Debits.

Letters to the Editor.

THE OLDEST RAILWAY IN SOUTH AMERICA.

State Railways of Chile, }
Santiago, Chile, August 30, 1910. }

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In your issue of June 17, 1910, p. 1570, you say: "This will give Paraguay its first connection with the outside world by rail, although the Paraguay Central is the oldest railway in South America."

This statement, please, sir, is not correct. The oldest railway in South America is here in Chile, between Caldera and Copiapo. It was constructed by an American, William Wheelwright, having as chief engineer W. W. Evans, also an American. The first train arrived at Monte Amargo, km. 41, on July 4, 1851. and it was driven by the engine "The Copiapo," from the Norris Works, Philadelphia, Pa. The first train arrived at Copiapo, km. 81, on December 25, 1851. On January 1, 1855, the railway reached Pabellon, km. 119, and on February 1, 1867, it reached San Antonio km. 140, the terminal of the line.

EDUARDO SOUBLETTE.

MORE REGULATION FOR AUTOMOBILES.

September 24, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I read with interest your comments in your issue of September 16 on the accident in which two people were killed by an automobile, in which you raised the question of the condition and qualities of the tires, also the virtues of the chauffeur and the owner of the machine. I am sorry you did not go further and raise a number of other questions which this naturally suggests:

For instance: A number of the states require a man to fire a locomotive at least three years before he can be promoted, and then he must stand a strict examination. Then he has to run a freight engine a required number of years before he can run a passenger train. Locomotive boilers must be inspected by state inspectors; if a railway has a small pump boiler some place of 15 or 20 h.p. we have to have for it a licensed engineer with a certificate from a state board of examiners. Some cities will not permit motormen to handle street cars until they have had a required amount of experience. Our factory and sanitary inspectors require us to adopt sanitary measures on railways and in our cities. It is a misdemeanor to expectorate on the floor of a passenger coach or on the sidewalks of a city, on account of the probabilities of bacteria spreading among us.

How do those things compare with the requirements regarding people operating automobiles? We put them in the hands of boys 12 to 20 years of age, who are too young to have calm judgment, or so-called "chauffeurs," whose character, education, etc., are questionable. Without any track to stay on, these young fellows run pell-mell over the highways and byways seeking whom they may devour with machines of from 20 to 60 h.p. A goodly part of the garages are operated by men claiming to be mechanics, who four or five years ago were somebody's footmen or blacksmiths—anything but what they claim to be, and the dear public is paying a very exorbitant price for their education—or, rather, for the education of both the repairmen and the public.

Is it right or sane for public officers, who have the welfare and safety of the community in their charge, to permit automobiles to be handled by boys and girls who have no sense of danger or responsibility, and by a lot of speed maniacs who absolutely have no judgment as to the rate they should travel? If some idiot gets on a locomotive and starts down the track everybody can get out of his road. People who are reputed to be of sane mind take chances on automobiles that a railway man would not dream of in his wildest moments.

Looking at the matter from a sanitary standpoint, it is wrong to expectorate or put anything on the streets that is apt to breed bacteria. But is it any better for the pedestrian walking down the street to be treated to a dose of gasoline and burnt oil and to have the bacteria on the street stirred up by the automobiles and blown in his face?

We are regulating many things nowadays, and it would seem that it is timely that a commission be inaugurated to regulate the use of the automobile. The most surprising thing to the writer is that Representative Joshua Pumpkinville has not already been active in efforts to secure stringent regulations of them similar to that of railways. It would not only be a good thing for the public as regards safety, but it would be a good way for the politicians to create places for a few constituents, such as inspectors of automobiles, etc.

RAILWAY MASTER MECHANIC.

REPORTING REVENUE ON EXCHANGE TICKET ORDERS.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

A considerable proportion of through passenger business is now handled on a form of ticket containing passage coupons to a point of interchange and an exchange order drawn on a connecting carrier for a ticket to be issued without collection of money for the balance of the journey. This arrangement, while reducing the number of printed ticket forms with which agents are supplied, is an inconvenience to passengers. It also works an injustice against some carriers which, because of their geographical location, are required to honor a great many more exchange orders than they sell. Carriers selling a large number of exchange orders and honoring comparatively few, force upon the exchanging carriers and on patrons much expense and annoyance.

Complaints which have been made indicate that the method of reporting revenue on exchange orders, which was satisfactory for a small amount of business, does not properly care for the great volume that is now transacted. "Recognized methods" were completely demoralized by the amount of westbound exchange business through Chicago, St. Louis and Kansas City during the tourist season of 1909, and the resulting confusion of accounts still remains unsettled.

The practice has been for the carrier selling the exchange order to report to the carrier on which the order is drawn all revenue accruing beyond the point of exchange. By the time that the exchanging carrier has received and is able to re-apportion this revenue, some of the carriers honoring the tickets have waited several months for their share of the revenue. This misplacement and delay in reporting a great amount of revenue unnecessarily impairs the integrity of accounts and causes expense. The road selling an exchange order thrusts upon carriers honoring it the responsibility and expensive labor of issuing a second ticket and reappportioning revenue for which they should not be held responsible.

The fact that these conditions have long existed does not excuse them, although the carriers profiting by this "legitimate graft" may oppose changes on that ground.

In endeavoring to make the best of present conditions the accounting departments of a number of carriers have recently arranged to report revenue on exchange orders the same as if proper coupons had been sold through to final destination. The carriers exchanging the orders report a description of them in lieu of revenue on tickets issued in exchange therefor, thus placing the revenue where it belongs through the proper party and much more promptly than was possible under the old arrangement.

Carriers opposing the necessary changes should either withdraw their opposition or give a reason for their position, so that they may be properly dealt with, and an equitable and uniform system be adopted.

H. C. EDMISTON.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.

The annual meeting of the Society of Railway Financial Officers was held at Old Point Comfort, Va., on October 25 and 26. The meeting was the most largely attended that has been held by the society since its organization. The subjects of clearing house settlements and credit and voucher books received particular consideration. A mileage of 17,144 miles is now represented in the society, which includes nearly all the important railway systems in North America.

The following papers were read: "The Formation of a Clearing House," Arthur Hale, general agent of the American Railway Association; "Watered Stock," George H. Crosby, vice-president of the Rock Island; "Short Term Notes," J. V. McNeal, vice-president of the Baltimore & Ohio; "Systems of Paying Interest Coupons and Registration of Same," P. W. Bigoney, treasurer of the Erie; "The Financial Outlook," E. L. Rossiter, treasurer of the New York Central; "Some Features of Railway Finance," Frank Scott, treasurer of the Grand Trunk; "Clearing House Settlements," F. H. Hamilton, secretary and treasurer of the St. Louis & San Francisco.

George H. Crosby, vice-president of the Rock Island, in his paper on "Watered Stock," said, in part:

"Investment in the stock of early railways was a problem in futures. It was purely speculative or was purchased as an inducement for the construction of the projected line through the desired sections, and the price realized for the stock was much below face value. After the earlier periods it developed that railways could not be built on the proceeds of the stock alone, and it became necessary to issue and market mortgage bonds. But the bonds of corporations in a comparatively new industrial field were not attractive as an investment, and to enhance the allurements for purchase it was frequently necessary to allot a certain proportion of stock with each bond, and even with this inducement and with the high interest rates then paid, the bonds could be sold only at large discounts.

"Gradually many of the railways began to earn dividends on their stock, small dividends, as the interest on the par value of the bonds sold at a discount had not only to be provided, but the hastily constructed roadways and obsolete structures needed rebuilding; wooden bridges were replaced by steel to safeguard the heavier traffic and, for the same reason the roads were ballasted. Small equipment gave way to cars and locomotives of larger capacity and heavier rails replaced the smaller or worn out types.

"In order that these betterments be provided, only a portion of the surplus available for dividends was paid to the owners of the stock, to those owners who had jeopardized the principal of their investment in their faith in the future of railways. The balance was put into needed permanent improvements.

"The amounts used from surplus income for improvements and extensions, the net earnings of the owners of the property, the stockholders, were applicable for dividends, but were diverted for capital uses, for the permanent betterment and growth and development of the railway properties.

"These improvements and extensions added the extent of their permanent value to the existing property and, the cost thereof having been temporarily diverted from the owners of the stock, these stockholders were, in various instances, later reimbursed by stock dividend; in some cases by a pro rata distribution, in more, at a certain cost per share of the new issues of stock, but less than the then prevailing market price.

"This action was properly taken in order that the owners of the stock should receive, in value, a portion of the net earnings which, although their just due, had been heretofore withheld for the needs and development of their properties, and

that the outstanding amount of capital stock should more nearly represent existing value. Yet the gross values of these stock dividends only approximated the actual cost of permanent improvements made to the properties. The larger portion of additional stock issues were made directly for public consumption at fixed prices per share, the proceeds to be used for needed modern facilities, second, third and fourth tracks, new yards, new branches, and the extension of lines, without unduly increasing the fixed charges. Interest on bonds must be paid, but dividends only if earned.

"It became customary when the earnings justified the act, to set aside or appropriate from income, certain amounts for future improvements, and when these amounts had been expended on permanent additions or betterments it was eminently proper and according to the ethics of conservative business methods to capitalize such expenditures. But, hundreds of millions of dollars were placed in the permanent way, and in equipment, without corresponding increase to capital account, it having been railway practice for many years to charge to operation items of expenses these companies are now, under the interpretation of the law, compelled to capitalize. Had the present methods been followed from the inception of railways in this country, their capital account would now stand in vastly larger figures, and legitimately so.

"All railway properties have not been honestly handled. There have been multiplied cases of over-capitalization, of wrongfully issued stock dividends, of wasted earnings, of incompetence and criminal management. So it is in all branches of industry. But, I feel assured that the large majority of railway corporations have been managed with ever-constant and successful effort for the permanent betterment of the properties at a minimum of capital increase.

"Railway values have increased corresponding with the prosperity of the country they traverse.

"Railways have contributed more than any other cause to the so-called 'unearned increment,' properly, the natural increment, and it is their just due that the enhanced worth of their properties from this reason be considered in their capital values.

"It is the firm belief of the unprejudiced students of the railway problem that, in money or labor, the face value of issued railway capital as now outstanding, has undoubtedly been paid, but were it not so, had the water in these securities been as claimed, yet has the country not been so greatly benefited, that a generous return on the investment should be cheerfully accorded by a grateful people? Men are not stimulated to engage in new ventures in untried fields by the prospect of so-called reasonable profits, but by the hope of large returns, and the net returns from railway capital investments have been far from large, dividends on railway stock averaging now but approximately 4 per cent. per annum.

"Railways are a government creation and under its fostering care and it is now a frequent claim from press and platform that their stocks should not be permitted to yield a greater annual net revenue than 6 per cent., nothing being allowed for depreciation or renewals. So are national banks government creations and under government control, yet, without protest from the public they are yearly earning net revenues of more than twice 6 per cent."

Mr. Hamilton, in discussing the question of clearing house settlements, said:

"Now, for some years it has occurred to me that while all the rest of the world was making settlements by differences the plan of making settlements between railways, which was really devised by the Accounting Department Association, of drawing on each other for the balances, was a step toward the clearing house idea. But we are drawing and paying on each other, sometimes drawing and paying to the same city. Therefore, somebody is carrying between these two cities something to represent the dollars which the railways owe each other. At a certain stage of our experience it was the actual coin or the actual cur-

rency that had to travel between these two cities. Somebody is going to pay for it, and as the railways are instigating the exchange of credits they pay for it, either in dollars or the loss of economy. There has been in some cities the clearing house agreement that the railways as well as all others shall pay exchange charges. In other cities that is not so, but the time is coming, I think, sooner or later, when we may all be asked to pay exchange charges on what we collect, and I think you will all agree that if we can find a plan of settling differences instead of drawing on each other for the large amounts we will be saving some money, although it will never be made a matter of record. I hope we can get to it and devise some plan of accomplishing it. I think it can be done without turning our present custom inside out and without revolutionizing the world, but it will have the effect of simplifying things, and, I hope, of saving clerical labor from the outset. Possibly with some it will be warding off business expense."

Mr. Hale described the organization and methods of the American Railway Clearing House in clearing per diem balances.

Mr. Scott, in his paper on the financial outlook, took a hopeful view. He said in concluding:

"On this great continent the future success of railway investments is assured. Notwithstanding the uncertainties that at present exist, notwithstanding the undue burdens imposed for the time upon transportation companies, more intelligent thought is being concentrated on railway problems than ever before. The interests of the public are championed to the fullest extent by a host of representatives. The investor also has interests which must be conserved, and an adequate return made on the money contributed by him to the development of the country. His claims are being ably advocated by those who perceive in radical action inimical to the investor, not only the impairment of railway credit, but also an actual blow at the credit of the country. Out of the turmoil of inquiry and discussion it cannot be doubted that there will be eventually evolved a stability and security in railway investments far exceeding anything existing hitherto. Underlying all the vicissitudes of railway financial endeavor certain broad principles must be formulated and followed by railway companies, both individually and collectively. It is the earnest hope that as an educational influence the deliberations and conclusions of the Society of Railway Financial Officers may be instrumental in establishing those ideals in the ethics of railway financing that make for progress and must be the accompaniment of energetic railway development in other directions."

The following officers were elected: President, George H. Crosby (Rock Island); vice-president, S. L. Shannon (Intercolonial); second vice-president, C. W. Rhodes (Baltimore & Ohio); secretary and treasurer, Carl Nyquist (Rock Island); members executive committee, to serve for two years, George H. Crosby and Frank Scott (Grand Trunk); F. H. Hamilton (St. Louis & San Francisco) and H. F. Baker (Lehigh & New England).

FOREIGN RAILWAY NOTES.

The news of the granting of a concession for the construction of a railway from Taubate, in South America, to Natividade has been very well received in the former city. The prefect gave the camera's employees a holiday and the people rejoiced exceedingly.

The lines under negotiation with the government of Rio Grande do Sul on account of an Anglo-American syndicate represented by General O'Brien, ex-minister of the United States at Buenos Aires, are as follows: From the southern extremity of Lagoa Mirim passing through Sao Francisco, Sarandy, and Nico Perez to Sao Luiz, and another that, starting from St. Rosa, a Brazilian town on the Uruguay, will connect by steam ferry with Monte Caseros, an Argentine town on the other side of river in the Province of Entre Rios Railway at Posadas, where an extension is to be constructed from Inmaculacion on the Paraguayan frontier.

THE LOGGING RAILWAYS OF THE PACIFIC NORTHWEST.

On the Pacific coast, in the United States and in British Columbia, from San Francisco nearly up to the Arctic Circle, there is gradually coming into being a network of railways about which the general world of transportation hears but little. These roads are built to bring out of the forests the timber which grows on the western slope, and to deliver the logs to the water, the mills or to connecting trunk lines. At present the logging railways form no connecting system, nor do they appear in the railway statistics of the country. Few of them have yet become common carriers. Nevertheless they are by no means insignificant in aggregate length, and their total purchase of supplies during the year would make a respectable figure. Just now they are indispensable to modern logging and to the production of cheap lumber; in the future they will be of inestimable value in building up the country and as feeders to the trunk lines. The economic value of the logging railways is constantly increasing; they are one of the few permanent assets which the country will gain from the devastation of its forests.

An average saw log cut from the forests of the Pacific coast is about 30 feet long and 3½ feet in diameter. It weighs approximately six tons. It is necessary, however, to handle logs up to 8 ft. in diameter and 30 ft. long, weighing 35 tons each. The hand logger of the early 70's could not manage such enormous weights and therefore he cut only choice trees on slopes where the logs would roll into the water by gravity. The ox team and skids of the 80's enabled somewhat less accessible timber to be reached and increased the output per man enormously. But the demand for cheaper transportation became more and more insistent as the lumber industry grew and the areas of choice timber receded further and further into the hills and less easily reached localities. So the ox team was succeeded in turn by the horse, the donkey engine, the tram road and the standard gage logging railway. To-day nearly half of the four billion feet of lumber cut on the Pacific coast is hauled out of the forest over logging railways. As the lumber industry grows older the importance of these roads increases. It will not be long before all the logs cut will be brought out by rail. When this time is reached the logging railways will have attained their maximum importance in the lumber business, but will be only in their infancy as regards their larger and permanent service to the community.

The logging railways began to make their appearance in the 90's. Up to date about 2,000 miles have been constructed and new lines are being built at the rate of about 100 miles per year. These figures are approximations, but are based on state reports and are reasonably accurate. The annual purchases for new line and new equipment amount to, roughly, \$1,000,000; and for repairs and replacements, \$1,500,000, making a total annual purchasing power of \$2,500,000. The roads are owned by various individual mill companies and lumbering industries. They are usually built up valleys and connect the timber tracts with navigable water, with trunk railways or with saw mills. The average length of each is about four miles, but this length is constantly increasing as the timber becomes more and more remotely situated.

In the year 1909 there were 630.75 miles of logging railways in the state of Washington alone; the ownership was divided among 154 lumber companies, making an average of 4.09 miles of track for each company. The Polson Logging Company, operating in Chehalis county, near Gray's Harbor, is credited with 32 miles, the most owned by any single company. There are three other companies in this state which own 20 miles or more of track each. The average length of track owned by each company is increasing both because of the construction of new line and because of consolidations of the various companies. Many roads appearing in the state reports as separately owned are in reality controlled by the same interests. The foregoing figures do not include the several short lines which do a general railway business, but which depend on hauling logs for 90 per cent. of their revenue, nor do they include those branches of the

trans-continental systems which are little more than logging roads.

Some few lines are as much as 50 miles long and several have already outgrown their early stages and become common carriers. Prominent among these is the Bellingham Bay & British Columbia, which, although virtually a logging road, is also a common carrier. This line, which with its branches is 69 miles long, extends from Bellingham, Wash., eastwardly into the Cascade mountains.

A great deal of the new construction consists of extensions of

extended on either side reaching all parts of the forest. Since it is not economical to yard or haul logs through the bush more than 800 ft., the branches are usually built 1,000 ft. apart.

There has been a gradual but perceptible improvement in the location and character of the main lines. The older roads were very rough and crooked, grading was confined to the absolute minimum and many tracks were unballasted. Twenty-five-degree curves and 15 per cent. grades were not unusual. At present on standard logging roads the grades on the main line vary from



Lower Terminus of a Logging Railway.

existing systems, although large numbers of totally new lines are built each year. Many saw mill towns have logging railways radiating in all directions up the valleys and into the hills for distances of from 2 to 30 miles. Fortunately for their future usefulness, the logging railways are now all built standard gage.

The modern practice in laying out logging roads is to build a main line through the tract of timber to be logged, locating it with reference to the topography of the country and the distribution of the timber. From this main line branches or spurs are

0.5 per cent. up to 8 per cent. for short distances; 4 per cent. grades, however, are the general limit. One well-known line in Washington has four miles of continuous 4 per cent. grade. Curves up to 12 degrees are permitted on the main lines. On feeders the grades run as high as 15 per cent. for short distances and 20-deg. curves are comparatively common. The main line is ballasted with gravel according to standard practice.

All weights of rail between 36 and 65 lbs. are used; 56-lb. rail, however, may be considered the standard for main lines, and



Terminus of a Spur.



Typical Logging Train.

very little new rail lighter than this is being laid. On branches and feeders 45-lb. steel may be considered the standard. The rails are connected with either fish plates or angle bars, modern practice tending more and more toward angle bars and heavier fastenings. Four bolts to the joint, however, are considered sufficient.

Ties are spaced 24 in. on centers. There are four spikes to the tie, sometimes six on curves, and on the better class of roads the curves are provided with rail braces.

The main line right-of-way is cleared only wide enough to admit the track and grade. No more grubbing is done than is necessary. Timber trestles, most of the members being hewed from the adjacent woods, are used almost exclusively where bridges are necessary. Occasionally one will find a timber trestle, but these are comparatively rare.

The following figures give the actual cost of a mile of representative main line logging railway in Washington or British Columbia:

	Per mile.
Clearing, grubbing and grading.....	\$2,400
2,500 ties, 25c. each.....	625
88 gross tons, 56-lb. rails.....	4,000
Laying track.....	530
Engineering.....	100
Total, per mile.....	\$7,655

The rolling stock is especially built for the service. On account of the sharp curves and heavy grades, light-g geared locomotives are in common use, although many roads use ordinary locomotives with four or six driving wheels. The locomotives are all equipped with efficient spark arrestors. Wood is generally used for fuel, but the use of coal is growing. It is found that in many cases the cost of splitting and preparing the wood, plus its value as lumber, is more than equal to the cost of the necessary coal.

In some cases the locomotive drags the logs on skids laid between the tracks, but the general practice is to carry the logs on specially designed trucks. These trucks are built to M. C. B. standards. They are made of steel and are very similar to modern steel freight car trucks except that each truck is provided with a drawbar and two couplers. Across the middle of the truck is built a heavy girder, called a bunk, on which the logs rest. The bunk is provided with adjustable chocks which prevent the logs from rolling. Where the logs are large two trucks are used for each log, one under each end, but generally three logs are loaded on each pair of trucks. The logs are secured to the trucks by chains.

In some cases, particularly where the logs have to go some distance, they are loaded on standard flat cars instead of simply on trucks. In these cases the flat cars are, of course, provided with air brakes, but the ordinary logging trucks are provided with hand brakes only.

There is usually only one locomotive on a given logging railway, so the problems of train despatching are simple. When two locomotives are used, the second engine is confined almost entirely to the branch lines.

The logs are handled in trains, there usually being from six to twelve pairs of trucks per train. A train will weigh therefore from 200 to 600 tons, or even more, depending on the size of the timber. It will be remembered, however, that the heavy load goes down hill, only the empty trucks have to be hauled against the ruling grade.

In addition to the equipment of locomotives and log trucks the railway is provided with a rude passenger car for carrying the men between their work and the camp, and also with a horse car for transporting the horses.

The cost of equipping a road operating one yarder, or on standard crew of men in the woods, is as follows:

One locomotive.....	\$20,000
10 pairs of trucks at \$600 a pair.....	6,000
One horse passenger car, and horse car.....	2,000
Total.....	\$28,000

The total cost of ten miles of road and equipment is, therefore, about \$110,000. The equipment is practically the same for all roads up to 10 miles in length.

SAFETY APPLIANCE STANDARDS.

Under date of October 13, 1910, the Interstate Commerce Commission issued its order for the application of the safety appliances that have been adopted in accordance with the act of Congress approved April 14, 1910, in which the number, dimensions, location and manner of application are given.

The order follows very closely the standards first suggested by the commission, which were published in some detail in these columns in our issue of August 26, 1910. The details published at that time covered only those pertaining to house or box cars, as the general features of those affecting other cars were practically the same.

The changes made are additions rather than eliminations and are as follows:

In giving the details of brakeshaft construction there is added: "Lower end of brakeshaft shall be provided with a trunnion of not less than three-fourths ($\frac{3}{4}$), preferably one (1), inch in diameter extending through the brakeshaft step and held in operating position by a suitable cotter or ring.

"The brake-pawl shall be pivoted upon a bolt or rivet not less than five-eighths ($\frac{5}{8}$) of an inch in diameter, or upon a trunnion secured by not less than one-half ($\frac{1}{2}$) inch bolt or rivet, and there shall be a rigid metal connection between brakeshaft and pivot of pawl."

Under each type of car considered a paragraph devoted to the end clearance, and specified as "End Ladder Clearance," has been introduced, as follows:

"No part of car above end sills within thirty (30) inches from side of car, except buffer block, brakeshaft, brake-wheel, brake-step, running board or uncoupling lever, shall extend to within twelve (12) inches of a vertical plane parallel with end of car and passing through inside face of knuckle when closed with coupler-horn against the buffer block or end-sill, and no other part of end of car or fixtures on the same above end-sills, other than exceptions herein noted, shall extend beyond the outer face of the buffer block."

As originally drawn up the standards did not make the exceptions now given, which were introduced after a protest on the part of the railways.

In the case of the vertical end handholds the minimum length has been reduced from 24 in. to 18 in.

The reports of the German Shantung Railway are interesting as showing what results can be attained from railways in China. This line has now been in operation for a few years in a very thickly peopled and productive country, but without connection as yet with other lines further in the interior. It is 271 miles long, and in 1909 its gross earnings were \$6,293 per mile, against \$4,826 in 1908. These seem very moderate returns, but what makes the investors' mouths water is the working expenses, which were but 35 per cent. of the gross earnings in 1909, leaving net no less than \$4,090 per mile. And this result is not due to high rates, for the average receipt was but 0.61 cent per passenger-mile and 0.82 cent per ton-mile. Evidently wages are not high. The traffic is not very great, last year averaging 160 passengers and 524 tons of freight each way daily for the entire mileage. Of the total tonnage a little more than half was coal, and next to it comes beans, 8 per cent. Grain was less than 1 per cent.—only about a third as much as petroleum, indicating very little export or import. The passenger traffic is very cheaply carried. More than 96 per cent. of it is third-class, and the number of first-class passengers averages less than five per day. Purely passenger trains are less than one daily, but the mixed trains are more than twice as numerous. The average train-load is 130 tons of freight plus 40 passengers, earning gross \$1.33 and net 87 cents. The net earnings of this railway were 45 per cent. greater in 1909 than in 1908, in spite of the great decrease in passenger traffic, the earnings from which were 17 per cent. of the total. All this confirms the conviction that there is a great future for railways in China.

Shop Section.

THE car repair kink competition, a complete announcement of which was made last month, will close on November 15. If you have not yet found time to prepare your contribution, do not allow the shortness of the time remaining to discourage you from doing so. Possibly the difficulty in arranging for drawings, sketches or photographs has interfered with your efforts in this matter. While photographs and good drawings are, of course, appreciated, yet a rough sketch is often just as satisfactory, and in many cases a good description of a simple but labor or time-saving method or practice will prove just as intelligible and as valuable to our readers as the description of a more complicated device accompanied by illustrations, but which may not have nearly as broad an application. Two kinks are required to enter the competition, but more may be submitted, allowing the judges to base their decision on what they consider to be the best two kinks in each collection. Prizes of \$35 and \$20 will be awarded for the best two collections. Others which are accepted for publication will be paid for at our regular space rates.

INCREASING Shop Output is the subject of the competition which is to close December 15. This is a topic which should appeal strongly to every one of our Shop Number readers, for the extent to which you have succeeded in improving the efficiency and output of your department or shop is a measure of the value of your services to your employer. The subject has purposely been made as broad as possible in order that every department may be represented. Tell us how you solved the problem, for it may prove of great assistance to someone trying to solve a similar problem in another shop; you may gain in an equal measure by finding how he has successfully solved a problem that is causing you difficulty and is hampering your output. A change in the organization, a rearrangement of equipment, the adoption of new methods or machinery, a critical study of the men with whom you work or who report to you, a new or better system of records, more explicit instructions to your employees, a more logical wage system, better treatment of employees, the establishing of a standard cost or allowance for each item of expenditure—all these, and many more, have been responsible for increased output, and there is not one of our readers who cannot tell an interesting story of his experiences along these lines. How did you manage to clean your coaches so much better or handle more coaches per day with the same number of men? With fewer men you are painting more cars in a week than you did last year. Why? The blacksmith shop never could quite keep up with the work. Now you are easily doing so, although you have more work to do and have not increased your force. How did you bring it about? The car repair yard is making a wonderful record this year. Why? Five more locomotives per month off the same number of pits. Who is responsible? How was it done? We made some changes in the flue shop and increased its output 25 per cent. What were they? When we completed certain changes the boiler shop was easily able to hold its own with the other departments, although it had not previously been able to do so. What were they? These are only a few suggestions to show the wide range of subjects which may properly be considered in connection with the increasing of shop output. The article should contain from five hundred to fifteen hundred words. Prizes of \$35 and \$20 will be given for the two best ones. Others which are used for publication will be paid for at our regular space rates.

A GENERAL Shop Kink competition will be held, to close January 15. It will include any kink used in connection with the repair and maintenance of locomotive or car equipment. The prizes will be \$50 and \$25 for the best two collections of three kinks. More may be submitted, but the award

will be based on what the judges consider to be the three kinks in each collection. Kinks or articles which do not win a prize, but are accepted for publication, will be paid for at our regular rates. Contributions may be entered any time between this and the closing date.

TWENTY articles were accepted in the competition on "Care and Selection of Machine Tools and Shop Equipment," which closed October 15. The grade of these contributions throughout was so high and a number of them were so good that the judges have had great difficulty in awarding the prizes. The first one of \$35 goes to J. S. Sheafe, engineer of tests of the Illinois Central, Chicago, Ill., and the second prize of \$20 to E. T. Spidy, instruction card inspector, Canadian Pacific, Angus shops, Montreal, Canada. The other contestants, not arranged in the order of merit, were: H. G. Becker, shop demonstrator, Lehigh Valley, Sayre, Pa.; George Black, machine shop demonstrator, Canadian Pacific, Angus shops, Montreal, Can.; C. J. Drury, master mechanic, Atchison, Topeka & Santa Fe, Arkansas City, Kan.; W. J. Eddy, tool room inspector, Erie, Meadville, Pa.; John M. Hamm, machine foreman, Lehigh Valley, Sayre, Pa.; A. H. Kcan, general foreman, Chicago, Burlington & Quincy, Havelock, Neb.; John V. Le Compte, foreman, Baltimore & Ohio, Garrett, Ind.; C. C. Leech, foreman, Pennsylvania Railroad, Buffalo, N. Y.; Charles Maier, engine house foreman, West Jersey & Seashore, Atlantic City, N. J.; J. F. Perritt, blacksmith foreman, Seaboard Air Line, Jacksonville, Fla.; A. D. Porter, shop efficiency inspector, Canadian Pacific, West Toronto, Ont., Can.; W. W. Reeves, machinist, Illinois Central, Burnside shops, Chicago, Ill.; William G. Reyer, general foreman, Nashville, Chattanooga & St. Louis, Nashville, Tenn.; George H. Roberts, assistant machine foreman, New York, New Haven & Hartford, Readville, Mass.; W. H. Snyder, assistant general foreman, New York, Susquehanna & Western, Stroudsburg, Pa.; W. P. Spade, formerly a shop specialist on the Baltimore & Ohio, but now with the Corning Glass Works, Corning, N. Y.; M. H. Westbrook, Battle Creek, Mich. The twentieth paper was prepared by the "Old Railroader," who for good reasons does not care to have his name used. It will be recalled that he presented a splendid paper in the competition on Increasing Shop Efficiency.

A GLANCE at the names of the contestants in the competition on The Care and Selection of Machine Tools and Shop Equipment, as announced above, shows at least fourteen different titles represented. It is not surprising therefore that the twenty papers differ greatly from each other, both as to the information presented and the manner of presenting it. Each one of the seven papers published in this issue is different from the other six, both as to the phase of the subject considered and the viewpoint. For instance, Mr. Sheafe's paper is mainly devoted to the care and maintenance of machine tools and the small tools used in connection with them. Mr. Maier, an engine house foreman, gives more attention to the general question of the selection of tools, but soon swings over and gets into the problem from the engine house point of view; his closing notes on the relation of the men and the tools they operate are important. Mr. Porter's paper goes into the belting question thoroughly; it is interesting to note that most of the contestants had something to say on this subject. Mr. Eddy, the tool room inspector on the Erie, treats the subject from the standpoint of one having general charge of the care and maintenance of tools on a large system. Mr. Reeves' notes from the viewpoint of a machinist are most interesting. His article is based on twenty-two years of experience on fifteen railways—and on two other vocations, that of the "circus" and the "sea," fields which railway shop mechanics do not often invade. Following is a quotation from one of his letters to the editor: "How far would a

storm-bound steamer get on Lake Superior if the most necessary tools had been left in Duluth and it became very acutely urgent to adjust some of the machinery to keep the boat from sinking? Hence that motto, 'a place for everything and everything in its place, and lash it down, if necessary.' Again, what is the canvas boss with a circus going to do if the center and quarter poles, a portion of the canvas, and the elephant car are left in the last town? The same thing applies to a machine shop and the pending job. Where, oh, where, is that ugly looking oil can? Where is that certain piece of iron, or the things we used to have to do this or that with? The absence of these things, is, of course, not as dangerous as at sea, but to my mind it is just as costly as in the case of the circus." Mr. Perritt takes us into the smith shop. Not a great many years ago one would have looked in vain for machinery in that quarter, but the railway smith shop would be practically helpless without it to-day. Mr. Drury's paper considers a subject not touched on by any of the others—the standardization of small tools and their manufacture and distribution from a central point. All of these papers are good and there are thirteen others still to be published. Mr. Spidy's article, which was awarded the second prize, will appear with others in the December number.

AS a result of the rule requiring that steel cars only shall pass through the tunnels and enter the New York station of the Pennsylvania Railroad, quite a number of orders have been given for the construction of all-steel business cars for railway officers and wealthy men who are accustomed to travel in their own private cars. The wooden business car, luxurious as it is and handsome in its finish and trimmings, must be replaced for this purpose by a structure made entirely of steel. The comforts of the wooden car, provided by its almost perfect insulation, included protection from heat and cold as well as noise. The beauty of the inside finish, made of mahogany or rare veneer, with artistic lines and shapes, delighted the eye. It will be a difficult matter to obtain equivalent effects when the base is an ugly grey steel sheet or molding. While remarkable progress has been made in adapting this material to passenger car construction, and the structural problems have been solved, much remains to be done in the direction of better insulation and a more pleasing interior decoration. Some of the all-steel parlor cars are unusually noisy, and there is noticed a peculiar rumble in the train that is not found with wooden cars. The color of the inside finish is usually too dark, and the dull paint is easily soiled and is difficult to maintain in its original tone. The toilet and smoking rooms are severely plain and are only relieved in outline by round-headed rivets. They give one the feeling that he is occupying a cell in a calaboose. Something different will be demanded for the new steel private cars, and we may be indebted to the methods that will be worked out for them, for improvements which shall make the future steel parlor cars and sleepers for the ordinary traveler more comfortable and more beautiful.

CONVENIENT methods for removing trucks from heavy passenger cars are as important a part of car shop equipment as those for locomotive wheels in the engine house, but this necessity is not always recognized. The usual method is to raise the car body by hand screw or hydraulic jacks; this is slow and laborious, requiring the constant transfer of the heavy jacks. At a new coach shop in the west there is a steel structure outside the shop with fixed power hoists capable of raising the heaviest car body. The trucks are removed and taken by transfer table to the truck shop, the car body is let down on temporary trucks and transferred to the repair shop. This method is a vast improvement over hand jacks, but it is open to the same objection as made to the use of chain hoists at Englewood, namely, the necessity of moving locomotive wheels. The heavy car is raised by an expensive overhead structure, when the lighter passenger car wheels or truck could be dropped by the use of a much less expensive pneumatic or hydraulic jack in a

pit. A drop pit for coach shops would, therefore, appear to be the most convenient and economical method for removing trucks, and it would not be expensive for application to old shops. New car shops are usually equipped with overhead traveling cranes, especially those intended for the repair of steel freight cars, and overhead cranes are provided at the truck shops. Traveling cranes for lifting modern steel passenger cars which weigh as much as 70 tons—and the bodies alone 50 tons—would require expensive columns and crane girders, and the cranes themselves would cost too much to warrant their use in a car repair shop. The drop pit—operated by compressed air, electric motor or hydraulic power jacks—is the most economical method of removing passenger trucks, and there are numerous shops where they could be profitably installed.

WE have been requested to inaugurate a Question and Answer Column for the benefit of our readers, the idea being to publish each month any questions that may be sent in relation to railway shop practice; the answers received from other readers, who may be able to supply them, to be published in the following issue. We shall be glad to comply with this request if our readers will start the ball rolling by sending in the questions, and co-operate with us in securing the proper answers. In this connection we should like to hear from some of our readers as to the proper length of wrenches for locomotive and car shop work. This is suggested in the letter from Mr. Snyder, published on another page.

THE CAR DEPARTMENT AND THE STEEL CAR.

THE introduction of the steel car in both passenger and freight service is rapidly transforming the equipment of most railways and gradually changing the character of the car shops and making its impress upon the car department generally. The shops are becoming iron working shops with punches, shears and riveters, and the repair men are no longer carpenters and cabinet makers, but sheet metal workers and blacksmiths. The design of the steel car is more of an engineering problem, and most of the work can be handled better by the machinist or other iron worker than by the old time car builder or wood worker. It is a remarkable fact, however, that the cabinet maker in the shops of the large passenger car builders has so adapted himself to the fitting of steel sheets, moldings and trimmings that his work is more rapid and accurate than the regular sheet metal workers. The work on the inside finish of steel passenger cars is now so systematized, and the men have become so skilful, that it is done more rapidly and the cars are turned out in a shorter time than was ordinarily required for those with wooden finish. It is true the surfaces and outlines in the steel cars are of necessity simpler and plainer than they were in the wooden car, but it remains to be seen whether they will be more durable and will cost less for maintenance and repairs. The car shop in its larger and in some cases almost exclusive use of metal instead of wood is coming in closer association with the locomotive shop, and the general supervision of both departments by one officer is even a more natural and reasonable condition than it was when wooden cars were used exclusively.

The vast change that has come over the car department in recent years on account of the introduction of the steel car is scarcely realized. Its importance may be gaged when it is found that on account of the large number of cars as compared with the locomotives on most lines, the cost of maintenance of cars is now greater than that for locomotives. The wholesale retirement of old wooden cars which became necessary with the purchase of new steel equipment has resulted in an unusually large item in the depreciation account for both passenger and freight cars. In the recent annual report of one of the large western railways we find that the depreciation of freight cars is charged at over one million dollars and for passenger cars over \$500,000. In the east the steel car has been used more extensively and in the report of one of the larger eastern lines over three million dollars is charged against depreciation of freight cars in one

year and a slightly larger amount for depreciation of passenger cars. On the same line the cost of maintenance of freight cars alone, including depreciation, was 50 per cent greater than the cost of maintaining locomotives, and the expense of maintaining freight and passenger cars, including depreciation, was very nearly twice that for locomotives.

While the large item of depreciation applies only to some of the systems that have introduced steel equipment rapidly and have abandoned large numbers of old wooden cars, yet it is a condition that all lines are approaching and it may safely be said that for some time to come the expense to railways of maintaining cars will equal or exceed the cost of maintaining locomotives. Where an equal amount of money is involved in the expenditure for labor and material in maintaining equipment, it would seem that the opportunity for waste and extravagance on one hand, or for economy and careful supervision on the other, would be greatest where there is the largest subdivision, and therefore, the car department, except in the matter of fuel economy, offers a more favorable field for good management in reducing expenses and in keeping them down than the locomotive department.

The freight car truck is by far the most numerous structure on railways, a dozen roads owning over 50,000 cars. They each have 100,000 freight trucks to maintain and the same multiplicity extends to other parts of the car—four times as many axles and eight times as many wheels—which in the aggregate make up very large numbers, so that the very small saving on each one will make a large item in the showing for the whole equipment. When such large expenditures are involved there must be large appropriations for shops, tools and salaries for supervision, and the car department becomes a more interesting field with greater promise of advancement than it has had heretofore. It should therefore attract more of the higher grade men who have been heretofore trained entirely in the locomotive department, and the organization in the mechanical department of railways should be such that the future motive power officer shall have a practical experience in the car department.

ENGLISH ENGINE HOUSE PRACTICE.

LIBERAL abstracts of the four papers discussing American engine house practice, which were presented at the joint meeting of the American Society of Mechanical Engineers and the English Institution of Mechanical Engineers, have been published in these columns. The only paper on English running-shed practice was presented by Cecil W. Paget, general superintendent of the Midland Railway, Derby; and it will be interesting to take up some of the features of English practice as described in this paper, and as brought out in the discussion, and point out how they contrast with American methods. It is the general impression here that the prevailing type of engine house in England is rectangular, but the author in describing English practice states that the center turntable type possesses considerable advantages of working, on account of the ease with which the engines can be got in and out without moving others. The illustrations in the paper include an engine house on the Great Western Railway, which, although rectangular in shape and 360 ft. by 400 ft., contains four turntables and has a capacity for 100 locomotives. The rectangular house as used abroad is economical in first cost and maintenance, but it is open to the objection of making it difficult to handle one particular engine without moving others. One of the most recent engine houses built in England is that at Eastleigh for the London & South-Western. This house has 15 through tracks and is 350 ft. long; the approaching tracks on each side are more than 400 ft. long. There is a quarter pitched roof over each set of three pits and a skylight on each side, so the lighting in daytime is admirable. Longitudinal hoods extending the whole length of the house and wooden flues extending through the roof provide for the escape of gas and steam.

Along one side of the house is what is known as the lifting shed, where shear legs are placed, which are capable of lifting

one end of an engine so that the wheels and axle boxes may be removed for examination or repair. These shear legs were at one time almost universally made of wood and of the tripod type, but on account of the greater width and weight of engines they are now made of steel with four columns. In the discussion of the paper it was pointed out that this method of raising locomotives was not only inconvenient but expensive, and that a more rational method was that of dropping the truck wheels or driving wheels, which weigh only a few tons, instead of lifting the enormous weight of one-half the engine. It requires three times as long to take out a pair of tender wheels with a shear leg as with the wheel drop jack, and with driving wheels the difference is even greater. The illustrations of wheel drops that have been built for English engine houses would indicate that they are more elaborate and expensive than those in general use in this country. One recent American engine house has, in addition to a large drop table over 50 ft. long, operated by electric motors, three drop pits, each operated by three pneumatic jacks.

The floor of engine house pits is usually made convex to drain down to each side, but it was suggested that a better shape would be to give the floor a straight incline to one side with a covered drain at the lower side. The height of the pit should be such that the distance from the bottom to the center of the link motion is about the height of an average man up to his eyes.

The use of hot water plants for washing out boilers and water softening plants for improving the quality of the boiler water, while not generally used in England, is being gradually introduced and is regarded with as much favor as in this country. On English railways the general practice in cleaning engines is to employ boys from 14 to 19 years of age, who are afterward promoted to firemen. This is regarded as a kind of an apprentice system. It is doubtful if such a system could be introduced in this country, as it is even hard to get young men to enter an apprenticeship in the cleaner work of the machine shop.

It is generally admitted that more attention is given to the cleaning of locomotives in England than in America, and it is believed that the money is well spent, as a clean engine enables defects to be more readily detected. It is also a good advertisement, as the appearance of locomotives is noticed by passengers at stations. The clean locomotive also has a good moral effect on men, and consequently affects the amount of repairs to the engines.

On the Lancashire & Yorkshire road the amount of material kept in stock was valued at \$40 per engine under steam. While figures for other roads were not available, this is believed to be much less than the stock kept at American engine houses.

In regard to engine failures, the records of the Lancashire & Yorkshire show only two per day for 1,000 locomotives, the chief cause of failure being leaky tubes or other tube troubles. On the Midland Railway, with 3,000 locomotives, the number of failures is less than one per day for each 1,000 locomotives under steam, and the tube troubles on this road are not so numerous. In the London district it is extremely important that no engine failures occur, for while the cost of repairs might be comparatively small, the disorganization of the service on such a section of the line, with frequent train movements, would prove very expensive. In this particular America has something to learn from English methods in regard to the prevention of engine failures about large terminals.

It is generally admitted that the mileage of English engines falls far short of that obtained in America. In England 10 per cent. of the engines are in the shop under repairs, and others—making a total of 25 per cent. out of service—are being washed out or detained at the engine house, so that 75 per cent. of the equipment is available for use.

The compilation of mileage, wages, coal, oil, stores, etc., involves such an amount of routine work that the Lancashire & Yorkshire has adopted the Hollereth tabulating machine with cards and punched holes. These cards, when conveniently assembled, show the cost of operation at various engine houses

and for different classes of engines. Mr. Paget's paper also contains a complete description of the method of inspecting locomotives on the Midland Railway, based on time and mileage.

MECHANICAL ARTICLES DURING OCTOBER.

SHOP NUMBER readers may want to refer to articles of interest to the mechanical department that have appeared in the weekly issues of the *Railway Age Gazette* since October 7. They are as follows:

The Safety Appliance Order. Editorials commenting on the final conference of railway representatives and others with the Interstate Commerce Commission.—Oct. 14, page 682, and Oct. 21, page 728.

Steam Auxiliaries for Passenger Service. So much power is required for operating air brakes, electric lights and steam heat on passenger trains that more attention should be given to the possible economies that may be effected in their use.—Oct. 21, page 726.

Ideal and Actual Paint Practice. Too little attention is given to the proper method of preparing metal surfaces before painting.—Oct. 28, page 772.

Wire Glass. The use of wire glass in shops, engine houses and other buildings was briefly discussed at the Bridge and Building convention.—Oct. 28, page 791.

Fireproof Oil Houses. A committee report presented before the Bridge and Building convention.—Oct. 28, page 793.

Pacific Type Locomotive for the Central Railroad of Brazil. Illustrated description.—Oct. 28, page 795.

Letters to the Editor.

CAR WHEEL FOUNDRY PRACTICE ON THE CANADIAN PACIFIC.

Montreal, Can., Oct. 22, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

We have read with a great deal of interest George L. Fowler's interesting and very able article on Car Wheel Foundry Practice on the Canadian Pacific that appeared in the *Railway Age Gazette* of October 7. As we are the general sales agents for the Deseronto charcoal iron referred to, we were, of course, pleased to note the mention made regarding our iron, but regretted to note that there was a serious error made in giving its analysis, which error we are afraid was caused through a misapprehension owing to information given by our Toronto office, the analysis of our iron as given being more injurious than otherwise to our business.

Knowing the reputation and policy of your paper, we feel sure that you would not intentionally do us an injustice in this respect and that you will be willing to correct the error made.

The two important errors were in reference to the phosphorus and sulphur content. Your article quotes the sulphur content as being from .01 to .03. The maximum sulphur in our iron is .018, the sulphur running from only a trace to this maximum, with an average considerably below the maximum. In regard to phosphorus: Your article quotes the phosphorus as running from .165 to .34 per cent. The maximum phosphorus is .20 per cent, and the majority of it runs from .14 to .16 per cent.

We enclose a copy of our grading card which gives the other contents of the iron for the different grades which we supply, ranging from A Scotch to No. 6 White Iron. The manganese is furnished as required by the specifications of our different customers and ranges from .30 to .90 per cent. The silicon content, of course, varies according to the grade required.

R. J. MERCER & CO.

LENGTH OF WRENCHES.

Stambridge, Pa., Oct. 10, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I would like to get an expression from your readers, as to the proper length of the following size wrenches: 3/4, 7/8, 1, 1 1/4, 1 3/8, and 1 1/2 in. These are the sizes that are mostly used on our work and in a locomotive repair shop. The question has often been asked as to what the proper length should be. It is a locomotive and our work must be done up tight and you will agree that the approved standard wrenches that are sent out with new machinery, stationary engines, etc., are too short for general work.

W. H. SAWYER.

Assistant General Foreman, N. Y., Long & Western.

APPRENTICE NOTES.

The following notes are taken from the proceedings of a conference of the apprentice school instructors of the Atchison, Topeka & Santa Fe, held in Topeka, Kan., almost a year ago and at the close of the second year of the new apprenticeship system.

The Dull Boy.—In his opening address, F. W. Thomas, supervisor of apprentices, laid considerable stress on the necessity of giving special attention to the slow, or the dull boy. He said: "For the bright, active, industrious boy, each of you has admiration. He offers no serious problem for you to solve. He will take care of himself. It only remains for us to act as governors, to apply the brakes occasionally to his progress. It is for the slower, duller boy, the plodding boy, I wish to speak. This boy watches the advancement of the brighter and smarter fellows with a feeling of envy. He broods over his slowness; he thinks he hasn't an even chance; he watches with selfishness the rapid progress of the others and soon begins to think he is a misfit; he loses interest in his work and drops out of service instead of swimming against the current with his power. The world has use for this boy. There is a function in the economic realms of nature that he must perform. It is in the handling of these boys that the real power, ability and value of our instructors are manifested. Here it is that tact and patience must be freely exercised. You must talk without scolding; reason without browbeating; smile, and not frown. It requires a greater artist and a greater genius to cut and shape a living statue from a rough block of marble than it does to simply chisel the name or date on the finished piece of sculpture and then place it on its pedestal. These are the boys whose molding, scouring and polishing will reflect the success of the instructor. Be patient with the dull boy, be indulgent, be companionable, be helpful. Above all, be extremely slow and sure of your ground before you send him in for dismissal. We are building up, not pulling down; we are trying to create rather than destroy. We are building, shaping, molding a precious cast, a human life, an immortal soul. Put your trade-mark on the cast."

Selection of Apprentices.—At present the apprentice instructors at all points examine each applicant and make a report to the chief mechanical official. It was decided that before making his recommendation he should ascertain if the applicant is physically fitted for the trade, should examine him as to his schooling, should ascertain as much as possible about his home life and associates, and above everything else endeavor to ascertain if he possesses any talent or natural fitness for the trade for which he is making application, and if he is specially desirous of learning this particular trade, aiming at all times to place the standard just as high as it can possibly be placed for that particular trade at that particular point; if necessary, a week's time should be taken for this examination and investigation.

Co-operation of Shop and School Instructors.—It is absolutely necessary for the shop and school instructors to co-operate not only in letter but also in spirit; that between the two there should exist a brotherly feeling, a feeling of warm friendship and of dependence. Each should feel perfectly free to go to the other for assistance or help and they should meet together as often as their duties and business permit. The supervisor of apprentices stated that he considered both positions of equal importance, that they were equally responsible for the training and welfare of the boys, and that credit or discredit would alike fall upon both for the success or failure of any apprentice.

Practical Value of the Classroom Work.—The discussion of this question brought out the fact that the lessons learned in school made the boys more accurate in their shop work, that the boys who were quick, active and accurate in their school work had proved to be the best boys in the shop, this being evidenced in a more pronounced manner where they had to work from blue prints, and especially in the boiler shop in laying out work. Shop instructors report that the boys are using their heads more than formerly and that third and fourth year ap-

mentees have no difficulty whatever in reading or interpreting blue prints and drawings.

In a paper on this question, C. W. Smith, apprentice school and shop instructor at Richmond, Cal., said: "A case of a piece of work came up a few days ago that required the drilling of a number of holes. I had a sketch and considered it quite difficult for the apprentice who was to do it, he being in his first year. I gave him the sketch without any instructions, and he had no trouble in going ahead and completing the job. During the eight months that the school has been in operation in Richmond I have seen marked improvement in the shop work of the boys, and in none is it more apparent than with the boilermakers and sheet iron workers. It tells directly in their every-day work and enables them to lay out work that in many instances would puzzle old and experienced men. At the Richmond shop two water tanks were built for the steamer Ocean Wave. These tanks were 54 in. in diameter and 24 ft. long, and had to be absolutely tight. The work was handled entirely by apprentices. All the flange connections and manholes, etc., were laid out from a sketch and an errorless job was made in good time, all of which was accomplished principally from knowledge gained in the school. Three of the boys who did this work were first year apprentices, and the other was in his third year. Apart from specific cases of this kind that might be cited, I am convinced from my own observation and the reports of the foremen who have to deal with the apprentices that the school training sends them to their work anxious to learn, better equipped to do their work well, and in so doing to improve their own position in life and repay the company for its efforts on their behalf."

Keeping the Boys Satisfied.—The boys should be kept constantly engaged in their work, as loafing and idleness give a boy opportunity of brooding over some imaginary grievance. He should be encouraged to approach the instructors for help and advice on any and all subjects. He should be discouraged from spending his evening hours at places where railway men, railway officials and shop matters are discussed as a matter of gossip. He should furthermore be discouraged from speaking lightly of any shop official or any other official of the company. The instructors should at all times be very careful on this subject themselves. Preach Santa Fe to them on all occasions. Give the boy to understand that the Santa Fe apprentice system is the best in the world. This sermon we can truthfully preach.

Discipline in the School Room.—It is absolutely necessary for the apprentices in the school room to know that the instructor must be master and that they should at all times appreciate his authority. This authority must be so exercised as to guarantee a quick and certain obedience. Along with this military discipline enough personal or parental spirit should be manifested in order that the boys' confidence and love may be commanded at all times. It was suggested as an experiment that occasionally a recess of some two or three minutes might be given in the school room in which the boys might relax from their duties. They should not, however, be allowed to leave the school room. While the school course should be adhered to in general and in detail, yet at times sufficient diversion may be made by the instructor in presenting some special subject in which the apprentice has shown an interest. Individual instruction should be given great prominence and each boy's special needs considered and provided for.

Instruction in Spelling, Writing, Etc.—Each of the instructors had noticed the weakness of the boys in spelling and writing and in the ability to express themselves understandingly. It was decided that all the apprentices who are backward in spelling and writing should be made to study and practice these two branches, and that for special training all the requests of the apprentices for favors, supplies, etc., should be made in writing. Occasionally fifteen minutes of the school time could with profit be devoted to spelling matches. All free-hand drawing should be confined to making sketches, the sketches to be reproduced as mechanical drawings.

The Backward Boy.—All the instructors recognized this as one

of the most serious and important of the many special cases that must be dealt with in handling apprentices, in that the moral, as well as the mental, obligation of the instructor is brought into prominence. It has been shown in a number of cases that some of our best boys have been developed from applicants who in the beginning belonged to the class of backward boys, and it is to these boys that we must look for our steady and constant mechanics. Patience, kindness and a humane interest are absolutely necessary in handling such boys, and these virtues, if not already possessed by the instructors, should be cultivated. This subject again emphasizes the importance of considering the apprentices individually.

Special Work for Apprentices.—The discussion of this subject tended to discourage the idea of detaching the boys from their shop work and giving them outside duties that had the least tendency to make them dissatisfied with their shop life. The fact was emphasized that the object was to make mechanics. In many cases it had been noted that when boys had been detached from shop work and given some office work to do, these lighter duties, easier hours, and the cleanliness of the work often made them somewhat loathe to resume work in the shop. The instructor should be careful in his instruction and should be sufficiently well acquainted with the apprentices to know how far he can go in any special or extra studies without injuring the boy. At the same time it should be the object and desire to teach the boys any special line that may be of benefit to them in the trades they are learning.

HOT WATER BOTTLES FOR HEATING PASSENGER CARS.

Although the limited and express trains on French railways are equipped with every comfort, the local trains are entirely without them. These trains are for the most part made up of the oldest cars, and consequently have many defects, of which the primitive method of heating, by means of hot water bottles, may be considered one of the most annoying. Upon entering



Hot Water Bottles Being Removed from the Car at a Terminal.

the compartment one stumbles over them, and they continue to be in the way throughout the journey. At first they are so hot that one cannot bear to keep his feet on them, but they soon grow cold, and are then worse than useless. Complaints are of no avail; you have to sit with the cold "warmer" under your feet until you get to one of the larger stations. The traveler is then gladdened by the employee's request "Attention s'il vous plait," as he requests you to make room for the fresh heater and removes the cold one.

Care and Selection of Shop Equipment.

FIRST PRIZE.

CAN THE EFFICIENCY OF SHOP TOOLS BE INCREASED?

BY J. S. SHEAFFE.

Engineer of Tests, Illinois Central, Chicago, Ill.

Abuse of Machine Tools.—The machine tool leaving the manufacturer's hands is to-day in very good shape to withstand much abuse, as this is the most important problem with which the tool maker is confronted, and he builds accordingly. Yet what a shame it is to see a beautiful machine roughly handled, scarred up and hammered! And is it other than the exceptional case to see a careful operator? If so, make a note on your next visit to a shop of the number of cases where a soft hammer is seen, as proper, instead of the constant use of the hard and ruinous machinist's hammer, as prevalent and improper, when to hammer is necessary.

How can this be eliminated? It cannot be until switchmen stop breaking up rolling stock, until engineers work their engines as advantageously as they would were they paying the coal bills, until trainmen do not waste supplies, and sectionmen do not leave jacks, picks and spikes on the right of way; in fact, until human nature changes for the better.

How Can Abuse Be Stopped?—There is this situation to be met and the only way to meet it is to work for the co-operation of everyone and thus to differentiate the unknown waste from a maximum towards zero, which value will never be attained, as there will always be some men who cannot be reached by anything but a time check; even then you are shifting the responsibility to some one perhaps not as well able to cope with it. The average man is sure to get just a little careless if he gets the impression that he is, in a way, "out of it." Now here lies the opportunity for accomplishing something by co-operation. Will any man admit that he has not gotten under his work with a good bit more vim after some superior officer has talked with him, asked his help, his advice, or made him feel that he was an important part of the organization? A machine cannot move itself, no more can it take care of itself. You look to the men to move it, so also look to them to take care of it, to prolong its life, to give maximum service, and to do good work while it is in the game.

The machine tools are usually run by the men who stay a long time in one place. The small tools, such as reamers, taps, pneumatic tools, etc., are mostly used on the pit side by the men who are here to-day and away to-morrow. The machine tool is operated daily and by the same individual; the small tool perhaps not twice by the same man; therefore the machine tool operator is more apt to look after his own comfort by keeping his particular machine right up to the mark, and if he is not so doing, the only alternative is to move him along down the line, as necessary, until he is a member of the stripping gang. He can then do as much hammering as he likes with less chance of damage.

There is no good reason for a corporation to meet the expense of repairing and renewing tools broken by indifferent workmen. In civil life an individual stands responsible for all damage to property and his own. The large majority of shops have some system of checking up damaged tools, with the supposed object of holding the operator responsible. This is all right, but how many cases are being followed up, blame fixed and penalty collected? The mechanic is a man of intelligence and is open to reason. This being the case, a vast deal of money is to be saved for the companies by looking more closely into the breakage of tools. The tool room checker may be accused, many times rightfully, of too lax inspection of small tools when returned, thus making it possible for damaged reamers, dies, etc., to get back to the rack in improper condition;

the mechanic responsible for this condition, with no knowledge either in the possession of the tool room or the foreman, goes on about his business feeling that the damage was not the result of his carelessness.

Keep a Check On Condition of Tools.—There is not a tool room foreman in the country who does not take a pride in the work turned out. It would be impossible for him not to feel a just satisfaction in tools nicely made, but after he sees these same tools returned all knocked out day after day, he would not be human if he did not ask himself: "what is the use?" He should, however, spend a little more time at the counter, looking over returned tools, while there is an opportunity of getting the right man. A small card, tacked to each case, whereon the tool-room boy could enter the number of the check and the date, would give a record of just who had used the particular tool for several times, and it would be possible to have a complete history of its users in cases of uncertainty. This should be in addition to the check left by the mechanic, which is a positive receipt for the possession of the tool belonging to the checked, empty rack.

Placing Responsibility.—There are two sides to the tool room question in the shop, engine house or repair yard. First, the company should not suffer loss either from broken, damaged or lost tools. Second, a mechanic should not be held wholly responsible for a tool that he is using and which some one has borrowed when his back is turned, or which has broken in fair usage. How to determine between the one and the other is, of course, up to the foreman. His knowledge of the characteristics of the one using the tool could almost decide the case, and correctly, too.

That a strict accounting should be made to prevent loss to the company is certain, but it is equally true that each question should be decided in all fairness. The only successful way to insure the proper care of tools, when used by a large number of men, is co-operation. First get the man, and after he is secured, leave it to him. He will take good care of the tool, get it back to the tool room in good shape and be contented and happy, and being thus will help to line up the others.

Tempering Tools.—Human accuracy is too limited to get a uniform temper on tools by the old fashioned hardening and drawing. Many good tools are too hard, and break, or are too soft and lose edge. On a dark day the heat seems more than on a light day. The electric furnace, with its pyrometer, determines absolutely the point at which the carbon changes and at which the tool should be quenched, and by this means the uncertainties of the tool dresser are overcome. Many good tools are spoiled by an indifferent method of tempering and as it is unfair to give one man an opportunity of improperly finishing up another's work, it follows that the tempering plant should rightfully be an adjunct of the tool room and under the tool room foreman's direct supervision.

Selecting New Tools.—In recommending new tools a foreman can get the best results by visiting other shops and getting their experience on the same work. Experience means dollars and cents, but mostly dollars, and minimizing the expense is something inherent in most people in responsible positions. It must be remembered that hundreds of men, all over the country, are working out similar problems and something that has worried one man has been mastered by another. It seems always best to recommend a standard article, regardless of price. The leading makers ask very little more than the ones who are really expecting the purchaser to help them experiment.

Care of Pneumatic Tools.—Pneumatic tools cost more than they should for repairs. Why? Because they are working a large percentage of water most of the time, are lubricated with the poorest oil at hand, and are not carefully handled. Every

shop should provide means of drying the compressed air. This can be accomplished either by expansion through an orifice or by radiating pipes and storage out at doors, as the warmer shop air will dry the air which is moist in a cooler temperature.

Case of Belting.—Many machines are abused when the operator has lost his temper, perhaps owing to a poor belt, or one which is too short for efficiency. The counters are too near to the lines shafts; this means a tight belt and much loss of power. The long sagging belt will help out many a machine that is balky in taking a good cut, but the shop layout prevents any betterment many times. Some belt dressings, like some belt compressors, are not made use of by the people who manufacture them. This is an important item and the action on the belts should be carefully watched. Many belts have been short lived on this account, and so a safe rule to follow is to use belt dressing sparingly, if at all. An overdose of dressing defeats the very end it is expected to attain, and may be compared with a physician's prescription; not the fact that certain medicine in any quantity is needed to effect a cure, but that the physician gauges the necessary amount, beyond which it is hazardous to venture.

Place Points of Emery Wheels.—Emery wheels, in most railway shops, are conspicuous by their absence from convenient locations. A machinist would rather continue for a while the use of a slightly dull tool than to bother going perhaps the length of the shop and waiting his turn at the wheel. This is hard on the machine, already hard pressed since the advent of high speed steel; also on the work and the man. When it is remembered that the rate of deterioration of a tool when dull does not vary as the work done, but as the square of the work done, there is an abuse all around. Emery wheels should be placed in all parts of the shop, both machine side and pit side. This makes it inexcusable for a man to work with anything but perfect tools.

Paint Machine Tools.—Machine tools should be kept painted a good bright color and the operators will keep them presentable, at least 49 out of 50 will. This, like many other seemingly superficial things, is only one of the little points which go to make up an educated shop, and in this kind of a shop there is little, if any, machine tool abuse.

Educate Apprentices Properly.—A great deal of responsibility lies with the foreman in charge of apprentices. He can either inspire them with a desire to outstrip their fellows in output or quality of work, which necessitates the proper care of the tools they use, or he can keep the boys moving from one machine to another, putting in the required time at each, shifting for themselves, learning as much or as little as they like, working hard or loafing harder, and becoming precise and careful only in turning in their checks when the whistle blows.

The careful, methodical man is always respected if not emulated.

THE TOOL QUESTION.

BY CHARLES MAIER,

Engine House Foreman, West Jersey & Seashore, Atlantic City, N. J.

One of your advertisers on the front cover of the October Shop Number makes a statement that applies to the tool question in general: "The keynote of cost is in the equipment." This is so self-evident that it admits of no argument. The only thing that must be taken into consideration in connection with it is: What shall that equipment be for any particular shop?

Selection of Tools.—It is obvious that it would be extravagance to put a large amount of tools in a shop where they would seldom be used. On the other hand, it would be poor economy not to provide tools simply because a certain sum of money that had been appropriated for this purpose had already been expended. This brings up the question: What shall determine the necessity of getting a tool? Suppose a certain operation had to be performed on an average of once a month. If it

could be done quicker by a special tool than by hand it would not necessarily be an argument in favor of getting the tool. If the amount saved in the operating would not cover the interest on the cost of the tool, together with a liberal percentage for depreciation, and then show a gain besides, it would not be advisable to get the tool unless an increased amount of business was in sight for the shop in question.

On the other hand, some operations are performed by hand, or by tools that are not up to date, that could easily be done in a much shorter time if a modern up to date tool was at hand. If such a tool can show a saving over and above interest on cost and depreciation it would be as much of a money maker as increased business would be.

False Economy.—An answer frequently given to a foreman making application for a new tool is: "We cannot afford it at present—our appropriation for this year has run out," or "orders have been issued to curtail expenses." If economizing or curtailing of expenses meant closing the shop, or repairs could be neglected, it would not be necessary to get a new tool. This is not the case, however. On the contrary, when orders are sent out to curtail expenses, locomotives and cars are generally run for a longer period before being shopped for general repairs. This adds more work to the outlying repair shops and if proper tools are not provided it is a rather expensive economy. An investment for a tool in cases of this kind will often earn the entire cost price in one year.

Folly of Not Providing Proper Tools.—With some tools, however, it would be a difficult matter to estimate the saving in dollars and cents. For instance, the writer was employed in an engine house some time ago to which a machine shop was attached in which about six men were kept busy continuously. All lathe, planer and shaper tools, also twist drills, were ground on a grindstone. It was a small stone and was supposed to be round, and even when in that condition it was slow work grinding a tool properly. The result was that men wasted time grinding tools and also wasted time in not keeping them sharp on account of the trouble of grinding them. Efforts had frequently been made to get a better stone, but none was provided. A machine for grinding twist drills would also have paid for itself in this place. It is almost impossible to estimate the amount of money lost with improperly ground twist drills. These are only two out of numerous instances that have come to my notice in which money was constantly being lost in not providing proper tools.

Care of Tools.—After tools are provided they must receive proper care and should be worked to their full capacity. A tool capable of being driven at high speed will not pay for itself unless provided with a cutting tool that will stand the speed. The same tool, even if provided with a proper cutting tool, would still be losing money if the bearings were allowed to run dry so it would not be capable of working to its full capacity. I have seen instances of machine tools that would not move for want of lubrication. This happened simply because the men were kept so busy they did not have time or inclination to properly lubricate them. If a certain time had been designated for oiling, such as the beginning of the day's work, for instance, the tools would never have been in this condition.

This tool question on a large railway system has such vast possibilities for economy that it should be followed up closely.

The Men and the Tools.—In this connection it is appropriate to mention the men operating the tools. These men in a certain sense can be classed as tools and in some instances receive no more consideration than a tool, and a rather poor tool at that. In most engine houses, even where there is a place for the men to make repairs under shelter, there is no place provided for them to wash. In some cases they have not got closets to hang their clothes in and in a general way they are treated as though they were only a necessary evil. The result is that the quality of mechanics employed in engine houses has deteriorated. Of what use is a good tool in the hands of an incompetent man? What reliance can be placed on the repairs made by this man?

Would it not pay to offer some encouragement to intelligent young men and boys to take up engine house work? At present an intelligent young man may be promoted to the position of engine house foreman, but I am afraid that is exactly what helps to scare him away. However, this tool question is so broad and the amount of discussion concerning it at present shows that it is receiving such an increasing amount of attention, that we can look forward with hope for better things to come.

THE CARE AND MAINTENANCE OF LEATHER BELTING.

By A. D. PORTER.

Shop Efficiency Inspector, Canadian Pacific, West Toronto, Ontario, Can.

Poor Belt Maintenance and Its Effect on Output.—If a machine stands idle during working hours, while the belt is being repaired or tightened, it produces nothing during that time, and there is a distinct loss in output. If it stands idle for one-half hour in ten hours' working time there is a loss of 5 per cent. in its output, and if in a shop having 100 machines ten machines lose one-half hour each day on account of repairs to belts it amounts to a loss of 0.5 per cent. of the total output of the shop. This, however, is probably not so serious as the loss in output due to belts being run so loose that they cannot begin to take the speeds, feeds and depth of cut for which the machines were designed and that the tools will stand. Almost every efficiency engineer in attempting to bring up the speeds of his machines to what he knows is possible has found that such attempts usually result in the belts slipping and breaking, or the lacings giving out, and he knows that where the care of belts is left to the man on the machine, in only a very few cases can the belts be depended on to do the maximum amount of work. Belts of the best quality must be used at proper tension, and they must be kept in first-class condition and inspected outside of working hours. Very few machinists, or even foremen, know how to tighten or lace a belt properly, the amount to be taken out being usually guessed at, and much time is lost through the machines standing idle while the cutting and trying is going on. I have known cases where good machinists have run cone belts, which have been made too tight, on "cross cones," i.e., on steps not in line with each other, the result being that the belt twisted itself up like a corkscrew and was practically ruined.

Proper Method of Lacing.—It is safe to cut belts 2 in. short in every ten feet of measured length. To lace with leather lacings, butt the ends of the belt together, being careful that the edges are cut exactly at right angles to the belt. Holes should then be cut in the belt with an oval punch, making the larger diameter of oval parallel with the sides of the belt. The holes should be punched as nearly as possible according to the following table:

Width of belt.	Punching hole holes, from ends of belt.		Center of belt holes on each side of belt, to be distant from each edge of belt.		Size of lace leather to be used.
	First cut.	Second row.			
2 1/2 to 4 0	1 1/2 in.	3 1/2 in.	1 1/2 in.	3 1/2 in.	1/4 in.
4 0 to 6 0	2 1/2 in.	4 1/2 in.	2 1/2 in.	4 1/2 in.	3/8 in.
6 0 to 8 0	3 1/2 in.	5 1/2 in.	3 1/2 in.	5 1/2 in.	1/2 in.
8 0 to 10 0	4 1/2 in.	6 1/2 in.	4 1/2 in.	6 1/2 in.	5/8 in.
10 0 to 12 0	5 1/2 in.	7 1/2 in.	5 1/2 in.	7 1/2 in.	3/4 in.
12 0 to 14 0	6 1/2 in.	8 1/2 in.	6 1/2 in.	8 1/2 in.	7/8 in.
14 0 to 16 0	7 1/2 in.	9 1/2 in.	7 1/2 in.	9 1/2 in.	1 in.
16 0 to 18 0	8 1/2 in.	10 1/2 in.	8 1/2 in.	10 1/2 in.	1 1/8 in.
18 0 to 20 0	9 1/2 in.	11 1/2 in.	9 1/2 in.	11 1/2 in.	1 1/4 in.
20 0 to 24 0	11 in.	13 1/2 in.	11 in.	13 1/2 in.	1 1/2 in.

The best method of lacing a belt is shown in Fig. 1; the lacing on the pulley side of the belt runs parallel with the belt and is crossed on the opposite side.

Belt Tension.—Belts put on too tight produce excessive strain on the pulleys bearing and consequent loss of power and output

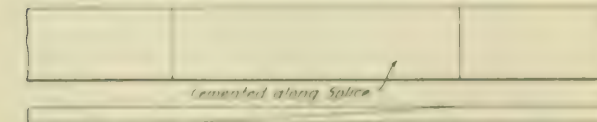


Fig. 3—Proper Method of Cementing a Belt: Cemented Splices Are Being Adopted Extensively.

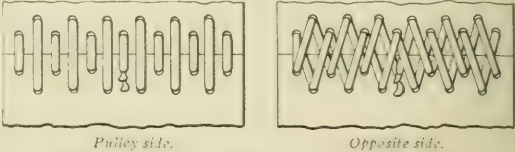
Belt clamps, Fig. 2, having spring balances between the pair of clamps, should be used for measuring the tension accurately each time the belt is tightened. They should be tightened in this manner to give the following pressure per inch of width, with an arc of contact of 180 degrees:

3-ply about 47 lbs.	5-ply about 63 lbs.	7-ply about 80 lbs.
4-ply about 57 lbs.	6-ply about 70 lbs.	8-ply about 95 lbs.
	10-ply about 140 lbs.	

Clamps for tightening belts, as shown in Fig. 2, can easily be made in various sizes to suit the different belts.

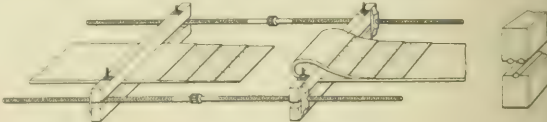
Cemented Splices.—Cemented splices, when properly made, give the best results and are being adopted by most up-to-date machine shops. The ends of the belts are beveled and then firmly cemented and rolled or pounded together and allowed to dry thoroughly before being run on the pulleys.

Keep Belts Clean.—One of the most important points in the care of belts is to keep them clean. All belts should be exam-



ined frequently, and the greasy or dirty ones scraped to remove all surface dirt. They should then be washed with warm water and soap, care being taken that the water is not too hot to be uncomfortable to the hands. Very dirty or greasy belts can be cleaned with a mixture of two parts of gasoline and one part of turpentine, but remember that this mixture is highly inflammable and must be kept away from open lights and fires; then scrape the loosened dirt off with an old file or dull knife, and wash again if you have not reached bare, clean leather. When the belt is dry it should be given a light, even coating of castor oil on the working side, and if very dry, on both sides.

A Good Belt Dressing.—A good formula for a surface compound for belts is: Equal parts of red lead, black lead, French



yellow and litharge. Mix with boiled linseed oil and add enough japan, to make it dry quickly. A thin coating can be applied with a brush and should be allowed to dry before running the belt. There are several good preservative foods or dressings manufactured by reliable firms which may be applied to belts after cleaning and from which splendid results have been obtained, as shown by experiments, records and data kept before and after treatment.

Belt Shifters.—A shifter having rollers should be used when the belt is a wide one. These rollers should press against the flat of the belt, not the sides, thus avoiding heating and damaging of the edge of the belt. Near each pulley on the lineshaft, where a belt drives a machine that is liable to stand idle for some time, a staple should be driven into the rafters or ceiling.



Fig. 4—Best Method of Cutting a Lap Splice for a Composition Belt.

A hook of 3-in. round iron should be hung from the staple; it should be made long enough to reach almost to the rim of the pulley, but a little to one side of it. When a belt is taken off its pulley it should be hooked up by the belt stick, the slack of the belt allowing it to be caught on the hook. When the belt sags

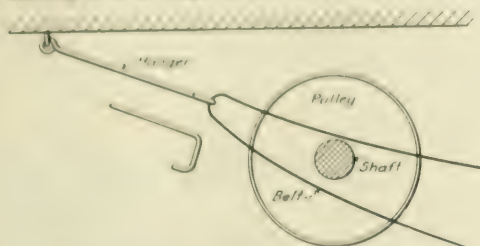


Fig. 5—Arrangement for Hanging Idle Belt to Clear Pulley and Line Shaft.

the hook should swing so as to make the belt clear the side of the pulley and also the shaft, as shown in Fig. 5. This avoids the tying of belts to beams, hangers, etc., or of leaving them hanging on the revolving shaft, causing the belt to be worn through or weakened. It is very little trouble to hook them up.

Keeping Track of the Belt Repairman.—In large machine shops and factories where a great number of belts are used a recording board, as shown in Fig. 6, has been used to advantage for keeping track of the belt man and keeping him informed as to the department or section of the works in which his services are required. Each of the top holes in the board has a number corresponding to a department or section. Near the center of

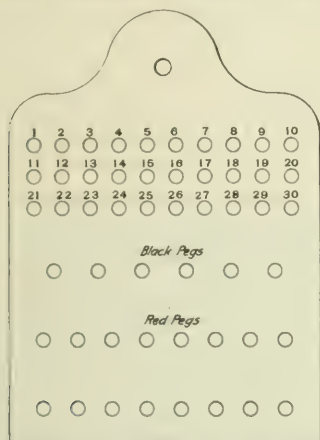


Fig. 6—Recording Board for Belt Repairman.

the board is a row of holes having black pegs inserted in them, and at the bottom of the board are two more rows of holes, in which red pegs are inserted. These lower holes are numbered from 1 to 15. When the belt man is wanted one of the numbered red pegs is put in the hole at the top to show the department where a belt requires attention. When the belt man returns he sees at a glance where he is wanted. Before he leaves the board he replaces the red peg with a black one. The first party coming to the board uses red peg No. 1, the second No. 2, and so on, thus letting the belt man know where to go first.

Belt Guards.—All belt drives within reach of persons standing on the floor, or on adjacent platforms, such as drives to emery wheels, etc., should be carefully guarded by wire screens of not less than 1-in. mesh. These are light and can be easily removed when it is necessary to get at the belt.

General Suggestions.—In conclusion, let me offer a few suggestions.

1. The best belt speed is from 4,000 to 4,500 ft. per minute.
2. To find the velocity of a belt, multiply the diameter in

feet of the pulley by the number of revolutions of the pulley by 3.1416; this gives the velocity in feet per minute.

3. Never overstrain a belt, as this produces unnecessary wear of belts and machinery and causes great loss of power by friction.

4. Do not throw on belts when pulleys are running at an extremely high rate of speed.

5. Do not run belts exceedingly tight, as the best service and greatest power are derived by their being just slack enough not to slip.

6. A steel tape is best in taking measurements for belting; other methods are less reliable.

7. A light belt on a large pulley is preferable to a thick belt on a small pulley.

8. The better you look after your belts the fewer machine failures you will have, which means less worry and more money.

THE CARE OF SHOP TOOLS.

BY W. W. REEVES,
Machinist, Illinois Central, Burnside Shops, Chicago, Ill.

Institute a system, and don't abide by a custom. Remember that changes come swift. Have a place for everything, and keep everything in its place. There is no system like the check for keeping track of tools, and as hunting for mislaid tools means time, and time is money, check your tools, just the same as the time of your men.

Have a censor for the scrap pile, and don't allow good material to get there.

Make some kind of a tool room in the engine house and put some one in charge of it. Check out tire heaters, hydraulic jacks, small jacks, crosshead extractors and all other appliances, just the same as you would other small tools, and then they will come back.

For the engine house machinist a tool box fastened securely to a truck, with individual wrenches, sledges, etc., is a good idea and saves many trips to the cupboard or tool room during the day.

The superintendent or master mechanic whose artistic sense of cleanliness is such that he will not leave enough pit-planks, small blocks, wooden and iron wedges and shims lying around to work with is guilty of criminal carelessness. Make a place for them and keep them in abundance; they are great dividend payers.

Remember your engines are larger than formerly, and make your pinch bars in proportion. It is a pitiful sight to see two little Austrians trying to move a 135-ton engine with a 4-ft. bar that belonged to the crop of 1884.

Construct or design a rack, or have a place where these heavy tools can be kept and found, and keep enough to go round. If the plant is large much time can be saved by serving recut files from the tool room, taking an old one in exchange for a new one. Do the same with the chisels. Have a man continually working on air hose, and let him examine and report all leaky pipe joints. Don't let a mechanic have to hunt two hours or more for these things and expect him to get a job out on time. Keep your motors well oiled, and also parts to repair them with, and if you must use old, worn-out drills, see that they are tempered.

Leave enough scrap around so a temporary bolt can be found without making a new one for a short job, only to be thrown away again.

Save and retap your old nuts and keep them, as well as old washers, in special size boxes in the engine house and backshop; they are worth their weight in gold. See that your tool room has a kit of pipe wrenches for common use; also a spirit level, screw driver, 2-ft. square and tin shears.

Keep a man that knows his business on belts, emery wheels and grindstones; the former are costly, and the latter are dangerous when not properly taken care of.

Don't persist in keeping a lot of old, worn-out taps and reamers in circulation; they are a joke, and a costly one at that.

Invest in high-speed drills and machine tools; it might pay to keep them in the tool room, and have a regular man grind them.

It is a good plan to let special men, like the "truck" or "steam-pipe" men, have their own outfits, with motor, drill brace, hose, etc., but for the rest, let them go to the tool room, and have plenty of these things there. Brains, like steel or anything else, cost money, but try and purchase enough brains in your "boss sweeper" so that he will pick up derelict oil cans, broken punches, chisels, etc., and save them from the scrap pile.

Few foremen seem to appreciate the value of a wedge, judging by the way they are allowed to be burnt up, if of wood, or sent to the scrap pile, if of steel; yet these things are in demand every hour in the day, and hours are spent looking for them.

A "bogie" or "buggy" bar is a handy tool; so is a "barrel" wrench; yet it would take a microscope to find either in some shops. A steel drift to draw the strap rod together is also a good thing and saves the bolt during the process. Don't allow a jack of any kind to stand around lonesome and neglected without a lever; it is a costly process. Give your doctors in the "repair hospital" practice enough to keep your tools in good order, and see that they are checked out and in. In closing, it is not the vast quantity of mechanical puzzles you have around the plant that counts, but it is the facility with which you can secure the necessary simple tools to do a commonplace, everyday job, and to know where they are.

SMITH SHOP TOOLS AND PRACTICES.

BY J. F. PERRITT,

Blacksmith Foreman, Seaboard Air Line, Jacksonville, Fla.

One of the most difficult problems in modern railway shop management is for a blacksmith foreman to keep his department abreast with the times by successfully competing with the output and the quality of work done in other shops on the system or shops of competing railways. This because of the fact that within the last few years the introduction of such machines as bolt headers, forging machines and bulldozers in the smith shop has so greatly increased the facilities for doing more work, and work that is more uniform, that the conditions which formerly existed in this department have been almost completely revolutionized, and the foreman with the most machines, or the most modern machines, has a decided advantage over the man without them.

If the management will buy these machines after the foreman selects them and shows the need of them, there will be easy sailing, as the majority of the tools made to use on these machines are designed on a uniform principle, and should the smith foreman lack the ingenuity to make them, the manufacturers of the machines, in order to increase their sales or the popularity of their machines—in other words, as a matter of business—will gladly furnish any assistance requested in getting up tools. However, if for some reason the management refuses to purchase the machines selected and required, still expecting results both in amount and quality of work, an extra effort is required on the part of the foreman to design and build, or build after some other fellow's design, any tools, such as steam hammer tools, forgers, air presses—or our machines, as some call them—and tools for the air presses, that in his opinion will assist in increasing his facilities.

While no air press that has come under my observation can successfully compete with the modern manufactured machines, they do help materially in increasing the output and making it of a uniform quality; the cheapness in building an air press, as compared with the price of a modern forging machine, is the principal thing that furnishes an argument in their favor. Such an air press, and some of the tools used on it are shown in Figs. 1 and 2. Thus I have recently made, and on some work it will compete with a forging machine or bolt header, as a general proposition, however, it will not. It was built partly during spare time, partly with stolen time, and chiefly from scrap material. With an air pressure of about 100 lbs. we have an

approximate pressure on the grip or vise of 21,500 lbs., and a pressure from the main cylinder or plunger of approximately 40,000 lbs. The dimensions given furnish $4\frac{1}{2}$ in. travel to the plunger, which so far has proven to be sufficient. This press has been of so much assistance that I am seriously contemplating building a larger one, to be used only on large work, as doing small work on a large machine would be an extravagant waste of air. As may be seen from both the sketch and the photo, there is plenty of room for improvement or changes, and I

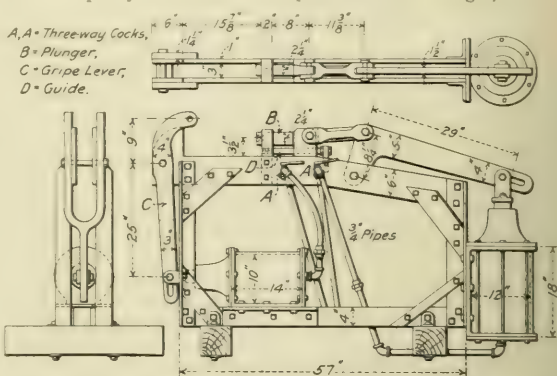


Fig. 1—Air Press for Bolt Work and Light Forging.

intend making several improvements as the opportunities arise.

Two tools used on another air press, with a travel of $14\frac{1}{2}$ in., built on the same plan as most presses affording a straight pressure, are shown in Fig. 3. The tool on the left for making straps for air reservoirs is a double tool; it may be reversed on the press by removing the bolts and turning it around. The arms connecting with the head pieces are interchangeable, so as to require only one pair. The straps made are for 10 in. and 12 in. reservoirs. The tool on the right is for making car steps with two bends and two quarter twists, such as shown in the illustration. This tool was suggested to me by a traveling sales-

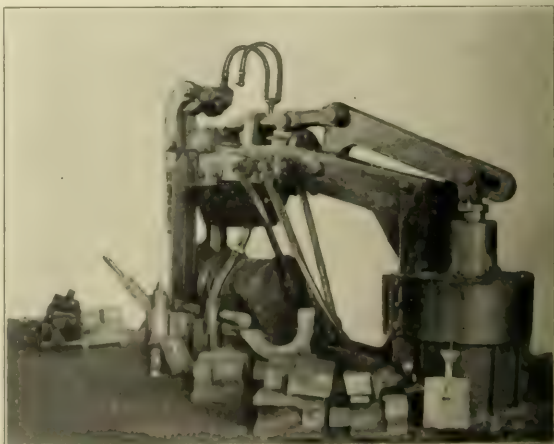


Fig. 2—Air Press for Light Forging.

man who was formerly a blacksmith foreman with the Southern Railway. I consider it the best step tool I have ever seen, as the step is completed in one heat with one stroke; in most cases, the number of steps bent on this tool in any given time is only limited by the capacity for heating them.

One of our tool racks and the method of keeping formers used under steam hammers, so that they can be found easily when needed, is shown in Fig. 4, the piece of work hanging on the same hook with the former with which it is made. This enables the smith, particularly a new man, to find the former

without any waste of time. The steam hammer swages, not shown in the photo, but on another rack, are kept in like manner, arranged in rotation from the smallest to the largest sizes; each swage has the size marked on it. This arrangement also saves considerable time. On another rack we keep various tools for steam hammer use, each tool being placed so that it can be found the minute it is wanted. Of course, if the task of keeping these tools in order is left to any and every one, they will not remain in order long; in our case an old helper is assigned to

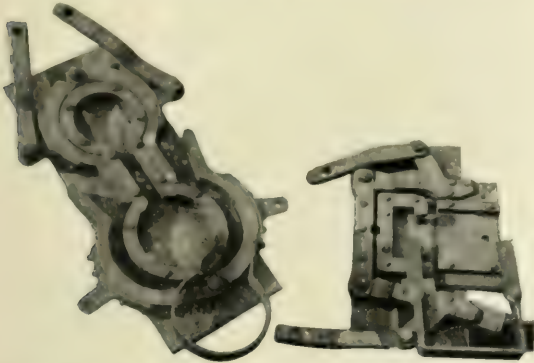


Fig. 3—Two Typical Tools Used on a Large Air Press, or Bulldozer.

the task of keeping the shop clean and these tools in order. About once a month he oils the working parts of the tools, using a piece of cotton waste and some cheap black oil. This is particularly necessary in a heavy, damp climate, where such tools rust quickly.

While forging machines have done a great deal toward displacing the steam hammer formers, the latter are still helpful, even where a foreman has his shop equipped with modern machines, as there are numerous jobs that can be done easily with a hammer tool that would be difficult and in some cases impos-



Fig. 4—Rack for the Storage of Steam Hammer Formers.

sible to do with a forging machine. A hammer tool for making and dressing claw bars, Fig. 5, is a convenient device and a big money saver wherever used. The cost of making wrenches of any ordinary size can be reduced to a minimum by the use of hammer formers and punches.

One of the greatest helps derived from a good selection of hammer formers and swages is that with them one is able to

utilize considerable scrap iron and steel that would be hard to utilize otherwise. A convenient way of keeping these tools in order and maintaining a standard of the various articles made with them is to have the original piece with which the swage or

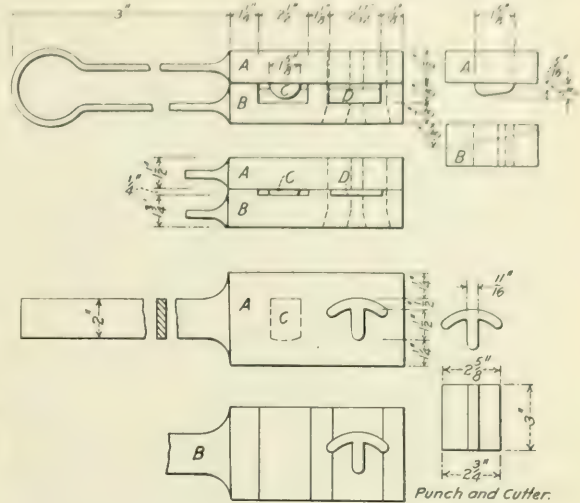


Fig. 5—Hammer Tool for Dressing Claw Bars.

former is made. It should be made of soft steel exactly the shape and size required, and after the first tool has been made with it, it should be kept for the purpose of working over old tools and making a new one when an old one breaks; in this way a great deal of time is saved and standards are maintained.

MANUFACTURE, MAINTENANCE AND DISTRIBUTION OF SMALL TOOLS.

BY C. J. DRURY,

Master Mechanic, Atchison, Topeka & Santa Fe, Arkansas City, Kan.

CENTRALIZED MANUFACTURE OF SMALL TOOLS.

Economical work depends upon the tools used, the condition in which they are kept and their availability for service when needed. The manufacture of small tools should be centralized, the principal shop being equipped to do this work. With this practice the tools are made standard, and the old practice of carrying thousands of dollars' worth of tool steel on racks at outside points to rust away can be eliminated. We should even go so far as to stop the dressing of tools at local points, which practice allows us to drift from our standards.

You are familiar with the great difficulty experienced when the simple little flue beading tool is allowed to be forged and finished at every division point. This is very noticeable when locomotives are transferred from one division to another.

The continued dressing of the large tools, such as used on planers, wheel lathes and other heavy machinery, soon makes them too short and they are allowed to be set aside, whereas if the practice of making and dressing them at one point is adhered to the scrap pieces may be worked up into small tools and sent to some other point where needed. How often has a certain special tool been made at some small plant, a bar of steel having been ordered ranging anywhere from 50 cents to \$1 a pound. The amount necessary for the tool is cut off, and the bar is set aside and soon forgotten.

The cost of shop machinery and tools is certainly no small item on our large railways, in some instances representing a yearly expenditure of over a quarter of a million dollars.

This centralizing of the manufacture of tools was inaugurated on the Atchison, Topeka & Santa Fe some four or five years ago and has brought about great reductions in the tool account,

as well as increased shop output. The Santa Fe at present has as near an ideal system of handling tools as any railway in the country. The tools are manufactured at one point and are delivered to the general storehouse and held in stock subject to requisition from outside points.

DISTRIBUTION OF TOOLS.

Requisitions made at all points or divisions must be approved by the assistant superintendent of motive power after being checked by the tool supervisor. A stock book is kept at all points, which is posted monthly, showing the tools on hand, the number and kind, also the number and kind ordered, with attached requisitions for the month's supply. This is mailed at the end of each month to the assistant superintendent of motive power for approval, and after being passed on in his office, where the requisitions are approved, changed or cancelled, the book is returned to the division. Foremen at all points are supplied with a catalogue, showing the standard tools carried in stock at the general storehouse. The illustrations show two typical pages from this catalogue.

After tools are received and placed in the tool room for issuing to employees, the check system is used. In case of lost or broken tools, a tool breakage clearance is required, made out and signed by the foreman; it must also bear the personal signature of the general foreman. In this way we are able to locate carelessness or ignorance in the handling of the tools by the workmen. At the close of each month the clearance cards from all shops are sent to the supervisor of tools. Information is thus obtained regarding defective design and construction of tools and recommendations are made for the improvement of the tool service. (The clearance card is shown on page 873. The article in connection with which it is used was written before Mr. Drury's paper was received, and, in a way, supplements it.)

The tool supervisor for the system sees all requisitions for tools and shop machinery. He is familiar with the equipment at each point; for example, a requisition may be made for some machine, perhaps an emery wheel stand. The tool supervisor, being acquainted with the tool condition of the system, may be able to fill the requisition from some other point, saving the purchase of new stock. This practice obviates the keeping of

STANDARD LATHE SIDE ROUGHING TOOL

SIZES	
C-102	1/2 x 1 x 8"
C-103	3/4 x 1 1/2 x 8 1/2"
C-104	1 x 1 1/2 x 8 1/2"
C-105	1 1/2 x 1 1/2 x 9"
C-106	1 3/4 x 1 3/4 x 9 1/2"
C-107	1 1/2 x 1 1/2 x 10"
C-108	1 1/2 x 2 x 12"
C-109	1 1/2 x 2 1/2 x 18"

NOTE—Tools to be ordered according to symbol number.

STANDARD PLANER RT & LFT SIDE ROUGHING TOOL

SIZES	
D-102	1/2 x 1 1/2 x 9"
D-103	3/4 x 1 1/2 x 9 1/2"
D-104	1 x 1 1/2 x 10"
D-105	1 1/2 x 2 x 12"
D-106	1 1/2 x 2 1/2 x 18"

NOTE—Tools to be ordered according to symbol number.

STANDARD STRAIGHT THREADING TOOL

SIZES	
F-102	1/2 x 1 x 8"
F-103	3/4 x 1 1/2 x 8 1/2"
F-105	1 1/2 x 1 1/2 x 9"

NOTE—Tools to be ordered according to symbol number.

STANDARD RIGHT THREADING TOOL

SIZES	
J-102	1/2 x 1 x 8"
J-103	3/4 x 1 1/2 x 8 1/2"
J-105	1 1/2 x 1 1/2 x 9"

NOTE—Tools to be ordered according to symbol number.

MACHINE TOOLS.
High Speed Steel.

Typical Page from Santa Fe Book of Tool Standards.

"Frenchman."

Gouge.

Diamond Point

Flat Chisel.

Cape Chisel.

Round Nose Chisel

MACHINISTS' AND BOILER MAKERS' HAND CHISELS.

expensive tools idle in one place when they are needed in another.

MAINTENANCE OF TOOLS AND MACHINERY.

To efficiently maintain these tools we have found it important that the operation of our machines be specialized. Our men do not become more proficient in the care and handling of their machine and tools than it switched from one machine to another. The constant changing of men on machines also allows the efficiency of our shop to decrease. The apprentice instructor should impress upon the boy the necessity of carefully handling his machine and regularly oiling it, and of keeping the bearings properly set up and adjusted, so that the machine can be crowded to full capacity without a breakdown.

Special men should be assigned to the repair work of machines, motors, shafting, hangers and belting. We not only get better results relative to the work performed, both quality and amount, but lessen the liability of accident. The proper maintenance of pneumatic tools is most important in the handling of an efficient shop. Experience has taught us that the maker's instructions regarding the care of such tools are very good rules to teach our apprentices and mechanics. These should be passed throughout the shops, and the foreman should see that they are rigidly carried out. It must be understood that air, steam and water leaks around the plant and shops help to depreciate the machinery. Boilers, air compressors and pumps soon wear out. The foremen should follow this up closely, seeing that such defects are given attention at the proper time, which will help the tool account. The tool room foreman in making his weekly or monthly inventory should be as eager to report a surplus tool as he is to order a needed one, thus helping out some other tool room without any increase in the account, at the same time getting credit for his own shop.

In solving the tool question we find that to carry on an efficient system we must keep in vogue the following rules:

- Centralize and standardize the manufacture.
- Systemize the distribution.
- Specialize the operation.

THE CARE AND MAINTENANCE OF MACHINE TOOLS AND SHOP EQUIPMENT.

BY W. J. EDDY,

Tool Room Inspector, Erie Railroad, Meadville, Pa.

The care and maintenance of machine tools and shop equipment is a question of no small magnitude with several of the large trunk lines. To keep in step with the rapid strides in improved design of machine tools and shop equipment we are compelled to give more thought and attention to the latest methods of operation. Designing machines and shop equipment by the well-known methods of calculation is a comparatively easy task. But there are so many unknown elements entering into the actual operation of the equipment and so great a factor of safety has to be added that in the end it is little better than guess work. Therefore, the designs of the future are strengthened by the failures of the present equipment.

Too much care and attention cannot be given machine tools. A machine operator who keeps his machine clean, the small tools on the tool board or in the cabinet for that purpose, and who does not permit his machine to get in a disorderly condition will produce a greater output than a negligent operator. Machine tools kept sharp by a systematic method of tool grinding will help to produce this greater output. This systematic method of tool grinding can be obtained by the installation of an up-to-date machine tool grinder in the tool room and by carrying in stock a sufficient number of standard tools ground to standard angles to supply the demands of the machine operators.

The proper care and maintenance of machine tools and shop equipment can only be accomplished by a systematic method of shop equipment failure reports and complete records. By the use of such failure reports and records and a careful study of them the design and selection of new equipment is determined.

Such a system is outlined below. Every machine tool and all shop equipment on the entire system is numbered, and a complete record is taken on standard 6 x 9 in. cards. These records are then filed in numerical order under the several shop headings, which readily locates all shop equipment in each shop. An index arranged in numerical order, regardless of shop location, readily locates any tool or piece of shop equipment by the number. By referring to the several record cards described, which cover machines, motors and generators, engines, air compressors, stationary boilers and shop air reservoirs, it will be noticed that complete information is given, which the superintendent of piece work or any general officer is able to obtain at a moment's notice.

A sample of the machinery record is shown in Fig. 1. This form is prepared to take a full record of all machines, giving complete information relative to feeds, speeds and distances, especially the distance between the counter and line shafts, in order that the best of belt conditions will exist. When a new machine is installed the next highest number is assigned from the general office, and this form is filled out in detail and forwarded to the general officer in charge. The form is then filed under the shop heading in filing cabinet. Whenever it is necessary to transfer a machine from one shop to another, it is so indicated on the form, giving the date of transfer, and it is filed under the shop heading to which the machine has been transferred.

The motor and generator record is shown in Fig. 2. It gives all the information necessary for a complete description and enables the electrical engineer to check up the electrical equipment in each shop at any time.

The stationary engine record is shown in Fig. 3. Each stationary engine on the system is assigned a number, regardless of location, and the forms are filed in numerical order. This form gives complete information covering the engine, which is easily available at all times.

The air compressor record is shown in Fig. 4. Each air compressor is assigned a shop number, and a detailed description is taken on these forms and filed in numerical order, regardless of location. Whenever a compressor is transferred to any other shop it is so marked on the card.

A complete record of all stationary boilers on the system is kept on the form shown in Fig. 5. These forms have an outline sketch of the boiler on the reverse side. Each boiler is assigned a number from the general office, and forms are filed in numerical order under each division. A semi-annual inspection and test of all stationary boilers is made, and complete records are kept of each test and inspection. The numbers are applied to the boilers on brass plates, which also show the steam pressures they are supposed to carry.

The shop air reservoir record is shown in Fig. 6. Each reservoir is assigned a shop number, and forms are filed in numerical order under each shop heading. Every three months each reservoir is given a hydrostatic test, washing and inspection; the air gages and safety valves are also tested and cleaned. The washing and testing are reported on the form shown in Fig. 8, and on receipt of this advice the date of the last test and washing is marked on the reverse side of the shop air reservoir record, and the reports are filed in numerical order.

Whenever a number is assigned to any piece of shop equipment it remains for all time; if the equipment is transferred, the number is also transferred. If a new machine or any piece of shop equipment is purchased to replace worn-out equipment, a new number is assigned, and the old number is scrapped with the old machine. Whenever a machine is scrapped and replaced by a new one it is so indicated on the record sheets, giving the date scrapped and number of the machine which takes its place.

Tool Failures.—The shop equipment failure card is shown in Fig. 7. Whenever a machine or any shop equipment fails in any way it is immediately reported to the general office on this card. This enables the general officers to know at any time the exact number of machines or equipment out of commission in each shop. When the repairs are made and the machine is in com-

STATIONARY BOILER RECORD.

Location _____	Type _____	No. _____
Locomotive Class Removed from _____	Specification No. _____	
Transferred or New _____	Builder _____	Reign No. _____
P. A. Order No. _____	Date Built _____	Date Received _____
Date Installed _____	Cost _____	Terms _____

DESCRIPTION	
Drift, Natural, Forced or Induced _____	Stack Diameter _____ Height _____
Class of Fuel Designed for _____	Stack Connection _____ Size _____
Flues Number _____	Large Size _____
Flues Length _____	Safe Working Pressure (Form 44-B) _____
Flues Gauge _____	Method of Firing _____
Firebox Length _____	Mechanical Stokers _____ Type _____
Feed Water Heater _____	Method of Boiler Feed _____ Injector or Pump _____
Dimensions _____	Ground Space Occupied _____
Grates for _____	Superheater _____ Type _____
Coal _____	Superheater Surface _____
Grate Area _____	Superheater Total Dimensions _____
Heating Surface _____	Flues _____ Sq. Ft. _____
Heating Surface _____	Flues _____ Sq. Ft. _____
Heating Surface _____	Flues _____ Sq. Ft. _____
Ratio of Grate Area to Heating Surface _____	Water Columns _____ Type _____
Rated Horse Power _____	Water Cocks _____ No. _____
Smoke Box _____	Distance from crown sheet to lowest _____
Length _____	1st to 2nd _____ 3rd to 4th _____
Diam _____	
MEADVILLE, PA. _____	190 _____

Fig. 5—Record Card for Stationary Boilers.

SHOP AIR RESERVOIR RECORD.

Location _____	Jobber _____	Spec. No. _____	Date Purchased or Made _____
P. A. Order No. _____			

DESCRIPTION	
Diameter _____	Inside _____
Length _____	Inside _____
Thickness of Sheets in Barrel _____	
Thickness of Sheets in Head _____	
Heads, Divided or Straight _____	
Circumferential Riveting _____ Pitch _____	
Circumferential Riveting _____ Diam. of Rivet _____	
Longitudinal Riveting _____ Pitch _____	
Longitudinal Riveting _____ Diam. of Rivet _____	
Longitudinal Riveting _____ Thickness of Inside Weld _____	
Longitudinal Riveting _____ Thickness of Outside Weld _____	
Blow-off Cock _____	Size _____
Blow-off Cock _____	Size _____
MEADVILLE, PA. _____	190 _____

Fig. 6—Record Card for Air Reservoirs in Shops.

mation again a second card is made out, giving the exact cost and time, and is forwarded to the general office. These cards are filed in the numerical order of the equipment number. Whenever the purchase of a new machine is anticipated these equipment failure report cards are gone over, and the specifications are rewritten to cover the weak points in the old design and also to take advantage of the latest improved methods of operation.

Repairs to Tools.—In the larger shops the maintenance of machines and large shop equipment is taken care of by a foreman in charge of a small repair gang of workmen, while the small tools are kept and maintained in the tool room by the tool room foreman and his force. In the smaller shops these two gangs are combined into one, with the tool room foreman in charge.

Belting.—The care and maintenance of belting is looked after by one man in each shop, reporting to the machine repair foreman. This man is provided with a belt lacing machine of the latest design, using the spiral wire lacing. He is also provided with a belt rack or case holding all standard widths of belts from 1 to 10 in. in length, varying in inches. These extra lengths are prepared for lacing. When a new belt is applied it is cut 10 in. short and is taken to the belt lacing machine and prepared for lacing by threading a spiral wire through each end. A 10-in. section is then inserted by simply inserting two pieces of raw hide about 1/4 in. in diameter, and the belt is applied. After the

FAILURE CARD FOR MACHINES OR OTHER SHOP EQUIPMENT.

Shop _____	Dept. _____	Date _____ 190 _____
Name of Machine _____	Shop No. _____	
Name of parts other than machines that fail _____		
Time of failure _____ 190 _____	A. M. _____ P. M. _____	Repairs finished _____ 190 _____
Name of part that failed _____		
Cause of failure and kind of material that failed _____		

were men sent home? _____ If so, how many? _____		
Name and description of any new parts either made or purchased _____		

Kind of material applied _____		
Estimated cost of repairs _____ Actual cost of repairs _____		
If material is ordered, give requisition reference _____		
REMARKS _____		

EXPLANATION.

Report must cover all failures to Stationary Engines, Air Compressors, Dynamos, Generators, Stationary Boilers, Motors, Machines, Steam Hammers, Pans, Shifting and Hangers, Furnaces, Cupolas, Air, Water and Steam Lines, Turnbuckles, and all failures which necessitate shutting down any machine or portion of plant, or result in delay to work.

This card must be made out and sent in to office of Mechanical Superintendent as soon as failure occurs, and should contain all information possible.

If repairs are not completed same day another card should be forwarded showing when machine was put into operation and any further information necessary.

Fig. 7—Failure Card for Machines and Shop Equipment.

belt has run for some time and sufficient slack has developed to require attention, the 10-in. section is taken out and a shorter piece inserted. This is done in less than a minute's time and does not interfere with the operation of the machine unless it is in constant motion; in that case it is done at the noon hour or the first time the machine is stopped. The 10-in. length is then put back into the rack to wait until the next application of a new belt. Each month a report is made to the general office showing the total amount spent on belting, both labor and material. This report enables the general office to ascertain the true

Shop Kinks.

FROM THE MORRIS PARK SHOPS OF THE LONG ISLAND RAILROAD.

BY F. E. LISTER,
Associate Editor, *Railway Age Gazette*

In gathering kinks at the shops of the Long Island, the effort was necessarily confined to the locomotive department, since practically all of the car work is that which has to do with electrical equipment.

There are some 800 men employed at the shops, about 350 of whom are in the locomotive department, working 10-hour days. There are 188 locomotives to be cared for, from 8 to 12 of which are in the shop at a time. A general overhauling usually takes from 16 to 21 days.

Some of the kinks which are described were made from ideas gathered from other shops, and no claim to originality is made in these cases. A number of them were, however, originated in these shops. Nor are they all given as being entirely new—for some closely resemble kinks previously shown in these columns—but only as representing efficient devices which have made for savings in shop work.

Both the photograph and drawing of the same kink are shown in a number of cases, it being realized that neither is entirely explanatory in itself.

G. C. Bishop is superintendent of motive power and E. H. Sweeley is general foreman of the locomotive department. To both of these, as well as the machine shop foreman, smith shop foreman C. A. Slinker, and boiler shop foreman Wm. Damon, we are greatly indebted for many courtesies and the necessary assistance in obtaining the information, drawings and photographs.

ECCENTRIC STRAP CHUCKS.

The details and also a working view of a chucking arrangement for machining cast steel eccentric straps on a boring mill are shown in Figs. 1 and 2. The Long Island uses a flangeless eccentric strap with an I-shape brass bearing liner. This liner is double-flanged, one side gripping the strap and the other overlapping the eccentric. The flanges on the strap side of the liner do not clamp it tightly, but just enough to hold it while handling. The $\frac{1}{2}$ -in. thick strap liners between the two halves extend beyond the cast-steel portion of the straps and hold the brass bearing liners from turning. The two holding pieces of the chucks, to which the halves of the strap are bolted through the $1\frac{1}{2}$ -in. holes, are made $\frac{1}{2}$ -in. thick to correspond to the standard liner used. The strap is held above the bed of the machine to permit facing off the under side without resetting. The driving clamp is fastened to the bed of the machine, as are the holding pieces, and grips the blade end of the strap by the two set-screws. All three pieces may be made of either wrought

iron or soft steel. Straps are handled, floor-to-floor, with these chucks, including boring and facing to snap gages, in about one hour per strap.

CYLINDER HEAD DOGS

The design and the application of a set of dogs used in machining cylinder heads on a boring mill are illustrated in Figs. 3 and 4. There are three such dogs in a set and they are

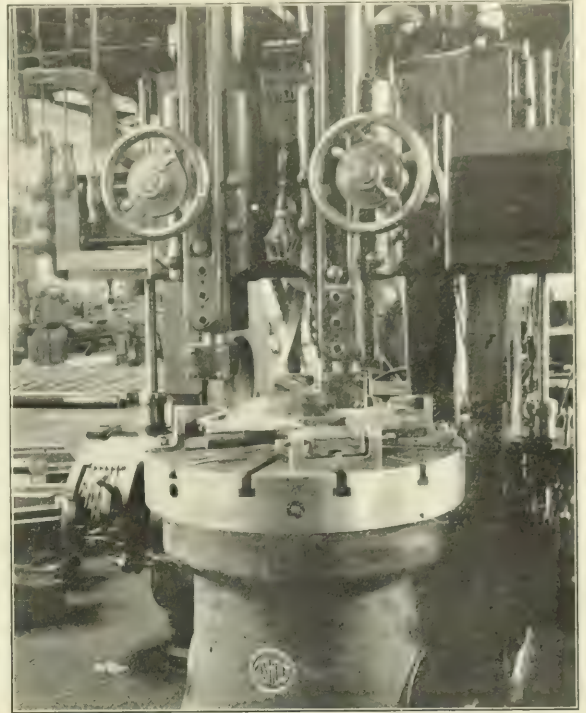


Fig. 2—Eccentric Strap Chuck as Used on Boring Mill.

made of soft steel. The gripping face, $\frac{3}{8}$ -in. in depth, has teeth, set at an angle of 60 deg. with the horizontal and opposed to the direction of motion of the machine, so that any tendency to slip forces the teeth more firmly into the work and wedges it more securely against the horizontal surface upon which it rests. Each dog has two holding bolts which tap into a cleat, fitting in the universal chuck strip in the machine bed. A sec-

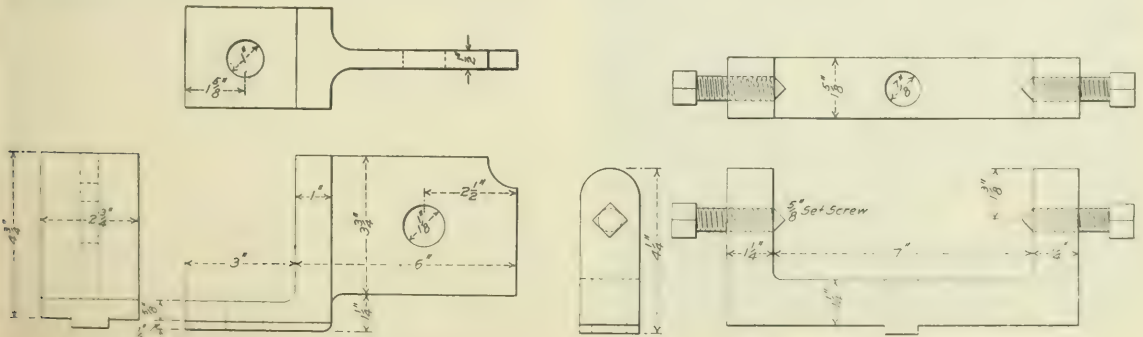


Fig. 1—Details of Eccentric Strap Chuck.

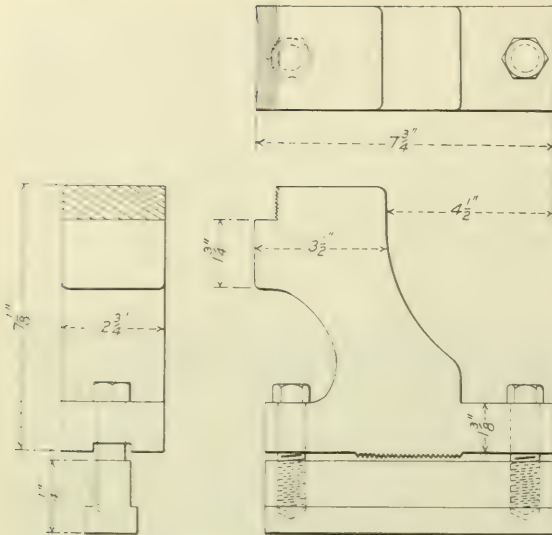


Fig. 3—Details of Cylinder Head Dogs.

tion of the base of the dog is supplied with teeth to mesh with those in the strips. These dogs are designed to take all of the cylinder heads used on the road. Although the chucks are used on a 42-in. high-power, double-head Gisholt mill, they give satisfactory results under the most severe conditions.

DRILL GUIDE

A simple and efficient guide for use in drilling a series of holes which run into each other in the base of a rail is shown in Fig. 5. The guide was made especially for use in connection with cutting planer clearance slots in a number of standard section rails, the flanges of which were being planed down to permit their being used for guard rails. Although it is a

special tool, it illustrates an application which may be used on any job requiring a series of consecutive drilled holes. A slight change in the design of the piece which holds the hardened bushing would be necessary for any work other than a rail. The guide is held in place on the rail by driving in the wedge

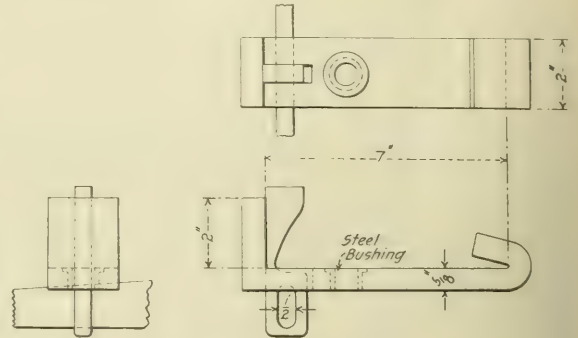


Fig. 5—Drill Guide.

which draws the loose key against the flange. This idea is one which is used very extensively at the Long Island shops, on all sorts of jigs and chucks. It replaces the nut which is usual in such cases, being much more quickly operated. The body of the device is made of wrought iron or soft steel and the drill bushing of hardened steel.

TIRE BORING CHUCKS.

One of a set of three chucking clamps which are used when boring tires and cutting retaining plate surfaces, at one chucking, on a 42-in. Gisholt boring mill, are shown in Fig. 6. A set of these dogs in use is illustrated in Fig. 7. The chucks are fastened to the bed of the mill by two bolts each, which



Fig. 4—Application of Cylinder Head Dogs to a Boring Mill.

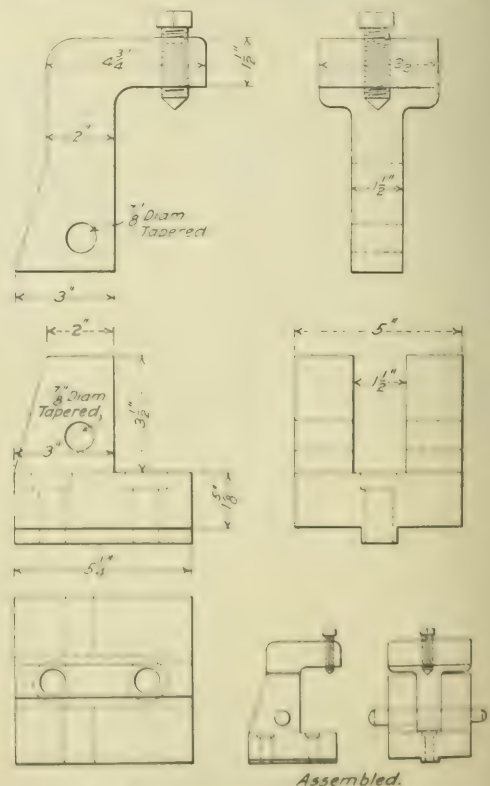


Fig. 6—Details of Tire Boring Chuck.

SHOE AND WEDGE CHUCK.

A chuck for planing shoes and wedges to the pop marks is shown in Fig. 11. It has a longitudinal strip cast on the bottom which fits the slot of the planer bed, and it is clamped down by two bolts which tap into a strip in the slot. The counterbored holes allow the bolt heads to be below the surface

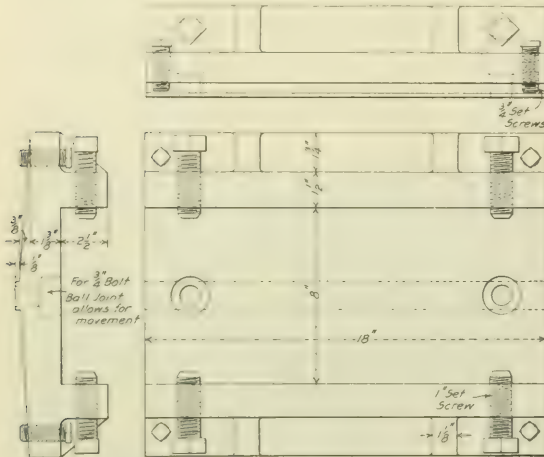


Fig. 11—Shoe and Wedge Chuck.

of the chuck, and as the bottom of the counterbore is ball-shaped, a tilting movement of the chuck is permitted. The shoe or wedge is placed in the chuck and the four 1-in. set screws set up lightly against it. The usual thin wedges are used under the flanges of the casting to bring the two pop marks on the outside flange up to the surface gage. When these points are correctly located, the four set screws are set up firmly and then the chuck itself is adjusted to bring the third pop mark to the same height as the other two. This adjustment of the chuck is accomplished by the four 3/4-in. set screws, one at each corner of the chuck, which bear against the bed of the planer.

EXPANSION CHUCK.

A large saving in brake equipment maintenance is effected by bushing the hole in the top of engineer's brake valve top cases, through which the rotary valve key passes. This hole becomes worn, allowing the key to rattle and air to escape at the key washer. Unless this hole can be bushed the worn top case must be replaced by a new one. It is a simple matter to bore out the hole, bush it, and bore out the bushing to the required size, as the case can easily be fastened to the lathe face-plate. But facing off the inside end of the bushing, against which the washer bears, is difficult unless some sort of special

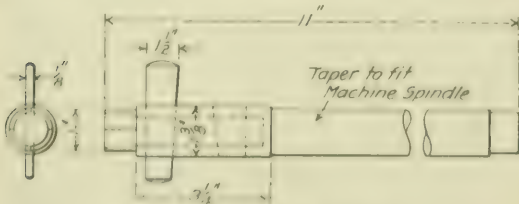


Fig. 12—Expansion Chuck.

chuck is employed. The one shown in the drawing, Fig. 12, is probably as simple, and at the same time as efficient as one as could be devised. Its application is shown in the photograph, Fig. 13. The taper fit of the chuck bush fits into the lathe spindle, while the opposite end fits the hole in the top case. The chucking end is sawed through up to the shoulder on two diam-

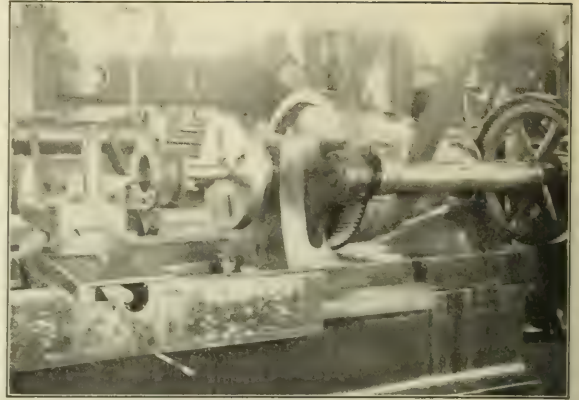


Fig. 13—Expansion Chuck as Used on a Lathe.

eters at right angles to each other. A conical wedge, with a straight shank which extends about 3 in. beyond the shoulder, is drawn into the split portion of the chuck, expanding it in the top case hole and gripping it firmly. The flat, tapered key is driven in one slot to spread the end of the chuck and in the other to close it again, the key, of course, passing through the straight shank of the conical wedge.

SLOTTER BAR.

A slotter bar, fitted with a clapper box which acts to relieve the tool during the return stroke, is shown in Fig. 14. The tool is held in the clapper by the two set screws which tap in from the bottom. Slots in the bottom of the bar provide for the movement of these screws. The coil spring, shown dotted, acts

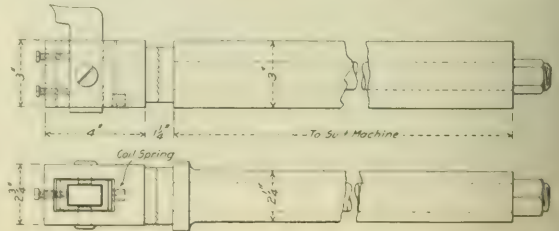


Fig. 14—Details of Slotter Bar.

to return the tool to the cutting position after it is free of the work and before the cutting stroke begins. Adjustment of the tool is also provided by loosening the nut at the top of the bar and revolving the end carrying the tool. This saves the work and the time required to readjust the bar on the machine head.

OLD TYPE CONTACT SHOE JIGS.

Three angle jigs used for holding an old type motor car contact shoe for drilling are shown in Fig. 15. As contact shoe parts are interchangeable, they are kept in stock in large quantities. The three jigs are placed on the multi-spindle press at the same time, so that one man can turn out 200 drilled contact shoe parts in a 10-hour day. The casting is machined on one face, and when placed in the jig this face provides for the setting. Provision for quick setting is made by clamping the casting against the jig and holding it by the wedge. This wedge is quickly placed and removed. Using three spindles and high-speed drills, the work is turned out rapidly.

JIGS FOR NEW TYPE CONTACT SHOES AND HOLDING KNUCKLES.

Two kinds of jigs, one for a new and smaller type contact shoe used on the new steel motor cars, and the other for the holding knuckle casting used with this shoe, are shown in Fig. 16. These castings also have planed surfaces, which set in the jig. The same method of holding, that of using wedges, is employed as in the above case.

SHAPER CHUCK FOR ROD BRASSES

At the left of the photograph of the double head shaper, Fig. 17, is shown a revolving chuck used for shaping rod brasses to size. The vertical faces are machined with a double cutter tool, the brass being revolved a quarter turn for each set of flanges and held in position by a pin stop. A second pin stop is at

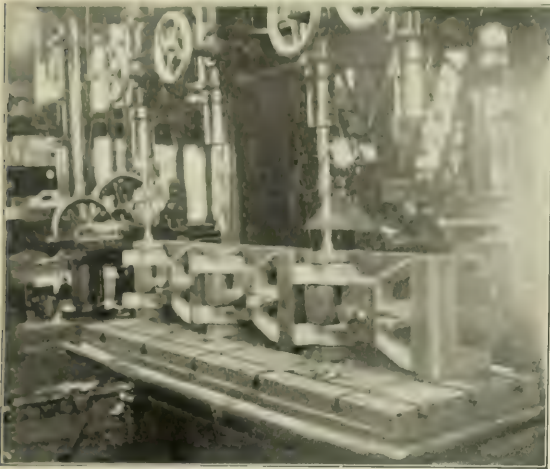


Fig. 15—Old Type Contact Shoe Jigs as Used on Drill Press.

ranged for less than quarter turns, such as for cutting the key taper faces on brasses which fit on square end rods. The brass is held against the angle plate by another flat plate, which is drawn up by the large nut. This jig has made it possible to do the work in one-quarter the time formerly required.

As originally made, the entire chuck, shown at the right in the illustration, was of cast iron, but it would not stand the severe

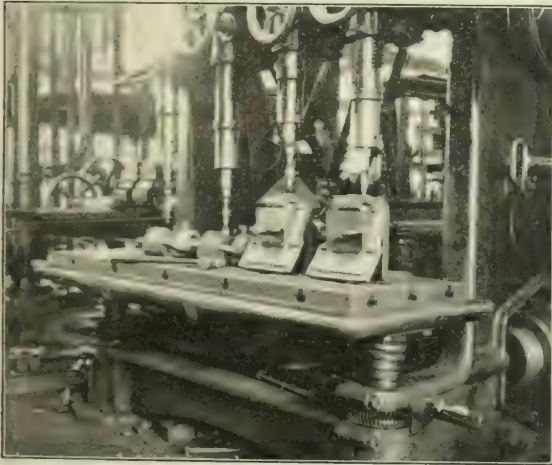


Fig. 16—New Type Contact Shoe and Knuckle Jigs as Used on Drill Press.

duty with high-speed steel. The old base is still in use, but the upper half and the sliding back were machined out of solid steel forgings. The adjustable foot rest is used to prevent any springing of the chuck when working on a long overhang job.

ECCENTRIC CAM CHUCK.

A cast iron chuck for boring and facing eccentric cams is shown in Fig. 18. Provision is made for 5-in., 5¼-in. and 5½-in. throw cams. When boring out cams that have been turned on the outside, circular filler pieces are used inside the chuck.

When facing, the casting is held in the three 1-in. set screws, and when boring by three tapered top clamps, fastened by 1-in. tap bolts. This work is done on the Grisholt boring mill illus-

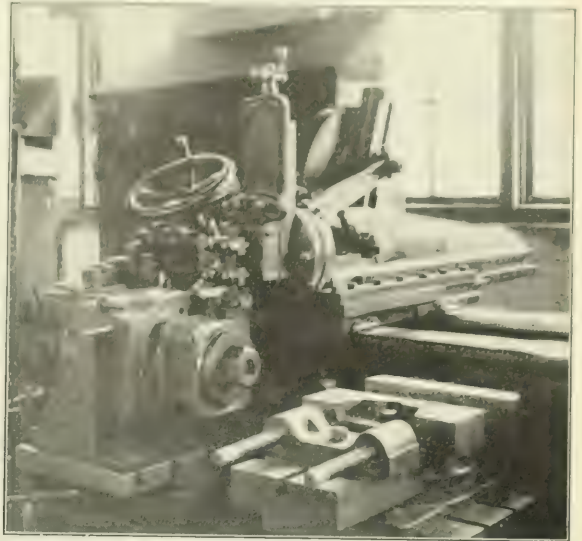


Fig. 17—Shaper Chuck for Rod Brasses.

trated in connection with the tire-boring chucks. About 1½ hours' time is required for the boring axle fit and facing both sides of a rough casting. For an old eccentric about 30 minutes' time is required for reboring.

PNEUMATIC STAYBOLT BREAKER.

The details of a pneumatic staybolt breaker are shown in Fig. 19. It is a rather highly-developed design, but does not differ in general from staybolt breakers previously shown in connection with shop kink articles. The cross section shows the

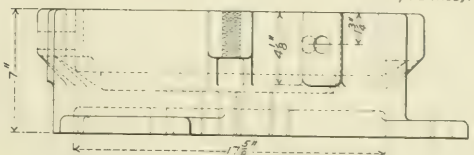
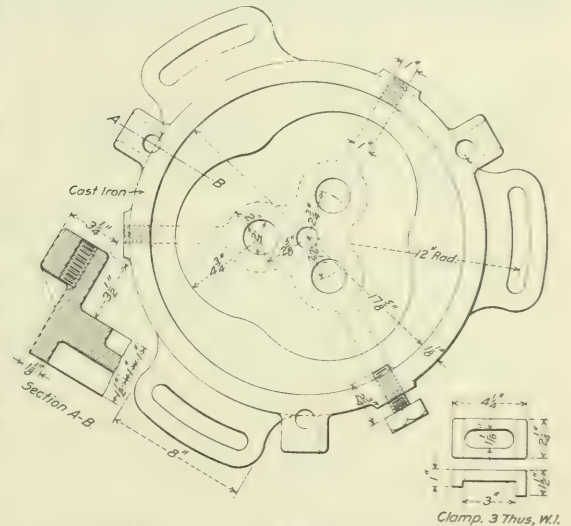


Fig. 18—Eccentric Cam Chuck.

arrangement of the live air and the exhaust valves, and the 16-in. x 3¼-in. diameter machinery steel ram, which has a packing ring at either end and a 2-in. x 4-in. piece of hard steel in the striking end. The ¾-in. x 2¾-in. x 14-ft. 3-in. long track on which the breaker runs is bolted fast to the firebox. One man operates the cam which locks the breaker in position, and also the air valve. A second man places the breaker bar end on the successive staybolts.

MANUFACTURE OF PISTON AND VALVE ROD PACKING.

When United States metallic packing was first introduced the rings were machined. Railway shops subsequently thought it practical to use cast rings in order to save the expense of the machine work, but in general it was found that serviceable packing could not be gotten in this way, as the metal would not flow sufficiently to fill the corners of the mold. Some success was attained, but it was confined to those shops where a non-shrinking metal could be made. When attention was directed to the subject of packing at the Long Island shops it was found that about all of the various types of United States metallic packing were in use, including a large number of sets of the

Fig. 21 illustrates the second operation, that of forming the outside of the rings to the exact contour of the vibrating cup. A set of formed rings is shown in place on the mandrel and the forming tool is shown turned up so as to better illustrate its shape. The rings are a neat fit on the mandrel, being held by the large nut and washer. After this second operation the rings are placed in stock in the storeroom, and the third operation, shown in Fig. 22, is performed where the packing is drawn for use. This last operation consists merely of boring the rings to the size for a particular rod. The set of rings is held in a bushing, of the same contour as a vibrating cup, by a chucking sleeve. One of these sleeves is also shown on the turret top. It has a heavy thread with three interruptions, which permits its being quickly placed in the chucking bushing, as but one-sixth of a turn is necessary to lock it. This bushing checks the finished size of the packing rings, since the rings will not properly fit in it unless they are made of the correct size. A number of sets of finished rings are shown in front of the turret.

The method of machining the vibrating cups for this packing is shown in Fig. 23. Close inspection of the photograph shows

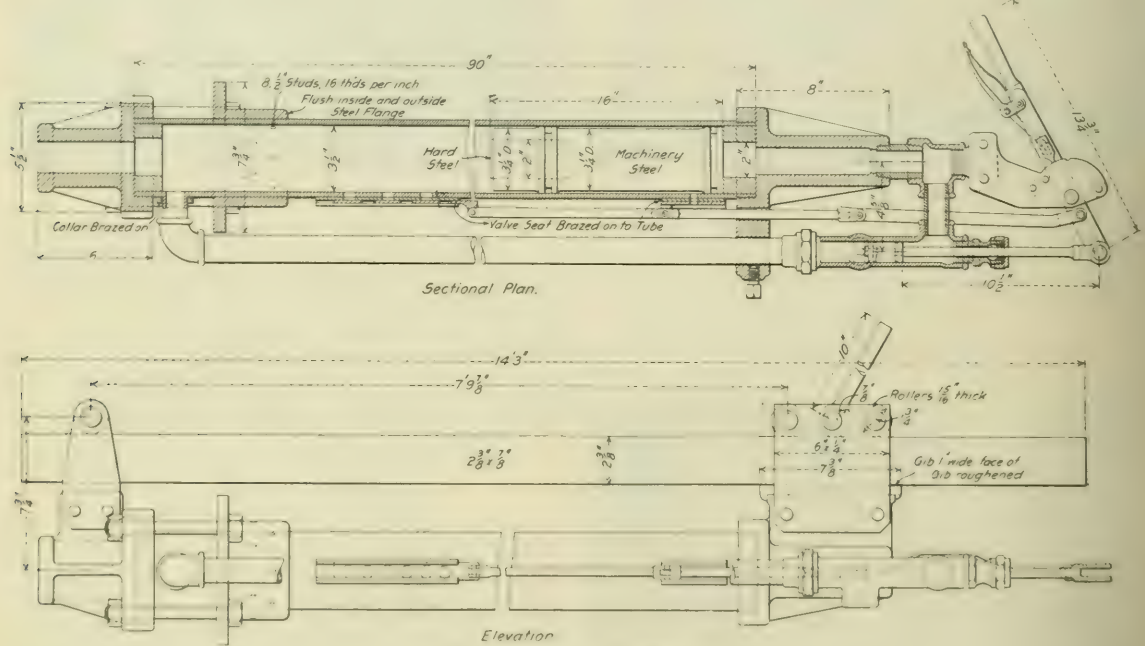


Fig. 19—Staybolt Breaker.

single angle design. This design is especially difficult to maintain and does not give nearly as efficient service as the multi-angular design, especially if the latter is machined and its vibrating cups kept close to the piston rod diameter. The use of the multi-angular design of packing also permits making the soft metal rings of a lead base metal, which is much cheaper than tin base metal.

The four photographs given herewith show the three processes of making the soft metal rings and that of handling the vibrating cups. The rings are cut from a cast bushing, using a gang tool and cutting off one set of three rings at a time, as shown in Fig. 20. The bushings for piston rod packing are cast sufficiently long for cutting five sets of packing from each, while those for valve stem packing make six sets per bushing. The bushing is rough bored to a maximum rod diameter before the rings are cut. This rough size also suits the mandrel which is used in the second operation, that of forming. On top of the turret head is shown a number of sets of rings, and on the pegs of the shelf above the machine are a number of sets of both cut rings and finished packing.

the two tools—roughing and finishing—which are used. These are forming tools, the roughing one doing most of the work and the finishing tool being used only for a light finishing cut to the exact contour of the rings. The rough casting is held in the universal chuck as shown. The outside is turned off and then the inside is formed. The cup is then reversed in the chuck, the straight face is finished and the rough metal remaining on the outside diameter is turned off. Vibrating cups are placed in stock and bored out to fit the rod when used.

The Gibbs pattern of vibrating cup is used on piston rods with enlarged crosshead fit ends, a built-up cup being necessary. The brass portion of the cup is cast in halves. These are faced for joining, doweled, sweat together, machined and afterward broken apart. The machine work is done on the same lathe and with the same tools and chucks as used for the packing.

APPLIED VERSION OF A STEEL RIM TO A DRIVING WHEEL LATHES.

The Paterson wheel lathe, one face plate of which is seen at the right of the photograph, Fig. 24, was purchased before the advent of the present day high speed steel. The gears were cast on the face plates and the teeth have broken and cracked to

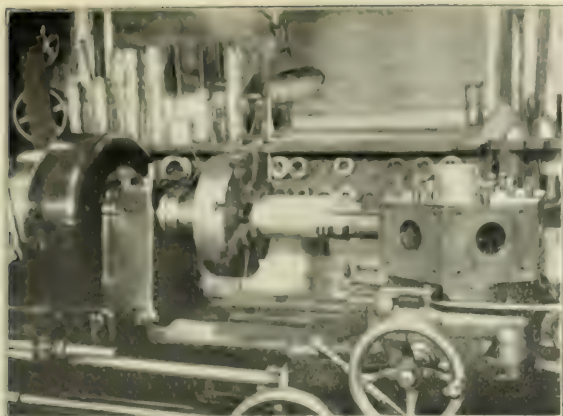


Fig. 20

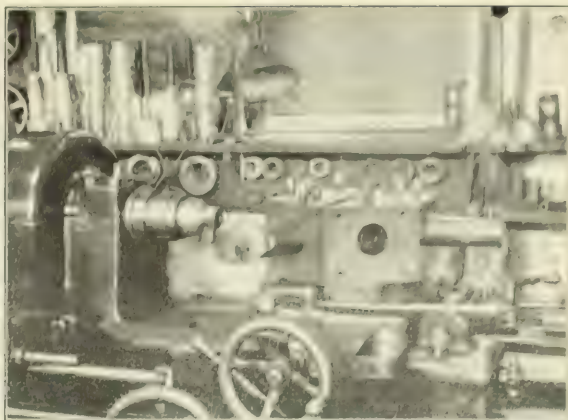


Fig. 21

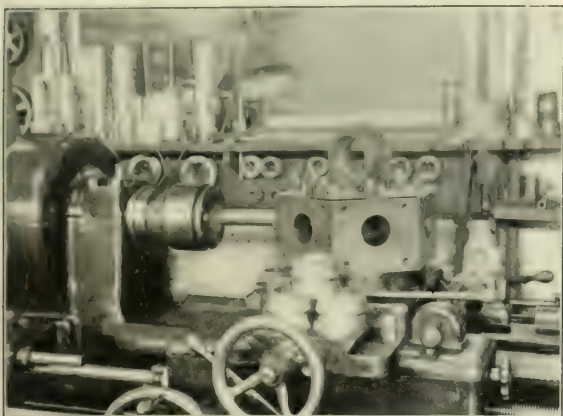


Fig. 22

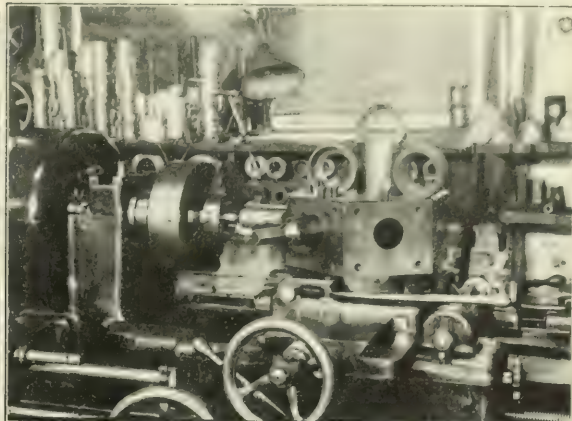


Fig. 23.

Manufacture of Piston and Valve Rod Packing.

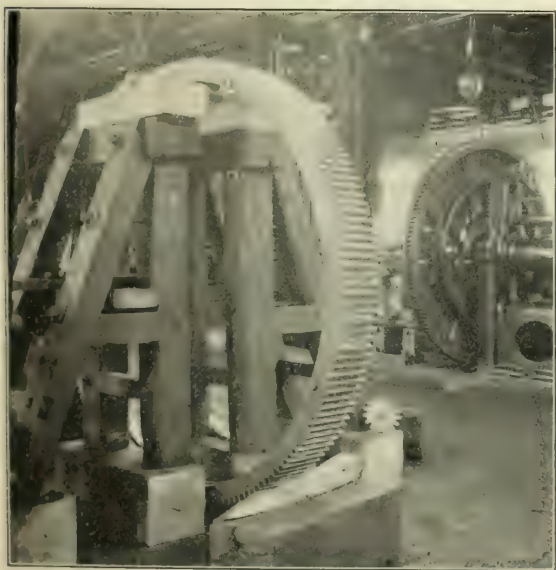


Fig. 24—Steel Gear Rims in Position for Filing and Lathe to Which They Will Be Applied.

such an extent, under the heavy duty to which the lathe has been subjected, that it was found necessary to get new face plates or put on new gear rims. The latter course was decided upon and in the foreground the two rims may be seen bolted together in the course of being finished. The old gear rims will be turned off on a 100-in. boring mill. A detail cross section of the new steel rims is shown in the drawing, Fig. 25, as is the method of fastening them to the face plate with 16, $\frac{7}{8}$ -in. tap bolts each. The application of these rims will not only completely redeem the lathe, but will make it serviceable for high speed steel duty.

Two special blank tires were made by a tire manufacturer. After being turned, bored and faced on the 100-in. mill, they were bolted together by drilling a few of the holes which will later be used for holding them to the plate. The 175 involute teeth, of 15-deg. obliquity and diametral pitch of 2, were laid off. A pop mark was made on the pitch line opposite each tooth. By bolting a crosspiece to the rim blanks and arranging a center, it was possible to cut the teeth on an 18-in. slotter. To provide for movement of the rims, front-end hopper castings were used. A permanent center point was arranged, which was let down into the pop mark on the pitch line when revolving the rim for each tooth. This acted as a check on the lines of the teeth. A square roughing tool was first used all around the gear, followed by a tooth-shaped tool. Snap gages checked the work while machining the teeth. The slotting operation was completed in about 100 hours. The photograph shows the two gears in position for filing the teeth to exact contour. The

small hand-cut pinion was made for a templet for filing. New steel cut pinions are being made by a tool builder for use with the new gear rims.

About two years ago new face plates were applied to this ma-

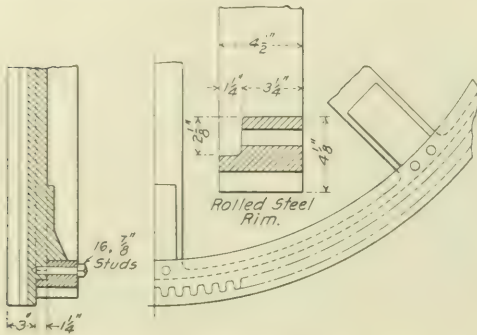


Fig. 25—Details of Driving Wheel Lathe Face Plate and Steel Gear Rim.

chine, but the cast gear rims failed. With the steel gear rims, it is expected that the machine will be useful for an indefinite period.

OIL TIRE HEATING.

The method of heating tires at the Long Island shops is illustrated in the photograph, Fig. 26. Wheels are handled to the stationary stand by the shop crane. This stand is made from an old axle, into which a cross frame brace is secured. The pipe which encircles the tire is perforated with 1/4-in. holes. The cheapest grade of fuel oil is used with this heater. The oil is contained in the old air reservoir, and is forced to the jet by air pressure in the tank. The oil reaches the jet through a small pipe which is concentric with the one shown, the outer pipe carrying the air for mixture with the oil at the nozzle. The

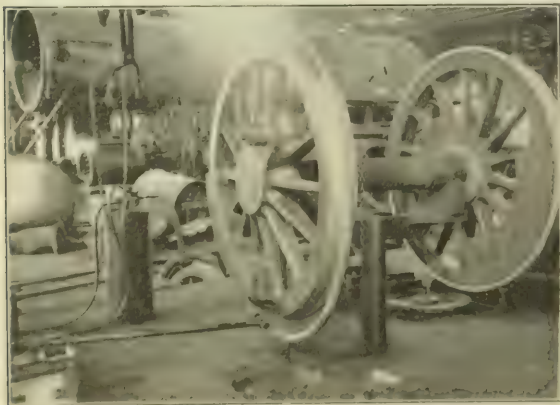


Fig. 26—Driving Wheels and Burner in Position for Heating.

oil is forced in both directions through the circular pipe and, by proper regulation and after the pipe has become heated, makes a steady blue flame all around the circumference of the tire. There is an open space of about 2 in. on each side of the T-end of the delivery pipe. This allows for syphoning outside air into the circular pipe. The tires are handled by the jaw clamps with a block and fall from a wall crane. It requires from 15 to 20 minutes to remove or replace a tire by this method of heating.

OIL CRUCIBLE FURNACE FOR MELTING BRASS.

An oil-burning crucible furnace for melting brass, for casting driving wheel hub liners, faces on driving and truck boxes, bushings for lathe shaft bearings and rocker boxes, etc., is shown



Fig. 27—Oil Crucible Furnace for Melting Brass.

in Figs. 27 and 28. The furnace proper is 40 in. in diameter, 36 in. high, and is set 18 in. below the ground level and in a concrete foundation. It is fire-brick lined and has a 9-in. x 9 1/2-in. base in the center, upon which the crucible rests. The center line of the blast and oil piping is 10 1/2 in. above the base of the furnace and about at mid-height of the base holding the crucible. The plan view in the drawing shows that the flame is directed into a space between the base and the brick lining, so that it takes a spiral course around the crucible. The furnace was designed along the general lines of a furnace seen during a visit to another shop, with one particular alteration, that of directing

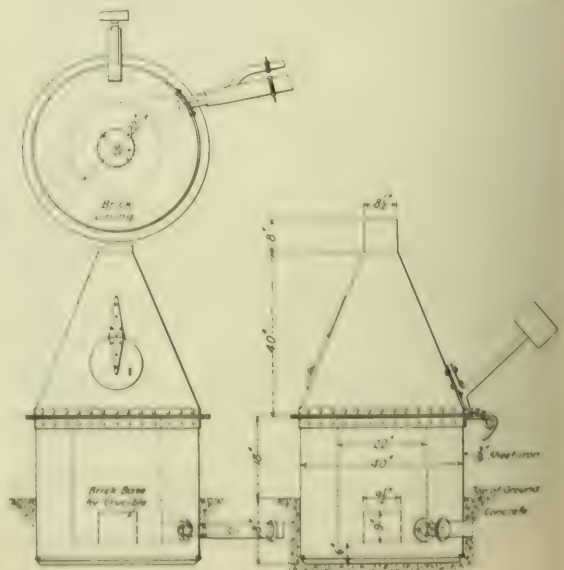


Fig. 28—Details of Oil Crucible Furnace.

the whole flame is shown in the drawing, rather than dividing and directing it separately against the base of the cylindrical pillar.

A detail of the burner, which was designed by Mr. Swedler, is shown in Fig. 29. The air blast, piped from the blacksmith shop, comes through the 1½-in. pipe and also through the 3-in. gas pipe. The smaller pipe is held concentric with the 3-in. air blast pipe by three ½-in. set screws. Each of these pipes has an individual gate by which the air is regulated and a proper adjustment of these gives the required air supply. The oil supply is piped to the ½-in. copper pipe, and jetted through the ¼-in. hole in the end of the copper pipe, against the ⅝-in. ball near the mouth of the 1½-in. pipe, forming a spray. This acts to atomize the crude oil so that it mixes with the air blast.

When this furnace was first installed, it was found that the brass, after being cast for a hub liner, for instance, would crack, showing that the metal was being oxidized in the furnace. It was, consequently, the custom to regulate the oil and air supply

best advantage. The all-metal stand in the center of the photograph illustrates the method used for overhauling steam and motor-driven air compressors, the compressors being motor compressors. They are handled to the stands by an air hoist, cleaned, overhauled and tested without being moved. These stands have a pivot leg at one end and a roller leg at the other, which permits them being swung around, according to the work being performed. At the left of the illustration is shown the switch-board, through which current is received for testing the motor compressors. At the right are the locomotive air pump testing racks, with a metal pan for any waste water or oil.

OVERHAULING

The three photographs, Figs. 31, 32 and 33, were taken from the same position at the entrance door of the flue shop. By swinging the camera around it was possible to take in the three sides of the building, and to follow the direction of the flues

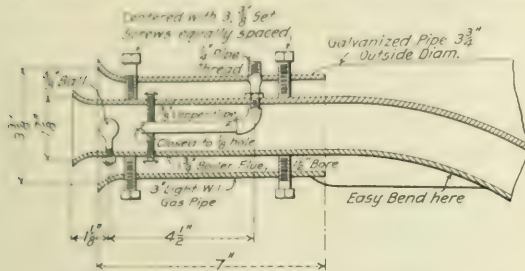


Fig. 29—Section Through Oil Burner.

to give a smokeless fire, but experiment with a slightly smoking fire gave a much better metal and one which would not crack when cold. The crucible will hold just enough metal to pour two hub liners at one heat. It requires 1½ hours to heat a charge from a cold crucible and 50 minutes from a hot crucible. When sufficiently heated, the top of the furnace is thrown back, as shown in the photograph; the crucible is lifted out with tongs and placed in a double handle loop, by which it is carried into the shop where the pouring is to be done. One of the cast brass hub liners is seen in place on the driving wheels shown in Fig. 26, and a cast driving box face being machined in Fig. 9.

AIR BRAKE ROOM.

A portion of the air brake repair room is shown in Fig. 30. Arrangements are now being made to move the air work to another portion of the shop, where about three times the floor space of the present room will be available. This fact, together with an appreciation of the close quarters of the present room, noticeable from the photograph, gives an idea of the possibilities of handling work in a small space when all of it is used to the

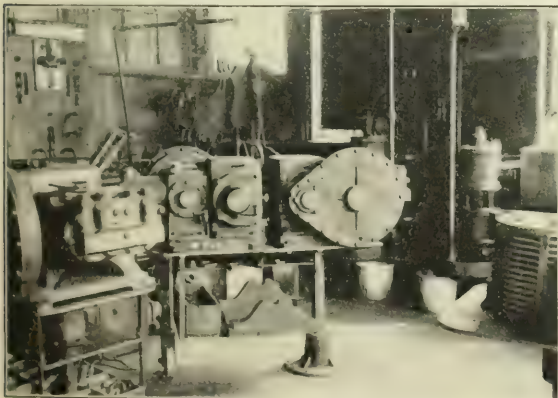


Fig. 30—Portion of Air Brake Room.



Fig. 31—Flue Shop. Cutting-Off and Cleaning Machines.

through the operations of their overhauling. The building, 50 ft. x 65 ft., with cement floor, stands some 12 ft. from the boiler shop end of the main building, from which the flues are brought by hand car over the rails of a pit track which extends into the flue shop. This arrangement affords a minimum of handling on the car, as a set of flues are carried to the flue shop pit track by the shop crane. In the center of the photograph, Fig. 32, is

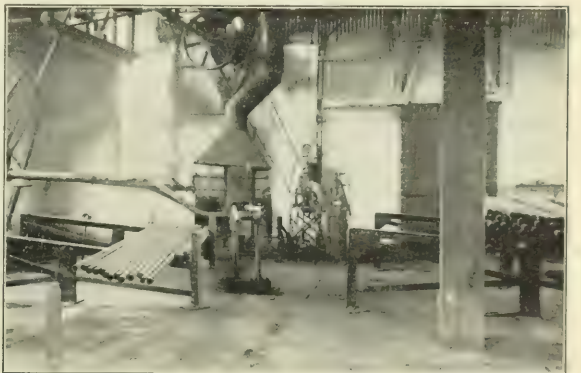


Fig. 32—Flue Shop. Furnace, Swedging and Welding Machines.

shown an Otto flue cleaning machine. This type of machine, when it was first introduced, replaced a large number of barrel flue rattlers, but has since been more or less generally discarded, it being thought that the toothed rolls were making the flues brittle. This matter, however, is not so considered at these shops, although only about ½-in. of scale is deposited on the flues between cleanings, so that the action of the rolls is not as heavy as would otherwise be the case. This method of cleaning

of the photograph, the following forgings are shown: Freight car grab iron, U-shaped brake beam hanger, cylinder cock in two pieces, eye bolt, insulating pin, grate shaker, bar end, brake

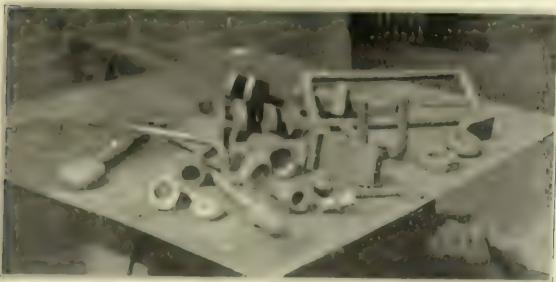


Fig. 36—Machine Forgings.

law, grease cup, flexible staybolt, sleeve cap, patch bolt, collar eye bolt, safety hook, pilot brace foot, wrist pin nut, safety chain hanger, passenger car brake beam hanger and trunion bar head. The more interesting and representative forgings of these are shown, with their dies, in the illustrations which follow.

INSULATING PIN DIES.

A pair of dies for making insulator pins, used on the high tension lines of the electric zone of the Long Island, is shown at the left in Fig. 37. The porcelain insulators are cemented to the end of the pin, the corrugations providing a permanent bond. The stock, $\frac{3}{4}$ -in. round, is first upset in either the upper or lower impressions, then reheated and the corrugations formed in the center impressions. The finished pin in place illustrates this operation. In making these pins five pieces of stock are placed in the furnace at a time. Each is upset and returned to the furnace, after which they are forged to shape. Previous to making the dies, these pins were made by having a cast iron threaded bushing instead of the upset end. They can be made on the forging machine at less than half of the cost by the former method.

CYLINDER COCK TOP PIECE.

The dies, plungers, etc., for making top pieces of locomotive cylinder cocks are shown at the right in Fig. 37. The stock, $1\frac{1}{4}$ -in. round iron, is first upset, using the lower impressions and the right hand plunger; it is then moved to the top impres-

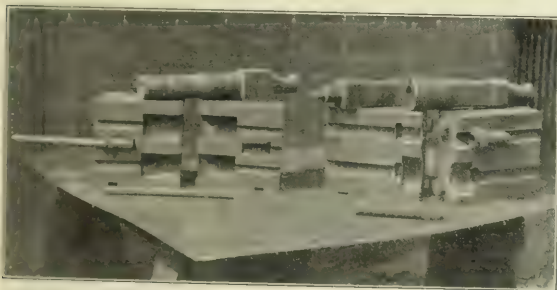


Fig. 37—Insulator Pin and Cylinder Cock Top Piece Dies.

sions, where the hole is punched with the left-hand plunger. Cylinder cock lower pieces are also made on this forging machine, and a great saving results, not alone in that iron is cheaper than brass, but since there is not the loss by stealing, as is the case with the brass ones.

SAFETY CHAIN HANGER.

A pair of dies used in making safety chain hangers for passenger cars is shown at the left in Fig. 38. A finished hanger is also shown. The stock, $\frac{3}{4}$ -in. x $2\frac{1}{2}$ -in., is first heated in a furnace and given the 90-deg. twist. After the second heat, the stock is upset and formed in the lower impressions, taking the

position shown. This same heat is sufficient for the final operation, that of giving the circular form to the loop. A thin film of metal remains after this blow, which is afterward punched out with a pin.

FLEXIBLE STAYBOLT SLEEVE CAP.

A die for making caps for flexible staybolt loops is shown at the right in Fig. 38. This cap is made in one heat, from $2\frac{1}{4}$ -in. diam. punchings of $\frac{3}{4}$ in. scrap. But one blow of the plunger is required, the stock being dropped in from the top



Fig. 38—Safety Chain Hanger and Flexible Staybolt Sleeve Cap Dies.

and the finished forging kicked out by a hammer blow on the ram seen at the back of the die. A man can make 800 of these caps per day of 10 hours.

BRAKE BEAM HANGER.

The left-hand dies shown in the photograph, Fig. 39, are used in making brake beam hangers for passenger cars. The stock, 1-in. round, is cut and bent to the shape shown as a bulldozer. After the second heat, the open end is placed between the dies and one end is formed and the weld, which falls in the center, is made. After a third heat the other end is shaped between the dies. About 25 of these hangers could be made in a day of 10 hours on an anvil, while by the above method 75 may be made in the same length of time.

U-SHAPED HANGER.

At the right of the photograph, Fig. 39, are shown two sets of dies for making a U-shaped hanger, used on the brake rigging of passenger cars. The piece of stock shown on top of the dies has been finally formed on one end in the large dies. The first



Fig. 39—Brake Beam and U-Shape Hanger Dies.

operation is that of bending, as shown at the opposite end. The S-shape is necessary in order to get sufficient metal into the dies to form the complete end, for which latter a second heat is required. This bending operation is done between the formers clamped on the top of the cast iron dies. A fifth heat is necessary for bending the hanger to the U-shape. The stock used is $1\frac{1}{4}$ -in. round; about 80 complete hangers can be made in 10 hours.

COLLAR EYE BOLT.

The left-hand dies shown in Fig. 40 are used in making collar eye bolts for brake beam safety chains, a finished bolt and a

piece of bent stock being shown. The eye is bent on an eye-bending machine, and is reheated for final forming and welding between the dies. It will be noticed that each die is made in two

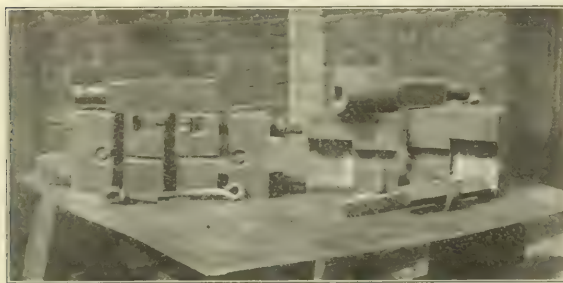


Fig. 40—Eye Bolt and Grate Bar Trunion Head Dies.

pieces, joined by two 1-in. bolts and held apart about 2 in. by the two coil springs. When in the machine, the dies first close on the stock and then the plunger strikes the pair which grip the eye and force them against the other pair. The metal which bridges the space between the two sets of dies then forms the collar. The stock used is $\frac{5}{8}$ -in. round.

GRATE TRUNION BAR HEAD.

At the right in the photograph, Fig. 40, is shown a pair of dies used in forming a grate bar trunion head. This job requires $1\frac{1}{4}$ -in. square stock, which is first heated for receiving the $1\frac{1}{4}$ -in. round pin. In the second operation the piece is completed.

ADJUSTABLE SCAFFOLD BRACKET.

A handy and quickly adjustable scaffold bracket in use in the car shops is shown in Fig. 41. The interesting part of this bracket is in the fact of its being counterbalanced by the swing weight and therefore being easily adjustable and self-fastening. The strips of $\frac{3}{4}$ -in. x 4-in. iron are bolted to the post and held



Fig. 41—Adjustable Scaffold Bracket.

a few inches from it by the filler pieces. Oblong holes are partly punched at intervals along these strips, and the metal is pushed back. This acts as a guide and pushes the holding pin, at the lower end of the bracket foot, out of the opening when the scaffold is to be moved upward. It is, therefore, only necessary to exert a slight pressure upward to raise the bracket and scaffold, as the counterbalance acts to lift the weight.

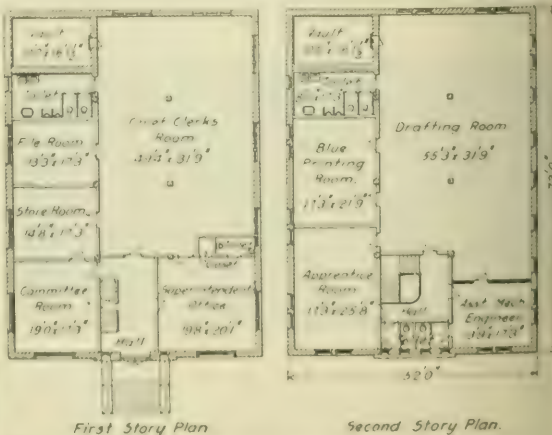
SHOP OFFICE OF THE ROCK ISLAND AT SILVIS.

The Rock Island has recently completed, at its main shop plant, Silvis, Ill., what is said to be one of the finest and best arranged railway shop office buildings in the country. The first



Office Building at the Silvis Shops.

floor will be occupied by the shop superintendent, G. W. Seidel, and his clerks, and the second floor by the mechanical draftsmen under charge of George S. Goodwin, recently appointed assistant mechanical engineer. The building is built of chocolate colored paving brick with Bedford stone trimmings. The interior is finished in substantial fireproof construction, the floors being cement. There are fireproof vaults on each floor, including the



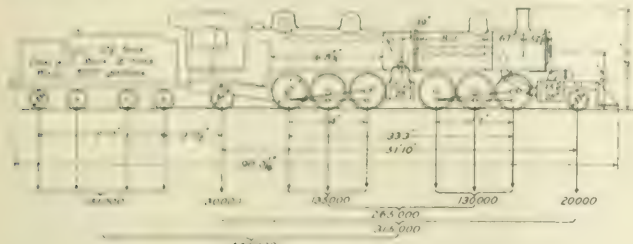
Arrangement of the Office Building at the Silvis Shops.

basement, the latter to be used for storage of office records. An important feature, the value and importance of which is becoming more and more generally recognized, but which has received little or no attention until comparatively recently, is the provision for an instruction room for apprentices—not a makeshift, pushed as far in the background as possible, but large, well lighted, comfortable quarters.

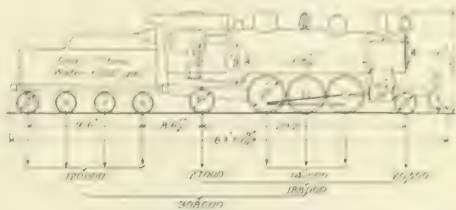
CONVERTED MALLET LOCOMOTIVES FOR THE CHICAGO GREAT WESTERN.

Extended experience in the conversion of simple locomotives into Mallet compound has resulted in a reduction in the cost by utilizing more of the old material. A good example of this is seen in the three articulated locomotives which were converted

The principal dimensions of the Pacific type locomotive are shown on the small diagram and in the accompanying table. The cylinders were 21 x 28 in. and the heating surface of the tubes was 3,225 sq. ft. The feed water heater, which occupies all the water space in the shell of the new front unit, has 400 2-in. tubes and it is assumed that this is equivalent to an addition of 1,700 sq. ft. to the normal heating surface, making



Mallet Locomotive Converted from a Pacific Type.



Pacific Type Locomotive Which Was Converted to a Mallet.

from Prairie type locomotives by the Chicago Great Western at its Oelwein shops. The front units with the low pressure cylinders were purchased from the Baldwin Locomotive Works.

The maximum tractive effort of the engine was thus increased from 33,000 to 52,000 lbs., or 57.5 per cent. The steam generating portion of the old locomotive remains the same; that

a total of 4,924 sq. ft. of tube heating surface, which, added to 154 sq. ft. in the firebox, gives a total of 5,078 sq. ft.

The driving wheels are 63 in. in diameter, and the new low-pressure cylinders are 35 x 28 in. The weight on the three pairs of old drivers has been reduced from 141,000 to 135,000 lbs., and the new front section has 130,000 lbs. on the drivers, making a total of 265,000 lbs. The total weight of the engine is 315,000 lbs. The principal dimensions of the Mallet locomotive, as converted, are shown on the small diagram, and the principal features of its construction are illustrated in the larger elevation. The table below gives the dimensions, weights and ratios of the old and new engines:

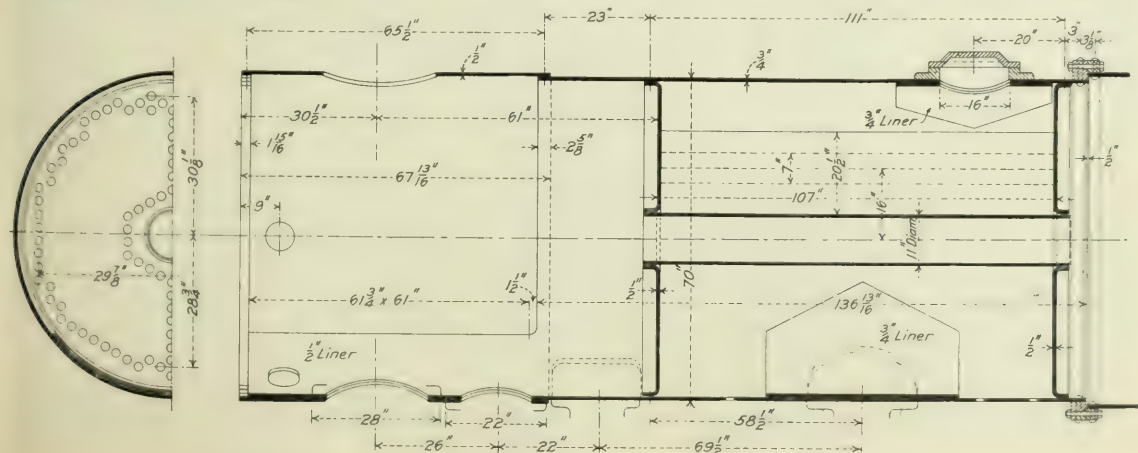
	Old Prairie type	New Converted Mallet
Heating surface, firebox	154.0 sq. ft.	154.0 sq. ft.
" " tubes	3,071.0 "	4,924.0 "
" " total	3,225.0 "	5,078.0 "
Grate area	49.3 "	49.3 "
Tubes, number and diameter....	352, 2-in.	400, 2-in.
Tubes, length	16 ft. 9 1/4 in.	16 ft. 8 7/8 in. & 8 ft. 11 in.
Steam pressure	200 lbs.	200 lbs.
Valves	11 in. piston.	11 in. piston.
Size driving journal, front & back	9 x 12 in.	9 x 12 in.
" " " main	9 1/2 x 12 "	9 1/2 x 12 "
" " " radial truck	7 x 12 "	7 x 12 "
" " " eng. truck	6 x 12 "	6 x 12 "
" " " tender	5 x 9 "	5 1/2 x 10 "
Total wheel base	54 ft. 2 1/2 in.	80 ft. 6 1/2 in.
Ratio, htg. surf. to grate area...	65.4	65.4
Ratio, htg. surf. to cyl. volume...	287.4	287.4
Total w't, eng. & tender, empty.	236,500 lbs.	367,500 lbs.
Total w't, eng. & tender, loaded.	305,500 lbs.	466,000 lbs.
Ratio of adhesion	4.23	5.1
Tractive effort	33,320 lbs.	52,100 lbs.
Trac. effort, per lb. M.E.P....	196	306

In converting the aim was to retain and utilize as much of

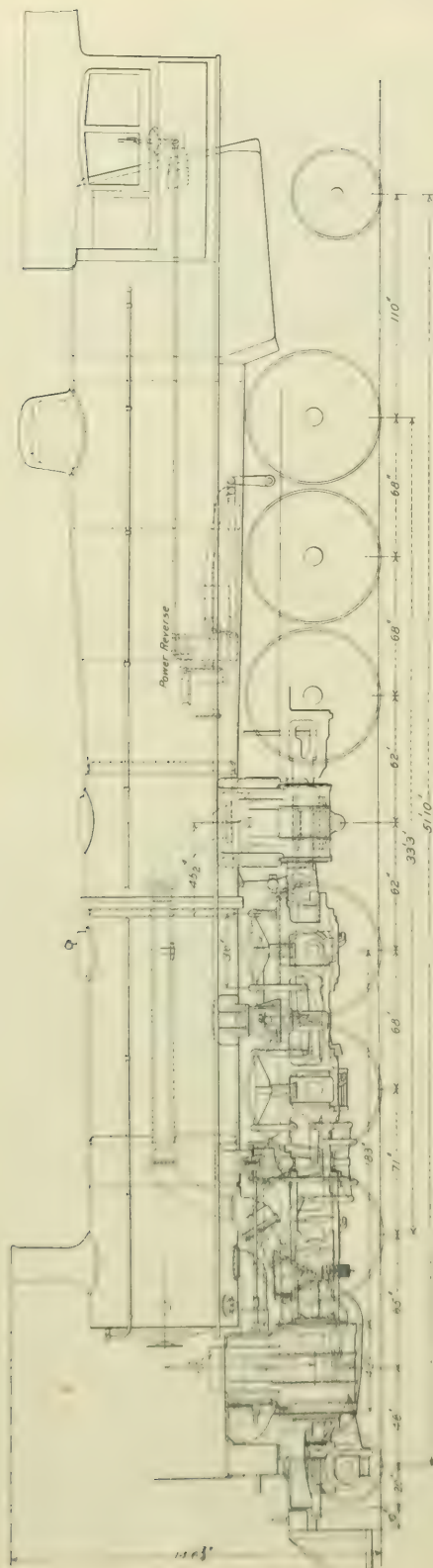


Mallet Locomotive Converted from a Prairie Type.

is, the firebox and boiler shell with the tubes remain as they were; the additional steam required for the larger engine will be obtained from the economy resulting from the compound cylinders and the large amount of heating surface provided in the feed water heater. It is claimed that converted Mallets on other roads are hauling 50 per cent. greater tonnage with the same amount of coal consumed by the old locomotives.

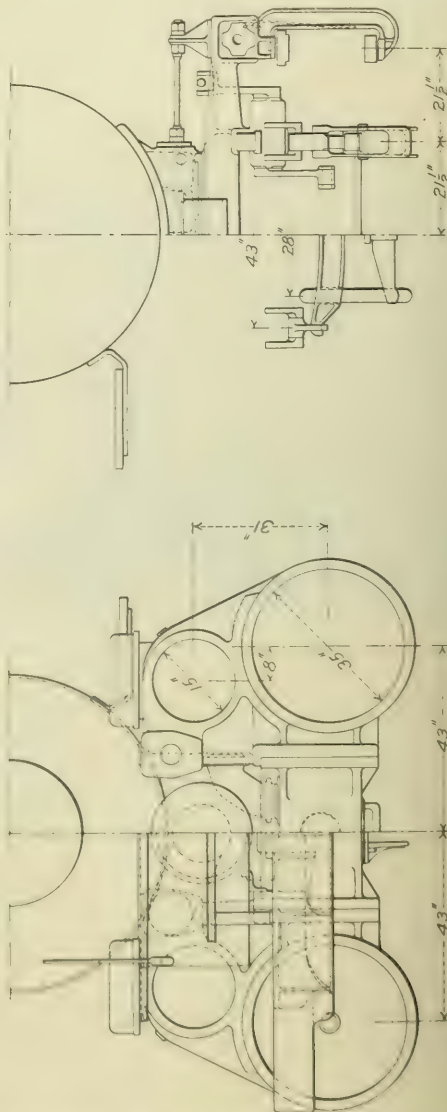


Boiler Extension for Converting a Pacific Type Locomotive to a Mallet.



Mallet Locomotive Showing in Detail That Part Which Was Added in Converting from a Pacific Type.

the old engine as possible, and the following parts were taken from the Prairie type engines and used on the front end of the Mallets: The pilot, engine truck and center pin, smokestack, blower pipe fittings, smokebox, air pump exhaust, fitting plug fixtures and headlight bracket. In addition to the new compound cylinders and the boiler shell with the feed water heater, the Baldwin Locomotive Works furnished the following: The lagging and jacket for the check pipes, a cover for the old stack base, steam power reverse rigging, cast iron diagonal steam pipes, reverse shaft, reverse lever rod, radius bar, cross-tie and brake fulcrum, transverse equalizing beam and link,



Sections Through Portion Which Was Added to Pacific Type Locomotive in Converting It to a Mallet.

engine truck, radius bar and brace, starting valve cock and handle. The Stephenson valve gear is retained on the new engine and a similar type of valve gear is used on the new front engine unit. The piston valves for the low pressure cylinders are 15 in. in diameter. The connection of the old smokebox with the new boiler extension is made with a V shaped joint secured by 36 1 1/2 in. bolts.

The feed water heater forms about one half the new boiler shell, while the smokebox occupies the balance. It is filled with

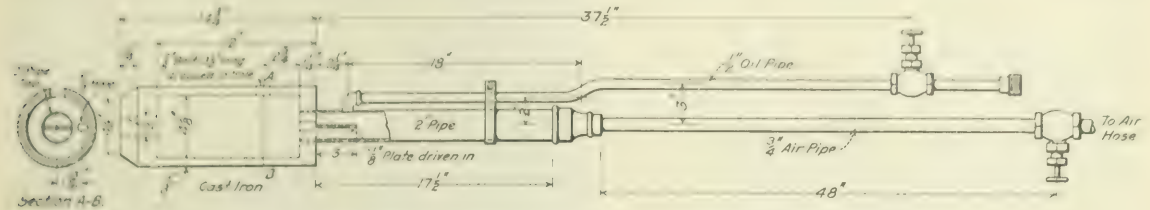
The feed water heater is 10 ft. long over the tube sheets. The heads of the feed water heater are flanged out at the center for passing in a 10-in. diameter inside and 1/2-in. thick, through this passes the 8-in. steam pipe or receiver, taking the exhaust from the high to the low pressure cylinders. The old exhaust line from the high pressure cylinder is covered by a diagonal pipe with a wide flange, and this carries the steam to a joint connected with the horizontal steam pipe at the center of the feed water heater; a similar joint and diagonal pipe at the front and back of the engine to a large flexible joint, outside the locomotive. The pressure is confined by a slip joint section connected to another flexible joint, which forms a direct passage

connected to the boiler, superheater and to the main part of the Chicago Great Western, for the driver and that included in this article.

WELDING FRAMES AT THE WABASH SHOPS.

The photograph illustrates a recent method of welding frames in use at all the main shops on the Wabash system, in addition to being used in a large number of small shops at branch houses.

To weld the top or bottom rail of a frame without taking it

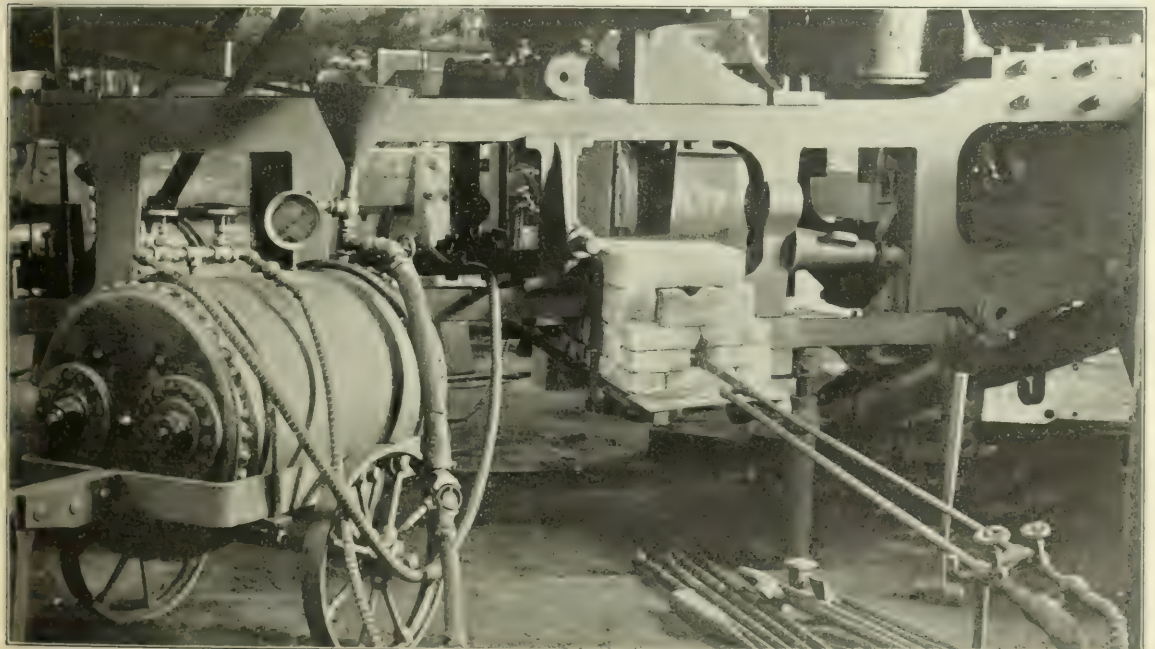


Crude Oil Burner Used for Welding Locomotive Frames at the Wabash Shops.

down is not difficult and is quite frequently done by simply dropping one pair of wheels. In this case, however, practically an entire new leg was welded on, as shown, without taking the frame down. The piece forming the new leg was first forged and finished, then held in place by applying the pedestal binder and a jack between the jaws.

A home made crude oil burner, shown on the drawing, was used and the weld in the bottom rail was made first in order to take care of the longitudinal expansion. The photograph shows the manner in which the welds were made; the ends of the frame were tapered and the ends of the new jaw were made V shaped, with sufficient metal to form the weld.

The total expense was \$57.43, including labor for forging and finishing the new pieces and the cost of the firebrick, clay and crude oil.



Welding a Frame with Crude Oil at the Fort Wayne Shops of the Wabash.

AIR-ELECTRIC HOIST IN THE LEHIGH VALLEY SHOPS AT SAYRE, PA.

BY H. G. BECKER,

Shop Demonstrator, Lehigh Valley, Sayre, Pa.

For use over the large flange fire in the boiler department, and swinging from one of the building columns, is a 25-ft. crane girder, from which is suspended a 6-ft. air hoist, for handling the various boiler sheets to be flanged. This air hoist operates satisfactorily on sheets that are only required to be raised from the fire and dropped upon the flanging form, but when flanging the upper half of a large throat sheet, it must be suspended and held in a vertical position, which necessitates one corner of the sheet being held 12 to 14 ft. from the floor. This is impossible with the use of the air hoist, as is clearly shown in Fig. 1. It was the custom to use the overhead traveling shop crane, which is in constant demand in the machine bay, to hold a throat sheet until the entire upper half could be flanged, which required from one to two days. The handicap in the machine bay due to the holding up of this crane may readily be realized, as the output of the shop depends upon prompt crane service.

To eliminate this trouble the electric hoist shown in Fig. 1 was designed. It consists of a drum, W, geared to a 5-h.p. electric motor, operated by the controller A, by which the load is raised or lowered by means of the $\frac{3}{8}$ -in. chain, one end of which is anchored at the extreme end of the girder, and passes back over the carriage pulleys X, X, and block Y, over pulley Z and down to drum W. The carriage is moved in or out on the girder by a $\frac{1}{4}$ -in. chain connection with the reversible air motor B. This motor is geared to a pulley that carries the chain which is fastened to the carriage O, and passes over a pulley on the extreme end of the girder. A light chain is fastened to the reversing attachment on the motor and is dropped to a convenient height so that the operator may control the motor with his left hand, leaving the right one free to operate the controller A.

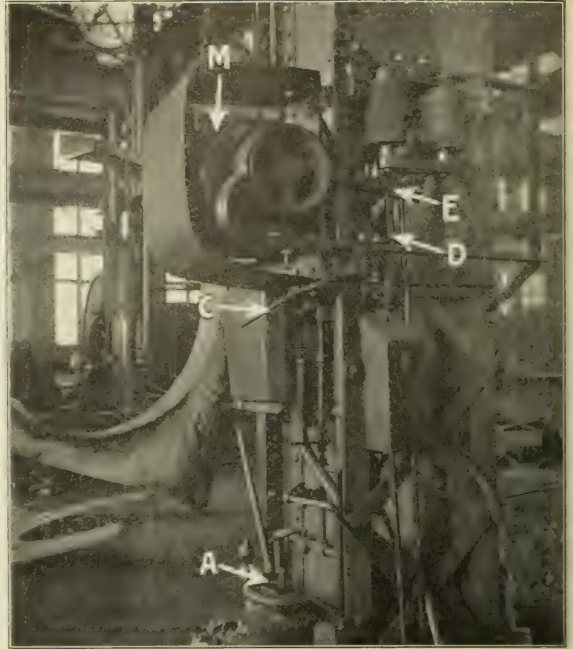


Fig. 2—Magnetic Brake for Electric Hoist.

In order that the load may be stopped and held at any desired height, a magnetic brake was devised, as shown in Fig. 2; this allows perfect control of the load at all times. The brake is applied instantly upon the current being shut off from the motor

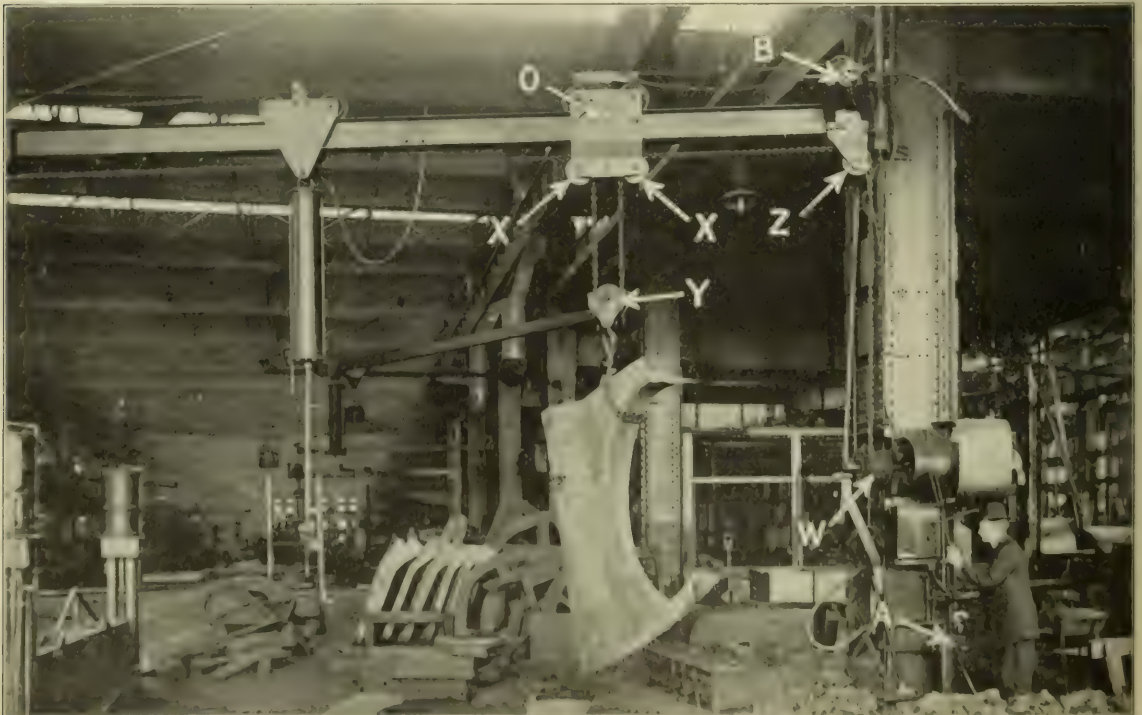


Fig. 1—Air-Electric Hoist Used in Connection with the Flanging of Boiler Sheets.

M. At the same time a hand release on the brake bar the electrically controlled air hoist. This lever operates the plunger D, which raises the brake lever E, releasing the brake band without applying the electric power, and the track can be lowered very slowly and be stopped at any point.

As may be seen from Fig. 1, the application of the hoist does not interfere with the original air hoist on the girder, as the carriage D when out in use is run back close to pulley Z, at least within the 100 ft. length of the girder to the work that may be more conveniently handled with the air hoist. As this air hoist has but two positive points of suspension—that is, when the piston is at the extreme top or bottom—and as its lift is but 6 ft., the advantages of the electric hoist are apparent, as the work can be held at any desired height up to 16 ft. and its lifting capacity is 2,000 lbs.

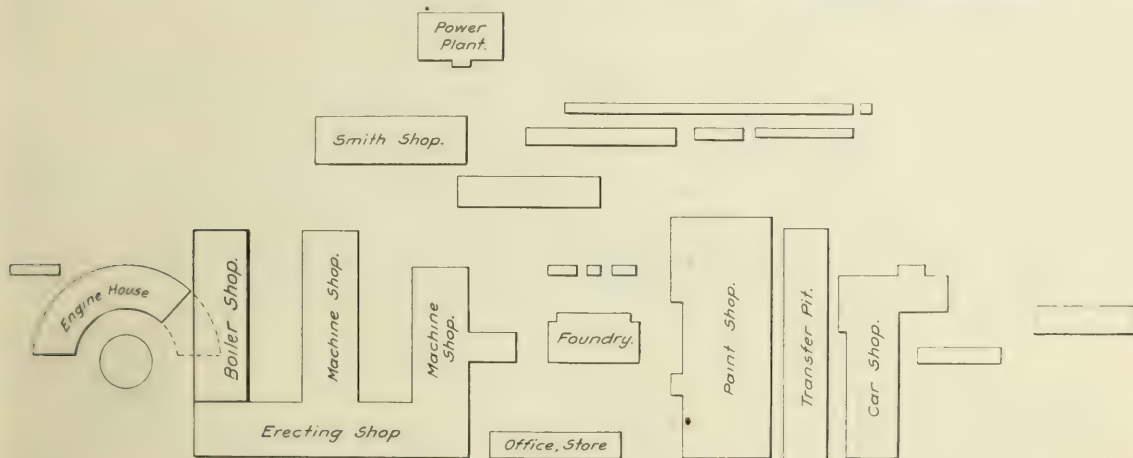
NEW BOILER SHOP OF THE PENNSYLVANIA RAILROAD AT RENOVO, PA.

The locomotive repair shops of the Pennsylvania Railroad at Renovo, Pa., have been enlarged in recent years by the addition of a modern erecting shop, a new smith shop and a power house. The erecting shop has longitudinal tracks parallel to the main line tracks and the two machine shops are at right angles to the erecting shop, with large openings into the latter.

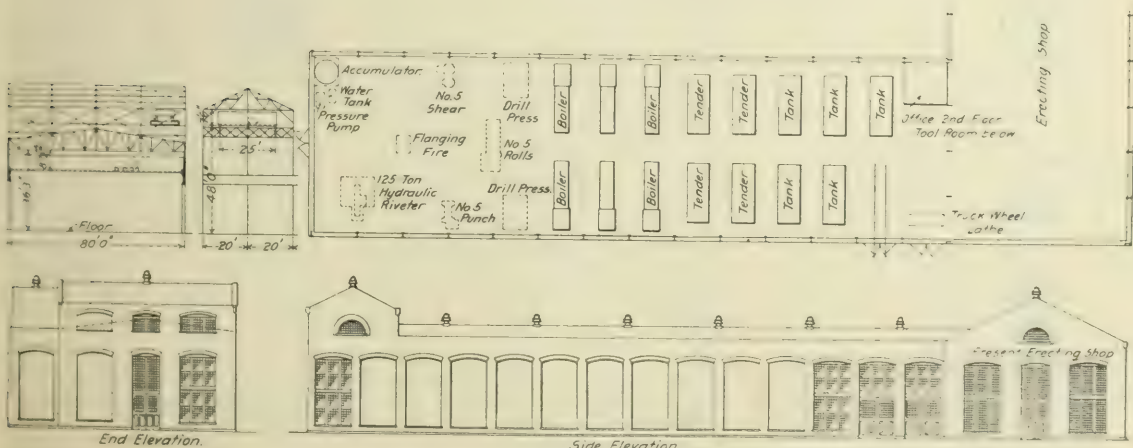
The new boiler shop was added to the existing shops at Renovo, Pa., as the erecting shop and the machine shops were located on a portion of the old engine house. This location was decided on, not only because it is convenient for the boiler makers working in the erecting shop and for the transfer of material between these shops, but because the limited ground available for shop additions at Renovo made a compact arrangement necessary. The general plan shows the relation of the new boiler shop to the other buildings. The windows and doors in the new building are similar in construction and general appearance to those in the erecting shop and the height of the side walls is the same, but the slope of the roof is much flatter, having an inclination of only 1½ in. to the foot.

In these two buildings the usual upper decks have been dispensed with, making a simpler and more clean-cut construction. The architecture is similar to that of the Pennsylvania locomotive shops at Juniata. The new boiler shop is 80 ft. wide and 280 ft. long; the height of the side walls is 42 ft. and the distance to the lower side of roof truss is 36 ft. 3 in. At one end of the shop is a riveting tower 40 ft. wide, and here the side walls are 62 ft. high and the distance to the lower side of the roof truss is 65 ft. 6 in.

At the riveting tower the shop is spanned by heavy crane girders for a transverse electric crane trolley; the height from the floor to the top of the crane girder is 47 ft. 6¾ in. There are supports for longitudinal cranes having spans of 75 ft. 8 in.,



Arrangement of the Pennsylvania Railroad Shops at Renovo, Pa.



New Boiler Shop at Renovo, Pa.—Pennsylvania Railroad.

TOOL REGULATIONS.

The cost of repairs and renewals to shop machinery and tools on the Atchison, Topeka & Santa Fe has decreased greatly during the past seven years, as indicated by the following table.

Fiscal year ending Jan. 30	Tool account	Gross earnings
1904	\$187,170	\$68,171,300
1905	486,620	68,376,857
1906	367,474	78,044,847
1907	313,841	93,683,406
1908	290,832	90,617,796
1909	289,633	94,265,716
1910	232,766	104,690,184

As shown, the gross earnings per year have increased over fifty per cent. during that period. At the same time the condition of the shop tools has been constantly improved, so that to-day they are in much better shape than ever before. These surprising results are due to the standardization of the tools, the centralization of their manufacture at Topeka, Kan., and the closer custody of tools of all kinds. The standards governing machine tool equipment, small tools, shop facilities and methods, and the regulations concerning them, have been published for the convenience and instruction of the various officers and employees interested. The volume of 463 pages is in loose leaf form in substantial covers and is carefully indexed for ready reference. Naturally it is composed largely of illustrations and includes sections on: Standard methods, abrasive wheels and stands, automatic forming machines, bench vises and stands, blacksmith hand tools, boiler maker tools, erecting shop devices, furnaces and portable forges, general hand tools, jigs, templates and gages, machine tools and holders, power appliances, reamers, shear blades, shop wagons, special finishing tools, special machines and cutters, special machine devices, stocks and dies, and taps.

The introductory portion includes the tool regulations in force at present and is as follows: Proper and economical work depends upon the tools used, the condition in which they are kept, and their availability for service when needed. In order to facilitate the work in this way system must be used in the care and distribution of tools, so that excessive amounts of them will not be accumulated, and expensive tools will not be kept idle in one place when they are needed in another; system must also be used in the standard designs of tools and the methods of doing work. With these objects in view, all decisions as to designs of tools, jigs, special devices, etc., and as to methods of doing work will be made after reference through the office of the assistant superintendent of motive power, at Topeka. All suggestions as to changes in methods and all ideas as to changes in design of tools, devices, etc., or as to new forms of tools or new jigs and devices, must be submitted to that office in duplicate, and receive the approval of the assistant superintendent of motive power, before they can be put into effect or be adopted. This is necessary, as often ideas and methods are developed at considerable expense in one place, when they have been already tried and proved unsatisfactory elsewhere. This useless expense should be avoided. Recommendations may be made either through the regular channels, or directly by the men.

A system for checking tools from the tool-room, checking them up in the tool-room, and inspecting them while out of the tool-room, has been developed from the best practice in use at first-class shops and will be thoroughly installed in all tool-rooms on this system.

This tool system will comprise the following features: Perpetual or continuous inventory will be had of all tools, machines and devices of all sorts at each shop, showing location of tool and whether assigned to tool-room stock or to the permanent use of an individual workman or gang.

Uniform aluminum checks of special design, six to each man, will be furnished from Topeka for each shop, indicating the shop and the block number of the mechanic to whom issued; these checks will be issued only to such men as need to call on the tool-room for tools. Topeka will be called on for such checks as are required from time to time, which will be forwarded by railway mail

Standard tool lockers will be assigned to men using tools, as far as practicable.

Standard tool kits, for each class of occupation, will be determined upon and these kits supplied to the man when he enters the employment, he signing for it and being held responsible therefor; the man will also be held responsible for the checks issued.

A regular weekly inspection system of all tools will be inaugurated as rapidly as it can be organized. In addition to these general measures the following special regulations will be in force:

No tools issued from the tool-room except in exchange for a tool-check.

No new hand-hammers or monkey wrenches to be given in exchange for old ones unless accompanied by an order from the gang foreman and marked "O K" by the shop foreman; chisels and soft hammers to be the only tools exchanged for new ones without a written order.

No letters or figures to be given out in lots of less than a full set.

All tools out on check must be turned into the tool-room every Saturday night before the tool-keeper leaves the shop. In all cases where tool-checks remain on the board over Sunday, the tool-keeper should notify the tool-room foreman or the

Mail-9-08-10M-268
(Form 2028 Standard)

Santa Fe.

IN ALL CASES WHERE TOOLS ARE LOST, BROKEN OR DAMAGED, THIS CARD MUST BE FILLED OUT.

TOOL BREAKAGE CLEARANCE.

(ONLY ONE TOOL TO EACH CARD.)

No. _____ has _____

(GIVE LETTER, NUMBER AND NAME)

Check Here

☐ Worn Out

☐ Damaged

☐ Broken

☐ Lost

(GIVE FULL NAME OF TOOL)

size _____

INITIALS REB.

DATE _____

as a result of

- ☐ Defective Material
- ☐ Accident
- ☐ Ignorance
- ☐ Carelessness

O. K.

This card must be signed by your Foreman, one of the following:

GEN'L FOREMAN

TOOL KEEPER

GEN'L TOOL FOREMAN

GEN'L FOREMAN

Fig. 1—Tool Clearance Card.

general foreman, and the men whom these checks belong to should be required to give an explanation for not returning them. In some shops it may be desirable to check up the tools daily.

In all cases of broken, lost or damaged tools, the tool-check will not be returned until the tool clearance card has been personally signed by the general foreman.

In places where, in addition to tools, the tool-room is used for a sort of shop sub-store for small engine supplies, such as cutters, small bolts, etc., the gang foreman's orders will be honored for these supplies.


The custody of all high-speed lathe, planer, and boring-mill tools should come under the tool-room foreman, or the man in charge of the tool-room. A man starting to work on a machine requiring these tools should be given a set and these should be charged to him. Should he break one of the tools, he will exchange it for a new one at the tool-room. The tool-room foreman or the tool man should get a list of the high-speed tools, the list showing size and style now at various machines and the workmen should sign for them.

All air motors must be returned to the tool-room every Saturday night and thoroughly inspected and oiled before leaving the tool-room again. At shops like Topeka, Albuquerque, San Bernardino, and Cleburne, it may be desirable to assign certain motors to a gang and that this gang be allowed to use the motors during the week, turning them into the tool-room on Saturday night for regular inspection. All motors should be numbered and a record kept of what gang they have been assigned to.

Where parts of motors are missing the motors should not be accepted without authority of the tool-room foreman. It should be the tool-room foreman's duty to see that all motors are regularly inspected, repaired and oiled as often as necessary, which, for motors in service, should be as often as once a week.

When a tool is lost or broken, a clearance card (Fig. 1) properly signed must be presented at the tool-room by the workman responsible before the tool-check will be returned to

Each shop is provided with a stock book. Before the first of each month the books are filled out in the column for the current month, showing the tools on hand and those needed. On the first of the month the books are forwarded to the supervisor of tools, along with requisitions for the tools ordered. The tools ordered are checked with those on hand and the requisitions are approved or changed as judgment dictates. The requisitions are then sent to the storehouse and filled. The



(Form 1007 (Revised))

STOCK BOOK

Section _____

Catalogue Page	DESCRIPTION OF ARTICLES	Symbol Number	Tools of	JUNE		JULY		AUGUST		SEPTEMBER	
				Inventory	Ordered	On Hand	Ordered	On Hand	Ordered	On Hand	Ordered

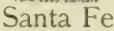
Fig. 2—Upper Part of Page of Tool Stock Book.

him. At the close of each month, the clearance cards from all the shops are sent to the supervisor of tools at Topeka, who checks them up and takes such action as he feels necessary for the improvement of the tool service. In this way losses and breakages of tools are reduced to a minimum and information

stock books are returned with letters advising the disposition of the requisitions.

A form (Fig. 3) is arranged to show in detail the various charges to repairs and renewals to shop machinery and tools at each shop. One copy is made out monthly by the master me-

Form 2033 Standard



(Insert name of Railway Company)

REPAIRS AND RENEWALS TO SHOP MACHINERY AND TOOLS: Account 47. (Replacing Old Account 17.) AND CHARGES TO POWER PLANTS, EXCEPT ENGINES, BOILERS AND MACHINERY CHARGEABLE TO OTHER ACCOUNTS.

AT _____
SHOPS, DURING _____
19__

SHOPS	Repairs large machinery in Replacements of Old and charged to Account 47	Repairs and Renewals to Machinery Appliances, Shells, etc., except machinery designated on this form	Making New Tools for use with Machines	Repairs to Tools for use with Machines, including Dressing	Repairs and Renewals of Power Engines and Boilers in Shops, etc.	Repairs and Renewals to Air-Line and Air Tools	Repairs and Renewals of Air-line Wheel	Repairs and Renewals of Belts	Repairs to Electrical Machinery, including Cranes	Other than Foregoing	TOTAL
	0	1	2	3	4	5	6	7	8	9	
47-A Machine	11										
47-B Erecting Shop	12										
47-C Boiler Shop	13										
47-D Blacksmith Shop	14										
47-E Tin Shop	15										
47-F Brass and Air Room	16										
47-G Tool Room	17										
47-H Water Service	18										
47-I Pattern Shop	19										
47-K Car Machine Shop	20										
47-L Loco Carpent Shop	21										
47-M Wheel and Axle Shop	22										
47-N Power Plant	23										
47-O Miscellaneous	24										
TOTAL											

THIS ACCOUNT INCLUDES REPAIRS
 General material used and labor expended in repairing tools and machinery in engine houses and at locomotive and car shops and foundries
 (a) including millinery, patterns and boilers for furnishing power
 (b) scaffolding and shoring
 (c) setting
 (d) other appliances for running machines
 (e) electrical, hydraulic, pneumatic and other appliances used in connection therewith
 (f) also in repairing forams, forges, hydraulic and other portable jacks
 (g) portable and other welding machines used in shops. Form of repairing heating boilers should be charged to account 18. Buildings, fixtures and tools.

RENEWALS Cost of new tools (1) 2 and 3
 (a) Machinery, including tools used in engine houses and at locomotive and car shops and foundries
 (b) including and more engines and boilers for furnishing power
 (c) scaffolding and shoring
 (d) setting
 (e) other appliances for running machines
 (f) electrical, hydraulic, pneumatic and other appliances used in connection therewith
 (g) also in repairing forams, forges, hydraulic and other portable jacks
 (h) portable and other welding machines used in shops. Form of repairing heating boilers should be charged to account 18. Buildings, fixtures and tools.
 (i) also in repairing forams, forges, hydraulic and other portable jacks
 (j) portable and other welding machines used in shops. Form of repairing heating boilers should be charged to account 18. Buildings, fixtures and tools.

Date _____
Master Mechanic _____
Station Power Accountant _____

Fig. 3—Form for Charges to Repairs and Renewals to Shop Machinery and Tools.

is obtained regarding defective design and construction of tools and shop devices.

One of the illustrations (Fig. 2) shows the upper part of one page of the stock book in which are kept records of the tools on hand and on order. In the book are listed the standard tools and devices in stock at Topeka subject to requisition

cards showing the labor charges to this account and one copy by the division storekeeper showing the material charged to it. These are forwarded monthly to the motive power accountant, who checks the total labor charges with the daily distribution, as sent from each shop. The forms are then forwarded to the supervisor of tools.

General News Section.

The two men (It is an uncertainty) for the telegraph on the Queen & Company between Danville, Ky., and Oakdale, Tenn., 15 miles.

Members of the Association of Locomotive Engineers, at a meeting in Washington last week, discussed a plan for securing an increase of pay 100 per cent on the Pennsylvania Railroad. They want \$200 a month on the main lines and \$150 on the branches.

At White Harris, Pa., in the morning of October 27, Special Policeman William Weathers, of the Lehigh Valley, who, in the night, with another man, was hunting for men who had tampered with automatic block signals, was shot and killed by one of his unknown men, who ran into the woods and escaped.

Surgeons of a number of the principal railways in the southwest have organized "The Association of Railway Surgeons of the Southwest." The president is Dr. D. K. Angle, of Silver City, N. M. The executive committee will have one member from each state and territory interested, and one from Mexico.

Major Flagler, United States engineer, announces that the Cumberland river is now navigable for 125 miles above Nashville, this being made possible by the recent completion of locks No. 6 and No. 7. With these improvements the river is canalized so that boats can run all the year round to a point above Carthage.

Railway employees in New York state are said to be preparing to vote for that one of the candidates for Governor of the state who will give them the most satisfactory promise in response to their question as to whether a "railroad man" will be appointed to a place on the Public Service Commission of the Second district.

At Columbus, Ohio, last Sunday, a meeting participated in by 500 members of the four principal railway brotherhoods, adopted resolutions calling on the Interstate Commerce Commission to permit the railways to make their proposed increases in freight rates; only by granting the wishes of the roads in this matter can the commission give them a "square deal."

On Monday, October 31, Ralph Johnstone, in a new and small biplane made by the Wright brothers, rose to a height of 9,174 ft. at Belmont Park, near New York City. This is 548 ft. higher than anyone has ever before soared in an aeroplane. In France, October 28, Maurice Tabuteau, in a Farnam biplane, flew 289 miles in six hours, without a stop, winning a premium of \$4,000. This record was made in the aerodrome at Etampes.

A meeting has been called for November 2 in Indianapolis to organize into one body all the employees of the Cincinnati, Hamilton & Dayton who belong to unions affiliated with the American Federation of Labor. There is at present a railway department of the American Federation of Labor, and the body to be organized will be a part of it. The local organization will include boilermakers, machinists, carpenters, painters, car repairmen, telegraphers, switchmen, blacksmiths, firemen, engine men, pipe fitters and coppersmiths.

The Men's Club of the Presbyterian Church of Chillicothe, Mo., has invited J. R. Koontz, general freight agent of the Atchison, Topeka & Santa Fe, and the other officers of this road who have been making harmony tours in Kansas, to address the members of the club on Sunday, November 6, and the invitation has been accepted. J. D. M. Hamilton, claims attorney of the Santa Fe, will be the principal speaker, and the subject of his address will be "The Railway and Its Employees and Their Relation to the People and the Government." This is the first Sunday engagement which the Santa Fe's harmony tourists have arranged to play!

The Illinois supreme court rendered a decision on October 28 requiring the Illinois Central to make an accounting to the state of Illinois to show whether or not it has since 1905 paid to the state the 7 per cent. of its gross earnings which it is required to pay by its charter. The state brought suit to compel an accounting for the period from 1878 up to the present time, but the court held that an accounting prior to the year 1905 could

not be required. The Illinois newspapers have stated that the decision is a victory for the state. It settles nothing except that a new accounting must be made, and does not determine whether or not the Illinois Central has failed to pay to the state all to which it is entitled.

A strike of express company drivers, which began in Pittsburg, N. J., last week, extended to New York and Jersey City and very seriously hampered the business of all the express companies for nearly a week. Little reliable information was given out by the companies or by the strikers, but an increase of pay and a shortening of the hours of work were the main points at issue. Disorder and rioting accompanied the strike from the very first, and although the police were vigilant there were many outbreaks, showing that either the strikers and their friends or the hoodlums of the city were in a decidedly ugly mood. There were many small disturbances in various parts of the city as strikers attacked wagons manned by strike-breakers. Stones and missiles of all kinds were thrown, and several drivers and their helpers were badly hurt. William Hoyt, a helper on an American Express wagon, had his skull crushed with a brickbat and was expected to die. All the disturbances were quickly quelled by the police, who dealt in no gentle manner with the strikers. Many arrests were made and heavy fines imposed. By Tuesday the police department had on duty 2,500 extra men and succeeded in maintaining order. The strikers were said to number several thousand, but the reports were very indefinite. The larger companies brought several hundred men from other cities and by Tuesday were moving all of their perishable freight and some of the ordinary merchandise. The principal railway stations and the depots of the express companies were guarded by strong forces of policemen and one or two officers accompanied every wagon that was sent out.

Congressman Mann Opposes Valuation of Railways.

Congressman James R. Mann, of Illinois, chairman of the committee of the National House on Interstate and Foreign Commerce, made a speech to the National Industrial Traffic League at Chicago on October 27, in which he deprecated the demand for a physical valuation of railways; such a valuation would show that it would cost more to produce the railways than they are capitalized for and might result in raised freight rates.

On the subject of regulation of the issuance of securities, he said that railway securities constituted a delicate mechanism, the slightest jarring of which might cause great injury to the country; it would be a catastrophe if legislation were enacted which should prevent the development of the railways. He was glad when both houses struck from the Mann-Elkins Act the provision for regulation of railway securities. But Congress will in some way regulate securities to the end that the issuance of stocks and bonds not based on actual investment shall be prevented.

Proposed Headlight Legislation in South Dakota.

One of the humors of the present political campaign is that the question of whether the railways of South Dakota shall or shall not be required to equip their passenger locomotives with electric headlights has been submitted to popular vote in that state on a referendum ballot, to be voted at the general election on November 8. The act does not specifically require the use of electric headlights or any other kind of headlights, but it does require the use of headlights of not less than 1,500 candle power without the aid of a reflector, and no headlight has 1,500 candle power without the aid of a reflector except an electric headlight. The law also proposes to give the railway commissioners power to order headlights of such candle-power as they may deem necessary on all locomotives other than those used on passenger trains.

The "little ballot" on which this proposed law is submitted to the people is over 6 ft. long and the various measures appearing on it are printed in very fine type. The law gives the voter three minutes in the election booth in which to decide how he

shall vote and to prepare his ballot. Of course, the farmers and country storekeepers of South Dakota are very much better qualified than the officers of the railways to decide what kind of headlights shall be used on their engines. The proposed legislation raises one very interesting question, however. Some roads, the Chicago & North Western, for example, run trains directly from Nebraska into South Dakota and *vice versa*. Suppose the people of Nebraska should require the railways to use some other kind of a headlight. Would it be necessary in that event for the North Western to stop all of its engines at the state line both going and coming, and change its headlights? If a train ran through three states it would, no doubt, be necessary to carry one headlight on the front of the engine and two in the cab, so that it would be prepared for all contingencies.

The penalty for each violation of the South Dakota law would be a fine of not less than \$100 nor more than \$1,000.

The Pyle-National Electric Headlight Company, by its president, R. C. Vilas, has issued a statement to the people of South Dakota, asking them to defeat the proposed electric headlight law, and is circulating it broadcast throughout the State. Mr. Vilas says in part:

"We are now, and always have been, against legislation of this nature, because we believe that the railways, under free competition, will naturally select the device best adapted to the protection of their own property and of the passengers entrusted to their care, and while we have heretofore scrupulously refrained from suggesting or criticizing any proposed legislation in this direction, we believe that now, when the question comes directly before the people, it is time for us to state distinctly and emphatically that we do not believe in and do not favor legislation of this kind. The electric headlight has proved a very useful and valuable device in railway operation. That this is true is demonstrated by the fact that it is being used by every railway system west of the Mississippi river and on every one east of the Mississippi and south of the Ohio river in numbers varying from 3 to 1,200; but we do not believe that the railways should be required by law to use it under all conditions, either in passenger or any other service. The managers of the railways, in our opinion, are the best qualified of all persons to decide when its use is necessary and when it is not.

"We know from long experience in dealing with them that they are even more anxious to make their service safe than any other class of persons is to have them do so. We, therefore, desire emphatically to express the opinion that the settlement of the question of the extent to which railways should use electric headlights should be left entirely to the officers of the railways.

"It may be said that they have not done all that they ought to do to make transportation safe, but our experience leads us to believe that they have done and are doing all that is practicable in this direction. For example, on June 30, 1909, according to the statistics of the Interstate Commerce Commission, there were in use in the United States, 57,212 railway locomotives, and of these no less than 12,000 had been equipped with electric headlights made by this company. Furthermore, the roads in all parts of the country are still buying large numbers of electric headlights, not only in states where laws have been passed or orders issued by railway commissions to require them to do so, but also where no such laws have been passed and no such orders have been issued. In this respect, and in all others, the railway managers are, we believe, doing all that they can with the financial means at their command to make their service satisfactory and safe, and does it not appeal to the people of South Dakota as unfair that when railway managers are pursuing this policy they should be harassed and burdened with arbitrary legislation, whose effect may be not only to require them to do things that they ought to do, but also to require them to do some things which their experience and sound judgment lead them to think should not be done and to prevent them from doing things which their experience and sound judgment lead them to think should be done? If they have proved worthy to be trusted in large matters, have they not proved themselves worthy of being trusted in this relatively small matter?"

This open letter to the public of South Dakota is not written at the suggestion of any officer of any railway, we have not consulted with any railway man about it, and no railway man knows that it is being written. We believe that the railways are being injured by unnecessary, unfair and burdensome legis-

lation. Because of this kind of legislation, they have become unable, within recent years, to spend as much money for supplies, equipment and construction as under other circumstances they would have spent. Their inability to spend as much money as they would have liked to have spent is injuring the railways, and the manufacturers, and is injuring indirectly the people of the whole country, including those of South Dakota. If legislation of this kind continues, it will continue to do more and more harm. Therefore, in spite of the fact that this particular piece of legislation, if passed, would inure to the benefit of this company, we urge the people of South Dakota to vote against it and against all other unfair measures for the regulation of railways which may be presented to them."

Employers' Liability in Great Britain.

The statistics of proceedings under the British Workmen's Compensation Act, 1906, and the Employers' Liability Act, 1880, during 1909, give substantially complete returns from the seven great groups of industries—mines, quarries, railways, factories, harbors and docks, constructional works and shipping. In the seven groups the number of employers included in the returns was 117,391, and the average number of persons employed coming within the provisions of the act was over 6,500,000, of whom 4,500,000 come under the heading "factories." In these industries in the year 1909 compensation was paid in 3,341 cases of death and in 332,612 cases of disablement.

The average payment in case of death was £154 (\$770), and in case of disablement £5 6s. (\$26). The annual charge for compensation, taking the seven groups of industries together, averaged 6s. 10d. (\$1.64) per person employed. It was lowest in the case of persons employed in factories, being only 3s. 5d. per person; in the case of railways it was 7s. 1d.; it rose to 9s. 2d. in quarries, to 10s. 8d. in shipping, and to 14s. 11d. in constructional works; it was highest in docks, 16s. 8d., and in mines, 20s. 1d. Allowing for industries not included in these returns it is calculated that the total amount of compensation paid in all industries will hardly fall short of three millions of pounds. These figures include, in addition to accidents, cases of the various industrial diseases (now 24 in number) included under the Workmen's Compensation Act. Compensation was paid, as is shown in the table, in 33 cases of death from disease and in 3,313 cases of disablement. The bulk of these cases, 82 per cent. of the total, occurred in the mining industry, and were due mainly to nystagmus, beat hand, beat knee and beat elbow. Of the remainder 497 were cases of lead poisoning.

Only a very small proportion of the claims under the act become the subject of litigation. The total number of cases under the Workmen's Compensation Act which were taken into court in 1909 was 8,254, but a half of these were settled out of court. The number of claims to compensation which have to be settled judicially is less than one in five in fatal cases and less than one in 200 in cases of disablement. Of the 3,087 cases settled judicially in England under the act, the decision was in favor of the applicant, that is, the workman, in 2,427, or 79 per cent. of the cases.

Commerce Court for Connecticut.

Charles S. Mellen, president of the New York, New Haven & Hartford, proposes that Connecticut have a commerce court. He says:

"Let the legislature provide three additional judges of the superior court. Let the chief justice of the supreme court from time to time assign a judge or judges of the superior court to conduct the sessions of the court of commerce. This court should have legislative authority to act under its own simple rules of procedure and of evidence, which should be so framed as both to prevent delays in the settlement of controversies and also to give the freedom of inquiry necessary for the effective investigation and speedy and just determination of difficult and complex commercial questions. Such a court would be better adapted to deal with a good many intricate commercial controversies than the ordinary court of justice with its technical and rigid procedure. But I now propose such a court only for the determination of controversies as to the reasonableness and fairness of charges made and services afforded by those who serve the general public, including particularly the so-called public service corporations.

"A commission sits and acts as a branch of the executive power and therefore must be free from many wholesome restraints against the arbitrariness and injustice with which the law has surrounded judicial activities. The free training of our judges peculiarly fits them to weigh evidence, to analyze a complex mass of facts and to apply logically and justly to the relevant facts the rules of law and right reason properly controlling the issues of the controversy. I feel, moreover, in common with other men of sober thought, that our judges are peculiarly protected by the traditions of their high office and by constitutional guarantees in the independent single minded administration of justice. I ask for the railways the right to have controversies affecting important property rights tried before a properly constituted judicial tribunal."

All of which, translated, seems to be a plea, not for the establishment of a court but for the appointment of judicial minded men on the railway commission.

Effect of Fire on Concrete.

A fire occurred in a building of reinforced concrete and brick. The original estimate of loss was made on the basis that the concrete floors and ceiling were not damaged sufficiently to be torn down. The owner refused to accept these figures, claiming that the concrete had been damaged and weakened. He requested that the building be tested by putting on a weight of 400 lbs. to the square foot, and if the flooring deflected more than $\frac{1}{8}$ in. it was defective and would have to be removed. This was the original test made by the architects when building was completed and turned over to the owner.

A panel $14\frac{1}{2}$ ft. x $18\frac{1}{2}$ ft. in the northeast corner of the building was first tested, and when a weight of 250 lbs. to the square foot was put on the floor deflected $\frac{1}{8}$ in. Another panel was tested and a deflection of $\frac{1}{4}$ in. to 250 lbs. was noted. There were eight panels, all approximately $14\frac{1}{2}$ ft. x $18\frac{1}{2}$ ft., which were involved in the fire, and as a further test it was decided to try one panel in another part of the building which had not been damaged by the fire, in order to see how it would show up. The sand used for testing was therefore removed to this panel, and with the same weights, viz., 250 lbs. to the square foot, this panel did not deflect over $\frac{1}{8}$ in.

The test seems to demonstrate the virtues as well as the defects of concrete construction. As there were about 60,000 lbs. of powdered bricks burned, a tremendous heat was created which would have meant a total loss to the building had it been of any other construction. At the same time, there is indicated by these tests a defect in concrete which it may be impossible to overcome, and that is, that the reinforcing steel used in its construction undoubtedly expands under a certain heat, causing the concrete to weaken.—*National Fire Protection Association Quarterly.*

American Society of Civil Engineers.

At the meeting held on November 2, a paper by C. R. Grimm, M. Am. Soc. C. E., entitled "The Arch Principle in Engineering and Esthetic Aspects, and its Application to Long Spans," was presented for discussion. This paper was printed in the September number of "Proceedings."

American Society of Mechanical Engineers.

A paper on the Rotary Kiln, by Ellis Soper, Detroit, Mich., will be presented at the New York meeting of the society on November 9. Following this paper, Charles Whiting Baker, editor of *Engineering News*, will give an illustrated lecture on the Panama canal. The date of this meeting has been changed from the customary one because the meeting would have come this month on election day.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meetings.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
AMERICAN ASSOCIATION OF DEMOCRATIC OFFICERS.—A. G. Thomson, Scranton, Pa.; next meeting June 22, 1911; Niagara Falls, N. Y.
AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn.

AMERICAN SOCIETY OF LOCAL FREIGHT AGENTS.—A. C. W. Denham, Peoria, Ill.
AMERICAN ASS'N. OF RAILROAD SUPERINTENDENTS.—C. L. Foster, Gates Lodge, Cincinnati, Ohio.
AMERICAN RAILWAY ASSOCIATION.—W. J. Allen, 11 Park Place, New York City.
AMERICAN RAILWAY BRIDGE AND ERECTING ASS'N.—C. A. Lighty, C. & N. W., Chicago, Sept. 17-19, 1911; St. Louis, Mo.
AMERICAN RAILWAY ENGINEERING AND MAINT'G ASS'N.—E. H. Fitch, Merchants Bldg., Chicago, March 21-23, 1911; Chicago.
AMERICAN RAILWAY ELECTRICAL ASS'N.—O. L. Moore, 10 E. W. Ry., St. Louis, Mo.; May 6, 1911; Detroit, Mich.
AMERICAN RAILWAY MASTER MECHANICS ASSOCIATION.—J. W. Fisher, 1000 Colony Building, Chicago.
AM. RAILWAY TOOL FOREMEN'S ASS'N.—O. F. Hoffman, Buffalo, N. Y.
AMERICAN ROADSIDEBUILT ASSOCIATION.—D. C. Loomis, 1000 E. 1st St., St. Paul, Minn.
AM. SOC. FOR TESTING MATERIALS.—F. E. Mottishaw, Union Trust Bldg., New York.
AM. SOC. OF CIVIL ENGRS.—C. W. Hodge, 20 W. 27th St., N. Y. C., 19th St. Wed., except July and August; annual, Jan. 18-19; New York.
AM. SOCIETY OF ENGINEERING CONSTRUCTION.—D. J. Hume, 12 Park Row, New York.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—C. W. Hodge, 20 W. 27th St., New York; annual, Dec. 6-9; New York.
AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Doherty, 29 W. 39th St., New York.
ASSOCIATION OF AM. RY. ACCOUNTING OFFICERS.—C. G. Phillips, 148 Dearborn St., Chicago, April 26, 1911; New Orleans, La.
ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; May, 1911; Montreal, Can.
ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Colegrave, I. C. R.R., Chicago.
ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston.
ASS'N. OF TRANS. AND CAR ACC. OFFICERS.—G. P. Conard, 24 Park Place, N. Y.; Dec. 18-14, Chicago; June 20-21, 1911, Cape May City, N. J.
CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
CANADIAN SOCIETY OF CIVIL ENGS.—Clement H. McLeod, 418 Dorchester St., Montreal, Que.; Thursdays; Montreal; annual, last week January.
CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aron Kline, 841 North 50th Court, Chicago; 2d Monday in month; Chicago.
CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul; 2d Monday, except June, July, and Aug.; St. Paul.
ENGINEERS' SOCIETY OF PENN.—E. R. Dasher, Box 704, Harrisburg, Pa.
ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fallon Bldg., Pittsburgh; 1st and 3d Tues.; annual, Jan. 17, 1911; Pittsburgh.
FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R.R., Richmond, Va.; 20th annual, June 21, 1911; St. Paul, Minn.
GENERAL SUPERINTENDENTS' ASS'N. OF CHICAGO.—H. D. Judson, 209 Adams St., Chicago; Wednesday preceding 3d Thurs.; Chicago.
INDIANAPOLIS AND MECH'L CLUB.—B. S. Downey, C. H. & D., Indianapolis, Ind.
INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; next convention, Omaha, Neb.
INTERNAT'L RY. FUEL ASS'N.—D. B. Sebastian, La Salle St. Station, Chicago; May 15-18; Chattanooga, Tenn.
INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.
INT. RY. MASTER BLACKSMITHS' ASS'N.—A. L. Woodworth, Lima, Ohio.
INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.
IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
MASTER CAR BUILDERS' ASS'N.—J. W. Taylor, Old Colony Bldg., Chicago.
MASTER CAR AND LOCO. PAINTERS' ASS'N. OF U. S. AND CANADA.—A. P. Danc, B. & M., Reading, Mass.
NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept.; Boston.
NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
NORTH-WEST RAILWAY CLUB.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d Mon., except June, July, August; St. Paul and Minn.
NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. M. & St. P.; 4th Saturday; Duluth.
OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Bldg.; Second Wed. Railway Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City; 3d Friday in month; Kansas City.
RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.
RAILWAY S'KEEPERS' ASS'N.—J. P. Murphy, Box C, Collinwood, O.; annual, May, 1911.
RICHMOND-RAILROAD CLUB.—F. O. Robinson; 2d Monday; Richmond.
ROADMASTERS' AND MAINTENANCE OF WAY ASS'N.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Oct., 1911; St. Louis.
ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.
SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. R. Ry., Montgomery, Ala.
SOUTHERN & SOUTHWESTERN R.R. CLUB.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs.; Jan., Mar., July, Sept. and Nov.; Atlanta.
TOLEDO TRANSPORTATION CLUB.—L. G. Macomber, Woolson Spice Co., Toledo; 1st Sat.; annual, May 6, 1911; Toledo.
TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; 1st Sat. after 1st Wed.; annual, Dec. 13; Buffalo.
TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.
TRAFFIC CLUB OF PITTSBURGH.—T. J. Walters, Oliver Building, Pittsburgh; meetings monthly; Pittsburgh.
TRAIN DESPATCHERS' ASS'N. OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 20, 1911; Baltimore.
TRAVELING ENGRS' ASS'N.—W. O. Thompson, N. Y. C. & H. R. E. Buffalo.
WESTERN CANADA RAILWAY CLUB.—W. H. Rosevar, P. O. Box 1707, Winnipeg; 2d Monday, except June, July and August; Winnipeg.
WOOD PRESERVER ASS'N.—F. J. Angier, First National Bank Bldg., Chicago; annual, Jan. 17-19; Chicago.

Traffic News.

The advances in coal rates from Illinois and Indiana mines which were to go into effect November 1 have been postponed to December 1.

The car shortage at the Indiana coal mines has become so great that appeals for relief are coming to the State railway commission daily.

The Northern Pacific's exhibit car, which advertises the agriculture and other resources of the northwestern states by carrying a complete (though condensed) agricultural fair to hundreds of points through the country, has just started on a 10,000 mile tour through the eastern states.

At a meeting of officers of the lines entering St. Louis on October 25, it was decided to finally refuse the demand of the arbitrary abolition committee, composed of representatives of the city council and of certain shippers of St. Louis, that the bridge differentials between East St. Louis and St. Louis shall be abolished.

An estimate is published, coming apparently from an officer of the road, in which it is said that the Long Island now carries 12,000 suburban passengers daily to and from its new terminus at the Pennsylvania station, Seventh avenue, New York City. From the same estimate it appears that the traffic of the Long Island ferry boats across the East river has decreased about 35 per cent.

Apparently with a view to making sure that the Interstate Commerce Commission shall not go out of business for lack of work, the New York Produce Exchange is going to file a petition asking for an investigation of the question of differentials on freights to and from the West, which, it is claimed, favor Philadelphia and Baltimore at the expense of New York. This question is only about 28 years old.

The Western Trunk Line roads, through their joint agent, W. H. Hosmer, have filed notice with the Interstate Commerce Commission of cancellation effective December 1, 1910, of the reduced proportional rates from Chicago and Mississippi river points to points on the Missouri river on through traffic from Atlantic Seaboard points, which reduced rates were prescribed by the commission in the Burnham-Hanna-Munger case in which the decision of the commission was recently confirmed by the Supreme Court of the United States. These reduced rates went into effect October 26, 1910, so that the commission's order, limited to two years (as required by law), is now expiring.

Bankers in New York seem to think that the controversy concerning bills of lading on cotton, which has caused much discussion for several months past, has come to an end. They believe that the English bankers will no longer insist on the severe conditions that they have been proposing. The project to form an insurance company or association to guarantee the genuineness of bills of lading appears to have made little or no progress, and the present hopes for peace appear to be based largely on the idea that the guarantees which the railways of the Southern States are now giving, and which in Texas are required by a law of the State, will afford reasonable security against fraud.

The Boston & Maine has issued its new milk tariffs for interstate traffic, in accordance with President Mellen's agreement, to go into effect Nov. 29. Lessees of milk cars will accept single car shipments from farmers at the regular car rates, plus one-half cent per car for care and icing. On an 8½-quart can the rate by passenger train is 2 cents up to 20 miles, 3 cents up to 40 miles, 4 cents up to 60 miles, 5 cents up to 100 miles and 6 cents per car for care and icing for any distance beyond that. Being must be done by the shipper. The B. & M. carries to Boston 65,000,000 quarts of milk per year 80 per cent. of which is interstate. About one-half of the milk is carried on freight trains, on which the rates are about 25 per cent. less than the passenger train rate.

The New Brunswick Board of Trade and other organizations in New Jersey have complained to the Interstate Commerce Commission against the passenger rates which have been announced by the Pennsylvania Railroad to and from its new station in New York City, which are to be considerably higher than those to the company's present terminals at the ferry landing in New York. The distance from New Jersey points

to the new station is 1.4 miles greater than to the old terminals. The railway company has announced that when the new station at Thirty-second street is opened the ferry from the railway station in Jersey City to the landing at Twenty-third street, Manhattan, will be discontinued, as will also the ferry from the Jersey City station direct to Brooklyn.

The Boise (Idaho) Commercial Club has adopted resolutions favoring the creation of a state railway commission and the Club of Commerce of Idaho Falls, Idaho, which is the second largest city in the state, has adopted resolutions opposing the creation of a state commission. The resolutions of the latter club call attention to the fact that only 8 per cent. of the total railway business in the state is intrastate, and that if a commission were created it would cost \$30,000 a year. The resolutions further call attention to the fact that the Oregon Short Line has spent \$20,000,000 in ten years in improving its facilities and extending its lines; that the Club of Commerce desires to encourage this policy, and that it believes a railway commission would probably interfere with its continuance.

The Southern Railway announces that on November 27, when its New York passengers will begin to be carried to and from the new Pennsylvania station at Seventh avenue and Thirty-second street in that city, there will be added a new train, to be called the "Southern's Southeastern Limited." This train will run between New York and Jacksonville, and south of Charlotte it will take the place of the New York and Florida Limited. The new train will leave New York at 12.38 p.m., and returning will leave Jacksonville at 9 a.m. On the same day the Southern will put on a new night train between Atlanta and Jacksonville which will accommodate local travel, and the Florida Limited, between Chattanooga and Jacksonville, will be devoted to through business. With the same time-table the regular winter train between Cincinnati and Jacksonville, the Florida Special, will be put on.

According to a press despatch from Washington, the Interstate Commerce Commission will decide the New England demurrage cases in accordance with a compromise which has been agreed upon, at the instance of the commission, between the railways and the complainants. The reduction of free time from 96 hours to 48 hours, which was decided upon by the railways, is to be approved except in the case of lumber, coal and grain, on which the free time for the next six months is to be 72 hours. A demurrage bureau is to be maintained at Boston to see to the proper administration of the new roads. The despatch says: Both sides agreed to let the rules go into effect December 1. The bureau, apparently, is to be established by the commission, for a term of six months. At the end of the six months the case may be reopened for argument before the commission for a final decision.

W. R. Stubbs, governor of Kansas, recently issued a statement in which he asserted that the increase in rates on live stock which the western railways propose to make would cost the people of Kansas alone a million dollars a year. Replying to this, J. R. Koontz, general freight agent of the Atchison, Topeka & Santa Fe, calls attention to the fact that the only rates in question are those between Kansas City and other Missouri river points and St. Louis, that the total number of cars of live stock hauled from Kansas City to St. Louis in the year ending June 30, 1909, was 29,097, and that if all of them had moved out of Kansas the total increase in freight rates to be paid by the people of Kansas would be only \$170,217. But as a matter of fact not over 40 per cent. of the shipments originated in Kansas, so that the increase in freight charges to the Kansas shipper would be \$68,000 instead of \$1,000,000, as estimated by the governor.

The State Railroad Commission of Alabama has issued a letter of advice to shippers reminding them that if they desire to promote promptness and economy in transportation, they should co-operate with carriers in making cars do the greatest possible service. In other words, they should load cars to their full capacity, in the least practicable time, and see that they are unloaded promptly at destination. If the railways are obliged to pursue wasteful practices in the use of cars they must buy more cars; and the public will have to pay the interest on the value of these additional cars. The *Wall Street Journal*, commenting on this order, says: "The stand of the Alabama commission is commended to the corresponding tribunals of Oklahoma, Texas and others in which the shipping

public has over-estimated its rights and ignored its duties. In fact, the latter examination of the shippers is the portion of many of the problems which affect the earning power of rail ways."

Chairman Knapp, of the Interstate Commerce Commission, replying to a complaining letter received from Charles Smith, Esq., of New York, recently, said that the members of the Interstate Commerce Commission had conducted their work with due diligence and had taken any reasonable vacation, and any delay in the rate increase was now before the commission has been ordered at the request of either the complainant or the carriers. The Washington correspondent of the New York *Journal of Commerce*, who frequently criticizes the commission, though in such mild and guarded language that it is doubtful if the criticisms count, says that the chairman has not made out his case. The commission has been overloaded with work for the last four years and done some of its tasks hastily, thus making it necessary to go over some matters a second time. The commission is not likely now to catch up with its docket, no matter how hard it may work, especially as "some members of the commission have not always worked very hard." The recent promotion of law clerks and others in the Washington office to the position of examiner is criticized as unsatisfactory, on the ground that these examiners have not proved to be very efficient. Moreover, "the commission has not been willing to give them the authority that was necessary in order to make them really effective in the work. * * The attempt to reorganize the service may fairly be said to have been unsuccessful and the commission remains overloaded with a multitude of executive and judicial duties confused with one another and impossible to classify or parcel out." This correspondent thinks that the work of the commission has been considerably discredited by reversals of its opinions in the courts. In 1906 and 1907 the commission's decisions appeared to fare well in the courts, but since then the tide has turned the other way.

Rate Advance Hearings at Chicago.

In the rate advance hearings at Chicago, while witnesses for the shippers testified that the railways formerly gave large rebates and that since they have quit giving rebates they ought to be able to get along with present rates, they positively refused, under cross-examination of the lawyers for the railways, to give any specific instances of rebating. The railway lawyers sought to get them to tell what railways had given the alleged rebates, the amounts, and, particularly, what shippers had received them.

E. J. McVann, traffic manager of the Omaha chamber of commerce, undertook to show that the estimated value of \$3,000,000 placed on the Burlington's terminals at Omaha by its general manager, F. E. Ward, was excessive. He introduced a statement to show that the terminals are worth less than \$1,000,000. Cross-examination by counsel for the railways brought out the fact that Mr. McVann in making his estimate had overlooked a very large part of the Burlington's Omaha terminals, including those in South Omaha.

J. R. White, traffic manager of the Burnham-Hanna-Munger Dry Goods Company, of Kansas City, Mo., testified that his concern formerly had received rebates amounting to 30 to 40 cents per 100 lbs. from the first-class rate of \$1.47 from the Atlantic seaboard to the Missouri river.

The star witness for the shippers was Governor W. R. Stubbs, of Kansas. Mr. Stubbs was, before he entered politics, engaged in the contracting business on an extensive scale, and, among other kinds of work, took a good many contracts for building railway lines. He produced an estimate which he said was based on his experience and on a personal investigation as to the amounts the railways now pay for labor and supplies, and he said that he could reproduce the main lines of the railways in Kansas for \$25,000 a mile and the branch lines for \$15,000 a mile. He gave detailed figures regarding the costs of rails, ties, grading, etc., his figures being as follows:

Rails, 80 lb., 140 tons per mile	\$4,200
Splicing, bolts, spikes, etc.	400
Ties	2,500
Grading	5,000
Track laying	600
Bridges, depots, houses, right of way	6,000
Ballast	4,000
Incidentals, freight, etc.	2,300

On cross-examination the attorney for the railways pointed out the fact that this included no equipment for the purposes of right-of-way, terminals or equipment. Governor Stubbs pointed out that even if he had the construction of railroads made to be given free, and estimated that it would cost it would cost only \$7,000 a mile. He estimated the cost of equipment at \$1,000 a mile. He said that a few years ago he had offered to build a road from Belleville, Kan., to Wichita, a distance of 150 miles, for \$16,000 a mile, but that a combination of railroads had prevented this construction from being done.

General Attorney Norton, of the Santa Fe, put in a statement showing that the Santa Fe had recently spent on a line in New Mexico the following amounts for the exact items mentioned by Mr. Stubbs under conditions somewhat similar to those existing in Kansas:

Rails, 80 lb., 140 tons per mile	4,200
Splicing, bolts, spikes, etc.	400
Ties	2,500
Grading	11,800
Track laying	1,000
Bridges, depots, houses, right of way	8,750
Ballast	1,415
Incidentals, freight, etc.	9,604

These items foot up to \$40,815 a mile. The governor admitted that it would cost an average of \$5,000 a mile to equip the road, and the addition of this figure and of \$2,000 for right-of-way would bring the Santa Fe's figures up to \$47,815 a mile. This includes no allowance for signaling or terminals.

The governor said that 20 years ago the railways hauled only 15 or 20 cars in a train and the cars were of much smaller capacity than at present. Commissioner Lane interposed the suggestion that at that time the railways were in the hands of receivers. Mr. Stubbs retorted that that was due to financial manipulation and not to inability of the roads to earn enough money to make proper additions to and improvements in their lines. He said that J. P. Morgan, James J. Hill and the other big financial men of the country are the people who have the money and to say that they cannot lend it to themselves is absurd. Governor Stubbs contended strongly that a valuation of railways should be made, based on the amount that it had actually cost to construct them, and they should then be allowed a "generous" return on the valuation. Asked what he considered a generous return, he said 5 or 6 per cent. Being asked which rate he meant (5 or 6), he said that probably the western roads should be allowed 6 per cent. and the eastern roads 5 per cent.

John Barton Payne, who conducted most of the cross-examination for the railways, questioned the governor regarding his motives for appearing as a witness for the shippers, and he said he appeared to protect the people of Kansas from extortionate freight rates. The railway lawyers found it impossible to pin him down to direct answers to their questions. Every time a question was asked he would get on his feet and address a stump speech to the crowd attending the hearing. Finally Mr. Payne said: "Governor, I suppose you expect your stump speeches here to be wired to the Kansas newspapers, and that you think that to deliver them here will do you as much good as if you made them in Kansas." Quick as a flash the governor replied: "I hope my speeches will be telegraphed to Kansas, and I am sure they will do me just as much good when delivered here as if delivered there."

Mr. Norton, of the Santa Fe, for the purpose of showing the reasons for the governor's appearance as a witness, read into the record a telegram from J. H. Atwood, attorney for the shippers, appealing to Governor Stubbs to come to Chicago. The telegram stated that the case of the shippers was in a bad way and that unless he came to the rescue of the people of the Middle West and did something to stir up public sentiment rates would probably be advanced.

Governor Stubbs vigorously attacked railway methods of financing, and said that if the farms of Kansas were run like the railways, "bonded for more than they cost and employed high-salaried officers," they would all be "busted" in a year. He declared it ridiculous for a railway to talk about poor credit; if the railways would stop their high financing they could get more money from the American people than they could use. The curse of American railways, he said, is the way they have juggled things and the way their officers have gotten rich in shady deals.

When his attention was called to the fact that large amounts of money had been lost in early investments in railways, he replied that may be the people who put money in them had lost it, but that the New York promoters had enriched themselves by bringing financial difficulties on the roads, and, in consequence, are now "too rich to be comfortable."

Governor Stubbs' purpose in appearing as a witness in the rate case is perhaps indicated by the fact that he brought with him a press agent from Topeka, Kan., and on the night before he was called to testify gave to the newspapers a statement of what he proposed to say.

After the shippers closed their testimony witnesses were called by the railways to justify the advances in the specific rates which it is proposed to make.

C. G. Burnham, vice-president in charge of traffic of the Burlington, in answer to statements of witnesses for the shippers that earnings had been greatly increased by the abolition of rebates as well as by advances in the published tariffs, introduced detailed tables giving present rates, proposed advances and those which were in effect in 1900 and 1905. The tables showed that the rates on some commodities have been advanced but that on more commodities they have been reduced, and that, in consequence, the average rate is lower now than it was in 1905 and that it is considerably lower than it was in 1900. Mr. Burnham showed that on the tonnage of September, 1909, and March, 1910, earnings would have been \$17,061 less under the proposed higher rates than they would have been under the rates in effect in 1900.

The following figures give the average of the commodity rates in effect in the past, in effect now and which it is proposed to put in effect: From Chicago to the Missouri river: In 1900, 31½ cents; in 1905, 26.9 cents; present average, 23½ cents; proposed average, 26.8 cents. From Chicago to St. Paul: In 1900, 25½ cents; in 1905, 22½ cents; present average, 19 cents; proposed average, 22½ cents.

Commissioner Lane suggested that the answer to these questions would be that the roads did not get their full rates in 1900. Mr. Burnham replied that his tables showed the ton-mile rates based on the actual freight receipts after the rebates had been deducted, and, therefore, indicated what the actual earnings were and would be. He added that the amount of rebates that the railways had given had been greatly exaggerated. He had never known any case where a rebate of over 30 per cent. had been given, and did not believe the rebates given by the Burlington would aggregate over 3 to 5 per cent. of the road's total freight earnings. There was similarly a very exaggerated view prevalent, he said, as to the amount of free transportation that formerly was given. The Burlington's records show that only 1.9 per cent. of the passengers formerly carried were hauled on free transportation. He added that rebates were not given on many of the commodities under consideration. The traffic manager of the Burnham, Hanna, Munger Dry Goods Company, of Kansas City, having testified that his company had received a rebate of 49 per cent. from the through rate from the Atlantic seaboard to the Missouri river, Mr. Burnham stated that this company had received the largest rebates of any company on the Missouri river.

In regard to the reasons for the proposed advances, Mr. Burnham said that the reports which had come to the officers of the roads had shown constant increases in gross earnings, stationary or decreasing net earnings, and continually declining average rates per ton per mile and per passenger per mile. They also indicated that economies effected by increased loading per car and by the use of heavier trains had ceased. It was concluded, therefore, that if the property was to be properly maintained and operated, it was necessary to get higher rates. He said the advances announced and the further advances considered would not give the Burlington anything like the additional revenue that it requires, but he believed that as a practical matter it would not be possible for the railways to make as large advances as they would like to. The roads, however, intend to make these advances in addition to those already proposed. The advances already proposed by the Burlington would yield it \$400,000 a year, and it was felt that other advances which would run this increase up to \$800,000 a year should be made. He did not believe it would be practicable to make any further advances.

Attorney Lyon, of the commission, asked Mr. Burnham if his road would have asked for an advance in rates if it had foreseen that its net earnings would be larger in the fiscal year

1910 than they were in the year 1909. He replied in the affirmative, because the increase in net earnings, he said, represented unusual economy. He explained that the commodity rates were selected for advances because they were disproportionately low. He believed that the class rates ought to be raised. For example, if the commodity rates should be advanced 15 per cent, class rates ought to be advanced about 10 per cent, but he doubted if, as a practical matter, class rates could be raised. He said that in deciding on the increases proposed the roads had taken into consideration the value of the articles, the cost of transportation, the tonnage of the various commodities, the increases in their selling prices in recent years, the effect on the rates from Chicago to St. Paul of the competition of the water lines from Chicago to Duluth, the profits of the shippers as compared with those of the railways, and numerous other factors.

Commissioner Lane asked whether the roads, when the commission had reduced some rates, looked around for other rates to increase, and whether they consider that they have a right, when the commission reduces some rates, to increase others. Mr. Burnham replied that the roads assume that they have a right to earn a fair return, and that if reductions made by the commission will prevent them from doing this, they have a right to advance other rates which the commission has not fixed.

S. H. Johnson, assistant freight traffic manager of the Rock Island, said that the proposed rate advances affect 12.23 per cent. of the tonnage of his road, and that, excepting grain and coal, none of the commodities which move in large quantities or that are necessities of life, are affected. Commissioner Lane remarked that until recent federal legislation was passed the roads could advance any rates they liked, and he asked why the advances had been made since the commission was given supervision of rates. Mr. Johnson replied that there was a conflict between the regulation of state and interstate rates that has helped to produce this condition; that the state commissions have not only made unwarranted reductions in rates, but have made harmful adjustments. Mr. Lane asked if the roads had taken proper steps to get the state rates on what they consider a proper basis. Mr. Johnson answered that they were litigating the rates in many states, citing cases which are pending in the federal courts in Oklahoma, Arkansas, Missouri and Minnesota. He said the roads could get along very well with the Interstate Commerce Commission if they did not have to deal with all the state commissions at the same time. Mr. Johnson was questioned at length by attorneys for both the railways and the shippers regarding his opinion of what constitutes a reasonable rate. He said that a reasonable schedule of rates was one that would enable a road to earn at least a fair return, but that as to the particular rates in question he thought they should be raised whether the railways receiving them were earning more or less than a fair return, as they are unfairly low as compared with other rates. An interesting colloquy took place between the witness, the lawyers for both the shippers and the railways and Commissioners Clark and Lane, when Mr. Johnson said he thought that rates should be based largely on the value of the service. The discussion showed that varying views are held as to the extent that value of the service should be considered in rate-making by the representatives of the railways and that they do not even agree very well as to what the term itself means.

James S. Peabody, statistician of the Santa Fe, testified that the handling of intrastate traffic costs the roads from two to five times as much as the handling of interstate traffic, and criticized the attempts independently to regulate state and interstate rates as an absurdity.

Revenues and Expenses of Railways.

The accompanying index gives the numbers of the page in volumes 47, 48 and 49 of the *Railway Age Gazette* on which the revenues and expenses of each railway reporting to the Interstate Commerce Commission is given for each month in the fiscal year ended June 30, 1910. On the following page there is given the earnings and expenses of roads whose monthly returns for the indicated months have not before appeared in the *Railway Age Gazette*. No trouble should be experienced in telling which volume the page numbers of the index refer

50. For instance, the figures 669, 771, 983 and 1317 for the Alabama & Vicksburg evidently refer to pages in volume 47, and the numbers from 202 to 1808 refer to volume 48, and from 202 to 258, volume 49.

PAGE INDEX TO REVENUES AND EXPENSES OF RAILWAYS
FOR THE FISCAL YEAR ENDED JUNE 30, 1910.

[illegible]

Name of Road	Jan	Feb	Mar	Apr	May	June	July	Aug
Delaware & N. York	652	1161	64	758	41	1178	1218	434
Delaware Island	1068	161	34	84	747	1608	11	1562
Delaware & N. York	652	1161	64	758	41	1178	1218	434
Louisiana R. & N. Co.	660	1161	64	758	41	1178	1218	434
Louisiana R. & N. Co.	660	1161	64	758	41	1178	1218	434
Louisiana West	660	1161	64	758	41	1178	1218	434
Louisiana & N. York	652	1161	64	758	41	1178	1218	434
L'ville, H. & T. L.	660	1161	64	758	41	1178	1218	434
Maine Central	517	720	988	1208	158	325	542	965
Michigan Central	617	720	988	1208	158	325	542	965
Minneapolis & N. York	660	1161	64	758	41	1178	1218	434
Minneapolis & N. York	660	1161	64	758	41	1178	1218	434
M. St. P. & S. S. M.	660	1161	64	758	41	1178	1218	434
Miss. Central	605	1101	202	270	911	1106	1383	1808
Miss. Riv. & B. L.	605	1101	202	270	911	1106	1383	1808
Missouri & N. Ark.	605	1101	202	270	911	1106	1383	1808
Missouri, K. & T.	617	720	988	1208	158	325	542	965
Mobile & Ohio	660	1161	64	758	41	1178	1218	434
M. J. & K. C.	660	1161	64	758	41	1178	1218	434
Momongahela	605	1101	202	270	911	1106	1383	1808
Monon Connect.	605	1101	202	270	911	1106	1383	1808
Morgans La. & Tex.	660	1161	64	758	41	1178	1218	434
N. R. & S. Co.	660	1161	64	758	41	1178	1218	434
N. R. & S. Co.	660	1161	64	758	41	1178	1218	434
Nevada Northern	660	1161	64	758	41	1178	1218	434
New Orleans & N.	660	1161	64	758	41	1178	1218	434
N. Orleans Gt. N.	660	1161	64	758	41	1178	1218	434
N. Or. M. & C.	660	1161	64	758	41	1178	1218	434
N. Y. C. & H. R.	517	720	988	1208	158	325	542	965
N. Y. C. & T.	617	720	988	1208	158	325	542	965
N. Y. C. & H. R.	517	720	988	1208	158	325	542	965
N. Y. C. & W.	517	720	988	1208	158	325	542	965
N. Y. Phila. & N.	660	1161	64	758	41	1178	1218	434
N. Y. S. & W.	560	821	1033	1317	202	457	844	1059
Norfolk Southern	517	720	988	1208	158	325	542	965
Norfolk & West	517	720	988	1208	158	325	542	965
Northern Central	660	1161	64	758	41	1178	1218	434
N. York & N. York	660	1161	64	758	41	1178	1218	434
Northwestern Pac.	660	1161	64	758	41	1178	1218	434
Ore. R.R. & N. Co.	517	720	988	1208	158	325	542	965
Ore. Short Line	517	720	988	1208	158	325	542	965
Oregon & Wash.	660	1161	64	758	41	1178	1218	434
Pecos & N. Tex.	605	821	1033	1317	202	457	844	1059
Pennsylvania Co.	517	720	988	1208	158	325	542	965
Pennsylvania Co.	517	720	988	1208	158	325	542	965
Peoria & Eastern	560	821	1033	1317	202	457	844	1059
Peoria & Eastern	560	821	1033	1317	202	457	844	1059
Peoria & Pekin U.	605	1101	202	270	911	1106	1383	1808
Pere Marquette	517	720	988	1208	158	325	542	965
Phila. & Reading	517	720	988	1208	158	325	542	965
Phila. B. & W.	660	1161	64	758	41	1178	1218	434
P. & L. E.	560	821	1033	1317	202	457	844	1059
P. & C. St. L.	652	1161	64	758	41	1178	1218	434
P. & N. York	560	821	1033	1317	202	457	844	1059
P. & N. York	560	821	1033	1317	202	457	844	1059
Port Reading	605	1101	202	270	911	1106	1383	1808
Q. O. & K. C.	605	1101	202	270	911	1106	1383	1808
R. F. & P.	605	821	1033	1317	202	457	844	1059
Rutland	517	720	988	1208	158	325	542	965
St. Jos. & Gr. Is.	560	821	1033	1317	202	457	844	1059
St. Louis & San P.	517	720	988	1208	158	325	542	965
St. Louis, B. & M.	560	821	1033	1317	202	457	844	1059
St. L. J. Mtn. & S.	660	1161	64	758	41	1178	1218	434
St. L. M. & B. Term.	605	821	1033	1317	202	457	844	1059
St. L. San F. & T.	605	1101	202	270	911	1106	1383	1808
St. L. Southwest	517	720	988	1208	158	325	542	965
St. L. S. of Tex.	517	720	988	1208	158	325	542	965
San Pedro	517	720	988	1208	158	325	542	965
San Pedro, Los An-	517	720	988	1208	158	325	542	965
geles & Salt L.	517	720	988	1208	158	325	542	965
San, Fe, P. & P.	560	821	1033	1317	202	457	844	1059
Seaboard Air L.	517	720	988	1208	158	325	542	965
South Buffalo	605	1101	202	270	911	1106	1383	1808
Southern	517	720	988	1208	158	325	542	965
Southern in Min.	660	1161	64	758	41	1178	1218	434
Southern Ind.	560	821	1033	1317	202	457	844	1059
So. Kans. of Tex.	605	821	1033	1317	202	457	844	1059
So. Pac. Co.	517	720	988	1208	158	325	542	965
Spok. & In. Emp.	821	1033	1317	202	457	844	1059	1383
Spokane Intern'l	560	1101	202	270	911	1106	1383	1808
Spokane, Port & S.	660	1161	64	758	41	1178	1218	434
St. L. & N. Y.	560	1101	202	270	911	1106	1383	1808
Tennessee Cent.	560	1101	202	270	911	1106	1383	1808
Term. R.R. Assn.	605	821	1033	1317	202	457	844	1059
of St. Louis.	605	821	1033	1317	202	457	844	1059
Tex. & N. York	517	720	988	1208	158	325	542	965
Texas & Pac.	517	720	988	1208	158	325	542	965
Toledo & O. Cent.	660	1161	64	758	41	1178	1218	434
Toledo, P. & W.	560	1033	1317	202	457	844	1059	1383
T. St. L. & W.	517	720	988	1208	158	325	542	965
Trinity & Braz.	560	821	1033	1317	202	457	844	1059
Ulster & Dela.	560	821	1033	1317	202	457	844	1059
U. R. K. of Balt.	605	821	1033	1317	202	457	844	1059
Union P. Pgh.	605	821	1033	1317	202	457	844	1059
Unim. Pacific	517	720	988	1208	158	325	542	965
Vandalia	517	720	988	1208	158	325	542	965
Vicks, S. & Pac.	560	821	1033	1317	202	457	844	1059
Vir. & S'western	560	1033	1317	202	457	844	1059	1383
Virginian	560	1033	1317	202	457	844	1059	1383
Wabash	560	1033	1317	202	457	844	1059	1383
Wash. & Pgh.	605	1101	202	270	911	1106	1383	1808
Wash. Southern	605	1101	202	270	911	1106	1383	1808
W. Jersey & Sea.	605	1101	202	270	911	1106	1383	1808
West. Maryland	605	821	1033	1317	202	457	844	1059
West. Ry. of Ala.	605	1101	202	270	911	1106	1383	1808
Wheeling & L. E.	517	720	988	1208	158	325	542	965
W. Wash. & P.	605	1101	202	270	911	1106	1383	1808
Wisconsin Cent.	605	1101	202	270	911	1106	1383	1808
Yazoo & Miss.	517	720	988	1208	158	325	542	965

*Indicates returns received too late for current publication, which are published on following pages.

REVENUES AND EXPENSES OF RAILWAYS.

Delayed Returns for the Fiscal Year Ended June 30, 1910

Operating expenses—		Maintenance of		Operating revenues—		Net		Outside		Operating		Increase	
Total		Total		Total		Total		Total		Total		Total	
Passenger	Freight	Passenger	Freight	Passenger	Freight	Passenger	Freight	Passenger	Freight	Passenger	Freight	Passenger	Freight
1909	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
1908	950,000	950,000	950,000	950,000	950,000	950,000	950,000	950,000	950,000	950,000	950,000	950,000	950,000
1907	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000	900,000
1906	850,000	850,000	850,000	850,000	850,000	850,000	850,000	850,000	850,000	850,000	850,000	850,000	850,000
1905	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000
1904	750,000	750,000	750,000	750,000	750,000	750,000	750,000	750,000	750,000	750,000	750,000	750,000	750,000
1903	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000	700,000
1902	650,000	650,000	650,000	650,000	650,000	650,000	650,000	650,000	650,000	650,000	650,000	650,000	650,000
1901	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000
1900	550,000	550,000	550,000	550,000	550,000	550,000	550,000	550,000	550,000	550,000	550,000	550,000	550,000

1909. Mileage operated on June 30, 1909: 1,454 miles; 1,467 miles; 1,474 miles; 1,481 miles; 1,488 miles; 1,495 miles; 1,502 miles; 1,509 miles; 1,516 miles; 1,523 miles; 1,530 miles; 1,537 miles; 1,544 miles; 1,551 miles; 1,558 miles; 1,565 miles; 1,572 miles; 1,579 miles; 1,586 miles; 1,593 miles; 1,600 miles; 1,607 miles; 1,614 miles; 1,621 miles; 1,628 miles; 1,635 miles; 1,642 miles; 1,649 miles; 1,656 miles; 1,663 miles; 1,670 miles; 1,677 miles; 1,684 miles; 1,691 miles; 1,698 miles; 1,705 miles; 1,712 miles; 1,719 miles; 1,726 miles; 1,733 miles; 1,740 miles; 1,747 miles; 1,754 miles; 1,761 miles; 1,768 miles; 1,775 miles; 1,782 miles; 1,789 miles; 1,796 miles; 1,803 miles; 1,810 miles; 1,817 miles; 1,824 miles; 1,831 miles; 1,838 miles; 1,845 miles; 1,852 miles; 1,859 miles; 1,866 miles; 1,873 miles; 1,880 miles; 1,887 miles; 1,894 miles; 1,901 miles; 1,908 miles; 1,915 miles; 1,922 miles; 1,929 miles; 1,936 miles; 1,943 miles; 1,950 miles; 1,957 miles; 1,964 miles; 1,971 miles; 1,978 miles; 1,985 miles; 1,992 miles; 1,999 miles; 2,006 miles; 2,013 miles; 2,020 miles; 2,027 miles; 2,034 miles; 2,041 miles; 2,048 miles; 2,055 miles; 2,062 miles; 2,069 miles; 2,076 miles; 2,083 miles; 2,090 miles; 2,097 miles; 2,104 miles; 2,111 miles; 2,118 miles; 2,125 miles; 2,132 miles; 2,139 miles; 2,146 miles; 2,153 miles; 2,160 miles; 2,167 miles; 2,174 miles; 2,181 miles; 2,188 miles; 2,195 miles; 2,202 miles; 2,209 miles; 2,216 miles; 2,223 miles; 2,230 miles; 2,237 miles; 2,244 miles; 2,251 miles; 2,258 miles; 2,265 miles; 2,272 miles; 2,279 miles; 2,286 miles; 2,293 miles; 2,300 miles; 2,307 miles; 2,314 miles; 2,321 miles; 2,328 miles; 2,335 miles; 2,342 miles; 2,349 miles; 2,356 miles; 2,363 miles; 2,370 miles; 2,377 miles; 2,384 miles; 2,391 miles; 2,398 miles; 2,405 miles; 2,412 miles; 2,419 miles; 2,426 miles; 2,433 miles; 2,440 miles; 2,447 miles; 2,454 miles; 2,461 miles; 2,468 miles; 2,475 miles; 2,482 miles; 2,489 miles; 2,496 miles; 2,503 miles; 2,510 miles; 2,517 miles; 2,524 miles; 2,531 miles; 2,538 miles; 2,545 miles; 2,552 miles; 2,559 miles; 2,566 miles; 2,573 miles; 2,580 miles; 2,587 miles; 2,594 miles; 2,601 miles; 2,608 miles; 2,615 miles; 2,622 miles; 2,629 miles; 2,636 miles; 2,643 miles; 2,650 miles; 2,657 miles; 2,664 miles; 2,671 miles; 2,678 miles; 2,685 miles; 2,692 miles; 2,699 miles; 2,706 miles; 2,713 miles; 2,720 miles; 2,727 miles; 2,734 miles; 2,741 miles; 2,748 miles; 2,755 miles; 2,762 miles; 2,769 miles; 2,776 miles; 2,783 miles; 2,790 miles; 2,797 miles; 2,804 miles; 2,811 miles; 2,818 miles; 2,825 miles; 2,832 miles; 2,839 miles; 2,846 miles; 2,853 miles; 2,860 miles; 2,867 miles; 2,874 miles; 2,881 miles; 2,888 miles; 2,895 miles; 2,902 miles; 2,909 miles; 2,916 miles; 2,923 miles; 2,930 miles; 2,937 miles; 2,944 miles; 2,951 miles; 2,958 miles; 2,965 miles; 2,972 miles; 2,979 miles; 2,986 miles; 2,993 miles; 3,000 miles; 3,007 miles; 3,014 miles; 3,021 miles; 3,028 miles; 3,035 miles; 3,042 miles; 3,049 miles; 3,056 miles; 3,063 miles; 3,070 miles; 3,077 miles; 3,084 miles;

President Ripley on Railway Capitalization and Rates.

President Ripley of the Santa Fe, in October 27 made a public address at Topeka, Kan. He had written to Governor Stubbs of Kansas regarding the subject of railway capitalization and rates. The letter was a reply to one which had been written to Governor Stubbs to him. In the course of his letter Mr. Ripley said:

"One of the most useful and fruitful sources of experience; of contact with shippers; of conference and consultation; in our case of course this is public opinion, when we believed that public opinion to be mistaken. Also they are the results of competition between railways, between railways and waterways, between markets and between individuals, and lastly, they are in part due to legislation and national laws, mostly unintelligent and passed in time of popular hysteria. If all these influences combined have not produced a perfect result are not the public and the law-makers at least in part responsible?"

"In my forty years' experience in the consideration of railway rates I have not known of a case in which the physical value of the railway property or its capitalization were the determining factor. The needs of the community, the value of the property to be transported, the price at the originating point and at destination, the shipper's view of what he can afford to pay, the rates prevailing in adjacent territory, whether by rail or water, and in general the value of the service, are the factors which determine the rates, when not interfered with by the various 'regulating' bodies, which occasionally cast stones into the meshes of the machinery. For instance, the four trunk lines in Kansas must perform have the same rates, yet their capitalization ranges from about \$45,000 for the Missouri Pacific to about \$100,000 for the Union Pacific. The rates of these four must not only be identical at the various junctions with each other, but also at local points, because the rates at a station on the Santa Fe must not be higher or lower than at a station 20 miles across country on the Missouri Pacific.

"You cite the supreme court decision in the gas company case, where a 6 per cent. return was held sufficient, but in that case the court said that in determining the sufficiency of a particular rate of compensation 'the amount of risk in the business is a most important factor,' and this factor the court found was 'reduced almost to a minimum.' In the case of railways, however, this element of risk, you must admit, is large and constant. You also ask why the railways appeal to the courts alleging that various legislative bodies are attempting to confiscate their property. I am not a lawyer, but I imagine the idea is that only by alleging a violation of the Federal Constitution can the protection of the United States courts be invoked. The acts of state legislatures and the orders of state commissions fixing rates have been successfully attacked because the facts in given cases showed that such rates were plainly confiscatory, and, hence, it was unnecessary to ask for a finding as to the limits of a reasonable return upon a business involving so much risk as that of railroading. In the gas case, the court recognized that there was a 'line of division between possible confiscation and proper regulation,' and that line has to be judicially determined. I believe the courts will hold that the limit of proper regulation has been passed if any carrier be deprived of the reasonable compensation it has a right to expect, considering the value of the services rendered, regardless of the exact percentage of profit from its operations."

Mr. Ripley added that when he said that the capitalization of the Santa Fe represents money actually invested in it, he had reference to the present company, which began business 15 years ago, taking over the property of the bankrupt company. He said that in the 26 years' experience of the old company, the average return on its capitalization was 3.23 per cent. on its bonds and 2.12 per cent. on its stock. He added, "Now, you may assume, if you please, that a considerable part of the original capitalization represented only the hopes of the promoters, but even supposing that one-half of it was what you call 'water' (which would be a violent assumption), it appears that the owners of this great property, which has been the chief factor in making Kansas what it is to-day, have received a totally inadequate return for the use of their money, to say nothing of the risk they took."

On October 27 Mr. Ripley delivered an address at a mass meeting given in his honor by the citizens of Topeka, in which he said that all the railway asks of the public is protection for its property, and freedom from interference with its business

and that in the 41 years since the original line was projected it had paid its cost of location and construction. He said that the action of public officers in insistently criticizing and misrepresenting it.

National Industrial Traffic League.

The annual meeting of the National Industrial Traffic League was held in Chicago last week. The committee on tracing of freight made a report urging shippers to desist from tracing unless there is some definite and urgent reason. "No tracer should be started," said the committee, "until a complaint has been received from the consignee of the non-arrival of the whole shipment or a part thereof, and then only after a reasonable time has elapsed for the consignment to reach destination, unless the shipper has information that his goods are being delayed at some point in transit." The committee finds that shippers are making so many tracing requests for which there is no good reason that they are interfering with the effectiveness of legitimate tracing. A statement of a car-service officer of a western trunk line was quoted, in which he said that between 6:30 and 9:30 p.m. of a single day he received telegraphic tracers for 125 cars. The next morning he found that there had been received 223 more, making a total of 348 wire tracers received between 6:30 p.m. and 8 a.m., and, besides, as many more came in by the morning mail. The committee said that the carriers have their operating departments so organized as to expeditiously move the business under ordinary conditions, and that ordinarily the tracing of freight will not hasten a shipment. W. E. Beecham, car accountant of the Chicago, Milwaukee & St. Paul, who was present to address the meeting on behalf of the General Superintendents' Association, said that at certain seasons congestions occur and cannot be avoided. The carriers are willing to establish and keep in commission a tracing department equal to the demands of any ordinary conditions, but they should not be held responsible for the faults of shippers. The tracing department cannot move traffic when the motive power is unable to do so, and, of course, every road in the country makes it a practice to move its freight in the most expeditious manner practicable.

The committee on loss and damage from team tracks said that it is the judgment of the league's legislative committee "that where delivery is made to the consignee on public team tracks, it is the duty of the railway, both as a carrier and a warehouse man, to exercise the same care in the protection of property being handled from the team track that it does for property being unloaded through their depots, and must afford reasonable police protection until delivery is actually made to the consignee. If, however, consignee fails to remove the property within a reasonable time, the liability of the carrier as a warehouse man will be lessened accordingly." As to package freight delivered from team tracks, it was the judgment of the legislative committee that the liability of the carrier ceases when delivery has been effected at the car door. Two subjects, "Control of Coastwise Traffic by the Interstate Commerce Commission" and "Ownership and Control of Competing Water Carriers," were laid on the table, as differences developed between the members as to what policy the government should pursue as to these matters.

The committee on re-issuing tariffs to show changes from former issues called attention to the order issued by the Interstate Commerce Commission on July 13, 1910, requiring that all tariff publications filed with the commission after September 1 must indicate, by the use of black-face type or by the use of symbols with proper explanations, all increases in rates, and the committee on simplification of tariffs was authorized to see if tariffs could not be so printed as to show decreases as well as increases in rates.

The following officers for the ensuing year were elected: President, J. C. Lincoln, St. Louis. Vice-president, W. M. Hopkins, Chicago. Secretary-treasurer, O. F. Bell, Chicago. Honorary vice-presidents: J. S. Marvin, New York; H. W. B. Glover, Atlanta; J. S. Davant, Memphis; J. H. Johnston, Oklahoma City; C. R. Rust, Duluth; F. B. Gregson, Los Angeles; D. O. Ives, Boston; Jno. Wunderlick, Cedar Rapids; H. M. Newlin, Philadelphia; R. E. Hanley, Buffalo.

Directors: S. H. Babcock, Salt Lake City; H. C. Barlow, Chicago; I. S. Bassett, Pittsburgh; Geo. T. Bell, Sioux City; J. M. Belleville, Pittsburgh; F. T. Bentley, Chicago; C. J. Berthcy, Milwaukee; L. B. Boswell, Quincy; Jas. Collord, Buffalo; M. S. Dean, Chicago; A. R. Ebi, Moline; W. J. Evans, Chicago; W. H. Frederick, Buffalo; C. B. Gregory, Rockford; J. M. Guild, Omaha; W. D. Hurlbut, Chicago; C. A. Jennings, Chicago; Jos. Keavy, Indianapolis; F. W. Maxwell, Denver; E. J. McVann, Omaha; F. B. Montgomery, Chicago; R. Muhl-Lerg, St. Louis; B. H. O'Meara, Cedar Rapids; E. A. Risdon, Duluth; G. A. Schroeder, Milwaukee; J. J. Telford, Louisville; W. P. Trickett, Minneapolis; W. R. Wheeler, San Francisco; E. E. Williamson, Cincinnati; H. G. Wilson, Kansas City; E. G. Wylie, Des Moines.

INTERSTATE COMMERCE COMMISSION.

John T. Marchand, for several years personal representative of President Winchell, of the Rock Island, has been appointed an attorney for the Interstate Commerce Commission.

Jurisdiction Over Private Cars.

Pat. Chappelle v. Louisville & Nashville. Opinion by Commissioner Lane.

Petition of defendant for rehearing denied, the commission reaffirming its right to exercise jurisdiction over private cars when used for the conveyance of amusement outfits, theatrical companies, and the like. (19 I. C. C., 456.)

Effect of Competition at Minneapolis Recognized.

Omaha Grain Exchange v. Chicago & North Western et al. Opinion by Commissioner Clark:

Complaint alleges unreasonable rates on grain from parts of South Dakota, Minnesota and Iowa to Omaha, Nebr., as compared with the rates from same points to other markets; the real and important question here is whether or not defendants shall be required to establish rates from the territory in question to Omaha on a basis of like rates for like distances as compared with their rates from same points to Minneapolis. It is held that the rates to Minneapolis are strongly influenced or controlled by competitive conditions which do not likewise affect the rates to Omaha. The interests of the Minneapolis lines which do not also reach Omaha, as well as the demands of the milling interests at Minneapolis, create conditions which, as to the rates and transportation to Minneapolis, are substantially dissimilar from those which apply to the rates and the transportation to Omaha. (19 I. C. C., 424.)

Validation of Excursion Tickets.

In re extra fare paid by reason of non-validation of limited excursion tickets. Opinion by Chairman Knapp.

The commission on its own motion investigated the subject of validation regulations, and has decided that a regulation by a railway company which provides that a person who fails to have the return portion of his excursion ticket validated must pay the one-way fare to the conductor, and that the railway will refund this fare on the passenger's proving that he returned over the same road that his ticket called for and that with the exception of having the ticket validated he fulfilled all the contracts of the ticket. (19 I. C. C., 440.)

George W. Riter v. Oregon Short Line et al. Opinion by Commissioner Parsons.

There is great force in the position of complainant that good faith to the public would require defendants to state in advertisements of their excursions the total amount which would be exacted for the transportation service, of which validation is a part, but it is difficult to see how it can be held to be a violation of the act to regulate commerce to exact a part of the tariff rate at the ticket office when the ticket is sold and the balance of that rate at the validating agency when the ticket is validated.

While it seems probable that in some instances the place of validation might be made more convenient than it now is and that the annoyance to the public might be somewhat lessened, still upon the theories made in this case and upon knowledge of the situation the commission hesitates to interfere by any general rule. If special instances arise where the inconvenience is undue, these can be dealt with individually.

It has been assumed that the validation of these excursion tickets was a legitimate or practice which fell within the juris-

diction of this commission, but that point has not been particularly considered, and is not decided.

Under the method of handling these validation fees they never find their way into the revenue returns of the carriers to this commission. In some way those fees should find their way into the accounts of the railways; but the circumstance that a proper account of the fees is not given does not of necessity stamp the exaction of it or the method of its exaction as illegal.

Complainant's contention that the manner in which these validation fees are handled amounts to a violation of the fifth section of the act is not sustained. (19 I. C. C., 443.)

COURT NEWS.

A press despatch from Ogden says that a clothing dealer of that city has been convicted and fined \$300 for riding on a pass from Ogden to Reno last July, at the time of the prize fight, and a representative of the Southern Pacific has been arrested for giving the pass.

A recent decision of the supreme court of Montana held that railway employees cannot use in that state any passes excepting those issued by the lines by which they are employed. The consequence is that all traveling representatives of the roads are having to pay cash fares when off the lines of their own roads.

The Supreme Court of the United States has denied the application of the state of Oklahoma for writs of certiorari to take from the federal court of appeals the appeals of the state from the order restraining the Oklahoma railway commission from enforcing its orders reducing commodity and passenger rates within that state. The ground for the motion was that as the state court had declared the orders legal, there was an unseemly conflict between the federal and state courts.

The United States circuit court, at St. Paul, October 27, issued an order restraining the Interstate Commerce Commission from enforcing its decision requiring the railways to reduce their rates on lemons from California to eastern points from \$1.15 to \$1. The court said that the question presented was very important, that the judges had serious doubts as to the validity of the order, and that they felt it should be suspended until it could be passed on by the new commerce court.

The United States circuit court of appeals at Chicago on October 25 entered a decree putting in effect the orders of the Interstate Commerce Commission in the Missouri river and the Denver rate cases. These are the cases in which the Interstate Commerce Commission held that the through rate should ordinarily be less than the sum of the local rates, and required that through rates less than the sums of the locals be made to cities on the Missouri river and to Denver. The shippers interested in this litigation will present to the Interstate Commerce Commission petitions for reparation amounting to \$500,000, the reparation being demanded because the railways kept in effect the higher rates after the Interstate Commission had ordered them reduced.

Judge Tuthill, of the circuit court of Cook county, Illinois, on October 28 dissolved a temporary injunction which he had previously issued restraining the Parmelee Transfer Company and seven railways entering Chicago from carrying out an agreement to give the Parmelee company the exclusive privilege of checking railway baggage from residences in Chicago to destinations. The injunction had been issued on the prayer of the Frank E. Scott Transfer Company. In dissolving it Judge Tuthill said that the railway companies have the full right to select a transfer company to handle baggage checks. The Parmelee company alleged that the Scott company had offered to sell out to it at an exorbitant price and that the litigation was begun to compel acceptance of the offer.

Mileage Tickets in South Carolina.

The supreme court of South Carolina has rendered a decision to the effect that a specific contract is made when a mileage ticket is bought, and that the purchaser must exercise reasonable diligence to get the coupons exchanged for a ticket according to the rule in the contract, wherever practicable. If there is a ticket agent at a station, the mileage book holder must get his ticket. If there is none then the mileage book coupons may be tendered for passage on the train. The case was brought by Des Portes against the Southern Railway, and a lower court had given him damages for "conspiracy"; but the supreme court reversed the judgment.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

The officers of the Stockton Terminal & Eastern, a new line in California, are as follows: M. J. Gardner, president; F. J. W. Dietrich, first vice-president; Andrew M. Cornejo, second vice-president; J. E. Adams, secretary, and A. D. Rothenbach, treasurer, all with offices at Stockton, Cal.

Incident to the separation of the management of the Chicago & Alton and the Toledo, St. Louis & Western from that of the Minneapolis & St. Louis and the Iowa Central, George H. Ross, vice-president of the four roads, resigns from the Minneapolis & St. Louis and the Iowa Central, and will continue as vice-president of the other two. C. H. Ackert, vice-president in charge of operation of the four roads, resigns, and W. G. Bierd, general manager of the Minneapolis & St. Louis and the Iowa Central, has been appointed vice-president and general manager of those two roads, with office at Minneapolis, Minn. (See item under Operating Officers.) E. S. Benson resigns as comptroller of the four roads, and has been appointed auditor of the Chicago & Alton and the Toledo, St. Louis & Western, with office at Chicago, succeeding W. D. Tucker, resigned.

Operating Officers.

W. M. Jaekle has been appointed assistant superintendent of the Oregon Railroad & Navigation Co., with office at Portland, Ore., succeeding C. P. A. Lonerger, resigned.

A. F. Helm, trainmaster of the Wabash Railroad, at Decatur, Ill., has been appointed superintendent of the Detroit and Buffalo divisions, with office at Detroit, Mich., succeeding to the duties of W. C. Heth, acting superintendent, who has been assigned to other duties.

D. C. Cheney, assistant general superintendent of the Chicago, Milwaukee & St. Paul at Milwaukee, Wis., has been appointed a fuel inspector, with office at Chicago. P. C. Eldredge, division superintendent at Milwaukee, succeeds Mr. Cheney, and F. M. Miller succeeds Mr. Eldredge.

Incident to the separation of the management of the Chicago & Alton and the Toledo, St. Louis & Western from that of the Minneapolis & St. Louis and the Iowa Central, F. W. Morse has been appointed general manager of the Chicago & Alton and the Toledo, St. Louis & Western, with office at Chicago. See item under Executive, Financial and Legal Officers.

H. C. Manchester, assistant superintendent of motive power of the Maine Central, the Washington County and the Somerset Railway at Portland, Me., has been appointed superintendent of transportation of these roads and the Sebasticook & Moosehead, with office at Portland. He will have jurisdiction over train and station service matters, the distribution of power and passenger equipment and the supervision of train and steamer schedules.

The Hine system of organization having been established on the Wyoming division of the Union Pacific, the titles of master mechanic, division engineer, trainmaster, traveling engineer and assistant engineer have been abolished, and the following officers, as well as H. J. Roth, now assistant superintendent at Cheyenne, Wyo., will hereafter be designated as assistant superintendent: Wm. Niland, master mechanic; G. R. Smith, trainmaster; Otis Thayer, assistant engineer, and A. J. Wharf, division engineer, all with offices at Cheyenne, and F. C. Letts, trainmaster at Laramie, Wyo., and M. F. White, trainmaster at North Platte, Neb.

R. E. Boswell, superintendent of the Sixth division of the Seaboard Air Line, at Jacksonville, Fla., having resigned to engage in other business, that division has been abolished and the territory south of Columbia, S. C., has been re-divided. There will be two divisions in future instead of three. H. B. Grimshaw, superintendent of the Fifth division, at Savannah, Ga., has been appointed superintendent of the new Fourth division, with office at Savannah, in charge of the territory from

Columbia to Jacksonville and from Savannah to Montgomery, Ala., including branches. W. A. With, superintendent of the First division, at Richmond, Va., has been appointed superintendent of the new Fifth division, with office at Jacksonville, in charge of the territory from Charleston, Fla., to natural levee river, and from Jacksonville to Tampa, including branches.

A. H. Westfall, general superintendent of the Chicago & Alton and the Toledo, St. Louis & Western at Bloomington, Ill., has been appointed general manager of the Chicago, Indianapolis & Louisville, with office at Chicago, succeeding B. F. Taylor, resigned. A photograph of Mr. Westfall and a sketch of his career were published in the *Railway Age Gazette* of April 8, 1910, page 967.

P. G. Walton, superintendent of the Chicago & Alton at Bloomington, Ill., has been appointed superintendent of the Chicago, Indianapolis & Louisville, with office at Lafayette, Ind., succeeding J. V. Success, resigned.

Traffic Officers.

C. Morrison has been appointed an agent of the Erie Despatch, with office at Toledo, Ohio, succeeding G. E. Hurlbut, resigned.

Kean B. Wells has been appointed a soliciting agent of the Louisville & Nashville, with office at Louisville, Ky., succeeding Russell Houston, resigned.

J. M. Green has been appointed a commercial agent of the Missouri, Kansas & Texas, with office at Pittsburgh, Pa., succeeding Paul Gruber, retired.

F. H. Dowle has been appointed general agent of the Erie Railroad for lines at Buffalo, N. Y., and Salamanca, and the West, with office at Detroit, Mich.

Charles E. McPherson, general passenger agent of the Canadian Pacific, lines west, at Winnipeg, Man., has been appointed assistant passenger traffic manager of the western lines, with office at Winnipeg, succeeding C. E. E. Ussher, promoted.

Oscar Townsend, assistant general freight agent of the Chicago Great Western at Pittsburgh, Pa., has been appointed an assistant general freight agent, with office at St. Paul, Minn., succeeding George F. Thomas, resigned to engage in other business.

R. R. Mitchell, assistant general freight agent of the Kansas City Southern at Texarkana, Tex., has been appointed general freight agent, with office at Kansas City, Mo., succeeding E. E. Smythe. G. B. Wood, general agent at Mena, Ark., succeeds Mr. Mitchell.

H. F. Latimer, traveling passenger agent of the Queen & Crescent Route at Birmingham, Ala., has been appointed a division passenger agent, with office at Birmingham. G. A. Lawton, city passenger and ticket agent at Chattanooga, Tenn., has been appointed a traveling passenger agent, with office at Chattanooga.

E. W. Clapp, chief clerk in the freight department of the Southern Pacific and the Galveston, Harrisburg & San Antonio at San Francisco, Cal., has been appointed general agent in the freight department, with office at San Francisco. W. A. Golden, traveling passenger agent of the Union Pacific and Southern Pacific at Pittsburgh, Pa., has been transferred to Los Angeles, Cal., and C. W. Jennings has been appointed a traveling passenger agent, with office at San Francisco.

George C. Wells assistant general passenger agent, eastern lines, of the Canadian Pacific, at Montreal, Que., has been appointed assistant to passenger traffic manager, with office at Montreal. He will have charge of the passenger rate bureau in addition to his other duties. C. B. Foster, assistant general passenger agent at Vancouver, B. C., has been appointed general passenger agent, western lines, Revelstoke, B. C., and east, with office at Winnipeg, Man., and H. W. Brodie, assistant general passenger agent at Winnipeg, Man., has been appointed general passenger agent, western lines, west of Revelstoke, with office at Vancouver, B. C. A. C. Shaw, general agent, passenger department, at Chicago, succeeds Mr. Brodie, with office at Winnipeg, Man. A. B. Calder, general agent at Seattle, Wash., succeeds Mr. Shaw, with office at Chicago, and E. E. Penn, general agent at San Francisco, Cal., succeeds Mr. Calder, with office at Seattle.

Engineering and Rolling Stock Officers.

C. T. Ripley and B. Hoffman have been appointed assistant engineers of tests of the Atchison, Topeka & Santa Fe, both with offices at Topeka, Kan.

J. L. Butler, master mechanic on the White river division of the St. Louis, Iron Mountain & Southern at Cotter, Ark., has been transferred to Crane, Mo.

Edwin Schenck, Jr., assistant master mechanic of the Pennsylvania Railroad, at Meadows, N. J., has been appointed assistant master mechanic at the Trenton shops, succeeding F. E. Marsh, promoted.

D. E. Sullivan, master mechanic of the Union Pacific at Evanston, Wyo., and P. A. Beck, supervisor of bridges and buildings at Ogden, Utah, have had their offices removed to Green River, Wyo.

Wm. Garstang, superintendent of motive power of the Cleveland, Cincinnati, Chicago & St. Louis at Indianapolis, Ind., has been appointed also superintendent of motive power of the Cincinnati Northern, with office at Indianapolis.

B. M. Angwin has been appointed master car builder of the Birmingham Southern, with office at Pratt City, Ala., succeeding J. N. Collins, deceased, and S. T. Harris has been appointed foreman of car shops at Pratt City, succeeding N. W. Howell, resigned.

W. H. Dooley, master mechanic of the Alabama Great Southern at Birmingham, Ala., has been appointed superintendent of motive power of that company and the Cincinnati, New Orleans & Texas Pacific, with office at Ludlow, Ky., succeeding J. P. McCuen, retired on account of ill health. Joseph Quigley, general foreman of the Chattanooga, Tenn., shops of the Cincinnati, New Orleans & Texas Pacific, succeeds Mr. Dooley, and H. B. Hayes, general foreman of the Danville, Ky., shops, succeeds Mr. Quigley. C. L. Shattuck succeeds Mr. Hayes.

Purchasing Officers.

Incident to the resignation of W. J. Souder as auditor and purchasing agent of the St. Paul & Des Moines, R. G. Smock, secretary, with office at Des Moines, Iowa, will hereafter have charge of the purchase of all materials and supplies.

OBITUARY.

W. T. Condon, traveling agent of the Chicago & North Western, with office at Helena, Mont., died at Helena on October 24.

M. Hayes, formerly secretary and treasurer of the Delaware Railroad, now a part of the Philadelphia, Baltimore & Washington, died at his home in Dover, Del., October 31, at the age of 93 years. Mr. Hayes was for many years a trustee of Delaware College, at Newark.

J. M. Frazer, general treasurer of the National Railways of Mexico, at Mexico City, Mex., died on October 28 in New York at the age of 81. Mr. Frazer was treasurer of the National Railroad of Mexico at the time it was taken over in 1908 to form part of the National Railways of Mexico, and previous to his service with the Mexican lines he was for many years treasurer of the Mobile & Girard, now a part of the Central of Georgia.

Edwin P. Dawley, for many years connected with the New York, New Haven & Hartford as civil engineer, died at his home in Providence, R. I., October 7, after a short illness, at the age of 57. Mr. Dawley was born in Providence and was a graduate of Brown University. He had been a civil engineer throughout his active career. He was chief engineer of the New York, Providence & Boston when that road was absorbed by the New York, New Haven & Hartford, and after the consolidation was continued as division engineer. It was during his administration that the company built the first bridge across the Thames river at New London and bought the Cove at Providence and built the new station on the site thus prepared. He was the first to suggest the tunnel through the east side hill at Providence, and he was the engineer of construction when it was made. This was in 1904-1907, ten years after the project was first broached. Mr. Dawley retired from the regular service in the road in March, 1909, and opened an office in Providence.

Railway Construction.

New Incorporations, Surveys, Etc.

ALBERTA ELECTRIC.—According to press reports from Medicine Hat, Alb., this company has applied to the Dominion government for a charter. The plans call for an electric line to connect Medicine Hat, Calgary, Lethbridge, Banff and McLeod.

ALTA & JORDAN VALLEY.—Incorporated in Utah, with \$200,000 capital, to build from Sandy, Utah, east to Alta, 16 miles. B. F. Cummings, president; W. F. Williams, secretary and treasurer, and M. A. Williams, vice-president, all of Salt Lake City.

ARBUCKLE & WESTERN.—An officer writes that it is expected that grading work will be begun within 30 days on this line. The company was organized to build from Ardmore, Okla., northwest to Chickasha, 110 miles, with a branch from Milo, west to Lawton, 80 miles. There will be a number of short steel or concrete bridges, and probably one important trestle. Contracts have not yet been let. Oscar O. Ayres, president and acting chief engineer, Ardmore. (April 8, p. 969.)

CANADIAN NORTHERN.—According to press reports, construction work on about 150 miles from Victoria to Barclay sound, on Vancouver Island, B. C., will be commenced soon. The route from Victoria is north and west via Esquimalt, Pedder bay and Mathieson lake to Sooke harbor, thence up Sooke river and lake to Shawnigan lake, and crossing the Keksilah to Cowichan river, thence to Cowichan lake, and following the Nitiat valley and Coleman Creek valley to upper Barkley sound and along Alberni canal to Alberni, and it is proposed to eventually extend the line northerly via Comox lake and Bute lake to either Hardy bay or Quatsino sound. (July 22, p. 173.)

The Railway Commissioners of Canada have approved the location of the line through townships 26-23, range 24, west fourth meridian, west fifth meridian, Alberta, mile 212.83 to 257.32, reckoned from the junction with the main line at Vegreville, Alb., and has also authorized the company to build a branch through townships 24 and 25, range 15, west of principal meridian, Manitoba, 6 miles, reckoned from the junction with the Ochre River branch.

CANADIAN NORTHERN ONTARIO.—The Railway Commissioners of Canada have approved the revised location of the line from Deseronto, Ont., to Shannonville, through the townships of Tyendinaga and Thurlow, 12.61 miles.

CANADIAN PACIFIC.—The Railway Commissioners of Canada have authorized this company to open for traffic a 14-mile section of the line known as the Virden-MacAuley branch; also a section of the line known as the Pheasant Hills branch, from mile 430.39 to mile 561.63, between Wilkie, Sask., and Hardisty, Man.

CARNESVILLE RAILWAY.—An incorporator writes that a charter has just been secured in Georgia and the prospects of building are good. The projected route is from Toccoa, Ga., south via Mize and Red Hill to Carnesville, about 20 miles. Maximum grades will be 2 per cent. and maximum curvature eight degrees. W. S. Erwin, Clarkesville, is an incorporator.

CHICAGO, WEATHERFORD & BRAZOS VALLEY.—This company is said to have filed an amendment to its charter, providing for the construction of a 60-mile extension from Bridgeport, Wise county, Tex., northeast to Gainesville. Col. R. E. Bell and J. W. Hicks, Weatherford, are interested.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—Second-track work has been authorized on 12.4 miles between Oakdale, Tenn., and Lancing. This will complete the double-track from Harri-man Junction north to Lancing, with the exception of a section of 1.6 miles, on which there are three tunnels and a bridge. On the completion of this work the company will have 74 miles of double-track between Cincinnati, Ohio and Chattanooga, Tenn.

CLEVELAND, BARBERTON, COSHOCTON & ZANESVILLE ELECTRIC.—An officer writes that the general contract to build the first section of 50 miles from Cleveland, Ohio, south, has been let to A. De Mayo & Co., Montreal, Que. The plans call for a line from Cleveland south via Copley, Barberton and Dowdstown to Ottville. Maximum grades will be 2.5 per cent. and maximum curvature 8 dees. J. I. Brechtger, president, 1907 Scho-

field building; I. C. Marble, chief engineer, 312 Lenox building, both of Cleveland.

DELAWARE, LACKAWANNA & WESTERN.—An officer writes regarding the improvements to be carried out on the Montclair branch that a contract has been given to Rutter, Curtis & Hill, Philadelphia, Pa., for work through Bloomfield, N. J., and at Watessing, including the stations. Residents of Montclair have submitted to the company suggestions for changes in the plans for the terminal improvements to be made at that place. The changes call for the lowering of the track terminals to lessen the grades of the viaduct on Grove street, the covering of the driveway at the approach to the terminal; provision for a Y for the street railway company at the terminal plaza; construction of a foot bridge over Pine street, and the depression of Bay street, to eliminate the grade crossing at that point.

DENVER & RIO GRANDE.—According to press reports, this company has under consideration the question of building an extension southwest to St. George, Washington county, Utah. Surveys have already been made.

DES CHUTES RAILROAD.—See Union Pacific.

ENID, OCHILTREE & WESTERN.—According to press reports, this company is now operating trains from Dalhart, Tex., east to Victory, 10 miles.

HARRIMAN, KNOXVILLE & EASTERN.—An officer writes that a contract has been given to the McDowell Contracting Co., Knoxville, Tenn., for work on a section of this line. The plans call for a line from Harriman, Tenn., east via Knoxville, through Roane, Anderson, Knox and Sevier counties, thence to a point in North Carolina. Maximum grades eastbound will be 0.65 per cent. compensated and maximum grades westbound will be 1 per cent. compensated; maximum curvature 6 degs. The work will be medium mountain work. There will be one steel bridge and five or six trestles. S. E. Hendrick, president, and W. J. Clarke, chief engineer, Harriman.

HUDSON RIVER & EASTERN TRACTION.—Application has been made to the New York Public Service Commission, Second district, for permission to issue bonds for an amount sufficient to extend this road. The route is from the present terminus in Ossining, N. Y., southeast through Briarcliff Manor, Pleasantville and Sherman Park to White Plains, about 18 miles.

LAKE CREEK & COEUR D'ALENE.—See Union Pacific.

LOS ANGELES PACIFIC (ELECTRIC).—Improvements are being made to this road in and near Los Angeles, Cal., at a cost of \$500,000. New rail is being laid on the Hollywood line, and plans are under consideration for a line from Hermosa Beach to Inglewood.

MALHEUR VALLEY RAILWAY.—See Union Pacific.

MINIDOKA & SOUTHWESTERN.—See Union Pacific.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—The report of this company for the year ended June 30, 1910, shows that the improvements to the terminal properties at St. Paul, Minn., including freight houses, storage tracks, etc., are about finished. Track laying on the Bemidji & Cas Lake division, on which construction was started in 1909, from Moose Lake, Minn., northwest to Plummer, has been finished, and the line will shortly be put in operation. During the year the company bought the Cuyuna Iron Range Railway and completed the line, which is now 37 miles long, connecting with the main line at Lawlor, Minn. An ore dock, to have a capacity of 35,000 tons, is now being built at Superior, Wis. Improvements were also carried out during the year on the old Duluth line and on the terminal properties at Superior and Duluth.

MISSOURI, OKLAHOMA & GULF.—Arrangements are said to be under way for building a branch from the main line west to Okmulgee, Okla.

MOUNTAIN VALLEY & PLAINS.—According to press reports, this company has under consideration the question of building a line from Springer, N. Mex., west through Arizona to San Francisco, Cal. The company was organized last year to build from Cimarron, N. Mex., east through the panhandle of Texas to Guthrie, Okla., 450 miles, and grading work has been started. J. H. Conlin, chief engineer, Dalhart, Tex. (March 4, p. 461.)

NEW YORK SUBWAYS.—The recent advertisements of the New

York State Public Service Commission, First district, asking for bids for the construction of underground railways in New York City with private capital, brought out no responses, but similar advertisements asking for bids for the construction of the railways with money furnished by the city, responses to which were opened October 27, brought offers from 23 contractors. The plans of the proposed work, as made by the commission, divide the territory into 21 sections, and a number of the bidders put in separate proposals for each section, so that at the present writing the tabulation and comparison of the bids has not been completed, because of the large amount of clerical work necessary to put the information in suitable form for comparison.

OMAHA & WESTERN IOWA TRACTION.—Incorporated in South Dakota, with \$250,000 capital and office at Omaha, Neb., to build from Omaha, via Council Bluffs, Iowa, north to Sioux City, 90 miles. The estimated cost of the line is \$20,000 a mile. The incorporators include: C. E. Brown, M. E. Gallian, C. D. McDonough, D. J. Avery, Chicago, and J. S. Sebree, Peoria, S. Dak.

OREGON RAILROAD & NAVIGATION CO.—See Union Pacific.

OREGON, WASHINGTON & IDAHO.—See Union Pacific.

PACIFIC & EASTERN.—According to press reports, work on the extension from Eagle Point, Ore., northeast to Butte Falls, about 40 miles, will be finished about the middle of November.

PACIFIC ELECTRIC.—This company will extend its line from La Habra, Cal., through Yorba Linda, 2.5 miles, and will build a line from Covina to Pomona. Plans are under consideration for a line from San Dimas to Claremont, or to a connection with the Claremont system at North Pomona. Work is now under way on an extension of the line through the city of Pomona. A line is also to be built through San Fernando valley from Los Angeles to Burbank.

ST. LOUIS & SAN FRANCISCO.—The report of this company for the year ended June 30, 1910, under date of October 1, shows that during the year a branch was built between Marion, Ark., and Hulbert, 5.49 miles, connecting the tracks of the 'Frisco with the Chicago, Rock Island & Pacific at Hulbert. This cut-off shortens the distance for through traffic between the two lines, besides materially facilitating the transfer of freight between the terminal yards of these companies, and relieving the terminal situation in Memphis proper, which is often congested. Extensive yards were built at Marion to provide for such interchange. Improvements were made, including the replacing of 972 ft. of metal bridges with metal bridges of heavier design; 2,620 ft. of trestles were filled; 600 ft. of trestles were replaced by concrete; 188 ft. of metal bridges were replaced by concrete, and 164 ft. of new metal bridges were constructed. New overhead steel bridges, 360 ft. long each, were constructed at Tulsa, Okla., and at Sapulpa; 18,157 tons of 85-lb. rail, 751 tons of 75-lb. rail, and 1,041 tons of 65-lb. rail were laid in main tracks during the year; 119.55 miles of track were ballasted and 54.82 miles of side-tracks were added. (See report of this company elsewhere in these columns.)

A press report from San Antonio, Tex., says that the 'Frisco has obtained control of the San Antonio & Aransas Pass from the Southern Pacific, and is planning to build an extension from Brady to Comfort to secure a short line from Chicago to San Antonio.

SALMON RIVER RAILWAY.—See Union Pacific.

TEXAS ROADS (ELECTRIC).—According to press reports, preliminary survey has been finished by the Stone & Webster Corporation, Boston, Mass., for the line between Houston, Tex., and Dallas. (Sept. 16, p. 521.)

TIDEWATER & SOUTHERN (ELECTRIC).—Incorporated at Stockton, Cal., with \$1,000,000 capital, to build from Stockton, southeast via Modesto to Turlock, with a branch to Ripon, in all about 50 miles. The incorporators include J. A. Mehling, J. A. Coley, K. C. Brueck and B. A. Bearce.

UNION PACIFIC.—The report of this company for the year ended June 30, 1910, under date of October 3, shows that the following lines were opened for traffic during the year: Oshkosh, Neb., to Northport, 44.47 miles; Sand Creek Junction, Colo., to St. Vrain, 17.45 miles; Greeley, Colo., to Briggsdale, 26.16 miles; Cloverly, Colo., to Hungerford, 13.16 miles; on the Nebraska division, 47.76 miles of second track, and on the Wyo-

ming division 10.57 miles was added. During the year there was a net increase in sidings of 78.34 miles.

Lake Creek & Coeur d'Alene has been opened from Lake Junction, Wash., to Lake Point, Idaho, 14.18 miles.

Oregon, Washington & Idaho, from Lewiston Junction, Wash., to Lewiston, Idaho, 72.03 miles, has been operated since December 3, 1909, by the Camas Prairie Railroad Co. for the account of the Oregon Railroad & Navigation Co.

In addition to the lines completed, construction work is under way on 348.17 miles of new lines as follows: Dent, Colo., to Fort Collins, 24.75 miles, grading finished on 18.52 miles and grading work under way on 2.16 miles; Rock Springs, Wyo., to Kilpacker creek, 21.73 miles, grading finished on 10.40 miles.

Malheur Valley Railway, from Vail, Ore., to Brogan, 23.77 miles, track laid on 21.42 miles and grading finished on 2.35 miles.

Minidoka & Southwestern, from Rupert, Idaho, to Bliss, 72.78 miles, track laid on 5.93 miles, grading finished on 65.10 miles and grading under way on 1.75 miles; Burley, Idaho, to Oakley, 22.09 miles, grading work finished.

Salmon River, from Moreland, Idaho, to Aberdeen, 28.80 miles, track laid on 10.86 miles and grading finished on 17.48 miles.

Oregon Railroad & Navigation Co., from St. Johns, Ore., to Woodlawn, seven miles, track laid on 5.47 miles and grading finished on 1.53 miles; Woodlawn to Troutdale, 13 miles, grading finished on two miles and work under way on 11 miles; Albina, Ore., to Mock Bottom, 1.25 miles, grading has been finished.

Des Chutes Railroad, from Des Chutes, Ore., to Redmond, 133 miles, track laid on 21.11 miles, grading finished on 56.89 miles and grading work under way on 55 miles. (See report of this company elsewhere in these columns.)

VANDALIA RAILROAD.—An officer writes that this company has made surveys and plans for double-tracking the St. Louis division between Indianapolis, Ind., and St. Louis, Mo. In one or two places the plans call for a revision of line, and in a number of places a reduction of grade. The company is building this year about 22 miles of second-track between Montrose, Ill., which is about 11 miles east of Effingham, and Altamont, about 11 miles west. This section does not require any revision of line and very little change in grade. There will be two reinforced concrete arch bridges, one near Salt creek, about one mile east of Effingham, to consist of one 50-ft. and two 40-ft. arches for double-track, and another bridge over Little Wabash river, about three miles west of Effingham, to have one 80-ft. and two 60-ft. spans. It is uncertain when any additional second-track work will be started. (Oct. 28, p. 811.)

VISALIA (ELECTRIC).—Work on a line north to Woodlake, Cal., is expected to be finished during November.

WILLAPA HARBOR & COAST LINE.—This company was recently organized in the state of Washington, with \$10,000,000 capital and office at South Bend, Wash., to build from Portland, Ore., north, crossing the Columbia river into Oregon, thence crossing the Willapa river to Willapacific, and via Brooklyn, in Pacific county, to Tacoma. The plans also provide for building a branch from a point on Willapa river, west via Raymond and South Bend. Right-of-way has been secured on about 20 miles. Steam will be used for the motive power on the main line, and electricity will probably be used on the branch via South Bend. Charles E. Miller, general attorney, South Bend. (Oct. 28, p. 811.)

FOREIGN RAILWAY NOTES.

The petition of Engineer Alexandre Martins Rodrigues and others, applying for a concession for building a railway between Cuyaba, South America, and Porto de Itaituba on the River Tapajós, with a branch to Bolivia, has been passed on by the Federal Chamber of Deputies to the Committees of Public Works and Finance.

Senor Claro Liberato de Macedo, notary, of São Paulo, South America, has petitioned the Senate for a concession and privilege for himself, or for a company which he will organize, to build, work and maintain a meter gauge railway, which, starting from São Paulo, and passing through Piracema, Pouso Alegre and Machado, shall terminate at Campo Bello, in Minas, with power to extend and to build branches.

Railway Financial News.

ATCHISON, TOPEKA & SANTA FE.—At the annual meeting it was announced that there were 28,000 stockholders, an increase of 3,000 since the previous annual meeting.

CENTRAL NEW ENGLAND.—The New York Public Service Commission, Second district, has given permission to the Central New England to make a mortgage for \$25,000,000 to secure 4 per cent. 50-year bonds, of which the company may issue immediately \$12,317,000 bonds for refunding purposes.

CHICAGO GREAT WESTERN.—The New York Stock Exchange has listed \$2,000,000 additional first mortgage 4 per cent. bonds of 1909-1959. These bonds are part of the \$9,500,000 reserved under the reorganization plan for betterments and improvements during the first two or three years of the existence of the new company.

GETTYSBURG & HARRISBURG.—The Hunter's Run & Slate Belt Railroad, running from Pine Grove Furnace, Pa., to Hunter's Run, 8 miles, has been turned over to the Gettysburg & Harrisburg and will hereafter be operated by that company.

HUNTER'S RUN & SLATE BELT.—See Gettysburg & Harrisburg.

MICHIGAN CENTRAL.—This company has sold to Morgan, Harjes & Co., Paris, France, 50,000,000 francs (\$10,000,000) one-year 4½ per cent. debenture notes, unsecured by collateral. The price at which these notes were sold was not made public, and the financial papers have variously estimated the cost of this money to the Michigan Central all the way from 4½ per cent. to 9 per cent.

NORFOLK SOUTHERN.—Judge McLemore has dismissed the bill of the Zell-Van Dyke syndicate, which tried for the fourth time to prevent the issue of securities of the new company and to hold up the transfer of the property of the old Norfolk & Southern to the new Norfolk Southern company.

The Norfolk Southern has sold to the Central Trust Co., New York, \$4,460,000 one-year 6 per cent. notes, the proceeds of these notes to be used to pay \$1,980,000 collateral trust notes; \$1,442,865 receiver's certificates; \$47,000 Raleigh & Pamlico Sound bonds; \$50,000 Suffolk & Carolina bonds; bills payable, amounting to between \$100,000 and \$200,000, and the expenses of the reorganization committee. The \$5,780,000 first mortgage 5 per cent. bonds which it is planned to issue as soon as the present litigation against the company is settled are deposited as collateral for the notes.

ST. LOUIS & SAN FRANCISCO.—See comments on the annual report of this company elsewhere in this issue.

ST. MARY'S & WESTERN ONTARIO.—In accordance with the requisition made by holders of one-half or more of the second mortgage bonds, a meeting of bondholders is to be held to consider what steps shall be taken in view of the default of the company to pay interest on these bonds. The road runs from Embro, Ont., to St. Mary's, 16 miles, and it is leased to the Canadian Pacific at a rental of 40 per cent. of gross earnings.

UNION PACIFIC.—See comments on the annual report of this company elsewhere in this issue.

WESTERN PACIFIC.—The following were elected directors, at the annual meeting held October 25: E. T. Jeffery, George Gould, W. J. Shotwell, C. H. Schlacks, Edwin Hawley, Warren Olney, S. C. Matthews, F. W. McCutcheon, Warren Olney, Jr., A. H. Calef, J. F. Evans, Charles W. Slack, C. M. Levey.

WILMINGTON, NEWCASTLE & SOUTHERN.—The sale of the line between Wilmington, Del., and Newcastle under the first mortgage of the Wilmington & Newcastle Railway has been ordered. The sale does not include the line from Newcastle to Delaware City.

Negotiations between a syndicate of American bankers and the Chinese government for a loan of \$50,000,000 have, it is understood, been concluded, and a syndicate of bankers, including J. P. Morgan & Co., Kuhn, Loeb & Co., the National City Bank and the First National Bank, all of New York, have agreed to take \$50,000,000 5 per cent. 45-year bonds at a price said to be in the neighborhood of 95. The bonds are an obligation of the Chinese government and the proceeds are to be used for currency reform, promotion of industrial development and the building of state railways.

Supply Trade Section.

The Chicago Bearing Metal Company, Chicago, announces the appointment of H. H. Hiland as general sales agent, effective October 15.

E. F. Lister, for the past two and one-half years an associated editor in the mechanical department of the *Railway Age Gazette*, has resigned to become eastern manager, with office at No. 1 Broadway, New York City, of *Municipal Engineering*, Indianapolis, Ind.

William C. Cuntz, previously mentioned in these columns as successor to E. Stutz, vice president and general manager of the Goldschmidt Therant Company, New York, will be general manager and treasurer of the company. Dr. F. H. Hirschland has been elected vice-president.

Ferro-lithic plate, consisting of dove-tailed cross-ribbed steel sheets which act both as form and reinforcement, was specified for the ceiling construction of the second floor of the new Chicago, Rock Island & Pacific station building at Kansas City, Mo. This ferro-lithic plate is made by the Berger Manufacturing Company, Canton, Ohio.

The National Bolt & Nut Company, Pittsburgh, Pa., manufacturers of "National" hot pressed nuts, has given contracts for new buildings and machinery for a plant to make cold punched nuts. The equipment will consist of one 150-h.p. Miller improved gas engine, several Pawtucket nut presses, National nut tappers, machine shop tools, etc. The present plant has a capacity of 75,000 kegs of hot pressed nuts per year, and the additional buildings will make this the largest nut works in Pittsburgh.

Frederick F. Fitzpatrick, vice-president of the Railway Steel-Spring Company, New York, was elected president on November 1, succeeding William H. Silverthorn, deceased. Mr. Fitzpatrick, who had spent some ten years in the operating department of the Missouri Pacific, was appointed St. Louis representative of the Charles Scott Spring Company (now a part of the Railway Steel-Spring Company) in 1898. In 1905, three years after the formation of the Railway Steel-Spring Company, he was made general sales agent, with headquarters in New York; and was elected a vice-president, in charge of sales, in 1906. Scott R. Hayes, whose identity with the railway spring business dates from 1900, when he was chosen to represent the Charles Scott Spring Company in Chicago, succeeds Mr. Fitzpatrick, as vice-president. Mr. Hayes has been connected with the sales department of the Railway Steel-Spring Company in New York since 1902, for the last seven months as general sales agent. Both promotions are well deserved and are good examples of the civil service that Jules French, now chairman of the board, has consistently applied to those responsible for the success of the Railway Steel-Spring Company.



F. F. Fitzpatrick.

TRADE PUBLICATIONS.

Batteries.—The Electric Storage Battery Company, Philadelphia, Pa., has issued bulletin No. 125, containing a description of installations of the chloride accumulator on the system of the Gulfport & Mississippi Coast Traction Company. Also bulletins Nos. 126 and 127, the former being devoted to this company's

type of oil insulator for installing battery tanks and the latter being a description of a number of its automatic regulating apparatuses.

Pneumatic Tools.—The Chicago Pneumatic Tool Company, Chicago, has issued a 100-page catalogue covering its line of pneumatic tools and appliances, and including considerable valuable data for users of these appliances. The book is printed on heavy glazed stock and is 6 x 9 in. in size.

Titanium in Iron.—The Titanium Alloy Manufacturing Company, Pittsburgh, Pa., has just issued a new booklet on the subject of Titanium in iron. The information in this booklet describes a process which is said to be entirely new in the treatment of iron with alloys, in that this alloy may be used through the cupola or through the air furnace to be melted down with the charge, making it far more simple and practicable for ordinary use than the ladle method, where the alloy may also be used, if desired.

RAILWAY STRUCTURES.

ARTHUR, ONT.—See Sudbury, Ont.

EDMONTON, ALB.—See Sudbury, Ont.

HARTFORD CITY, IND.—The Pennsylvania will build a \$50,000 passenger station and a coaling and water station, the latter to be located one mile west of the city. Contracts have already been let and work has begun.

LOS ANGELES, CAL.—The Southern Pacific is making improvements to its wharf and sheds at Los Angeles harbor, San Pedro. The work will cost about \$15,000.

MILWAUKEE, WIS.—Plans are being made by the Chicago, Milwaukee & St. Paul for a new passenger station to be built in Milwaukee. It is estimated that the cost of the new station, together with the changes which will be necessary in the yards, will amount to \$2,000,000.

NEBRASKA CITY, NEB.—The Chicago, Burlington & Quincy has asked the council to close South Sixth street to allow them to begin work on a \$40,000 passenger station at the foot of that street. The railway company agrees to build a subway under their tracks at Ninth street if Sixth street is closed.

NORTH ADAMS, MASS.—The Boston & Maine is to build an engine house for the electric locomotives which are to be used in hauling trains through the Hoosac tunnel.

SAN BERNARDINO, CAL.—The Atchison, Topeka & Santa Fe will enlarge the pre-cooling plant at San Bernardino, at a cost of \$150,000. The present capacity of 128 cars in 24 hours is to be increased to 192 cars.

SPOKANE, WASH.—The Chicago, Milwaukee & St. Paul and the North Coast are preparing independent plans for a union passenger station with a view to harmonizing the ideas of the two companies and reaching an early agreement.

SUDBURY, ONT.—The Railway Commissioners of Canada have authorized the Canadian Pacific to build a bridge over Little Key river, on the Lake Superior division, Sudbury subdivision; a bridge over Pincher creek, on the Alberta division, Crow's Nest subdivision, and a bridge over the North Saskatchewan river, at Edmonton, Alb. The commission has also approved the location of the proposed station to be built at Arthur, Ont.

TOPEKA, KAN.—Fire in the yards of the Atchison, Topeka & Santa Fe destroyed between 600 and 700 freight cars on October 28. The big shops were saved after a hard fight. The loss is variously estimated at \$500,000 to \$800,000.

TYLER, TEX.—The St. Louis Southwestern is building additions to its machine shops at Tyler, at a cost of \$300,000. It is expected that the work will be finished soon. The company is also installing an electric light and power plant.

WILKESBARRE, PA.—The county commissioners have given a contract for building the new river bridge to connect Plymouth and Breslau to the Penn Bridge Co., Beaver Falls, at \$276,973. The structure is to be of steel and concrete and is to carry tracks for electric surface lines.

Late News.

The results of our survey were similar to those reported in other studies conducted in the United States.

By a long legal dispute the company succeeded in getting the Government to pay compensation to groups for the loss of the Pashanang National Park, the company's intention to use the Pashanang Forest for 999 years. (24p. 25 p. 26.)

On a recent morning of March 8, Wilson communicated to Lawrence that it was time to announce publicly to some \$400,000 per stock, to be offered to shareholders in 250,000 shares, valued at \$1.60 per share. The issue of \$400,000 was paid down both common and preferred shareholders on a right as according to not one share for each share money was left. There is at present outstanding \$250,000 common and \$150,000 preferred stock.

John B. Hartman, former general manager of the Union Carrier, John W. Davis, former general president, and Charles L. Gandy, former general superintendent, all of whom were at Chicago, have been found dead in the third floor of the Westgate Hotel, Kansas City, Missouri, at Chicago on the charge of being guilty of conspiring to obstruct justice by false testimony. Their trial was closed at 4:45 p.m. The Union Car Wash, one of the businesses which benefited at Union W. Davis, an insurance agent.

Following last week's hearing by the Federal Grand Jury charging the Shading Valley Railroad and the Spring Creek Coal Company with obstruction of justice in the company's attempt to sue the Shading Valley, an indictment was returned against them, but the Spring Creek company and its agents in the region of Western Kentucky have been told that a \$100,000 bond must be posted against the Shading Valley, to be the company of collected, unpaid taxes in the Spring Creek Coal Company, which threatened such payment had no work or property brought into the state against it. It is alleged in the indictment that since 1910, when the Shading Valley was sold by the Spring Creek company, the company's agents have been paid toward its expenses and they have received a total of \$140,000. The government further charges that the Spring Creek Coal Company failed to pay to the state a total of \$100,000 in the amount of \$10,000 and also in April, 1910, the coal company attempted to pay out \$100,000 more, but in 1910 the bond was not posted.

[illegible]

Equipment and Supplies.

UNCLASSIFIED E E-1020

The London City Hall is perfect proof for its design team.

The Journal of the American Society for the History of the United States is published by the American Historical Association.

1822

The volume of *Wet Feet* is a true masterpiece, and one that you will not want to miss.

¹ Also, *Stellaria media* Nutt. is found growing up in the woods but has not been recorded.

TV Shows: Car Chase has earned success by being an offshoot with a strong theme.

For instance, the list of actors shown on 12 months had more southern actors (more than 50%).

The judge believes it necessary to tell the jury on the stand, in fact, which is a form of an "implied" question.

David's Women's Center has been the best resource available.

and the fact that the company is not a public company, the company is not required to file its financial statements with the SEC.

The Chrysler Truck reported in the February-April *Commercial* is similar to one tested in the past but its 1970 body was

The company is a subsidiary of the General Electric Company.

However, it is wrong to be misled by these figures and not recognize that they reflect the equipment from the American

The following Preliminary & Final report returned to the

1. *Strong* (the variety of September 30) is being in the market for the first time in over 20 years, which means including this variety.

The following *Lebanonensis* flowers, recorded in the Fall-

very high quality of material. It is being in the market for 100
and 1000 dollars. It is being in the market for 100 and 1000 dollars.

Learn why from the Ford Seed Car Company

MAC-19 EB. AND TOOLS

The National reported in the January New Yorker in July 1949 to the nation that a lot of money was being raised for the cause and the work will continue to expand soon.

IRON AND STEEL

Fig. 7. γ -irradiation is required to heat-treated 2000 hrs at 100°C.

The Lizard Valley has ordered 300 tons of bridge steel from the Phoenix Bridge Company.

The firm has argued that loss of sales from the Chicago South Branch has caused it to operate at a loss.

The Louisville Railway Company has ordered 500 cars of steel from the Carnegie Steel Company.

The 1984-1985 Wheatstone B survey, reported in the last issue, also covers 10 October 22 as its median low tide run.

The Long Island, reported in the *Register*, also carried out

September 17 we left the harbor for 12:00 noon at approximately noon, but without the expected rain the first 100 miles

The authors thank the several helpful reviewers of this paper.

the Pennsylvania Steel Company, in relation to the said bridge, that the Pennsylvania Steel Co. & Railroad Company do

Duke University Library

The common sense view is that in the present, at least, as a permanent yard, especially for use in housing and all other urban, public buildings, etc. It is that suitable for installation in urban housing, public or other, the maximum income is a total housing within the yard will be



Keller Duplex Stationary Vacuum Cleaner.

using the program to simulate scenarios of the study showing trucks

When used in houses, either in existing buildings the house is permanently altered to be a small office. The electric motor is connected to a motor of water which runs from a main battery in the engine room. The line bag, as shown in the illustration, is located in the upper portion of the tower and the line is fed into it through a system

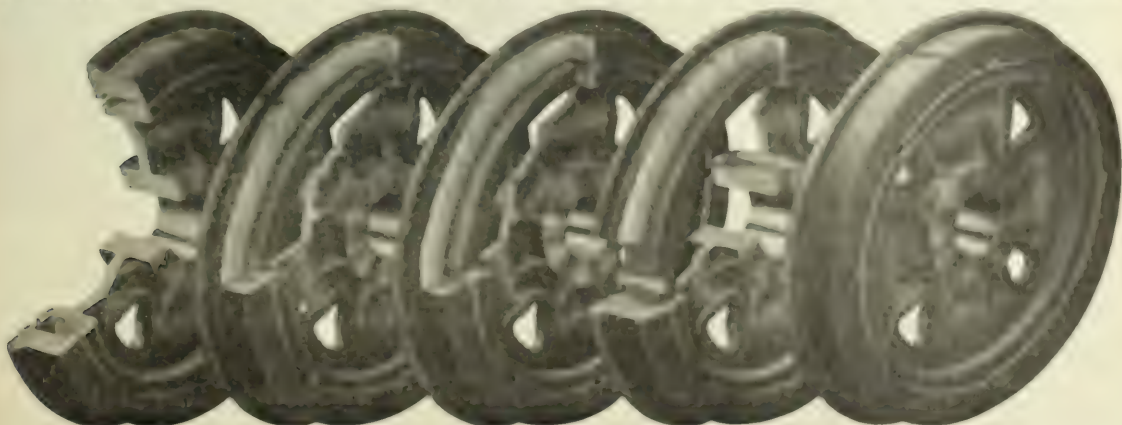
A few things appear wrong with this. There is an extra comma, 4 is in place, the first is with comma, is the giving comma, and the last, writing the missing number is dropped and that translated. It is not necessary to be concerned to know the length of the line followed by with 20 points of 4. It is the case with present giving teachers, the number of the way between the length of the line between. The teacher is concerned that a sufficient number of items be included in the world of giving teaching, and some to be included with a sufficient length of 20 in an area. This then should be mentioned when it is included in their present, some, then one being said. If it is necessary, also, to have the giving of some of the world, the sufficient number be included with the world in 20 in an area, when the line is used.

The Mississippi valley, the position of the living stream which still continued to the N. of that of the extinct and a channel of some 5 to 8 ft. with a temperature of 50° above that of the water. Fine as well as coarse particles through the use of a siphon the specimen and the preservation of various beetle eggs, marked and across the ground in the water basin supplied directly and in enough time with the water. The water and various are specimens of the various specimens were, except the last being specimens and the two water. However, like to the water being separated between the separating water and in a siphon line with them, and to the sample specimens of the water above the bed is increased, the water in the water bearings in sufficient amount. The water of the bed and water that is water above

be operated for several months without the

The design is covered by the Kenney Manufacturing Company, Philadelphia, Pa., under broad basic patents. It is also licensed under the fundamental Kenney patents.

New Steel Tired Wheel

[illegible]

View Showing the Construction and Method of Assembling the New McConway Steel Tired Wheel

with the use of a portable cupola, melting one ton per hour.

The construction and assembling of the wheel are shown on the accompanying illustration. The view at the left shows the tire, center and hub assembled. The cast steel center is shrunk on the cast iron hub. As may be seen there is a considerable open space between the periphery of the center and the inner face of the tire. This space is divided into eight segments by spacing wedges, which are used to temporarily adjust the tire and center and hold them together. The wheel is then laid flat and molten iron is poured through the annular opening on the side. The center is so shaped on its periphery that the eight cast iron sections thus formed, known as permanent locking wedges, form four sets of wedges with points opposed. The second view from the left shows a pair of these locking wedges with the temporary spacing wedges still in place. As the metal in the locking wedges cools, it shrinks. The spacing wedges are then removed and the locking wedges are driven home until the opposing points of each set practically, although not quite, come in contact, as shown in the third or middle view in the illustration. This leaves four large spaces between the large ends of the different sets of wedges. At these enlarged spaces are sprag notches in the inner flanges of the tire, into which steel sprags are fitted and final closers are cast in place, thus completing the circle of locking wedges, which are practically under the same compression as if the tire was shrunk on. The sprags imbedded in the circle of cast iron wedges, one of which is shown in the fourth view from the left, engage the tire at the notches in the flanges, preventing it from turning. The completed wheel is shown at the extreme right in the photograph.

Commercially considered, the first cost of the initial wheel of this design is the value of the tire, the cast steel center, the cast iron hub and the cast iron locking wedges. Renewals of the initial wheel mean the purchase of new tires only. The salvage in the scrap value of the old tire is more than enough to remelt the locking wedges and attach the new tire to the old center, which is itself indestructible. The salvage from the old tire will pay the cost of the removal of the wheel and its return to the axle, which reduces the computation of the cost of wheel renewals to the price of a new tire. The makers of the wheel frankly state that: "With the economic value of steel tires, as compared with other forms of wheel construction, it is not our purpose to deal at this time. What information we have on the subject is derived from the experience of railway men, many of whom confess frankly that they have yet much to learn. The relative endurance of steel tires of different makes is not a new question, it is probably as old as the steel tire itself. Not being makers of steel tires, it is not our province to enter into a discussion of that feature; what we are now proposing to do is to furnish the mounting for a steel tire which will carry it through its lifetime and serve the same purpose for its successors, indefinitely, and we reckon it to be no small matter that so large a percentage of wheel tonnage should be always at par as is the case with the form of construction that we offer."

Buckwalter Electric Baggage Trucks.

The principal feature of the Buckwalter electric baggage truck is the use of double end control, which embodies a folding platform for the operator and sockets for controller and steering handles at each end, so that the truck can be operated with equal facility in either direction, thus avoiding the necessity of turning on narrow platforms or runways. The baggage porter stands on a platform at the end of the truck which happens to be pointed toward his destination. He simply plugs in the steering and controller handles in their proper sockets, and the truck is ready for operation.

A small platform is hinged at each end of the truck, the two being connected so that the operative position of the one involves the closing of the other. Allowing the operator to ride enables the truck to be operated at two or three times the speed of a hand truck, and conserves his energy for transferring of baggage at his destination. As he stands squarely on both feet and leans against the end standards of the truck he has positive control of the steering apparatus.

The four-wheel steering arrangement enables the truck to be turned in a very small radius, as compared with its size, permitting it to be operated safely in narrow passage ways. This also has the advantage that the driver need only see that the front end of his truck clears a column or other

obstruction, as the then rear end tracks with the front.

The tread of the wheels is widened so that the wheels are just within the protection of the side sills; and a special form of steering knuckle was developed to reduce hub projection to within the rim of the wheels, which still further reduces the possibility of collision with railway equipment, columns or other trucks. The sockets for the controlling apparatus do not project beyond the rear end of the truck, which reduces the liability to damage on elevators.

The truck is constructed on the four-point support principle to provide for the greatest stability to reduce throwing of bag-



Drop Frame Type; Buckwalter Truck.

gage. Each wheel carries its quota of weight on account of the flexibility of frame construction. The storage batteries and motor are flexibly suspended from the frame to reduce vibration. The latter is geared through heavy double reduction spur gearing directly to the wheel rims. The controller is operated directly from either end of the truck and provides three speeds, namely, two, four and six miles an hour in either direction. The brakes are likewise operated from the driver's platform from either end of the truck and operate on the trailing wheels. The



Straight Frame Type; Buckwalter Truck.

brake shoes are of the internal expanding type, bearing directly on the wheel rims, and develop about twenty times the braking power it is possible to get with a hand truck. The brakes may be applied by foot pedal from either of the operators' platforms, and also are applied automatically when the driver steps off the platform. The brake is also connected to open the electric circuit when the driver leaves the truck or applies the brake.

The trucks are built in two types. The straight frame type is intended for stations where the platform is approximately on a level with the rails. Twelve of these trucks are in service

at the Jersey City station of the Pennsylvania Railroad, to have a capacity of 1,000 lbs. each, and weigh approximately 7,000 lbs. Twelve trucks of a similar model are in use at the Washington terminal.

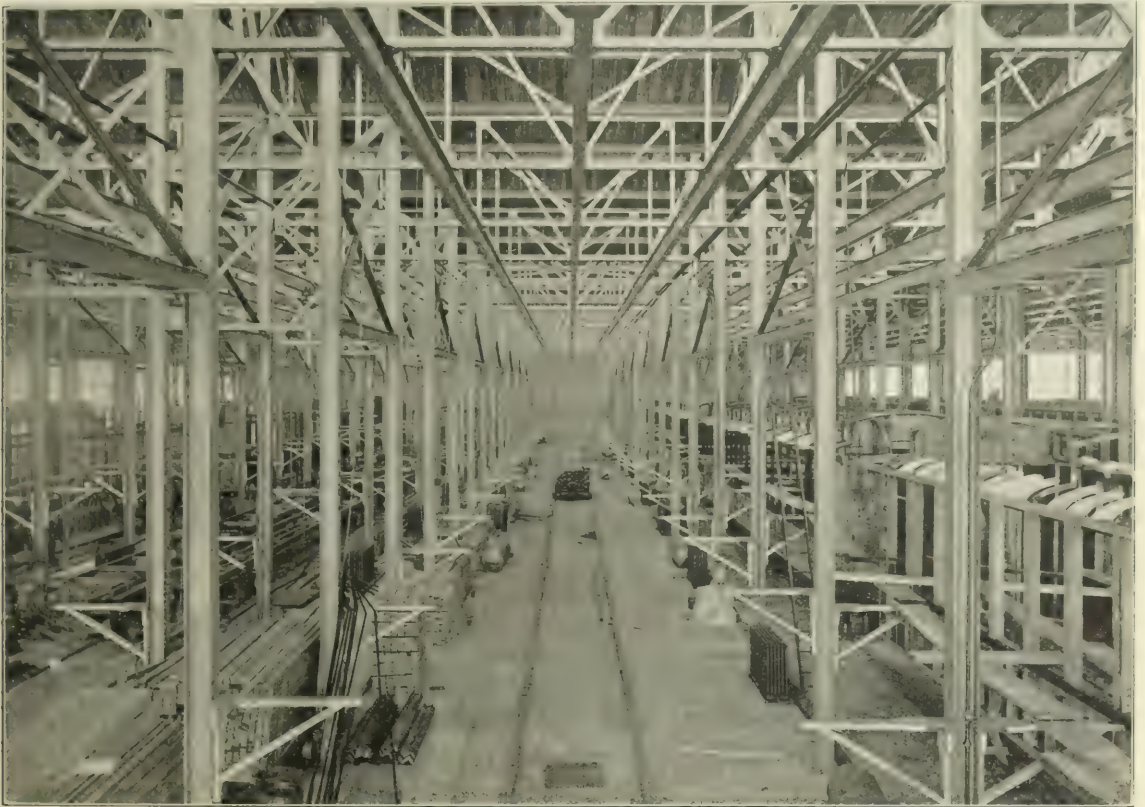
The drop frame trucks are intended for stations having depressed tracks, and, as the height of these trucks is only ten inches, the truck floor is approximately on a level with the baggage car floor, which reduces the labor of handling baggage to a minimum. Twenty-five of these trucks are in use at the new Pennsylvania station at New York City and a like number are on order. Three are in use at the Grand Central station, New York City.

The saving of labor due to these trucks varies with the service. In the ordinary passenger station the saving amounts to two or three men per truck, while another of the trucks in shop service at Altoona has replaced four men. Their greatest value lies in the expedition with which baggage is handled, as the time between the baggage room and the trains is more than cut in half.

Harlan & Hollingsworth New Car Shop.

The Harlan & Hollingsworth Corporation, Wilkes-Barre, Pa., has recently placed in operation a new car shop, one of a series of buildings of which are shown. The building was erected by Fred A. Brown & Company, Philadelphia, Pa., under the supervision of G. R. Henderson, mechanical engineer, New York.

The building is 172 ft. wide by 300 ft. long, being designed to accommodate 32 of the largest passenger coaches and having 2,406 ft. of trackage. A pile foundation, topped with heavy concrete caps, supports the reinforced concrete girders, beams and the floor. The frame of the superstructure is of steel construction, enclosed on all sides with expanded metal plastered wall and separated from the adjoining building with a brick fire wall. It was the aim of the architect to afford a liberal allowance for natural light and the sides of the building are, therefore, provided as far as possible with glass sash and the roof



Interior of New Car Shop.

while the fact that the operator arrives at the train in fresh physical condition enables him to unload his truck very quickly. Baggage masters estimate that delays to trains for baggage have been reduced from three to ten minutes since the introduction of these trucks. Since using these trucks it has been found that the baggage departments can get along and handle their work during rush periods, as occur in the spring vacation season, Labor Day and holidays, without taking on "green" men from other departments, which, by maintaining the baggage organization intact, reduces the delays and misunderstandings with the public, due to mistakes in improperly forwarding baggage, while at the same time effecting a considerable reduction in the wages of the extra men.

The double end baggage trucks were designed and patented by T. V. Buckwalter, Altoona, Pa., and are manufactured by the Elwell-Parker Electric Co., Cleveland, O. L. C. Brown, 50 Church street, New York City, is sales manager for the latter company, and to him all inquiries should be addressed.

with 10 lines of saw-toothed skylight, at close intervals, all of which operate and afford liberal ventilation and light. Three sides of the building have windows and doors, affording extensive glass area. Artificial lighting is provided by Cooper-Hewitt lamps.

The plant is equipped for pneumatic drilling and riveting, while for the operation of assembling cars there is an equipment of trolley beams, which carry electric hoists, enabling quick transportation of parts to all points in the building. Lengthwise the shop is divided into 20 panels 15 ft. long. The center longitudinal section is 83 ft. wide and is divided into a 6-ft. 8-in. panel in the center and two 19-ft. panels on each side. The two side sections are divided into inner panels, 6 ft. 8 in. wide, and two outside panels 19 ft. wide. In the center of each of these panels is a track, running the full length of the building from the 13-in. brick fire wall on the south end out through the large doors at the north. The interior illustration shows one of these center tracks, the photograph being



Harlan & Hollingsworth Car Shop No. 3.

taken looking in the direction of the brick wall. In each of the 19-ft. panels and secured to the overhead trusses are three 12-in. I-section trolley tracks, running the full length of the building. These are used in connection with chain hoists, in assembling the cars under construction.

The window frames on the east and west sides extend from column to column, and are 15 ft. long by 15 ft. high, consisting of nine sashes containing 12 lights each. The window frames in the saw-tooth roof also extend from column to column and consist of four frames, 7 ft. by 19 ft., and one frame 7 ft. by 6 ft. 8 in., there being three sashes in the 19-ft. frames and one sash in the smaller frame.

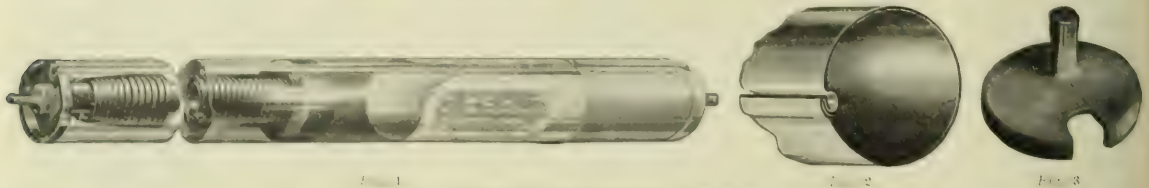
The entrances to the building consist of two small doors, 4 ft. by 7 ft., on both the east and west sides, and of the large doors at the end of each of the panels on the north side. There are also three material track entrances on the north side, one between each pair of large doors. The sides of the saw-teeth and the rest of the outer walls not taken up by window or door openings are covered with 2 in. of plaster on metal lath.

The yellow pine piles in the foundation are driven to a solid bottom. Each column is supported by two piles with a concrete cap, 2 ft. x 4 ft. x 2 ft. 3 in. high, and the tracks and

About 550 tons of structural steel were used in the entire building. The roof purlins consist of 6-in. channels on the flat portion and 10-in. channels on the saw-toothed section. These are bolted to the roof trusses, which are built up of angles and plates. The columns supporting the roof and the 12-in. trolley tracks are of the new Bethlehem H-sections.

Metal Curtain Roller.

The Rex all-metal curtain roller, which has been subjected to the hardest kind of shop and service tests and is the only one ever put on the market in whose construction no wood is used, is manufactured by the Curtain Supply Company, of Chicago. All the parts are made by dies and are uniform and correct. Special machinery has been designed and made to manufacture the barrels, springs, mandrels, bungs, end pieces, brackets, etc. The roller barrel is closed by a seam, as illustrated in Fig. 2, instead of being soldered in the usual manner. This seaming process produces a barrel of uniform diameter, allowing the curtain to be wound up evenly. It also prevents the barrel from opening at the joint. The pressed metal end caps and pins give assurance that the end pins will always remain at the center of the barrel, and as the pins are part



"Rex" All-Metal Curtain Roller and Parts.

floor slab by piles with 2-ft. x 2-ft. x 2-ft. 3-in. caps. A total of 1,195 piles were driven having 252 2-ft. x 4-ft. x 2-ft. 3-in. caps, and 691 2-ft. x 2-ft. x 2-ft. 3-in. caps, requiring in all about 252 cu. yds. of concrete.

The network of beams and girders supporting the floor and car tracks varies but slightly in size and reinforcement. The girders supporting the track beams are 12 in. wide by 28 in. deep, and are reinforced by four $\frac{3}{4}$ -in. square bars. The track beams are 8 in. wide by 26 in. deep and are reinforced with three $\frac{3}{4}$ -in. square bars. All other beams are 12 in. x 26 in., reinforced with four $\frac{3}{4}$ -in. square bars. In all 955 cu. yds. of concrete were required for the beams and girders. The concrete floor supported on these beams and girders is a slab 11 $\frac{1}{2}$ ft. x 30 ft. and varies in thickness from 4 in. to 7 in. It is reinforced with $\frac{3}{4}$ -in. bars, placed 6 in. center to center, with additional $\frac{3}{4}$ -in. square bars placed between these in that portion of the floor slab between the track beams and girders.

The total amount of concrete required for the floor was 872 cu. yds. A total of about 2,579 cu. yds. of concrete and 163 tons of reinforcement were required for the whole building.

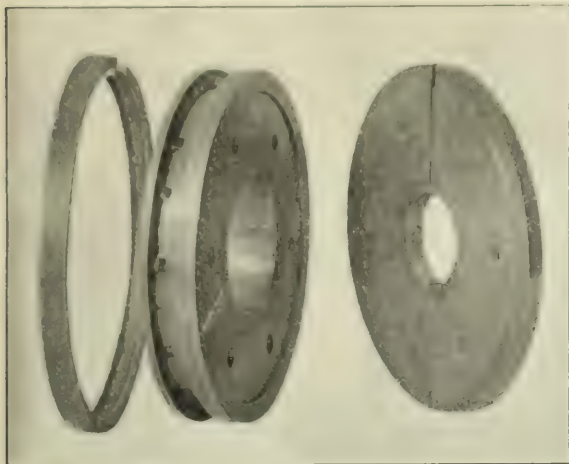
of the end piece, they cannot get out of alignment. This construction allows the roller to revolve on its axis and eliminates all wobbly motion. On account of its peculiar construction, the groove (Fig. 2) is never clogged with solder, and has a round instead of a sharp edge. The grooves also mate and match perfectly, rendering it easy to apply the curtain to the roller.

The plug ends are made of metal with spring extensions which bear against the inside of the roller barrel (Fig. 1), and produce an even and smooth holding adjustment, at the same time permitting the roller to be readily lengthened or shortened; avoiding, also, all swelling or shrinking as with the wooden plug. The mandrel is made of hollow metal and is strong and designed to prevent breakage. The metal bung affords a durable and smooth working bearing and is stronger than the ordinary wooden bung. The springs are made on specially designed machines, out of drawn wire and made according to this company's own specifications as to temper and size. The springs are stronger than the usual spring and have more coils, making less variation than usual in the spring ten-

ston when the curtain is at the top and bottom of the window. The Rex brackets are made of pressed metal and are therefore strong and uniform. The rollers are made in all lengths and of standard diameters, the strength of the barrel and spring being adapted to the special size and use intended.

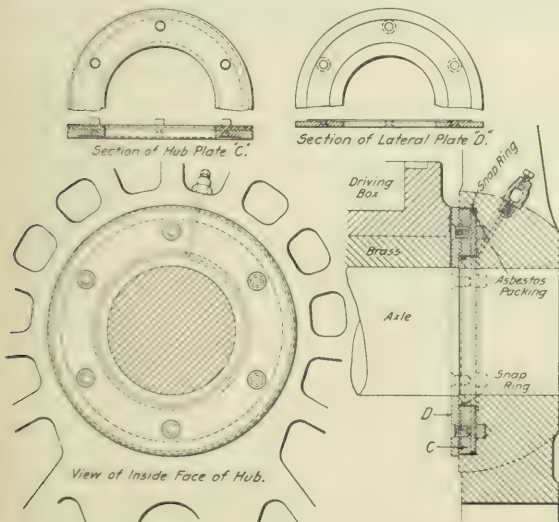
Smith Locomotive Adjustable Hub Plate.

The purpose of the hub plate here illustrated is to prevent excessive lateral motion and thus avoid the wear of the locomotive machinery, and, to some extent, the wear of the track. The plate consists of a ring which fits in a recess in the hub of the drive-



Smith Adjustable Hub Plate.

ing wheel and has a packing ring, so that it has a tight piston fit. The hub plate is held against the driving box by pressure obtained by the use of heavy grease behind the plate, the pressure being controlled by a screw plug. By increasing the amount of grease, the plate may be adjusted to any position to take up the lateral motion, thus making it, as the name implies, an adjustable hub plate. The quality of grease used is commonly known as pin grease. The packing rings prevent any possibility



Application of Smith Adjustable Hub Plate.

of the grease escaping and insure the plate remaining in proper position. It is found that a $\frac{3}{8}$ -in. counter bore in the wheel hub is sufficient for the average locomotive. The cavity affects the strength of the hub very little. With a full round plate it is, of course, necessary to press off one of the driving wheels

in order to apply, but with the sectional plate here illustrated this is not necessary. It has been found by experience that it takes a mechanic from 10 to 15 minutes with a grease filling cup to adjust the plate to any position desired in case too much lateral motion is found. This adjustable hub plate is in use on



Sections of Smith Adjustable Hub Plate.

locomotives on the Kansas City Southern. It was invented by F. H. Smith, president of the Smith Locomotive Adjustable Hub Plate Company, Pittsburg, Kan.

Detroit No. 22 Bulls-eye Lubricator.

Owing to its reliability and the form in which the lubricant is delivered the hydrostatic lubricator has always been acknowledged as the ideal method of obtaining perfect lubrication for simple, compound or superheated locomotives; although its use in the old tubular glass form was attended with more or less danger to the operator. Consequently, the bull's-eye feature, insuring absolute safety, was received with favor by all railways whose managements desired to protect the employees and equipment against harm by the use of a safe, reliable and economical device. In designing the first bull's-eye lubricator, known as the Detroit No. 21, the paramount idea was safety, with simplicity and economy as secondary considerations. In the six years in which this device has been upon the market its safety has been demonstrated beyond question. In designing the Detroit No. 22, the safety features of the No. 21 have been retained and special attention has been given to greater economy and convenience of operation.

The ability of the modern locomotive to do the work for which it was designed, its economy in fuel and cost of up-keep, as well as its hauling power, is dependent to a large extent upon the proper lubrication of its valves and cylinders. What, ten years ago, would have been considered satisfactory lubrication of the locomotives then in use is entirely inadequate for the large and more powerful locomotives of to-day. Modern lubrication means complete and perfect lubrication under every condition, and perfect lubrication cannot be obtained from a device that, at a time a locomotive is performing its heaviest duty, fails to deliver the lubricant. Neither can it come from a mechanically driven device where the quantity of lubricant per mile remains the same irrespective of the duty requirements.

To satisfactorily perform the work required of it a modern



Detroit No. 22 Bulls-eye Lubricator.

lubricator should have certain essential features, most important of which is the ability to deliver the lubricant under all conditions and up to the full efficiency of the locomotive. It should automatically, through the decreased speed of the locomotive in heavy duty on grade, increase the amount of oil per mile and, on level track at higher speed return to the rate of feed required for that class of service. The ability to start or stop the device should rest with the operator and not be dependent upon the movement of the locomotive itself. Theoretically the idea of having the starting and stopping feature controlled by the movement of the locomotive is attractive but practically it does not permit of getting the oil to the valves and cylinders before the locomotive is in motion without additional manual labor on the part of the operator. The means for accomplishing this should be of such a character as will place within the hands of the operator the power to instantly stop, start or throttle the rate of feed, without disturbing the adjustment of the regulating valves, or the ability to withhold the lubricant from the valves and cylinders and allow the air pump feed to continue working. The duty of the modern air pump is so severe that it requires almost constant lubrication from the time it leaves a terminal to its return to the engine-house. It is therefore most important that the air pump feed be left working while the locomotive is temporarily at rest at a station or on a siding.

A modern lubricator should be so constructed that, having once adjusted the regulating valves for perfect lubrication in a class of service, these valves need not be disturbed or touched again until the class of service is changed. The importance of this as regards perfect lubrication, economy and convenience can hardly be overestimated. The introduction of an oil valve in the oil passage between the reservoir and the sight feed regulating valves in the Detroit No. 22 Bullseye lubricator, places in the hands of the operator an instantaneous means of starting, stopping or throttling the rate of feed, does away with the necessity of shutting off the feed regulating valves at a terminal, or in refilling on the road, and consequently the necessity of opening and readjusting these valves after refilling or at the commencement of a service movement. Under the old method of closing, opening and adjusting the regulating valves, the frequency with which this occurred not only shortened the life of the device, but the length of time consumed in this operation made it impractical to require the operator to shut off his cylinder feeds during temporary stops, with the result that much oil was wasted and the oil mileage decreased. This oil valve has a lever handle and index plate, and is so designed that from the "closed" position a half turn will open all feeds, or a quarter turn the feed to the air pump only, and vice versa.

In adjusting the feed regulating valves of a lubricator, the practice differs, the usual custom being to race the feeds and gradually throttle, which means a waste of oil on account of the cold condition of the steam chest and cylinders and the washing action of the heavily saturated steam during the initial movement. Another practice, attended also by decreased oil mileage and even more harmful results, is that of starving the valves and cylinders through insufficient lubrication, due either to error in judgment on the part of the operator as to the number of drops per minute at which he should set the feeds, or through not starting the lubricator in sufficient time before leaving the terminal. This practice will result in distortion of the valve motion through dry valves, waste of fuel, loss of time and speed and the necessity of racing the feeds in order to get the valves back into proper working condition. The use of the oil valve, the regulating valves having been once adjusted, makes the starting of the lubricator an instantaneous operation and insures the correct amount of lubrication. The operator knows that as soon as the lubricator has reached its proper temperature, the oil will feed at the rate required.

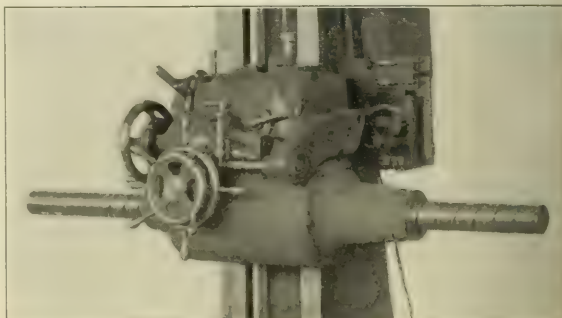
The adjustment of the lubricator feeds in night service or where the device is inconveniently located is always a matter of more or less difficulty. As the oil valve does away with the opening and closing of the regulating valves and the necessity for observing the sight feed meters, when starting and stopping the device, it becomes a great convenience to the operator, as under all conditions of service, night or day, he can by the sense of touch alone, place the lever handle of this valve in any one of its three positions. The Detroit lubricator is manufactured by the Detroit Lubricator Company, Detroit, Mich.

Shop Equipment.

Rochester Horizontal Boring, Drilling, Tapping and Milling Machine.

In the type of boring machine illustrated advantage is taken of the fact that it is easier to adjust the counterbalanced saddle carrying the boring bar and operating mechanism than it is to adjust heavy and irregular castings to a fixed bar. The special advantages, other than its compactness, rigidity, ease of operation, adaptability and capacity are as follows: All operations are controlled from one position, convenient to the work; continuous traverse of the spindle for any length may be obtained without resetting; the spindle is journaled in taper bearings located far apart and adjustable from the outside; all bearings are lined with phosphor bronze bushings provided with felt oil pads; wide range of speeds and feeds is provided to meet all requirements; rapid power traverse is available in all directions; and the machine is self contained, motor driven, and may be located regardless of the line shaft.

The motor is mounted on top of the column and drives the vertical splined shaft through rawhide gearing, transmitting power to the driving gears enclosed in the saddle. By this arrangement a high efficiency of transmission is obtained. All of the operating levers and hand wheels are located on the saddle within easy reach of the operator and convenient to the work. The machine may be started, stopped or reversed independent of the motor, the direction of rotation or stopping being controlled by a lever which operates friction clutches. The spindle is journaled in long phosphor bronze taper bearings located at



Detail of Spindle Saddle.

each end of the saddle and adjustable from the outside. It is driven by two large spline keys fitted in a sleeve on which the driving gear is mounted. This sleeve is journaled in separate bearings, clearance being provided between it and the spindle to eliminate any possible vibration from the driving gear.

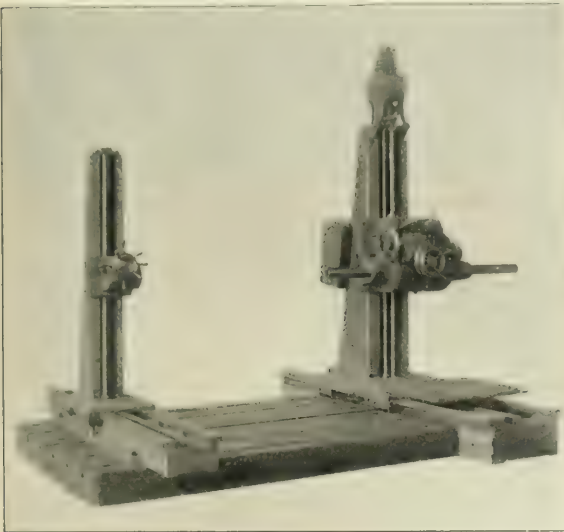
All driving and feed gears are either nickel steel, cast steel or manganese bronze. They are all enclosed in the saddle and are fully protected, running in oil. A wide range of speeds and feeds is provided, there being 10 speed and 8 feed changes, and 4 feed changes available for milling only. All of the feeds are reversible. Rapid power traverse is furnished for the spindle saddle and column in all directions, and hand adjustments are also provided. Graduated scales with vernier readings are provided for locating the saddle and main column. The outboard support and column are also furnished with scales, having vernier readings. The spindle has a micrometer reading for gaging depths in boring, drilling and milling, and these graduations are also convenient for laying out work.

The column is of heavy construction, with a long and wide base designed to give the utmost rigidity. The slide base is heavy and of deep section, and is firmly braced throughout its entire length with strong box ties. It is provided with a groove on the side for accurately locating the floor plate, which latter is planed top and bottom and provided with longitudinal T-slots, unless otherwise specified. The slide base is rigidly attached to the floor plate by heavy bolts; the latter may be made any desired size, the standard being 6 ft. x 9 ft.

The outboard bearing is provided with the same vertical and horizontal traverse as the main column and is adapted for sup-

potting boring bars in suitable buildings. It is traversed to and from the main column by a rack and pinion and is guided so as to remain parallel at all times with the main slide base. The head and column of the outboard support are traversed by hand wheels located concentrically. Graduated scales are furnished corresponding to the scales on the main column and base. The saddle, column, outboard support, etc., are guided by flat surface bearings, close together, and of ample length to insure rigidity.

The spindle is of crucible steel, and all of its bearings are lushed with best quality of phosphor bronze. A superior grade of steel is used for all shafts, studs, etc., practically no machine steel being used. The equipment as furnished includes the machine complete with motor, floor plate, outboard support and graduated scales; special tables, boring bars, cutters, etc., will be furnished extra, if desired. The machine may be varied to meet special conditions requiring different traverse of spindle, saddle or column, or size and style of floor plate. The range of spindle speeds may be changed from the standard speeds of 15-200 rpm to 10-123 rpm or 7 1/2, 100 rpm, etc. These



Horizontal Boring, Drilling, Tapping and Milling Machine.

machines are manufactured by the Rochester Boring Machine Company, Rochester, N. Y.

The specifications of standard No. 3, No. 4 and No. 5 machines are as follows:

Number of machine	3	4	5
Spindle diameter	3 1/2 in.	4 1/2 in.	5 1/2 in.
Spindle traverse, longitudinal	36 in.	48 in.	60 in.
Spindle speed, revs. per min.	15 to 200	6 to 120	2 1/2 to 160
Number of speeds for spindle	10	12	16
Number of feeds for boring	8	10	12
Number of feeds for milling	1	5	6
Boring feeds per revolution spindle per minute, inches	.001 to 0.25	.001 to 0.5	3/4 to 5
Milling feeds per revolution spindle per minute, inches	.004 to 0.152	.004 to 0.304	3/4 to 5
Taper bore in spindle, one end, Morse	5	6	7
Saddle, vertical traverse	54 in.	60 in.	72 in.
Column, horizontal traverse	72 in.	84 in.	96 in.
Size of floor plate	6 x 9 ft.	7 x 10 ft.	8 x 12 ft.
Size of motor recommended	3-h.p.	5-h.p.	10 h.p.
Net weight complete	19,000 lbs.	29,500 lbs.	58,000 lbs.

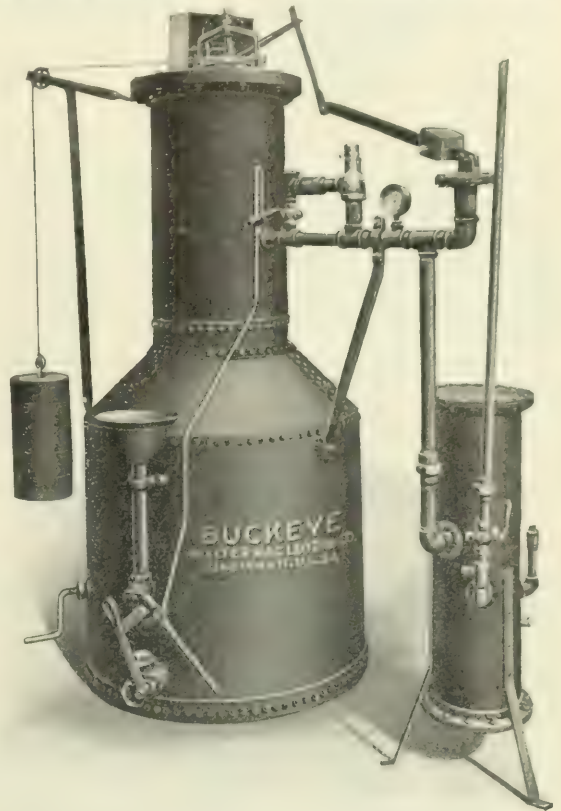
Autogenous Welding in Railway Repair Shops.

Autogenous welding has proved especially valuable in railway locomotive boiler shops in the repairing of flue sheets, cracked and broken crown sheets, water legs, arches, etc., and its uses in the other departments are numerous. About two years ago one of the largest railways in the East repaired a broken crown sheet as a test, and the locomotive is said to have been in constant service ever since without any sign of deterioration in the weld. A number of other boilers have also been successfully repaired for this same road.

The Buckeye autogenous welding outfit, manufactured by Walter MacLeod & Company, Cincinnati, Ohio, is made in three

stock sizes, and special equipment, to meet all demands. Both maximum and minimum, are built to specifications. The welding plant has three principal features: the oxygen supply, acetylene supply and the torch with its accessories. The oxygen generating plant of the Buckeye welding equipment is a simple device for the manufacture of gas. It consists of a retort in which a mixture of potassium or sodium chlorate and manganese dioxide is placed. The retort is installed in a small portable furnace, which latter is heated either by gas, gasoline, kerosene or coke. The retort is connected by means of an extra heavy pipe, with the necessary valves, gage and safety valve, to a wrought iron scrubber, in which the gas is cleaned, filtered and cooled, and from which it passes to a steel receiver arranged to be used as a portable tank or made stationary as a container.

The pressure acetylene generator, shown in the illustration, is of the carbide feed type. These generators are built to



Acetylene Generator of the Buckeye Autogenous Welding Outfit.

contain 25, 50, 100 or 200 lbs. of carbide in the hopper, generating 100, 200, 400 and 800 cu. ft. of gas, respectively. The generation of gas is automatic, and when the pressure is adjusted to any given point, it so remains until the charge is exhausted or the adjustment changed. A safety valve of ample size is connected directly to the receiver and storage chamber, and the pressure gage is placed in the pipe line ahead of the pressure regulator; this automatically keeps the pressure indication at a certain point, according to the position of the sliding weight on the pressure arm.

The torch is one of the important features of the equipment. It is light in weight, positive in its mixture of gas, has a flash-back protection and an ample number of tips to take care of all grades of welding. A cutting point accompanies each torch, and for extra heavy work a special cutting attachment is supplied.

The operation of generating oxygen with the Buckeye plant is as follows: About 12 to 15 lbs. of sodium or potassium

chlorate and manganese dioxide, in a mixture, is placed in a pan in the retort. Heat is applied and the valve to the scrubber opened when the generation of gas begins. The valve between the scrubber and the receiver is next opened, allowing the oxygen to flow into the receiver. When the generation of gas ceases, the valve is closed, the pan of exhausted chemical is removed from the retort, and a new one substituted for it. This operation is continued indefinitely, according to the amount of gas required.

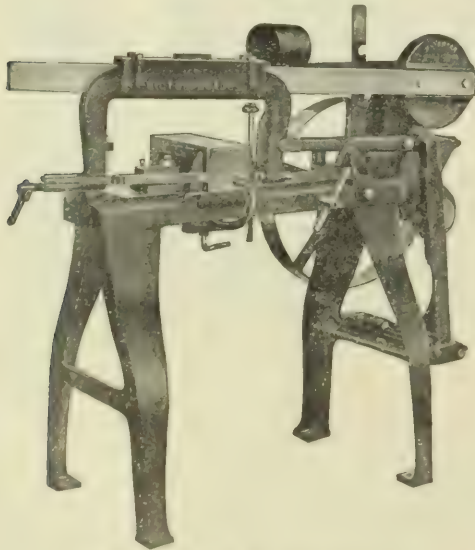
The generation of acetylene gas is also a simple process. The water and the flash back chambers are each filled with water and the carbide hopper with carbide. On opening the hopper, the water is automatically shut off, and it cannot be started until the hopper has been sealed, when the generation of gas commences.

In operating the torch the acetylene is first turned on and ignited and the valve is properly adjusted. The oxygen is then turned on and its valve is adjusted until a clear cut white flame, oval in shape, appears at the extreme end of the tip, and surrounding it a more voluminous, almost colorless, flame. The white, sharply defined flame is the welding one, and the surrounding jacket is a protection, as it guards the weld against oxidation from the outside air.

Power Hack Saw Machine.

The Massachusetts Saw Works, Chicopee, Mass., manufacturers of Victor hack saw blades, frames, machines, etc., has recently added to its line a new hack saw machine. It is illustrated herewith, and is known as the No. 6 M. S. W. hack saw machine. Each part is high grade in every particular, being built like a machine tool. It has a capacity for cutting 6-in. stock and is unusually rigid and strong, the frame being strongly braced, eliminating all side play and vibration and assuring a straight cut.

An adjustable stop is provided for making cuts of any desired depth. The machine stops automatically and does not require



M. S. W. Hack Saw Machine.

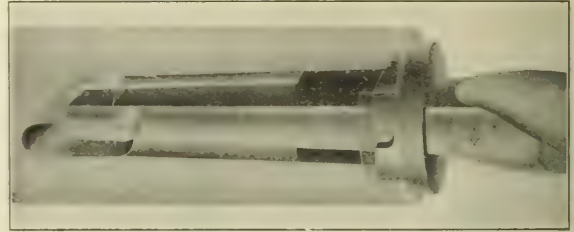
any attention after the cut is started. There is also a rest for the stock, which prevents the blades from getting broken when the piece falls, as often happens on the old-style machines.

This machine has a steady, even, forward stroke, similar to that of a man with a file, and a quick return stroke. There is a patent lift that may be adjusted to raise the blade from 1/8 in. to 1/2 in. above the work on the return stroke, thus eliminating the wear on the teeth on the return and greatly increasing the life of the blade, a feature that very soon results in a saving of hack saw blades sufficient, it is claimed, to cover the cost of the machine.

New Drive for Flat Twist Drills.

The Cleveland Twist Drill Company, Cleveland, Ohio, has recently applied for patents on a new device for driving drills with flat shanks, that are tapered both on the flat sides and round edges. These shanks are regularly furnished on this company's "Paragon" flat twist drills, and are driven by sleeves or sockets having flat taper holes, accurately fitting the shanks of the drills, and externally tapered to fit standard taper sockets or spindles. In the case of large diameter flat twist drills having No. 6 shanks, this drive was found to have certain disadvantages as it made necessary the use of cumbersome extension reducing sockets to adapt the large shanks to the drill press spindles. To overcome this difficulty as well as to provide additional driving strength, the new drive, illustrated herewith, was designed.

Both the No. 5 and No. 6 "Paragon" shanks have been redesigned to the same length as regular taper shanks, the taper



Drill Shank, Collet and Spindle of New Drive for Flat Twist Drills.

on the round edges being the standard Morse, as heretofore. When this modified shank is inserted in the spindle, its upper end is received and driven by the flat slot in the spindle just as is the tang of an ordinary taper shank drill. This alone would constitute a strong and practical drive, but for the lack of support the shank would have on its two flat sides at the lower end of the spindle. To provide against the resultant possibilities of vibration and wear between the shank and spindle, and to furnish a powerful additional drive at the lower end of the shank, where its cross sectional area is greatest, a new and original type of socket, called the "Paragon" collet, has been devised.

The collet has two lugs projecting upward from a flattened disc through which is cut a rectangular hole to receive the shank. The lugs have rounded outside surfaces ground to standard taper and flat inner surfaces tapered to fit the flat taper shank. A groove is provided to receive the point of a drift key in case the collet should stick in the spindle. When the collet is on the shank the combination is practically a taper shank, interchangeable with the standard shank of that type and with an unusually long tang.

The illustration shows the shank, collet and spindle, in combination. The additional drive is provided by the extension which projects from the circular base of the collet. This projection mortises into a slot cut across the end of the spindle conforming to the standard slots now being put in the spindles of heavy duty drill presses by several well known manufacturers. That this tongue-and-groove drive at the large end of the shank is very much stronger than any drive on the tang could possibly be is evident from the illustration. The collets without this extension will fit any spindle or socket and will be furnished to those whose spindles are not fitted with slots, when this requirement is plainly specified, but they will, of course, not have the additional driving strength otherwise afforded.

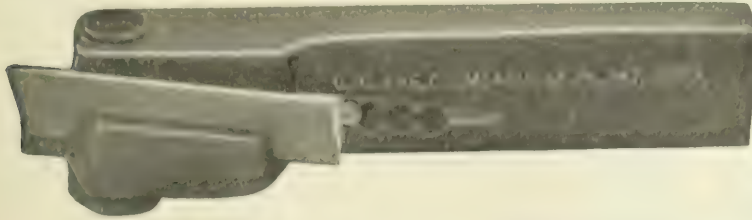
Lang Tool Holder.

The G. R. Lang Company, Meadville, Pa., has designed a tool holder, illustrated herewith, to cover the range of work handled by the ordinary tool holder and to displace the solid tool on a large class of heavy work. Rolled, triangular-section, high-speed steel cutters are used of greater area and depth than if of square steel for the same class of work. The size of the point is said to provide ample radiating surface for heat, while the method of clamping the tool provides rigidity. Proper

top and side angles may be provided with this triangular steel without waste in grinding. The extension at the front of the holder supports the tool under the cutting point, and in a direct line with the thrust, which prevents the tool point from springing away from the work. Very heavy cuts are therewith possible.

These holders may be used for lathe work by removing the ring and wedges from the tool post and inserting a solid steel block. The block may be cut out to clear the bottom of the

due to an excess of stock or cold metal being fed into the dies. The fly wheel is held between friction flanges which are keyed to the shaft. When excessive material or cold stock is fed into the machine and prevents the bending tool from



Lang Tool Holder.

tool post when necessary. The holders are said to be especially advantageous for vertical boring mill work. Special designs are made for this purpose, having, however, the same general features as the holder shown.

National Improved Forging Machine.

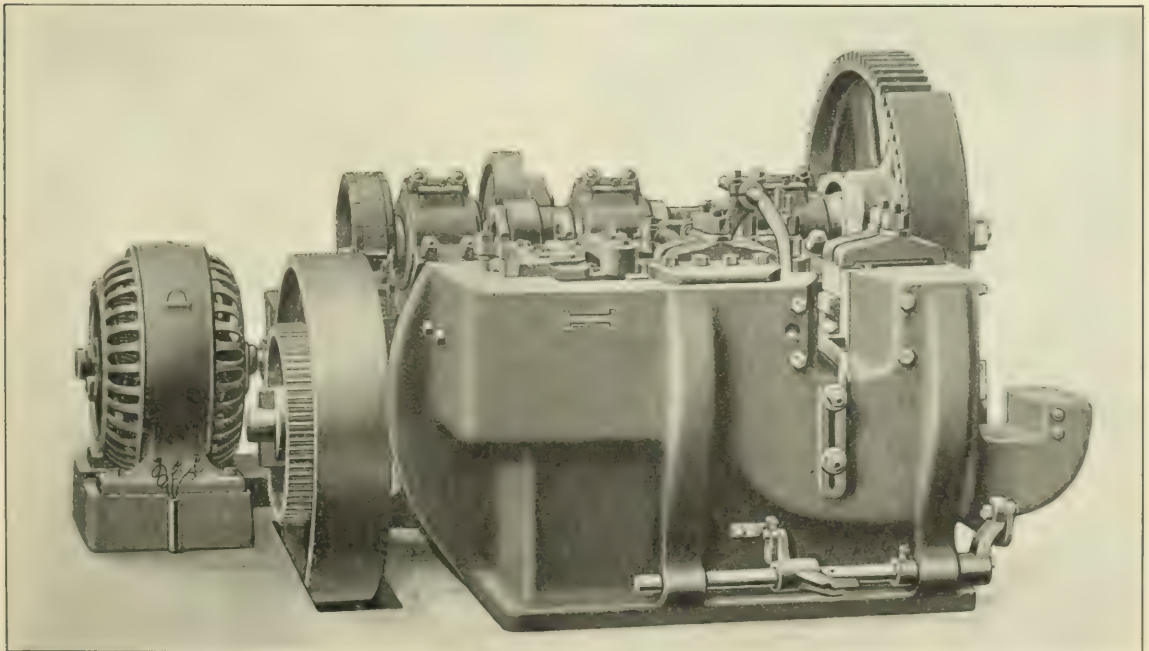
Among the many new and improved designs shown at the recent exposition, by the National Machinery Company, of modern bolt, nut and forging machinery, at Tiffin, Ohio, August 19 to 23, none attracted more attention or proved of greater interest than its line of improved forging machines. The new features that attracted the greatest attention were the friction slip fly wheel design and the direct motor drive construction.

The friction slip fly wheel design, for which a patent is pending, while extremely simple in details, meets a positive requirement in forging machine construction. It is a protection or relief to the machine against the enormous strains thrust upon it by the fly wheel momentum when the machine stalls, or, in other words, is prevented from completing the revolution

completing a full stroke, the fly wheel slips between these friction flanges. This action dissipates the momentum of the wheel and eliminates the strains attendant with a rigid fly wheel. It thus protects not only the machine, but the motor as well.

In the National direct motor drive design the motor is secured to a bracket attached to the machine bed. The motor pinion meshes with a gear bolted to the friction fly wheel. This design insures compactness, protection to the motor and the machine and has proven after exhaustive tests to be the most practical method of direct connecting a motor to a forging machine.

The double cam mechanism operating the grip is also an interesting feature. It permits the opening and closing of the dies to be timed so as to give an unusually large upset or gathering capacity, and makes possible a wider range of work and more intricate forgings in fewer operations. These machines are built in sizes of 1½, 2, 2½, 3, 3½ and 4-in. capacity. The illustration shows a machine of the 2-in. size, and displays both the friction slip fly wheel and the direct motor drive designs plainly.



Two-inch National Improved Forging Machine.

ANNUAL REPORTS

UNION PACIFIC RAILROAD COMPANY—THIRTEENTH ANNUAL REPORT.

INCOME FOR THE YEAR.

The gross revenues and expenses of the Union Pacific Railroad and auxiliary companies, after excluding all offsetting accounts between them, were as follows:

	1910.	1909.	+ Increase. —Decrease.
Average miles of railway operated during the year.....	6,296.22	6,062.13	+ 234.09

TRANSPORTATION OPERATIONS.

Gross operating revenues.....	\$88,506,465.44	\$77,360,429.36	+\$11,146,036.08
Outside operations—revenues.....	1,721,626.76	1,890,032.19	+ 331,594.57

Total revenue	\$90,228,092.20	\$79,250,461.55	+\$11,477,630.65
---------------------	-----------------	-----------------	------------------

Operating expenses	\$45,132,681.73	\$36,503,075.95	+\$8,629,605.78
--------------------------	-----------------	-----------------	-----------------

Outside operations—expenses.....	1,806,227.61	1,442,009.61	+ 364,218.00
----------------------------------	--------------	--------------	--------------

Taxes (rail lines and property dealt with as outside operations)	3,264,347.51	2,570,561.89	+ 693,785.62
--	--------------	--------------	--------------

Total expenses and taxes.....	\$50,203,256.85	\$40,515,647.45	+\$9,687,609.40
-------------------------------	-----------------	-----------------	-----------------

Revenue over expenses and taxes	\$40,024,835.35	\$38,234,814.10	+\$1,790,021.25
---------------------------------------	-----------------	-----------------	-----------------

Charges.			
----------	--	--	--

Interest on funded debt in the hands of the public (table 15)	\$12,455,577.15	\$13,331,368.07	— \$875,790.92
---	-----------------	-----------------	----------------

Sinking fund requirements.....	16,014.33	12,013.33	+ 4,000.00
--------------------------------	-----------	-----------	------------

Interest on equipment—balance.....	1,923,095.63	1,389,483.26	+ 533,612.37
------------------------------------	--------------	--------------	--------------

Rentals for lease of road—balance	14,928.71	14,029.36	+ 899.35
---	-----------	-----------	----------

Total	\$14,409,614.82	\$14,746,894.02	— \$337,279.20
-------------	-----------------	-----------------	----------------

Deduction:			
------------	--	--	--

Rentals from joint trks, yds. and term—bal. \$330,547.55			
--	--	--	--

Miscellaneous:			
----------------	--	--	--

Rentals—bal.... 42,780.90			
---------------------------	--	--	--

Income	5,090.06		
--------------	----------	--	--

	378,418.51	374,087.73	+ 4,330.76
--	------------	------------	------------

	\$14,031,196.31	\$14,372,806.27	— \$341,609.96
--	-----------------	-----------------	----------------

Surplus from transp. oper. after payment of charges	\$25,093,639.04	\$28,862,007.83	+\$2,131,631.21
---	-----------------	-----------------	-----------------

Application of Surplus.

Dividends on stocks of Union Pacific Railroad Co.:			
--	--	--	--

4 per cent. on preferred stock	\$3,981,760.00	\$3,981,760.00	
--------------------------------------	----------------	----------------	--

6 per cent. on common stock	18,022,319.50	11,806,996.33	+\$1,215,323.17
-----------------------------------	---------------	---------------	-----------------

Dividends on preferred stock of the Oregon Railroad & Navigation Co. in the hands of the public	240.00	64.00	+ 176.00
---	--------	-------	----------

	\$17,004,319.50	\$15,788,820.33	+\$1,215,499.17
--	-----------------	-----------------	-----------------

Surplus after payment of dividends	\$8,089,319.54	\$8,073,187.50	+ \$16,132.04
--	----------------	----------------	---------------

INCOME OTHER THAN FROM TRANSPORTATION OPERATIONS.			
---	--	--	--

Income on bonds owned of companies other than Oregon Short Line Railroad and Oregon Railroad & Navigation Cos. (table 16)	\$1,263,088.16	\$1,119,155.80	+\$144,827.36
---	----------------	----------------	---------------

Dividends on stocks owned of companies other than Oregon Short Line Railroad and Oregon Railroad & Navigation Cos. (table 17)	15,208,078.00	14,711,806.72	+ 496,271.28
---	---------------	---------------	--------------

Balance of interest on bonds and on open accounts owned by other subsidiary companies	2,359,720.15	1,506,659.64	+ 1,003,060.51
---	--------------	--------------	----------------

Rentals from steamships.....	304,800.00	304,800.00	
------------------------------	------------	------------	--

Net income from lease of property owned and owned by other companies	928.43	2,476.40	+ 1,547.97
--	--------	----------	------------

Minor income items.....	3,314.40	29,761.52	+ 26,447.12
-------------------------	----------	-----------	-------------

Total	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
-------------	-----------------	-----------------	-----------------

Less:	1,776.05	18,566.65	— 16,790.60
-------------	----------	-----------	-------------

Total income other than from transportation operations	\$18,068,811.82	\$17,726,427.03	+\$342,384.79
--	-----------------	-----------------	---------------

Deduction:			
------------	--	--	--

Dividends on stocks of Union Pacific Railroad Co.:			
--	--	--	--

4 per cent. on common stock	2,681,416.33	7,871,330.89	— \$5,189,914.56
-----------------------------------	--------------	--------------	------------------

Surplus income from transportation operations	\$10,377,400.00	\$9,855,092.24	+\$522,307.76
---	-----------------	----------------	---------------

Total surplus from transportation operations and from other income after payment of dividends	\$10,377,400.00	\$9,855,092.24	+\$522,307.76
---	-----------------	----------------	---------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

	\$19,844,887.87	\$17,744,993.68	+\$2,100,000.79
--	-----------------	-----------------	-----------------

The results of the year's operations, compared with those of the preceding year, were as follows:

	Increase.	Per cent.
Average miles of railway operated.....	234.09	3.86
Gross operating revenues and revenues from outside operations	\$11,477,630.65	14.57
Operating expenses and expenses of outside operations	8,993,823.78	23.70
Revenue over expenses and taxes.....	693,785.62	26.99
Income other than from transportation operations.....	1,790,021.25	4.68
Total income	1,775,657.92	10.01
Fixed charges	3,565,679.17	6.37
Surplus over fixed charges.....	\$41,609.96	2.38
	3,907,289.13	9.39

*Decrease.

ASSETS AND LIABILITIES.

The assets and liabilities of the Union Pacific Railroad and auxiliary companies are shown in detail in table No. 5. The securities owned are stated after eliminating all offsetting accounts between the companies, thus dealing only with the securities in the hands of the public, the assets collectible from the public and the liabilities payable to the public.

The increase or decrease in assets or liabilities since last report, briefly stated, is as follows:

Increase in assets:	
Cost of railways, equipment and appurtenances, as shown in detail under "Capital Expenditures"	\$11,947,075.57
Demand loans to Southern Pacific Co.	\$10,901,568.97
Other demand loans and time deposits.....	8,650,000.00
Loans to Utah Light & Railway Co.	2,155,392.63
Expenditures for the construction of new lines and for terminal properties.....	\$9,747,516.32
Rolling stock	2,694,743.32
Ocean steamships	1,013,167.38
Due from proprietary companies.....	13,455,427.02
Material, fuel and supplies.....	1,547,665.72
Current cash accounts.....	1,731,230.24
Total	\$50,731,918.55

Deduction:	
Decrease in cash on hand.....	\$17,908,362.35
Loans to San Pedro, Los Angeles & Salt Lake R. R. Co.	3,099,371.69
Stocks and bonds of other companies disposed of or acquired, as shown in tables 9, 10 and 11, viz.:	
Stocks and bonds sold.....	\$24,858,104.60
Stocks transferred to other accounts	348,750.00
Total	\$25,206,854.60

Less:	
Stocks acquired under subscription rights and stocks purchased	\$15,801,981.69
Stocks taken over in settlement of accounts.....	834,500.00
Bonds purchased and bonds taken over in settlement of accounts	7,156,997.50
Total	\$23,793,479.19
Adjustments in contingent unadjusted accounts	\$18,740.53
	23,239,849.97

Net increase in assets	\$27,492,068.59
------------------------------	-----------------

Decrease in liabilities:	
--------------------------	--

Funded debt	\$25,336,650.00
-------------------	-----------------

Deduction:	
------------	--

Increase in common stock....	\$17,275,400.00
------------------------------	-----------------

Due to proprietary companies	600,756.48
------------------------------------	------------

Current cash accounts.....	1,975,378.36
----------------------------	--------------

Reserve for depreciation of steamships and equipment.....	183,330.56
---	------------

	20,039,860.40
--	---------------

Increase in assets in excess of increase in liabilities (gain in profit and loss)	\$39,788,858.18
---	-----------------

With the exception of 7,949 shares (par value \$100 each) of Northern Securities Company "Stubs," the company has sold all the stock of the Northern Securities Company, the Great Northern Railway Company and the Northern Pacific Railway Company, received in the distribution of the assets of the Northern Securities Company and the stocks subsequently acquired by subscription rights.

The statement at the top of the following page shows the transactions growing out of the original investment in the \$24,918,714 shares of the capital stock of the Northern Securities Company and the reinvestment of the proceeds received from the sale of the respective stocks.

In table No. 5 the proceeds from the sales of the above stocks are treated as a credit against the cost of stocks and bonds.

The stocks and bonds owned, other than stocks and bonds of the Union Pacific Railroad and auxiliary companies, stand charged at the close of the year with \$995,361.65. This charge includes not merely the above stocks and bonds but also the other stocks and bonds, shown in detail in tables Nos. 9, 10 and 11.

The bonds of the stocks and bonds of the Union Pacific Railroad and auxiliary companies issued and outstanding are shown in tables Nos. 7 and 8. From table No. 8 it will be seen that the companies own bonds, unpledged, to the amount of \$9,747,300.00 face value.

Company.	Shares.	Cost.	Amount received.	Gain.	Per share.
Northern Securities Co.	824,918.71	\$79,459,691.86	100,000.00	\$16,800,000.00	20.38
Great Northern Ry. preferred	2,000	2,000.00	300,000.00	63,341.73	31.67
Great Northern Ry. sub. properties	30,341	30,341.00	3,000.00	2,949.59	9.72
Great Northern Ry. sub. properties	30,341	30,341.00	3,000.00	2,949.59	9.72
Northern Pacific Ry.	84,346	84,346.00	50,000.00	6,000.00	7.11
Northern Pacific Ry. sub. properties (50, 62 1/2 and 75% paid)	84,346	84,346.00	50,000.00	6,000.00	7.11
Northern Securities Co. stock		2,290,912.60	34,400	3,000,000.00	13.22
Total Northern Securities investment		\$80,301,401.36		\$117,377,341.62	
Reinvestments:					
Atchafalpa, Topeka & Santa Fe preferred	100,000	\$10,300,000.00	100,000	\$10,491,703.44	10.49
Baltimore & Ohio preferred	77,000	7,700,000.00	77,000	7,888,940.00	10.23
Baltimore & Ohio common	393,342	39,334,200.00	393,342	40,000,000.00	10.17
Chicago, Milwaukee & St. Paul preferred	18,400	1,840,000.00	18,400	1,880,000.00	10.22
Chicago, Milwaukee & St. Paul common	42,800	4,280,000.00	42,800	4,380,000.00	10.23
Chicago & Northwestern Ry. common	40,187.50	4,018,750.00	40,187.50	4,100,000.00	10.20
Chicago & Alton R. R. preferred	103,431	10,343,100.00	103,431	10,500,000.00	10.15
Illinois Central R. R.	231,415.63	23,141,563.00	231,415.63	23,500,000.00	10.15
New York Central & H. R. R. R.	178,571	17,857,100.00	178,571	18,000,000.00	10.14
Railroad Securities preferred	19,859	1,985,900.00	19,859	2,000,000.00	10.07
Railroad Securities common	84,884	8,488,400.00	84,884	8,600,000.00	10.13
Total reinvestments		\$161,008,985.68		\$21,422,695.50	
Total		\$240,309,387.04		\$138,800,037.12	

(a) For 794,918.71 shares of Northern Securities Co. stock, there were received in exchange 210,520,894 shares of Great Northern Ry. Co. stock, 287,898,621 shares of Northern Pacific Ry. Co. stock and 7,249,187 shares of Northern Securities Co. stock.

(b) Included in the \$79,459,691.86 original cost of Northern Securities Co. stock.

CAPITAL EXPENDITURES.

The charges to capital account, other than for stocks and bonds in companies other than the Union Pacific Railroad and auxiliary companies, were as follows:

Expenditures for account of the construction of railways taken over into cost of railways, equipment and appurtenances	\$149,289.60
Expenditures for account of extensions and cost of extensions transferred from deferred assets, viz.:	
Union Pacific Railroad Company:	
Cloveny to Hungertford, Colorado	\$264,477.01
Dent to Fort Collins, Colorado	501,210.53
Grant Mine to La Salle, Colorado	442,515.78
Greeley to Briggsdale, Colorado	313,474.97
Onaga to Marysville, Kansas	509,016.56
O'Fallons to Northport, Nebraska	387,479.51
Pine Bluffs Branch, Wyoming	27.98
Rock Springs to Coal Fields, Wyoming	7,236.60
Sand Creek to St. Vrain, Colorado	484,017.09
Summit to Lane, Nebraska	24,478.56
	\$2,834,834.50
Oregon Short Line Railroad Company:	
Kemmerer to North Kemmerer, Wyoming	45.33
Oregon Railroad & Navigation Company, Coyote to Echo, Ore.	\$6,918.84
St. John's to Troutdale, Oregon	265,409.55
	\$272,328.39
Less credit:	
Elgin to Joseph, Oregon...	17,121.73
	255,206.66
	\$3,090,086.58

Expenditures for additions and betterments (Table No. 24), viz.:

Roadway, track and appurtenances:

Ballast	\$138,722.32
Bridges, trestles, culverts and grade crossings	346,213.81
Changes in line, revision of grades, widening embankments and tunnel improvements	660,244.94
Increased weight of rails improved frogs and switches, track fastenings and appurtenances	425,251.83
Interlocking, block and highway crossing signals	399,013.78
Main tracks	4,955,227.97
Real estate, right-of-way and station grounds and fencing right-of-way	1,176,017.29
Sidings and passing tracks	777,732.51
Telegraph and telephone lines	92,556.42
	\$9,000,980.87

Buildings, structures and appurtenances:

Engine houses, shops, machinery, tools, etc.	\$400,873.27
Roadway buildings, machinery, tools, etc.	178,284.26
Station buildings, terminal yards and appurtenances	463,371.75
Water and fuel stations	311,566.30
	1,349,095.58

Equipment

Additions and improvements to existing equipment	\$43,675.97
23 locomotives	302,482.64
61 passenger-train cars	350,826.96
1,758 freight-train cars	1,710,057.32
756 work equipment	161,506.79
Less:	\$2,598,619.68
12 locomotives, 20 passenger-train cars, 2,080 freight-train cars and 256 work equipment, vacated during the year...	1,538,650.82
	1,059,968.86
Improvements to Northern Pacific Terminal property, Portland, Ore.	25,777.62
Adjustment in amount, deducted from cost of railways, equipment and appurtenances on account of the difference between the face value of stocks and bonds of the auxiliary companies and the prices at which they were taken over.	98,259.38
Total charges	\$14,773,457.90
Credits:	
Amount received from the trustee of the Union Pacific Railroad Company's first railroad and land grant mortgage, in payment for expenditures for betterments, improvements, equipment, etc., not otherwise provided for.	\$2,050,000.00
Abandoned property not to be replaced (rail lines)	442,813.80
Floating equipment sold	233,163.62
Real estate sold	100,405.00
	2,826,382.42
Net expenditures for capital account	\$11,947,075.57

The accounting regulations of the Interstate Commerce Commission in respect to charges for "Additions and Betterments," effective July 1, 1909, require that the original cost (estimated if not known) of equipment retired be credited, and the cost of equipment acquired be charged directly to the equipment accounts. The changes during the year in the equipment, dealt with in accordance with these regulations, were as follows:

Condemned, Destroyed, Sold or Transferred to Another Class and Credited to Equipment	No.	Equipment.	Union Pacific Equipment Association.	Total.
	No.	No.	No.	Cost.
Locomotives	(a)12	(c)23	(f)35	58
Baggage cars	21	21	26	47
Baggage, mail and passenger cars	1	1	1	1
Baggage and mail cars	2	2	8	10
Baggage and passenger cars	2	3	3	3
Business cars	1	1	1	1
Chair cars	10	10	10	10
Composite cars	1	8	2	10
Dining cars	1	1	6	6
Motor cars	1	1	4	4
Observation cars	7	5	27	32
Passenger cars	3	11	11	11
Postal cars	3	11	11	11
Total passenger-train cars	(b)20	(f)61	(j)73	134
Box cars	1,131	746	396	1,142
Caboose cars	13	25	*26	*1
Flat cars	57	50	*50	
Furniture cars	272	250		250
Gondola cars	317	2		2

*Credit.

<i>Passenger traffic:</i>	This year.	Last year.	Increase or decrease.	Per cent.
Revenue passengers carried	\$8,806,930	\$7,190,853	\$1,116,077	15.62
Revenue passengers carried one mile	960,734,984	795,199,750	165,535,234	20.82
Revenue per passenger trains per mile of road	\$4,022.14	\$3,633.55	\$388,59	10.69
Revenue per passenger trains per revenue train mile (a)	\$1.63	\$1.77	*\$0.14	7.91
Average revenue per passenger per mile	2.122 cents	2.169 cents	*.047 cents	2.17
Average distance carried	115.64 miles	110.58 miles	5.07 miles	4.56

Freight traffic: (Way-bill tonnage.)			
Tons of revenue freight carried	15,312,211	13,726,025	1,586,186
Tons of revenue freight carried one mile	5,997,233,894	5,266,658,054	730,575,840
Revenue per mile of road	\$9,764.54	\$8,907.79	\$856.75
Revenue per revenue train mile (b)	\$4.62	\$4.63	*\$0.01
Average receipts per ton per mile—revenue freight	1.024 cents	1.025 cents	*.001 cents
Average distance carried—freight	345.78 miles	343.33 miles	2.45 miles

(b) Revenue freight train and all mixed train miles.

Compared with the preceding year, the per cent. of operating expenses (including expenses of outside operations) to the gross revenues (including revenues from outside operations) was as follows:

	Rail	Rail lines
--	------	------------

For "Maintenance" (Maintenance of Way and Structures, and Maintenance of Equipment).....	21.44	....
For "Operations" (Traffic Expenses, Transportation Expenses and General Expenses).....	29.55	....
	<u>50.99</u>	<u>50.99</u>

Total this year.....	50.99	52.02
Total last year.....	47.19	48.18

The operating revenues and operating expenses for the year distributed among the respective primary accounts provided for in the classification of the Interstate Commerce Commission are shown in table No. 26. The details of passenger and freight traffic are shown in tables Nos. 27 and 28. The expenses of the rail line for "Maintenance" increased \$3,860,355.70, or 25.53 per cent., and the expenses for "Operation" \$4,769,350.08, or 21.37 per cent., over last year. These increases have resulted principally from the higher wage schedules. There are a greater amount of renewals than were made last year, and from an increase in mileage of locomotives and cars in revenue service and from an increase in the movement of additional traffic, by additional trains, run and higher speed of the trains. The mileage of trains hauled by gas engine and gasoline motor cars, is included in the mileage of these cars, which aggregated 552,485 miles, is included in the mileage statistics. There are also included the operating expenses, although distributed

In the following statements the operating expenses, although distributed as provided for in the classification of the Interstate Commerce Commission, have been combined under comprehensive titles of accounts so as to present the year's expenses in a concise form.

MAINTENANCE OF WAY AND STRUCTURES.			
	This year.	Last year.	Increase or decrease.
Average miles operated—			
last and additional			323.19 + 4.99
main tracks	6,800.46	6,477.27	\$51,891.56 + 165.84
Ballast	\$83,295.97	\$31,404.41	\$63,755.73 + 9.76
Ties	1,325,730.78	1,663,355.05	\$65,979.73 - 19.01
Rails	280,674.92	346,554.65	
Frogs, switches and other track material	844,805.60	837,113.24	7,692.36 + .92
Total material for roadway and track	\$3,084,507.27	\$2,878,427.85	\$156,079.92 + 5.43
Repairs of roadway and track	4,236,874.39	2,969,313.62	1,267,060.77 + 42.66
Bridges, trestles and culverts	448,674.58	392,453.76	56,220.82 + 14.83
Buildings, grounds and appurtenances	1,243,315.24	843,343.30	\$99,971.94 + 47.43
Snow and sand fences and snow sheds	16,345.65	12,440.72	\$3,904.93 + 81.39
Electric power, telegraph and telephone lines	97,348.51	65,155.04	\$32,193.47 + 49.41
Superintendence	583,232.41	47,021.38	108,210.53 + 22.78
Stationery and printing	39,293.43	19,507.53	9,715.84 + 49.51
Other expenses	190,791.00	25,982.96	9,188.87 + 35.35
Abandoned property			190,791.00 + 100.00
Total	\$9,016,481.65	\$7,682,116.16	\$2,223,365.49 + 29.67
Cost per mile all main tracks	\$1,438.06	\$1,185.26	\$272.80 + 23.02

The increase in these expenditures resulted principally from the expenses incurred in maintaining 323 miles of additional main tracks and 78 miles of sidings, the removal of a much greater number of ties, the higher wage schedule, and from charges under the new provisions of the Interstate Commerce Commission for property abandoned, which were formerly charged to Profit and Loss. Although the charge for the increase in the weight of rails to Additional and Betterments has resulted in a diminution in the charge for rails put out and replaced, the cost of the labor in making these renewals, which exceeded the track, the cost of the labor in the track last year, is included in the above.

The following rails, ties, tie plates and continuous rail joints were used in making cereals, and the entire cost thereof was charged to operating expenses, with the exception of \$425,251.33 for increased weight of rails and improved frogs and switches, charged to additions and betterments, in accordance with the classification of Expenditures for Additions and Betterments promulgated by the Interstate Commerce Commission.

The results of the year's transportation operations, compared with those of the preceding year, are as follows:

	This	Last	Increase or decrease.	Per cent.
--	------	------	-----------------------	-----------

	This year.	Last year.	Increase or decrease.	Per cent.
Average miles of railway operated	6,206.22	6,062.13	234.09	3.86

Presented, including excess	\$20,814,819.96	\$17,672,357.06	\$3,142,462.90
Excess	4,809,154.37	4,331,717.19	104,711.18
Max. and excess	61,479,669.79	54,000,195.46	7,479,484.24

Freight	61,159,869.29	869,871.76	27.7
Sales taxes and all other taxes	1,502,331.41	1,333,159.65	
Total expenses	\$88,506,160.14	\$7,360,129.36	\$11,146,936.08
Operating operations—total	1,221,626.56	1,430,032.19	331,594.53

nuc	390 988 693 20 3 8 750 461 75 11 4 7 630 65 14
Total revenues.	

Total expenses			
<i>Operating expenses</i>			
Maintenance of city and streets	\$9,915,181.65	\$ 682,116.16	\$2,233,515.19-29
	9,905,195.18	1,184,500.27	1,026,920.71-10
Maintenance of equipment	1,888,941.61	1,425,000.00	12,988,567.25
Utilities	22,200,800.68	1,914,468.92	4,200,807.76-23
Transportation expenses	1,004,565.21	1,908,300.00	56,166.56-06
General expenses			
Total operating expenses	\$35,132,681.73	\$36,503,075.95	\$8,620,605.78-23
Operating expenses less payments	1,806,227.61	1,412,000.61	364,218.00-26
Total expenses	\$36,938,909.34	\$37,915,076.56	\$8,984,823.78-29

[illegible]

	This year	Last year	% Increase or Decrease
Miles of new steel rail	268.00	250.04	+ 18.86
Percent of renewal of all rail in track, including sidings	3.09	2.96	+ .13
Number of butt-jointed ties	1,453,287	1,345,321	+ 108,066
Number of other ties	341,249	627,319	- 113,996
Total number of ties	2,194,536	1,972,640	+ 222,096
Equal to miles of continuous track	954.13	763.71	+ 260.42
Percent of renewal of all ties in track, including sidings	0.01	8.33	- 88
Number of tie plates	2,251,308	2,674,101	- 122,343
Equal to miles of continuous track	402.10	477.17	- 75.07
Number of continuous rail joints	133,389	163,178	- 10,459
Equal to miles of continuous track	31.46	232.35	- 14

The weight of rails per yard in main lines and branches at the close of the year was as follows:

MILES OF FIRST AND ADDITIONAL MAIN TRACKS OPERATED,
INCLUDING MILEAGE OPERATED UNDER TRACKAGE RIGHTS.

	Mare line.	Branches.	Total.	Per cent. of total miles of track.	Per cent. year.
Less than 10 ft.	10	224.90	226.06	3.3%	4.07
10 to 14 ft.	14	577.00	577.14	8.54	8.93
14 to 16 ft.	16	1,108.23	1,111.44	16.41	17.36
16 to 22 ft.	22	22.56	22.56	.32	.....
22 to 26 ft.	26	20.45	30.03	.44	.46
26 to 30 ft.	30	481.57	1,255.69	18.14	19.26
30 to 35 ft.	35	190.07	795.13	11.76	12.36
35 to 40 ft.	40	1,556.03	2,302.00	33.92	35.70
40 to 45 ft.	45	1.42	33.11	.50	.57
45 to 50 ft.	50	18.92	1,182.57	17.50	18.59
50 to 60 ft.	60	1,163.65	1,163.65	17.17	18.19

Total	4,081.29	2,677.67	6,758.96	100.00	100.00
At the timber-treating plants of the companies, 2,121,316 cross-ties, 53,338 switch-ties and 2,000,000 tie plugs were burnettized, and 64,008 cubic feet of piling and other timber were creosoted.					

TRANSPORTATION EXPENSES.

	This year.	Last year.	Increase.	Per cent.
Locomotives, fuel for...	\$7,084,790.58	\$5,440,119.54	\$1,644,671.04	+ 29.23
Locomotive service, other than fuel	4,805,010.60	3,768,862.88	1,041,147.02	+ 27.63
Train service	3,647,784.61	2,910,282.64	737,501.87	+ 25.34
Passenger and terminal service	4,397,029.15	3,739,702.98	668,326.17	+ 17.77
Injuries, loss, damage and other casualties	1,174,849.28	1,110,721.87	65,127.91	+ 4.92
Superintendence	897,882.76	807,837.76	90,045.00	+ 11.15
Stationery and printing	186,185.93	151,379.86	34,806.07	+ 22.95
Other expenses	29,298.97	16,102.39	13,196.58	+ 81.95

Total \$22,205,806.68 \$17,914,908.92 \$4,290,897.76 +23.95

The work done by the transportation department of the rail lines over that of last year is shown in the following table:

	Increase.	Per Cent.
Gross operating revenues	\$11,146,036.08	+14.41
Transportation expenses	4,290,897.76	+23.95
Revenue passengers carried one mile.....	185,535,234	+20.82
Mileage of passenger cars.....	14,743,508	+18.33
Locomotive mileage with passenger trains, including helping	3,259,311	+24.80
Tons of revenue freight carried one mile...	730,575,840	+13.87
Tons of revenue and company freight carried one mile	883,695,869	+13.82
Mileage of freight cars	40,864,564	+10.21
Locomotive mileage with freight and mixed trains, including helping	1,865,690	+14.30
Total locomotive mileage in which for which the attendant expenses are charged to "Transportation Expenses"	6,159,746	+21.33

The average number of tons of freight per train, and loaded cars per train (excluding caboose), and the tons per loaded car for the respective companies for the year were, as shown in the following table:

Revenue and Company Freight (Way-Bill Tonnage).		*Tons per Train. + Increase. - Decrease.		
	Tons.	Tons		Per Cent.
Union Pacific R. R. Co.	543.45	- 8.16		1.48
Oregon Short Line R. R. Co.	589.91	+ 20.30		3.56
Oregon Railroad and Navigation Co.	501.03	+ 4.90		.99
Average all lines	547.89	- .60		.11

*Ton miles per revenue freight train and all mixed train miles.

The cost per locomotive mile run in revenue service and in non-revenue service for which the expenses are charged to "Transportation Expenses" was:

	This Year.	Last Year.	
For fuel for locomotives.....	20,210 cents.	18,827 cents.	+1,383 cents.
For all transportation expenses.	63,345 cents.	62,000 cents.	+1,345 cents.

General Expenses.

	This Year.	Last Year.	Increase.	Per Cent.
Salaries and expenses of general officers.....	\$194,902.42	\$240,833.56	*\$45,931.14	—19.07
Salaries and expenses of clerks and attendants.....	900,050.95	809,910.42	90,140.53	+11.33
Law expenses.....	271,923.65	261,779.50	10,144.15	+3.88
General office expenses.....	105,002.82	91,415.47	13,587.35	+14.86
Stationery and printing.....	118,323.61	156,192.74	*\$37,869.13	—34.25
Insurance.....	180,169.18	145,083.21	15,085.97	+10.40
Pensions.....	50,527.41	38,335.83	12,191.58	+32.47
Other expenses.....	163,556.27	164,940.22	—983.95	— .60
Total.....	\$1,964,856.31	\$1,908,390.75	\$56,465.56	+ 2.96

NO. 4 - PROFIT AND LOSS FOR THE YEAR ENDED 1919	
Balance the department of equipment moved and handled by other company	\$117,006.70
Abandoned property not to be returned	302,004.91
Cost of surplus withdrawn	182,513.28
Advance to Portland by other company	118,776.25
Miscellaneous payments	800.45
Adjustments on accounts	2,783
Balance Jan. 1, 1919, by	1,008,427.83
Sinking funds	115,796,645.97
	\$117,169,472.10

Balance, Jan. 1, 1960	19,819,824.54
Balance, income from transportation	10,000,000.00
Balance income other than from transportation	19,819,824.54

Difference between \$30,231,950 face value Union Pacific R. R. Co. Twenty Year Four Per Cent. Convertible Bonds retired and canceled and \$17,275,400 par value common stock issued

Profit on sales of securities other than investment stocks....	1,238,714.56
Sinking fund contributions and income from sinking fund	

Collections of old accounts.....	\$13,099.95	
	33,764.99	

Less: Payments of old accounts.....	11,704.23	
		1,395.72

Proceeds from sale of unpledged lands and town lots.	1,356.63
--	----------

UNION PACIFIC RAILROAD AND AUXILIARY COMPANIES.
No. 9.—Stocks Owned of Other Companies, June 30, 1910.

UNION PACIFIC RAILROAD AND AUXILIARY COMPANIES.

No. 9—Stocks Owned of Other Companies, June 30, 1910.

Company.	Total-Issued and Outstanding June 30, 1914.	Total Owned by Union Pacific Railroad and Auxiliary Companies.	+ Increase. <i>(Decrease)</i>
Camas Prairie Railroad....	\$20,000.00	\$10,000.00	+
Central Idaho Railroad....	22,000.00	22,000.00	+
Gray's Harbor & Puget Sound Railway .....	.....	.....	—
Green River Waterworks..	225,000.00	225,000.00	.....
Ilwaco Railroad	315,000.00	315,000.00	.....
Kansas City Terminal Rail- way	1,000,000.00	100,000.00	.....
Leavenworth & Topeka Railway	50,000.00	25,000.00	.....
Leavenworth Depot & Railroad	150,000.00	50,000.00	.....
Occidental & Oriental Steamship .....	.....	.....	—
Ogden Union Railway & Depot	300,000.00	150,000.00	.....
Oregon & Washington Railroad	1,000,000.00	999,300.00	.....
Pacific Press .....	.....	.....	—
Pacific Fruit Express....	10,800,000.00	5,400,000.00	.....
Rattlesnake Creek Water....	78,300.00	78,300.00	.....
Riverside Homestead	100,000.00	100,000.00	+
St. Joseph & Grand Island Railroad:			
Common	4,600,000.00	3,080,500.00	+
First preferred	5,600,000.00	1,415,100.00	+
Second preferred	3,500,000.00	1,815,000.00	+
Salt Lake & Idaho Railroad	16,000.00	16,000.00	+
San Francisco & Portland Steamship	500,000.00	500,000.00	+
San Pedro, Los Angeles & Salt Lake Railroad	25,000,000.00	12,500,000.00	.....

Loaded Cars.	Per Cent. Increase. — Decrease.		Per Cent. of Loaded Car Mileage To Total Car Mileage.	Tons per Loaded Car. — Increase. — Decrease.		
	Cars.	Per Cent.		Tons.	Tons.	Per Cent.
26.07	— .98	3.62	75.99 + 1.28	30.85	+ .46	2.26
22.73	+ .70	3.18	73.84 + 1.35	25.95	+ .19	.39
11.13	+ .05	.24	83.06 — .70	23.71	+ .18	.76
24.66	— .43	1.91	76.30 + 1.16	32.22	+ .41	1.88

Short Line Land & Improvement	100,000.00	50,000.00	.....
Topoka Iron	110,000.00	55,000.00	.....
Union Depot & Railway (Denver)	400,000.00	240,000.00	.....
Union Depot (Kansas City)	500,000.00	45,000.00	.....
Union Land	10,000.00	45,000.00	.....
Union Pacific Coal	5,000,000.00	5,000,000.00	.....
Union Pacific Equipment Association	100,000.00	100,000.00	.....
Union Pacific Land	100,000.00	100,000.00	.....
Union Pacific Water	500.00	500.00	.....
Utah Light & Railway:			
Common	2,052,250.00	1,849,525.00	75.00
Preferred	3,996,500.00	3,840,875.00	900.00
Total, 1910		\$38,092,100.00	\$9,280,525.00

Total, 1909	\$47,372,625.00
-------------------	-----------------

(a) This company has been liquidated and the investment of \$310,198.95 has been transferred to Contingent Assets pending final adjustment.

Note—Of the total \$100,000.00 Union Pacific land stock \$99,400.00 was pledged and the remaining \$600 was unpledged.

UNION PACIFIC RAILROAD AND AUXILIARY COMPANIES.

No. 10—Receipts and Expenditures from all Sources, Year Ended June 30, 1910.

EXPENDITURES.

Capital Liabilities.

U. P. R. R. Co., Twenty Year Four Per Cent. Convertible bonds retired and canceled.....	\$30,231,950.00
O. S. L. R. R. Co. Income "A" Bonds acquired.....	8,500.00
Deduct for:	
U. P. R. R. Co. First Lien and Refunding Four Per Cent. Bonds sold.....	\$4,902,000.00
U. P. R. R. Co. First Lien and Refunding Four Per Cent. Sterling Bonds exchanged for Dollar Bonds.....	1,800.00
U. P. R. R. Co., common stock issued in exchange for Twenty Year Four Per Cent. Convertible Bonds retired and canceled.....	17,275,400.00
	\$22,179,200.00

Capital Expenditures.

Expenditures for construction and acquisition of new lines.....	\$149,939.60
Advances and betterments.....	10,350,075.95
Equipment.....	1,059,008.86
Cost of new lines, transferred from deferred assets.....	3,090,086.58
Miscellaneous improvements and adjustments.....	124,037.00
	\$14,773,457.99

Deduct for:	
Receipts from Improvement and Equipment Fund.....	\$2,050,000.00
Abandoned property, not to be replaced.....	442,813.80
Other property sold.....	333,568.62
	\$2,826,382.42

Increase in Assets.

Demand loans to Southern Pacific Co.....	\$10,901,568.97
Other demand loans and time deposits.....	10,805,892.63
Advances for the construction of new lines.....	9,390,184.78
Advances for steamships.....	1,013,167.38
Lands and other miscellaneous property.....	357,381.54
Rolling stock.....	3,604,718.32
Due from proprietary companies.....	843,558.40
Material, fuel, and supplies.....	1,547,665.72
Current cash accounts.....	1,731,280.24

Total increase.....	\$33,784,842.98
Less decreases:	
Cash.....	\$17,908,362.35
Loans to San Pedro, Los Angeles & Salt Lake R. R. Co.....	3,099,371.69
Stocks and bonds owned.....	1,413,375.41
Unadjusted accounts.....	818,740.52
Total decrease.....	\$23,239,849.97

Total.....\$35,553,318.58

UNION PACIFIC RAILROAD AND AUXILIARY COMPANIES.

No. 10—Investment Stocks Owned, June 30, 1910.

Company.	Total Owned by Union Pacific Railroad and Auxiliary Companies.	+ Increase. — Decrease.
Atchison, Topeka & Santa Fe Railway.		— \$10,000,000.00
Preferred stock.....		
Baltimore & Ohio Railroad.		
Common stock.....	\$32,334,200.00	
Preferred stock.....	7,206,400.00	
Chicago & Alton Railroad.		
Preferred stock.....	10,843,100.00	
Chicago & Northwestern Railway.		
Common stock.....	4,018,750.00	+ 803,750.00
Chicago, Milwaukee & St. Paul Railway.		
Preferred stock.....	1,845,000.00	
Great Northern Railway.		
Iron ore properties, 38,864 shares (a).....	(a)	
Illinois Central Railroad.		
Capital stock.....	22,500,000.00	
New York Central & Hudson River R. R.		
Capital stock.....	17,857,100.00	+ 8,571,400.00
Northern Securities.		
Stocks.....	724,000.00	
Railroad Securities.		
Common stock.....	3,483,400.00	+ 500.00
Preferred stock.....	1,933,900.00	
Southern Pacific.		
Common stock.....	6,126,650,000.00	+ 36,650,000.00
Preferred stock.....		— 84,200,000.00
Total, 1910.....	\$228,898,750.00	\$3,174,850.00
Total, 1909.....	\$302,073,100.00	

(a) Par value not stated in certificate. All sold during the year.
(b) Exchanged for common stock.

(c) Of this amount \$108,000,000 is deposited as collateral under Oregon Short Line Railroad Co. Four Per Cent. Refunding Mortgage. Of the total \$100,000,000 of bonds outstanding under the mortgage, \$5,000,000 are a loan used in the treasury of the Union Pacific Railroad Co.

RECEIPTS.

Increase in Liabilities.

Current cash accounts.....	\$1,975,873.36
Reserve for depreciation of steamships and rolling stock leased.....	188,330.56
Due to proprietary companies.....	600,756.48

\$2,764,460.40

Profit and Loss.

Gross operating revenues and revenues from outside operations.....	\$90,228,092.20
Interest, dividends and other income.....	19,890,469.86

Total revenue.....\$110,118,562.06

Deduct for:

Operating expenses and expenses of outside operations.....	\$46,938,909.34
Taxes.....	3,264,347.51
Interest on funded debt and sinking fund requirements.....	12,471,590.48
Dividends on preferred and common stocks.....	25,685,865.85
Miscellaneous expenses and charges.....	1,925,540.70

Total expenses and charges.....\$90,286,253.88

Less:

Difference between \$30,231,950 face value, U. P. R. R. Co. Twenty Year Four Per Cent. Convertible Bonds, retired and canceled, and \$17,275,400 par value common stock issued in exchange therefor.....	12,956,550.00
--	---------------

Balance.....\$77,829,703.88

\$32,788,568.18

UNION PACIFIC RAILROAD AND AUXILIARY COMPANIES.

No. 11—Bonds Owned of Other Companies, June 30, 1910.

Company.	Total Issued and Outstanding, June 30, 1910.	Owned by Union Pacific Railroad and Auxiliary Companies, Total.	— Decrease. + Increase.
Atchison Union Depot & R.R.			
Second Mortgage 5%.....	\$31,500.00	\$4,500.00	
Cheyenne County, Colorado.			
Refunding 5%.....		26,200.00	
Green River Water Works.			
First Mortgage 6%.....	198,000.00	198,000.00	
Idaho Northern R.R.			
First Mortgage 5%.....	875,000.00	875,000.00	
Second Mortgage 5%.....	160,000.00	160,000.00	+ \$11,000.00
Ilwaco R.R.			
First Mortgage 6%.....	305,000.00	305,000.00	
Leavenworth & Topeka Ry.			
First Mortgage 4%.....	250,000.00	125,000.00	
Leavenworth Depot and R.R.			
First Mortgage 5%.....	150,000.00	63,000.00	
Northern Pacific Terminal.			
First Mortgage 6%.....	3,443,000.00	174,000.00	
Ogden Union R.R. & Depot.			
First Mortgage 5%.....	326,000.00	163,000.00	
Oregon, Wash. & Idaho R.R.			
First Mortgage 6%.....	3,000,000.00	5,000,000.00	+ \$2,000,000.00
Payette Valley Ry.			
First Mortgage 5%.....	44,000.00	44,000.00	
Rattlesnake Creek Water.			
First Mortgage 6%.....	116,000.00	116,000.00	
San Pedro, Los Angeles & Salt Lake R.R.			
First Mortgage 4%.....	46,886,000.00	23,443,000.00	+ \$3,443,000.00
Southern Pacific.			
4% Twenty-Year Convertible.....	81,151,000.00	927,000.00	— \$833,000.00
4% Twenty-Year Gold.....	227,000.00		+ 65,000.00
Utah Light & Power.			
Consolidated Mortgage 4%.....	1,115,000.00	2,000.00	
Utah Light & Ry.			
Consolidated Mortgage 5%.....	1,485,000.00	993,000.00	
Collateral Trust 6%.....	20,000.00	41,000.00	
Union Pacific Coal.			
First Mortgage 5%.....	3,000,000.00	3,507,000.00	— 188,000.00
Union Pacific Land.			
First Mortgage 4%.....	5,846,000.00	5,846,000.00	— 750,000.00
Total, 1910.....	\$40,107,700.00		+ \$1,748,000.00
Total, 1909.....	\$38,359,700.00		

* 1,000,000 held by Union Pacific Coal Co. sinking fund.
Note: The \$3,800,000 first mortgage 4% bonds of the Union Pacific Land Company are pledged.

UNION PACIFIC RAILROAD AND AUXILIARY COMPANIES

NO. 3—ASSETS, JUNE 30, 1919				NO. 4—LIABILITIES, JUNE 30, 1919			
Including stocks and bonds owned, but not for sale, and property acquired and all other assets, as shown in Table 1				Including stocks and bonds owned, but not for sale, and property acquired and all other liabilities, as shown in Table 1			
Assets	June 30, 1919	June 30, 1919	Increase	Liabilities	June 30, 1919	June 30, 1919	Increase
Capital Assets				Capital Liabilities			
Cost of stocks and bonds owned, but not for sale, and property acquired and all other assets, as shown in Table 1	\$119,781,240.74	\$91,841,163.17	\$11,947,077.57	Cost of stocks and bonds owned, but not for sale, and property acquired and all other liabilities, as shown in Table 1	\$119,781,240.74	\$91,841,163.17	\$11,947,077.57
Stocks and bonds owned, but not for sale, and property acquired and all other assets, as shown in Table 1	208,061,011.05	209,971,387.06	*1,111,815.41	Stocks and bonds owned, but not for sale, and property acquired and all other liabilities, as shown in Table 1	208,061,011.05	209,971,387.06	*1,111,815.41
Trust funds	261,802.44	22,092.43	239,710.01	Trust funds	261,802.44	22,092.43	239,710.01
	\$613,604,114.83	\$603,834,642.66	\$10,769,472.17		\$613,604,114.83	\$603,834,642.66	\$10,769,472.17
*Decrease.				*Decrease.			
Current Assets				Current Liabilities			
Demand loans, S. P. Co.	\$10,901,088.97		\$10,901,088.97	Demand loans, S. P. Co.	\$10,901,088.97		\$10,901,088.97
Loans to San Pedro, Los Angeles & Salt Lake R.R.		\$3,099,544.69	*3,099,544.69	Loans to San Pedro, Los Angeles & Salt Lake R.R.		\$3,099,544.69	*3,099,544.69
Loans to Utah L. & N.	1,000,000.00	2,351,700.00	*1,351,700.00	Loans to Utah L. & N.	1,000,000.00	2,351,700.00	*1,351,700.00
Cash	9,582,088.21	20,900,100.00	*11,318,011.79	Cash	9,582,088.21	20,900,100.00	*11,318,011.79
Demand loans and time dep.	2,450,000.00	18,500,000.00	*16,050,000.00	Demand loans and time dep.	2,450,000.00	18,500,000.00	*16,050,000.00
Accounts and contracts	1,014,116.17	924,164.59	*11,951.58	Accounts and contracts	1,014,116.17	924,164.59	*11,951.58
Trade and accounts receivable	100,504.27	329,897.05	*1,29,392.78	Trade and accounts receivable	100,504.27	329,897.05	*1,29,392.78
Income accrued to June 30, on securities owned	1,939,880.50	4,845,863.95	*95,717.25	Income accrued to June 30, on securities owned	1,939,880.50	4,845,863.95	*95,717.25
Individuals and companies	3,022,480.88	1,788,787.32	*1,133,702.56	Individuals and companies	3,022,480.88	1,788,787.32	*1,133,702.56
U. S. Gov't bonds	100,000.00	100,000.00		U. S. Gov't bonds	100,000.00	100,000.00	
Deposits income earned and called bonds	3,000.00			Deposits income earned and called bonds	3,000.00		
Material, fuel and supplies	12,631,166.74	11,083,401.02	*1,547,665.72	Material, fuel and supplies	12,631,166.74	11,083,401.02	*1,547,665.72
	\$75,002,126.08	\$70,631,927.78	\$4,367,199.20		\$75,002,126.08	\$70,631,927.78	\$4,367,199.20
*Decrease.				*Decrease.			
Deferred Assets				Deferred Liabilities			
Advances for cost and acquisition of new lines	\$16,690,519.47	\$37,330,284.79	\$10,360,194.78	Advances for cost and acquisition of new lines	\$16,690,519.47	\$37,330,284.79	\$10,360,194.78
Cost of steamships owned	6,132,890.48	5,119,793.10	*1,013,107.38	Cost of steamships owned	6,132,890.48	5,119,793.10	*1,013,107.38
Rolling stock	12,341,314.85	9,646,501.53	*2,694,813.32	Rolling stock	12,341,314.85	9,646,501.53	*2,694,813.32
Tools, shops and other funds	1,367,354.90	3,909,955.06	*2,542,600.16	Tools, shops and other funds	1,367,354.90	3,909,955.06	*2,542,600.16
Individuals and companies	78,087.27	503,062.96	*424,975.69	Individuals and companies	78,087.27	503,062.96	*424,975.69
	\$69,530,076.37	\$56,499,625.04	\$13,030,451.33		\$69,530,076.37	\$56,499,625.04	\$13,030,451.33
*Decrease.				*Decrease.			
Contingent Assets				Contingent Liabilities			
Unclaimed accounts	\$783,079.04	\$1,561,819.56	*\$818,740.52	Unclaimed accounts	\$783,079.04	\$1,561,819.56	*\$818,740.52
Debt of non-proprietary companies	1,311,747.00	968,188.60	*\$343,558.40	Debt of non-proprietary companies	1,311,747.00	968,188.60	*\$343,558.40
Land and town lot contracts	2,749,622.94	3,117,300.66	*367,677.72	Land and town lot contracts	2,749,622.94	3,117,300.66	*367,677.72
	\$4,794,448.98	\$5,637,308.82	*\$842,859.84		\$4,794,448.98	\$5,637,308.82	*\$842,859.84
Total assets	\$764,930,767.16	\$737,806,376.30	\$27,124,390.86	Total liabilities	\$764,930,767.16	\$737,806,376.30	\$27,124,390.86
*Decrease.				*Decrease.			
The sum of \$17,648,252.12 received to date from the Improvement and Equipment Fund and \$16,959,816.24 appropriated from "Income Account," a total of \$34,608,068.36, has been applied as a credit against this cost.							

No. 27.—GENERAL OPERATING RESULTS.

	June 30, 1910	June 30, 1909	Increase or Decrease	Per Cent.
1. Average miles oper.	6,296.22	6,062.13	234.09	3.86
Revenues and Expenses, (Rail Lines and Outside Operations.)				
2. Gross revenues	\$90,228,092.20	\$78,750,461.55	\$11,477,630.65	14.57
3. Gross expenses	46,988,909.34	37,945,085.56	8,993,823.78	23.70
4. Revenues over exp.	43,239,182.86	40,805,375.99	2,483,806.87	6.09
5. Ratio exp. to gr. rev. (San Lines Only)	52.02	48.18	3.84	7.97
6. Total operating rev.	88,506,465.44	\$77,360,429.36	\$11,146,036.08	14.41
7. Operating expenses	45,132,681.73	36,508,075.95	8,629,605.78	23.64
8. Net operating rev.	43,373,783.71	40,852,353.41	2,521,430.30	6.16
9. Ratio of oper. exp. to oper. rev.	50.99	47.19	3.80	8.05
10. Oper. rev. per m. rd.	14,057.08	12,761.26	1,295.82	10.15
11. Oper. exp. per m. rd.	7,168.22	6,021.49	1,146.73	19.04
12. Net oper. rev. per m.	6,888.86	6,739.77	149.09	2.21
13. Oper. rev. per rev. train mile (a)...	3.21	3.40	—\$1.19	5.59
14. Oper. exp. per rev. train mile (a)...	1.64	1.60	.04	2.50
15. Net oper. rev. per rev. train m. (a)	1.57	1.80	—23	12.78
Train & Locomotive Miles.				
16. T'l frt. train miles	11,905,708	10,256,036	1,789,672	16.96
17. Pass. train miles (a)	14,260,161	11,056,313	3,203,848	28.91
18. Mixed train miles	1,283,930	1,397,817	—113,887	8.15
19. Special train miles	63,225	28,297	34,928	123.43
20. T'l rev. tr. mls.	27,608,024	22,738,468	4,869,556	21.39
21. Frt.—Lt. & helping loco. miles	1,599,246	1,862,100	287,146	17.41
22. Pass.—Lt. & helping loco. miles	826,575	659,984	166,591	25.24
23. Rev. ser. mixed—Lt. & helping loco. m.	32,546	29,787	2,759	9.26
24. Rev. ser. special—Lt. & helping loco. m.	13,265	9,674	3,591	37.12
25. Rev. ser.—Total loco. miles exc. switching	30,074,656	24,800,008	5,274,648	21.27
26. Rev. ser.—Switching loco. miles	4,405,689	3,596,635	809,054	22.49
27. Rev. ser.—Total loco. miles (a)...	34,480,345	28,396,643	6,083,702	21.12
28. Non-rev. ser.—Loco. miles included in "Trans. Exp. U. S."	574,362	498,518	76,044	15.25
29. Ratio of light and helping loco. miles to rev. ser. train miles	8.95	9.07	—12	1.32
30. Ratio of helping m. to rev. ser. total tr. m. exc. running lt.	3.63	3.48	.15	4.31
Revenue Service:				
31. Ft. car mls.—loaded	327,436,361	298,047,722	34,388,639	11.73
32. Frt. car m.—empty	10,689,023	96,964,632	4,724,391	4.87
33. Frt.—Caboose mls.	11,991,101	10,239,567	1,751,534	17.10
34. T'l frt. c. & chse m.	441,116,485	400,251,921	40,864,564	10.12
35. Non-rev. ser.—T'l. frt. car and caboose m.	424,372	297,787	126,585	42.51
36. T'l frt. c. & cab. m.	441,540,857	400,549,708	40,991,149	10.23
37. Rev. ser.—Pas. c. m.	95,192,504	80,448,996	14,743,508	18.33
38. Non-rev. pas. c. m.	215,166	187,687	27,479	14.64
Revenue Service:				
39. Spec. car m.—Frt. and caboose	850,334	414,153	—434,949	15.42
40. Spec. c. m.—Pass.	475,346	467,354	367,992	342.78
41. T'l spec. car mls.	825,680	521,537	304,143	58.32
Average No. cars:				
42. In Pass. trains...	6.12	6.46	—34	5.26
43. Loaded, in frt. trns.—East or North.	24.16	26.27	—1.81	0.80
44. Loaded, in frt. trns.—West or South.	24.85	24.01	.84	3.50
45. Loaded, in frt. trns	24.66	25.14	—48	1.91
46. Ld. & empty in frt. trns, excl. cabse.	32.21	33.47	—1.16	3.47
47. Ratio of loaded frt. c. mile, to total frt. c. mile, to total (d)	76.30	75.14	1.16	1.54
48. Ratio of empty frt. c. mile, to total (d)	23.70	24.86	1.16	4.67
Miscellaneous.				
49. Av. cost of M. of W. & S. pr. m. of m. tr	\$1,458.06	\$1,185.26	\$272.80	23.02
50. Av. cost of repairs & replacements per loco.	3,656.45	4,122.78	536.67	17.09
51. Av. cost of repairs & replmts. per pas. train car....	1,286.66	1,188.56	97.50	8.23
52. Av. cost of repairs & replmts. per frt. train car....	121.68	99.75	21.93	21.98
53. Trans. exp. per total rev. train mile (a)	80.45 cents	78.79 cents	1.66 cents	2.11
54. Cost per loco, mile for which the attendant exp. are charged to "Trans. Expenses"	63.85 cents	62.00 cents	1.85 cents	2.18

(a) Includes 552,485 miles run by motor cars. (b) Includes 889,649 miles run by motor cars and trailers. (c) Includes mileage of passenger-train cars in all trains. (d) Excludes non-revenue and caboose mileage.

FOURTEENTH ANNUAL REPORT OF THE ST. LOUIS AND SAN FRANCISCO RAILROAD COMPANY—FISCAL YEAR ENDED JUNE 30, 1910.

The Directors respectfully submit their report of the operations and affairs of the St. Louis and San Francisco Railroad Company's Lines (exclusive of the Chicago & Eastern Illinois Railroad), for the fiscal year ended June 30, 1910.

The results of operation for the fiscal year were as follows:

Operating revenue (increase \$3,085,555.33 or 9 per cent.)	\$41,165,939.37
Operating expenses (increase \$2,916,751.94 or 15.8 per cent.)	28,676,842.19
Net operating revenue (decrease \$507,707.71 or 3.0 per cent.)	\$12,489,097.18
Taxes	1,458,185.96
Miscellaneous items	\$11,030,911.22
Total income	2,390,128.72
Interest, rentals and other fixed charges	\$13,331,339.94
Net income after providing for all charges	12,209,380.77
Dividends paid (not per cent on first preferred stock)	\$1,131,059.17
Surplus carried to credit and loss	199,742.12
	\$922,317.05

The mileage and results of operation of the Orange & Northwestern Railroad and the Rivermont, Saint Lake & Western Railway which were included in the annual report for 1909 have been eliminated therefrom in the foregoing statement, and also in all other comparative statements in this report. Two new roads referred to were, during the past year, operated as separate properties and form parts of the New Orleans, Texas & Mexico Railroad Lines. See page 76 showing the mileage of roads comprising the lines of the New Orleans, Texas & Mexico Railroad.

The freight decrease, 88-100 of a mile in the average mileage operated, is caused by a re-measurement.

On pages 74, 75 and 76 will be found details of the mileage of all the lines operated, owned or controlled, by this Company.

CAPITAL STOCK.

There was no change during the fiscal year in the Capital Stock issued or outstanding.

FUNDED DEBT AND EQUIPMENT BONDS AND NOTES.

The outstanding funded debt at June 30, 1910, was	\$221,966,174.11
The outstanding equipment trust bonds and notes were	15,700,521.79
Total	\$237,666,695.90
The outstanding funded debt at June 30, 1909, was	\$199,339,619.30
Less that of B. S. L. & W. and O. & N. W. R. R.s	748,566.50
Total	\$198,591,052.80
The outstanding equipment trust bonds and notes were	15,033,591.09
Total	\$213,624,643.89
The net increase was	\$24,042,052.01

The balance of the Fort Smith and Van Buren Bridge Company First Mortgage 6 per cent bonds were redeemed and cancelled during the year, and the mortgage was released as record.

In May, 1910, \$1,644,000 of the Five Year 5 per cent Gold Notes of 1911 were redeemed and cancelled, and at the same time, funds were deposited with the Trustee to redeem on July 1, 1910, the balance of that issue, amounting to \$2,820,000.

Bonds were also deposited with The Mercantile Trust Company of New York for the payment at maturity (September 1st, 1910), of \$492,000 of Memphis, Kansas & Colorado Railway Company First Mortgage 7 per cent bonds.

The new issue of this company's New Orleans, Texas & Mexico Division Trust Mortgage Thirty Year Gold Bonds, dated March 1st, 1910, is secured by a first mortgage, dated May 17, 1910, on the property of the New Orleans, Texas & Mexico Railroad Company, the latter Company assuming the payment of both principal and interest of the bonds.

The New Orleans, Texas & Mexico Railroad Company is operated separately and extends from New Orleans, La., to Brownsville, Texas, on the Mexican border, owning a half interest in the bridge across the Rio Grande River to Matamoros where connection is made with the National Railway of Mexico. A profitable interchange of traffic with the Mexican lines should result, beginning with the opening of this new International line on September 1st of this year. Your Company owns all of the capital stock, except preferred shares, of the New Orleans, Texas & Mexico Railroad Company.

On pages 74 and 75 will be found statements showing in detail the amount of tax bonds and notes issued as well as the amount of bonds and operating charges as reflected on a cashed during the year, and on page 76 a summary of the details of properties remaining in the treasury as a current asset.

EQUIPMENT.

The following equipment was purchased during the fiscal year:

1. Under Truss Agreements.
2. Under Truss Agreements.
3. Under Truss Agreements.
4. Under Truss Agreements.
5. Under Truss Agreements.
6. Under Truss Agreements.
7. Under Truss Agreements.
8. Under Truss Agreements.
9. Under Truss Agreements.
10. Under Truss Agreements.
11. Under Truss Agreements.
12. Under Truss Agreements.
13. Under Truss Agreements.
14. Under Truss Agreements.
15. Under Truss Agreements.
16. Under Truss Agreements.
17. Under Truss Agreements.
18. Under Truss Agreements.
19. Under Truss Agreements.
20. Under Truss Agreements.
21. Under Truss Agreements.
22. Under Truss Agreements.
23. Under Truss Agreements.
24. Under Truss Agreements.
25. Under Truss Agreements.
26. Under Truss Agreements.
27. Under Truss Agreements.
28. Under Truss Agreements.
29. Under Truss Agreements.
30. Under Truss Agreements.
31. Under Truss Agreements.
32. Under Truss Agreements.
33. Under Truss Agreements.
34. Under Truss Agreements.
35. Under Truss Agreements.
36. Under Truss Agreements.
37. Under Truss Agreements.
38. Under Truss Agreements.
39. Under Truss Agreements.
40. Under Truss Agreements.
41. Under Truss Agreements.
42. Under Truss Agreements.
43. Under Truss Agreements.
44. Under Truss Agreements.
45. Under Truss Agreements.
46. Under Truss Agreements.
47. Under Truss Agreements.
48. Under Truss Agreements.
49. Under Truss Agreements.
50. Under Truss Agreements.
51. Under Truss Agreements.
52. Under Truss Agreements.
53. Under Truss Agreements.
54. Under Truss Agreements.
55. Under Truss Agreements.
56. Under Truss Agreements.
57. Under Truss Agreements.
58. Under Truss Agreements.
59. Under Truss Agreements.
60. Under Truss Agreements.
61. Under Truss Agreements.
62. Under Truss Agreements.
63. Under Truss Agreements.
64. Under Truss Agreements.
65. Under Truss Agreements.
66. Under Truss Agreements.
67. Under Truss Agreements.
68. Under Truss Agreements.
69. Under Truss Agreements.
70. Under Truss Agreements.
71. Under Truss Agreements.
72. Under Truss Agreements.
73. Under Truss Agreements.
74. Under Truss Agreements.
75. Under Truss Agreements.
76. Under Truss Agreements.
77. Under Truss Agreements.
78. Under Truss Agreements.
79. Under Truss Agreements.
80. Under Truss Agreements.
81. Under Truss Agreements.
82. Under Truss Agreements.
83. Under Truss Agreements.
84. Under Truss Agreements.
85. Under Truss Agreements.
86. Under Truss Agreements.
87. Under Truss Agreements.
88. Under Truss Agreements.
89. Under Truss Agreements.
90. Under Truss Agreements.
91. Under Truss Agreements.
92. Under Truss Agreements.
93. Under Truss Agreements.
94. Under Truss Agreements.
95. Under Truss Agreements.
96. Under Truss Agreements.
97. Under Truss Agreements.
98. Under Truss Agreements.
99. Under Truss Agreements.
100. Under Truss Agreements.

2 Purchased for cash.

100 Commercial for Cars

All this additional equipment was received at June 30, 1910, with the exception of six Combination Passenger and Mail cars, five Combination Coach and Cafe cars and six Dining cars.

CONSTRUCTION.

During the fiscal year a branch was built between Marion and Hulbert, Ark., connecting the tracks of the Frisco with the Chicago, Rock Island & Pacific Railway at Hulbert, a distance of 5.49 miles. This cut-off shortens the distance for through traffic between the two lines, and materially facilitates transfer of freight between the terminal yards of these lines, relieving the terminal situation in Memphis proper, which is often congested.

Extended yards were built at Marion to provide for such interchange.

GENERAL.

Much has been said of late respecting the obvious necessity of greater compensation for the railroads per unit of service rendered. In this connection it has been frequently stated that within the past few years, rates have already been raised and that the actual rate basis is now higher than in the recent past. Figures refute this so far as "Frisco" is concerned. On our 1910 rates, if we had received the rates of 1907, our freight revenues would have been larger by \$933,729.32; at the rates of ten years ago, 1900, we would have had \$2,291,881.06 more freight earnings. Our passenger rate per mile in 1907 applied to our 1910 passenger miles would have yielded us a further increase of \$1,609,811.82. If the railroads are to serve the public adequately, net revenues must be preserved or increased by means of better service and not by poorer maintenance; the public cannot afford the latter method.

Your company's property is receiving a substantial improvement in value by reason of the number of treated ties (creosote treatment) which are being put into the track, at an increased expense, borne by maintenance charges. This work was begun late in 1908, and has been used, at an additional more than three million cross-ties, has had been used, at an additional cost for treatment and handling of more than one million dollars. The life of these treated ties is estimated at fifteen years or more, or approximately two and one-half times the average life of the untreated ties; the benefit to the property in reduction of maintenance charges on this account will not be noticeable for several years.

At the close of the fiscal year new automatic electric block signals had been installed and were in use on 325 miles of road, and work of that character is being actively pushed upon 404 miles more, a good part of which will be in service before winter comes.

A strike of coal miners on April 1, 1910, closed practically every coal mine in the states of Missouri, Kansas, Arkansas and Oklahoma, causing serious losses in many ways—the loss of gross and net earnings on commercial coal, decrease in tons handled per freight train, and consequent increase in cost per ton handled, temporary increase in cost price of our engine fuel and, most expensive of all, the enforced additional cost of hauling company coal from Indiana, Kentucky and Alabama to Oklahoma, Kansas and Texas. At the close of the fiscal year the mines had not resumed operation. The cost to your lines in actual net earnings for the period April 1 to June 30, was probably not less than one million dollars. This, in addition to the difficult operation in consequence of an unusually long and severe winter, together with increases in wages—necessary and unavoidable—has given your operating officials little opportunity to show efficiency in the matter of transportation costs.

By an agreement with the Houston & Texas Central Railway Company and other Southern Pacific lines, close arrangements have been made effective for the transportation of freight and passengers via Dallas, Sherman and Fort Worth, and via Houston, Tex. This understanding largely serves our purpose as a connecting line between our properties north of the Red River and those in Southern Texas, and obviates the necessity of expensive construction through a territory already well occupied by north and south railroad lines.

The statement of industries located on the Company's tracks during the year as reported by the Company's Industrial Department shows the usual satisfactory increase. Three hundred and twenty new industries, costing approximately \$5,727,000.00 and employing 8,400 men, were established during the year.

The usual statements showing the Condensed Balance Sheet, Income and Profit and Loss Accounts, and Statistical Statements, each including the figures of the Chicago & Eastern Illinois Railroad Company, will be found on pages 44 to 76.

The Interstate Commerce Commission has prescribed and issued a form of General Balance Sheet Statement for steam railroads and made same effective June 15th, 1910. That form has been followed in stating the Condensed Balance Sheet including the figures of the Chicago & Eastern Illinois Railroad Company, but the comparative balance sheet of the Company on pages 16 and 17 is stated as heretofore in order to make an intelligent comparison with the preceding year.

Cheerful acknowledgment is hereby made of the faithful and efficient service rendered by officers and employees during the year.

By order of the Board of Directors.

B. L. WINCHELL,
President.

October 1st, 1910.

GENERAL PROFIT AND LOSS ACCOUNT AND ADJUSTMENTS THEREIN.

June 30, 1909, to June 30, 1910.

CREDIT.

Balance at credit, as per annual report, June 30, 1909	\$4,014,320.34
Adjustment account conversion of B. S. L. & W.	185,791.14
By and O. & N. W. R. R.	\$4,200,111.48
1910	922,217.05
Surplus for the year ended June 30, 1910.	\$5,122,328.58
Total credit	

DEBIT.

Proportion for the year of discount on securities sold	\$450,183.79
Depreciation prior to July 1, 1907, in the value of equipment, destroyed and dismantled during current fiscal year	225,922.11
Similar adjustments not affecting current year's income	21,616.40
Total debit	
Balance	\$4,200,111.48
By balance at credit, June 30, 1910.	\$4,200,111.48

ST. LOUIS AND SAN FRANCISCO RAILROAD THE
CONDENSED BALANCE SHEET, JUNE 30, 1919, AND COMPARISONS WITH PREVIOUS YEARS

	1919	With E = 1 N W and O & S. W. apportioned	Increase or decrease
Fixed assets and accounts	\$11,000,000.00	\$10,000,000.00	\$1,000,000.00
Stocks and bonds owned	500,000.00	500,000.00	
Total fixed assets and property	\$11,500,000.00	\$10,500,000.00	\$1,000,000.00
Liabilities against the Kansas City, Fort Scott & Memphis Railroad	18,647,500.00	18,600,541.11	3,458,422.25
Liabilities against Kansas City, Fort Scott & Memphis Railroad	9,700,000.00	9,700,000.00	\$1,334.02
Fixed assets and property less debts and liabilities	1,852,500.00	1,849,458.89	*2,893,458.92
Chicago & Eastern Illinois Railroad Company—unaffiliated stock owned only	9,351,500.00	9,351,500.00	
Chicago & Eastern Illinois Railroad Company—unaffiliated stock owned	18,500,187.13	18,200,000.00	*500.00
Total	\$21,651,800.13	\$20,000,000.00	\$21,628,780.11
Current accounts			
Cash on hand	1,368,000.00	1,368,000.00	262,040.00
Cash on deposit with banks	1,195,000.00	1,195,183.89	399,066.28
Cash on deposit with railroad companies and other banks (see schedule)	6,248,000.00		6,318,000.00
Due from agents and conductors	631,968.00	636,841.33	97,127.26
Due from railroad companies (see schedule)	25,710.00	41,044.13	*18,334.09
Due from companies and individuals	2,375,852.23	1,670,966.45	704,885.78
Bills receivable	672,204.71	61,234.42	610,970.29
Due from United States Post Office Department	84,335.34	102,208.47	*18,873.13
Securities in treasury	9,269,958.32	7,024,078.66	2,245,879.66
Supplies on hand	3,873,795.63	3,071,499.15	802,296.48
Advances account construction	934,786.65	5,144,047.82	*4,209,261.17
Total	\$20,986,771.97	\$22,762,274.52	\$7,224,497.45
Deposited amounts			
Open carrying accounts in process of adjustment	747,074.05	593,250.75	153,823.30
Discount on bonds, carried in suspense to be charged out in annual installments	9,788,690.67	4,849,094.56	4,939,596.11
Trustees sinking fund accounts	468,776.58	448,370.64	20,405.94
Sinking funds	82,483.30	78,184.07	*45,700.77
Total	\$11,037,024.60	\$5,968,900.02	\$5,068,124.58
Total assets	\$35,654,599.70	\$319,321,197.56	\$36,321,402.14

* Decrease.

NOTE.—In stating the assets and liabilities of the companies covered by this balance sheet, the holdings of the St. Louis & San Francisco R. R. Co., in the bonds and capital stocks of leased and auxiliary lines, are eliminated.

ST. LOUIS AND SAN FRANCISCO RAILROAD LINES.
INCOME ACCOUNT.

Fiscal Year Ended June 30th, 1910, Compared With Previous Year.

	1908-09.			
		With B. S. L. & W. and O. & N. W. figures omitted.	Increase or Decrease.	Per Cent.
Average miles operated...	5,071.79	5,072.67	—88	...
<i>Operating revenue:</i>				
Freight	\$27,645,863.48	\$25,269,515.93	\$2,383,347.55	9.8
Passenger	10,548,069.83	9,503,404.36	945,665.47	9.0
Mail	1,009,241.56	999,935.45	9,306.11	0.9
Express	1,134,904.37	1,129,291.66	5,792.71	0.5
Miscellaneous	550,811.88	527,951.03	22,860.85	4.3
Total transportation rev.				
Revenue from operation	\$40,889,791.12	\$37,522,044.33	\$3,366,846.79	9.0
other than transpor- tation	276,148.25	234,041.71	42,106.54	18.0
Total operating revenue...	\$41,165,939.37	\$37,756,986.04	\$3,408,953.33	9.0
<i>Operating expenses:</i>				
Maintenance of way and structures	\$5,778,268.15	\$4,987,632.77	\$790,635.38	15.9
Maintenance of equip- ment	5,940,310.37	4,596,862.39	1,343,447.98	29.2
Traffic expenses	1,006,821.23	873,282.10	163,539.13	18.7
Transportation expenses.	14,698,094.33	13,105,875.11	1,592,219.22	12.2
General expenses	1,223,348.06	1,108,425.71	24,922.35	2.1
Total operating expenses	\$28,676,842.19	\$24,760,091.15	\$3,916,751.04	15.8
<i>Net operating revenue...</i>	\$12,489,097.18	\$12,996,894.89	\$507,797.71	3.9
<i>Taxes</i>	1,458,185.96	1,532,148.60	\$73,962.64	4.8
Operating income	\$11,030,911.22	\$11,464,746.29	\$433,835.07	3.9

*Decrease

[illegible]

* Decrease.

†Excludes, in order to avoid duplication, \$10,000,000 N. O. T. & M. Division bonds pledged as collateral to other liabilities included in "Funded Debt."

\$3,000,000 of Kansas City & Memphis Railway & Bridge Co. bonds transferred from "Funded Debt Auxiliary Companies" to "Funded Debt Leasehold Estate (the K. C. F. S. & M. Ry.)."

	1908-09.			
	1909-10.	With B. S. L. & W. and O. & N. W. figures omitted.	Increase or Decrease.	Per Cent.
Miscellaneous income—				
Hire of equipment.....	\$609,988.27	\$260,086.63	\$349,901.64	134.5
Other income	2,910,416.99	1,715,112.20	1,195,304.79	69.7
Total miscell. income....	\$2,300,428.72	\$1,455,025.57	\$845,403.15	58.1
Total income	\$13,331,339.94	\$12,919,771.86	\$411,568.08	3.2
Interest	\$7,447,805.63	\$6,517,319.38	\$930,486.25	14.3
Rentals and sinking funds—				
Interest on guaranteed securities	2,594,390.91	2,591,631.12	2,759.79	0.1
Other rentals and sink- ing funds	627,302.23	661,562.88	*34,260.65	5.2
Dividends on trust certifi- cates, the Kansas City, Ft. Scott & Memphis Railway	540,400.00	540,400.00	.....	..
Dividends on trust certifi- cates, Chicago & East- ern Illinois Railroad..	999,482.00	1,094,482.00	*95,000.00	9.7
Total charges	\$12,209,380.77	\$11,405,395.38	\$803,985.39	7.0
Available for dividends....	\$1,121,959.17	\$1,514,376.48	*\$392,417.31	25.9
Dividends—				
Four per cent. on first preferred stock	\$199,742.12	\$199,742.12	.....	..
Surplus carried to credit of profit and loss....	\$922,217.05	\$1,314,634.36	*\$392,417.31	29.9

*Decrease. †Debit

CHICAGO AND EASTERN ILLINOIS RAILROAD COMPANY—TWENTY-FIRST ANNUAL REPORT.

FISCAL YEAR ENDED JUNE 30, 1910.

To the Shareholders:

The Board of Directors herewith submit their report of the operations and affairs of the Chicago and Eastern Illinois Railroad Company for the fiscal year ended June 30, 1910.

The results of the operations for the fiscal year were as follows:

Total operating revenue (increase \$1,480,736.60 or 14.4 per cent.)	\$11,750,355.59
Operating expenses (increase \$1,019,450.33 or 14.7 per cent.)	7,953,983.84
Net operating revenue (increase \$461,286.27 or 13.8 per cent.)	\$3,796,371.75
Taxes	362,124.80
Operating income	\$3,434,247.45
Miscellaneous income	742,622.31
Total income	\$4,176,869.76
Interest and rentals	3,001,079.60
Net income after providing for all charges	\$1,175,790.16
Dividends paid (6 per cent. on preferred and 8 per cent. on common stock)	1,107,266.00
Surplus for the year	\$68,524.16

For comparative income account in detail, see table on page 10.
There was no change in the capital stock of the Company during the year; the mortgage, bonded and secured debt shows a decrease of \$281,057.76, and the working liabilities decreased \$606,433.58.

The rate question is attracting much attention and it is pertinent to say that if the average passenger and freight rates received during the year 1900 had been applied to the traffic of this past fiscal year, your revenues would have been larger by \$1,295,988.00, or if the rates of the year 1907 had obtained, your earnings would have been \$1,001,143.00 greater.

The distribution of the increase in total operating revenue was as follows:

Increase in expenditures on the property (maintenance accounts)	\$538,836.91
Increase in transportation, traffic and administration expense	480,613.42
Increase in net operating revenue	461,286.27
	\$1,480,736.60

A little more than 31 per cent. of the total increase was saved for the net operating revenue, and the surplus available for dividends increased 69 per cent.

The cost of engine fuel and of yard service constitute the largest items in the increased cost of movement, the ratio of transportation expense to total operating revenue showing nevertheless a decrease of .54 of one per cent. Tons of all freight per train mile were 592.51, an increase of 17.71, while tons per loaded freight car mile rose to 30.40.

Thanks and credit are due to officers and employees for the faithful service which brought these results.

By order of the Board,

B. L. WINCHELL,
President.

October 1, 1910.

CONDENSED GENERAL BALANCE SHEET, JUNE 30, 1910,
AND COMPARISON WITH PREVIOUS YEAR.

ASSETS.	1910	1909	Increase or Decrease
Property Investment:			
I. Road and equipment:			
Investment to June 30, 1907:			
Road	\$34,654,422.67	\$34,654,422.67	
Equipment	20,173,710.41	20,173,710.41	
	\$54,828,133.08	\$54,828,133.08	
Investment since June 30, 1907:			
Road	\$815,972.73	\$700,242.97	\$115,729.76
Equipment	2,319,937.39	2,361,491.86	-41,554.47
	\$3,135,910.12	\$3,061,734.83	\$74,175.29
Reserve for accrued depreciation	\$57,964,043.20	\$57,889,887.91	\$74,175.29
	Cr 144,953.57	Cr 95,826.61	Cr 49,126.96
Total road and equipment	\$57,819,080.63	\$57,794,011.30	\$25,048.33
II Securities:			
Securities issued or assumed—Pledged:			
Funded debt	\$729,000.00	\$2,140,000.00	-\$1,411,000.00
Securities of proprietary, affiliated and controlled companies			
Unpledged			
Stock	373,231.76	373,231.76	
Total securities	\$1,092,231.76	\$2,513,231.76	-\$1,411,000.00
III Other investments:			
Miscellaneous investments			
Pledged property	\$98,551.28	\$177,551.40	\$30,999.88
Securities—Unpledged	1.00	1.00	
Total other investments	\$98,552.28	\$177,552.40	\$30,999.88
Total property investments	\$59,199,873.67	\$60,484,835.46	-\$1,354,951.79

ASSETS.	1910	1909	Increase or Decrease
Working Assets:			
Cash	\$1,006,946.93	\$1,153,841.93	-\$146,895.00
Securities issued or assumed			
—Held in treasury:			
Funded debt	423,000.00	817,000.00	—394,000.00
Marketable securities:			
Stocks	4,171.42		4,171.42
Funded debt	153,000.00	83,000.00	70,000.00
Miscellaneous	100,635.12	100,635.12	
Loans and bills receivable	437,077.38	286,744.58	150,332.80
Traffic and car service balance due from other companies	317,531.27	294,476.47	113,054.80
Net balance due from agents and conductors	327,778.63	237,916.45	89,862.18
Miscellaneous accounts receivable	607,865.29	501,572.07	106,293.22
Material and supplies	1,038,243.04	1,061,574.47	—23,331.43
Other working assets	2,384.45	1,772.86	611.59
Total working assets	\$4,413,433.53	\$4,448,533.95	-\$35,100.42

Deferred Debit Items:

Advances:			
Temporary advances to proprietary, affiliated and controlled companies	\$40,099.30	\$10,099.30	30,000.00
Working funds	1,055.58	865.54	190.04
Rents and insurance paid in advance	43,655.95	38,460.07	5,195.88
Unextinguished discount on securities:			
Unextinguished discount on funded debt	1,164,186.22	688,070.00	476,116.22
Special deposits	10,578,091.64	10,578,091.64	
Cash and securities in sinking and redemption funds	16,219.06	19,437.47	—3,218.41
Other deferred debit items	386,202.31	190,159.66	196,042.65
Total deferred debit items	\$12,229,510.06	\$11,555,183.68	\$674,326.38
Total	\$75,777,817.26	\$76,488,543.09	\$710,725.83

NOTE.—The figures for 1909 have been revised under Interstate Commerce Commission classification.

LIABILITIES.	1910	1909	Increase or Decrease
Stock:			
Capital stock:			
*Common stock	\$13,626,100.00	\$13,626,100.00	
*Preferred stock	8,992,000.00	8,992,000.00	
Stock liability for conversion of outstanding securities of constituent companies	168.88	168.88	
Total stock	\$22,618,268.88	\$22,618,268.88	

Mortgage, Bonded and Secured Debt:

Funded debt:			
In treasury (pledged or unpledged)			
Mortgage bonds	\$1,152,000.00	\$2,957,000.00	-\$1,805,000.00
Outstanding (not held in treasury)			
Mortgage bonds	40,408,000.00	37,453,000.00	2,955,000.00
Collateral trust bonds	27,000.00	27,000.00	
Equipment trust obligations	6,960,289.92	8,391,347.68	-\$1,431,057.76
Total mortgage, bonded & secured debt	\$48,547,289.92	\$48,828,347.68	-\$281,057.76
Working Liabilities:			
Loans and bills payable	\$500,000.00	\$1,425,000.00	-\$925,000.00
Traffic and car service balance due to other companies	250,421.31	127,039.18	123,382.13
Audited vouchers, and wages unpaid	1,241,027.12	1,033,438.97	207,588.15
Miscellaneous accounts payable	313,741.91	108,302.22	205,439.69
Matured interest, dividends and rents unpaid	55,995.00	804,982.00	-\$748,987.00
Matured mortgage, bonded and secured debt unpaid	3,336.04	7,336.04	—4,000.00
Other working liabilities	63,903.70	28,760.25	35,143.45
Total w'k'g liabilities	\$2,428,425.08	\$3,034,558.66	-\$606,433.58

Accrued Liabilities Not Due:

Unmatured interest, dividends and rents payable	\$713,102.92	\$676,957.00	\$36,145.92
Taxes accrued	221,345.53	188,399.93	32,945.60
Total accrued liabilities not due	\$934,538.45	\$865,356.93	\$69,181.52

Deferred Credit Items:

Operating reserves	\$179,305.31	\$104,119.71	\$175,185.60
Other deferred credit items	259,946.77	172,633.75	87,313.02
Total deferred credit items	\$439,252.08	\$336,753.46	\$102,498.62

Profit and Loss:

Balance	\$810,922.85	\$804,937.30	\$5,985.55
Total	\$79,777,817.26	\$76,488,543.09	\$3,289,274.17

*The Trust Company of America holds in Trust Assets \$161,300.00 preferred and \$6,408,300.00 common stock included in above figures.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY EIGHT TIMES IN JUNE, BY
THE RAILROAD GAZETTE (INC.), 88 FULTON ST., NEW YORK.

CHICAGO: Plymouth Bldg. (CLEVELAND: Williamson Bldg.
LONDON: Queen Anne's Chambers, Westminster.

W. H. BOARDMAN, President. HENRY LEE, Secretary.
E. A. SIMMONS, 1100 Park & Forest. The address of the company is the address of the officers.

EDITORS.

W. H. BOARDMAN, Editor.
SAMUEL O. DUNN,
H. CATCHER, Edit. Mgr.
BRADFORD BOARDMAN,
Eastern Ed. Mgr.

ROY V. WRIGHT
G. L. FOWLER
WILLIAM FORSYTH
S. W. DICKING
CLARENCE DENING

B. B. ADAMS
W. E. HODGER
F. W. KRAEGER
H. H. SIMMONS

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada.....	\$6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies.....	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.
Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49. FRIDAY, NOVEMBER 11, 1910. NUMBER 20.

CONTENTS

EDITORIAL:

Editorial Notes.....	909
Safety Appliance Standards.....	910
The Western Railways and the Locomotive Engineers.....	910
A Family Lunge Order.....	911
Chicago, Burlington & Quincy.....	912, 946
High Speed Locomotives at the Berne Congress.....	912
Missouri, Kansas & Texas.....	913
New Books.....	915

LETTERS TO THE EDITOR.....	916
----------------------------	-----

ILLUSTRATED:

Electrical Operations of Drawbridges.....	917
Double Track Railway in Mississippi.....	922
Double Track Railways in Alabama and Florida.....	922
Electric Locomotive for Freight and Switching Service.....	927

MISCELLANEOUS:

Accident Bulletin No. 36.....	923
Tracing Freight Shipments.....	927
Foreign Railway Notes.....	928

GENERAL NEWS SECTION.

SUPPLY TRADE SECTION.....	929
---------------------------	-----

A CORRESPONDENT, "W.," in another column, describes some annoyances in traveling, of a kind with which everyone is familiar. Being familiar and, we may say, hoary with age, why, it may be asked, do we print these criticisms? Well, for one reason, because they are real and just grievances. Being old does not outlaw them. Again, the letter bears strong internal evidence of a friendly, reasonable and discriminating spirit. People friendly to the railways are far too ready to let their friendliness suppress a righteous indignation which ought to be voiced. Therefore, we give prominence to the statement of this public-spirited man who is willing to do his part toward abating nuisances. Why is it that such slipshod practices continue? No one will accuse the *Railway Age Gazette* of being an apologist for poor railway service, so we may for a moment ask whether there is any explanation. One obvious explanation (though not a defense) is that in the department store which our correspondent cites, the manager has his 5,000 employees right under his thumb, almost literally. The railway superintendent with 5,000 men has to work through miles of distance; and the distance is a real obstacle, not a mere fancy. Of probably two-thirds of his most important men, it is fair to say that each is so isolated that he must be largely his own boss. We may assume that each of these employers is trying to get the best possible service for the least possible money; but the storekeeper in a large city has the great advantage of being in an ideal labor market, all of the buyers and sellers of labor having intimate knowledge of each other; and his labor market is always overstocked. The railway officer's conditions are al-

most at the other extreme. Intense competition among applicants, 10 or 50 cents instead of one, and difficult conditions of service. By difficult conditions we mean the need of a long apprenticeship to make satisfactory trainmen, and the necessity of having conductors, brakemen and porters who will work together harmoniously and efficiently. It would quite certain that the Interborough Rapid Transit Company, for example, employing 10,000 men in New York City, gets better service out of the same grade of men than can the Great Northern Railway, a thin line 2,000 miles long. The incident of the porter crushing the hat is typical of innumerable cases, familiar to every superintendent, where the employee knows he is at fault, knows he ought to apologize, and in the great majority of cases, we may say, is at heart willing to apologize, yet for the moment is so scared by the prospect of a two-dollar damage bill that he is completely rattled and forgets common politeness. This bad habit of saying whatever seems at the moment to be justified by the barbarous law of self-preservation is found in conductors and other employees supposed to be decidedly higher in the social scale than porters. The writer encountered it the other day in a Broadway ticket office, and not from one of the five clerks, but the agent himself. Why should not the more reliable and better class of employees be assured that small damage bills, as for crushed hats, will not be deducted from their pay? Well-disposed superintendents are trying all the time to assure employees of the company's friendly feeling toward them. Why not, as an experiment, put this assurance in some such concrete form?

POSSIBLY the foregoing is based too exclusively on old-fashioned notions. It has long been our conviction that a polite, careful and courteous force of trainmen was to be secured only by having energetic and public-spirited superintendents, who would select men possessing intelligence, moral character and some measure of "good address," and, having selected good men, would by fair treatment, reasonable pay and strict discipline, do their best to secure from such men the best service within their capabilities. But an apostle of love has arisen in the Southwest, who, we must admit, may have found a better way. He enforces proper deportment by fiat. This fiat marks such a refreshing change from all methods heretofore known that we reproduce it nearly in full. It is an official order of the Corporation Commission of Oklahoma. It reads:

PROPOSED ORDER NO. 82.

Case No. 1071.

To All Steam and Electric Railway Companies, . . . and
To All Persons, Etc.

You are hereby notified that * * * on the 16th day of November, the commission will hear any objections which may be urged against the following proposed order, rule, regulation, and requirement:

All employees of steam and electric railways or railroads, the Pullman Company, and all persons, firms, or associations regularly engaged in the transportation of persons or property, for hire, employed in the operation of any car, train, or other vehicle, of conveyance, in the state of Oklahoma, as conductor, train auditor, brakeman, motorman, porter, or otherwise, shall, at all times, extend to the public, and to each individual passenger or patron, every possible courtesy and perform every duty devolved upon him by his position, to provide comfort and convenience to the public and to all passengers and patrons. . . . J. E. LOVE, Chairman. . . .

We had not heard of this order when we put our correspondent's letter in type, else our suggestions might have been different. "Every possible courtesy" is the golden text of this document, if we may be permitted the use of a Sunday school term. There is only one other man in the country who could have delivered such a masterstroke of executive efficiency and literary incisiveness, and his failure to think of it first must be explained by the fact that for the past month he has been engaged in making political speeches, east or west, night and day and Sunday.

THE decision of the Interstate Commerce Commission in the Morgan Grain Company case, involving rates from Ohio and Mississippi river crossings to Atlanta and Birmingham, an abstract of which is published elsewhere in this issue, definitely states that the decision rendered by the majority, and the opinion

expressed by the minority, deal only with this specific case, and are not to be taken as an indication of the attitude of the commissioners on the question of the general advances in rates now under discussion before the commission. We may assume that this is in a literal sense true, since the rates concerned were increased prior to the amendment of the Interstate Commerce Act, so that in the case under consideration the burden of proof rested on the shippers, while in the advances now asked for by the carriers a burden of proof of reasonableness is on the railways. It is nevertheless interesting to see that the two opinions, majority and minority, may well be taken as typical of the two opinions that may be held in the present rate advance question. The opinion of the majority is that the rates resulting from the advances are not unreasonable in themselves, and that it is proper and right for the commission to accept as valid the argument made by the railways that they need money to better their property, and that such betterment work is of more than enough advantage to the public to offset the comparatively slight sums that each consumer or shipper will have to pay under an advanced schedule of rates. On the other hand, the minority opinion, written by Commissioner Clements, holds that an advance in the cost of staples of 12 cents per year per capita is unjust, and then goes into a discussion of the valuation of railways, stock waterings, etc., and concludes that the rate advances are unreasonable. Commissioner Clements says: "It was said on the record that a stock had paid less than 4 per cent. for thirty years, and the query was made as to how the holder was any better off at the end of that time if his holdings had not increased in value. Without undertaking here to state my views as to what would be a reasonable percentage of profit on the value of the property or the amount of the investment therein, it may be said in answer that the holder has at least had his original investment returned and his dollar is still working for him * * *." Absolutely true, and if he had had 1 per cent. interest on his investment for 100 years, he would now have had his principal returned to him and still have a dollar working for him, which would be a comfort to his heirs even if he did die of starvation.

SAFETY APPLIANCE STANDARDS.

THE Interstate Commerce Commission may be criticized for going into too much detail in its recent order designating the number, dimensions, location and manner of application of safety appliances. Yet while it is true that the commission has gone into far greater detail than did the previous standards of the Master Car Builders' Association, it must be admitted that the latter were more or less crude and unfinished, and it is difficult to see how they could be otherwise considering the conditions under which they were established. The M. C. B. safety appliance standards have been compared by one mechanical officer to a blanket; the various roads each tried to stretch it to cover some peculiarity of design on certain cars which they owned, with the result that it threatened to become so pulled out of shape and thin as to seriously affect its value. As an example, take the M. C. B. rule referring to the location of the brake shaft: "The brake shaft to be located on the end of the car, *preferably* to the left of the center thereof, when facing the end of the car." The I. C. C. rule reads: "The brake shaft shall be located on end of car, to the left of and not less than 17, nor more than 22 in. from the center."

It is not intended in criticizing the M. C. B. standards to reflect on the integrity or ability of the men who have been instrumental in formulating them. They did the best they could do under the circumstances. With the great variety of designs used by the roads represented in the association, it was impossible to secure the adoption of standards that would put an huge proportion of the members to considerable inconvenience in living up to them, and even if such standards could be adopted, there was no means of enforcing them. Considering these difficulties, the Master Car Builders' Association did good work and the standards have served their purpose admirably. The secretary of the Interstate Commerce Commission, year

after year, has expressed his belief in the work of the M. C. B. Association and has emphasized it by adopting its standards in enforcing the safety appliance law. It is not to be wondered at, however, that when the new act was adopted last April authorizing the commission to establish standards for safety appliances, it drew up a more complete and thorough set of standards than had been adopted by the M. C. B. Association. Hearings were arranged for at which both the railways and representatives of the trainmen could present any objections which they might have. The railway representatives, realizing that in previous hearings the railway interests had suffered seriously by a lack of harmony on their part, decided after the preliminary hearings to get together and act as a unit at the final hearing. This they did with some success, although their interests were so conflicting in some instances that they could not even agree among themselves. Mechanical department officers who were present at all the hearings state unreservedly that the Interstate Commerce Commission inspectors were fairer to the railways in general than some of the railways' representatives were. If the railways had got together previously and adopted a more complete set of standards than those adopted by the M. C. B. Association, there is little question but that the commission would have been glad to be relieved of the task and would have adopted them without question. This again emphasizes not only the importance but the necessity of the railways' acting as a unit in such matters.

The wisdom of providing four side handholds, one near each end on each side of the car, is open to question, as there is only one ladder on each side. The extra handhold was probably provided for the convenience of trainmen when switching in the yards, but if a man should grasp one of them in the dark, believing that there was a ladder above, he might have to hang on, if the train had gathered speed before he discovered his mistake, until he became exhausted and fell off.

The commission, realizing the great and unnecessary expense that will be placed on the railways by enforcing the application of the new standards to the present equipment, will undoubtedly extend the time for the application to such equipment indefinitely, or for the life of the cars now in service, except in cases where the violation is flagrant and proves a menace to the lives of trainmen or passengers. Many troublesome questions will undoubtedly arise, such as what should be done with cars that were placed in service after the law was passed last April, and also in case of the rebuilding or partial rebuilding of equipment in railway shops; but it is believed by those who have come in close contact with the Interstate Commerce Commission and its inspection that the railways will be inconvenienced to as small an extent as possible.

THE WESTERN RAILWAYS AND THE LOCOMOTIVE ENGINEERS.

THE representatives of the Brotherhood of Locomotive Engineers and the officers of the western railways, who have been negotiating at Chicago over the matter of an advance in the wages of the engineers, have been unable to agree, and on November 7 the former broke off the negotiations and announced that they would submit to a vote of their members the question of authorizing a strike. Further details regarding this matter are given in our news columns. The two important facts regarding the situation which stand out prominently are these: First, the railways offered the engineers advances in wages which would have averaged 9½ per cent. These advances would have been as large in proportion as the state and federal boards of arbitration last summer held ought to be given to the switchmen and firemen on the same roads. Second, the railway managers have been willing throughout the negotiations, and are willing now, to submit the questions involved to mediation, either by representatives of the railways and the Brotherhood of Locomotive Engineers, or by Chairman Knapp, of the Interstate Commerce Commission and Labor Commissioner Neill, or to arbitration under the Erdman act. On the other hand, Grand Chief Stone, of the Brotherhood of Locomotive Engineers, has declared that he will not submit any of

the questions involved to arbitration. These facts seem to be all that are necessary to show which side is confident that it has the more meritorious case. The attitude of railway employees and railway managers toward arbitration have been remarkably reversed within the last few years. Formerly it was the employees who demanded arbitration and the managers, who hesitated to consent to it. Now it is the managers who suggest it on every occasion when they cannot reach a settlement otherwise and the employees who run away from it. Almost every suggestion for mediation or arbitration of labor differences on railways which has been made this year has come from the railway managers.

Two of the points regarding which the managers and engineers were unable to agree were to what extent the jurisdiction of the brotherhood should be extended over the operation of gasoline motor cars and the differential that should be made between the wages of engineers on Mallet and other locomotives. The managers are willing in employing motormen to give the preference to experienced engineers who have qualified themselves for motormen, but they are not willing to make employment on motor cars and on steam locomotives interchangeable. There are various reasons for this. One is that as the operation of a steam train gives employment to more men than the operation of a motor car, it is feared that engineers on motor cars would not handle them in such a way as to get the best results from them, simply because anything that prevented them from giving good results would tend to cause steam trains to be substituted for them. As to Mallet engines, the railways are buying them for the purpose of effecting economies in operation. The main reason why their use makes possible economies is that with them a given number of employees can get over the road a very much larger train load than with less powerful engines. The operation of a Mallet engine involves somewhat more work and responsibility for the engineer than the operation of a smaller engine, and for this reason the railway managers concede that engineers on them should be paid more. They, therefore, offered them a differential of 75 cents a day; but the officers of the brotherhood insisted that engineers on Mallets be paid practically double what others receive. The evident desire to get established the principle that the wages of engineers shall be based on the amount of tonnage handled by them. But if this principle should be applied to fixing the wages of engineers, why should it not be applied to fixing the wages of conductors and firemen? Why should it not be applied so that the train despatcher will be paid more for despatching a long freight train than a short one, or a fast train than a slow one? The adoption of the principle that engineers running Mallets shall receive anything like twice as much as engineers on other engines would very seriously interfere with the economies for which these engines have been invented and introduced. It is to the public's interest that all possible economies in the cost of transportation shall be made which do not impair the service given. Therefore the railways in resisting the attempts of the brotherhood to penalize the use of large engines are protecting not only their own interests, but those of the public.

The Brotherhood of Locomotive Engineers is perhaps the finest labor organization on earth. Certainly no other has a more intelligent membership or a finer record for able leadership and wise action. For these reasons it occupies a very high place in the estimation of the public. But the Brotherhood of Locomotive Engineers cannot, any more than any other labor organization, reject an offer of a 9½ per cent. advance in wages, refuse a fair offer of arbitration, and strike, without arraying public sentiment against it; and public sentiment largely determines the results of strikes. Because the members and officers of the brotherhood know this, it is a safe prediction that, no matter what the vote of the brotherhood is, there will be no strike and that ultimately either the managers and the representatives of the brotherhood will agree, or all of the questions involved will be arbitrated.

A FAIRLY LARGE ORDER.

It is most recent order to the railway, the Interstate Commerce Commission suggests that the search for information may be for purposes other than the present inquiry into the reasonableness of rate increases. In doing for a quantity of statistics that bids fair almost to overwhelm the accounting departments of railways, the commission says that the roads are required to furnish these statistics "for use in the above entitled investigation, for advance in rates and for the general information of this commission." (The italics are ours.) The great detail into which the commission goes in its questions, and especially the elaborate questions that are asked in regard to capitalization, suggest that the commission may want this information not only for its present inquiry, but for use in the future by the new Hadley commission on railway capitalization. The commission orders the roads to give in great detail figures for operation and maintenance in April, May, June, July, August and September of 1907, 1908, 1909 and 1910. From the care with which maintenance figures are specified, it seems that the commission intends to make a thorough investigation of the charge that the roads have been padding their expense accounts in recent months as an argument for higher rates. For instance, the railways are ordered to give for each of the months in each of the years named the number of cubic yards of ballast applied, the average cost, and the average charge to operating expense per cubic yard for transportation to point of use; this information to be subdivided into rock, gravel, cinder and slag, and other ballast. Transportation expenses are taken up in detail, and equipment is made the subject of as searching an examination as is maintenance of way. These questions apparently deal specifically with the inquiry now before the commission.

The questions in regard to capitalization would appear to go beyond the present inquiry. Companies are ordered to state in detail "for each authorization since the date of the creation of the company [italics are ours] made by its board of directors, managers or trustees for the issue of stocks or of bonds, notes, or other evidences of indebtedness maturing later than one year after the actual issue thereof." The railways are ordered to tell the par value of the securities issued and also to tell the net amount received from the sale of these securities. The detail into which the commission goes is well shown by the requirement that "the terms of all contracts, whether oral or written, made by the respondent company with bankers, brokers, syndicates and other agencies for selling or distributing the said securities, including herein a statement of all fees, commissions and other things of value paid or to be paid to such agencies for their service in such sale or distribution"; and, again, "the requirement that the gross proceeds to the respondent company of each issue of securities be classified as cash, including herein money, checks, drafts, bills of exchange and other commercial papers, payable at sight and realized on at par on demand; promissory notes realized on at par on demand or subsequently, with interest from date of issue; and book accounts realized on at par, with interest, etc."

There is an interesting point brought up by this order of the commission. In the twelfth section of the amended Interstate Commerce Act the commission is given authority to obtain from common carriers full and complete "information necessary to enable the commission to perform the duties and carry out the objects for which it was created * * *"; and for the purpose of this act the commission shall have power to require by subpoena the attendance and testimony of witnesses, and the production of all books, papers, tariffs, contracts, agreements and documents relating to any matter under investigation." Now, apparently, there can be no doubt that if the questions asked the roads in the recent order are all pertinent to the investigation now being made into the reasonableness of rate advances, the commission has full power to require answers to them. If, however, a court should hold that the searching questions in regard to capitalization are not all pertinent to an investigation of rate increases, the question would then be raised

as to whether the commission has power to make such an inquiry as the present one, under the general provision that it is keeping itself informed as to the manner and method in which the business of the carriers is conducted.

All of this information is to be furnished to the commission on or before December 5, 1910. On the face of it, this would look like a physical impossibility.

CHICAGO, BURLINGTON & QUINCY.

THE Burlington handles a great deal of coal from the Illinois mines into Chicago. In April, May and June these mines were closed because of the strike of coal miners. The consequent loss of low grade traffic, which can be moved in heavy train loads, is shown to a marked extent in the ton mileage and other traffic statistics of the Burlington in its annual report for the fiscal year ended June 30, 1910. The total ton mileage last year was 7,435,000,000, an increase of 814,000,000 ton miles over 1909. This increase is about 12 per cent., and under ordinary circumstances a road like the Burlington could handle this increase in traffic with a considerably smaller proportionate increase in car and freight train mileage. In 1910, however, the total freight car miles amounted to 637,000,000, an increase of 71,000,000, or 13 per cent., over 1909. The average train load last year was 381 tons, which is less by six tons than the 1909 train load. The average number of loaded cars per train mile was 22.44 last year and 22.69 the year before, while the average number of empty cars was 9.28 and 9.48, respectively, in those two years.

Another reason for the smaller train load and much greater car mileage is the growing demand of the public for more regular and expeditious freight service. For example, the railways are running a great many more package cars out of Chicago than formerly. There is an increase in the number of package cars every year, and also in the speed called for by their schedule. This greater movement of freight on a time schedule tends distinctly to prevent an increase in train load, since a package car running in a regular schedule must be sent out whether it is fully loaded or not.

Under these circumstances we would expect to find that the Burlington, handling less low grade traffic, was receiving a higher average rate per ton per mile, but this was not the case. In 1910 the average receipts were 7.83 mills, and in 1909, 7.89 mills. Thus the operation of the road was hampered by the change in the character of the tonnage carried, while the receipts from the greater proportion of high class tonnage did not benefit appreciably the freight earnings.

Last year the Chicago, Burlington & Quincy Railroad Co. earned from operation \$87,900,000. This compared with 1909 earnings of \$78,600,000. Operating expenses last year totaled \$63,000,000, and the year before \$54,600,000; so that after the payment of taxes, the operating income in 1910 was \$21,700,000, as against \$21,400,000 in 1909. Other income includes this year the dividends paid on Colorado & Southern stock owned by the Burlington, and is therefore much larger than in 1909. Other income amounted to \$2,500,000 in 1910. The Burlington, after paying its 8 per cent. dividend on the \$110,839,100 stock, of which \$107,612,600 is deposited under Great Northern and Northern Pacific joint bonds, had a surplus of \$4,441,618, from which it appropriated \$3,300,000 for additions and betterments.

Conducting transportation cost \$28,300,000 in 1910. This compares with transportation expenses of \$24,600,000 in 1909. Both maintenance of way and maintenance of equipment were also more expensive in 1910 than in 1909, as is evident from the table at the end of this review.

Beside the changes in character of traffic mentioned as one of the causes for higher operating costs, the weather in the territory through which the Burlington runs was so severe last winter that it materially interfered with operating efficiency. The snow was deep and this made it necessary to reduce the average train load. It was so cold that locomotives would not

steam properly and could not haul as large a tonnage as in the previous winter.

The balance sheet, arranged in the form prescribed by the Interstate Commerce Commission, is quite different from the previous balance sheet of the Burlington, and about the only item that can be safely compared for the years 1910 and 1909 is cash on hand, which amounted last year to \$9,100,000, and in 1909 to \$15,100,000. The 1910 balance sheet shows total working assets of \$40,600,000 and working liabilities of \$12,000,000. The balance sheet also shows that the company has spent from income \$8,800,000 since June 30, 1907, for additions to property, and has reserved from income or surplus \$28,200,000 invested in sinking funds and \$4,600,000 not specifically invested.

The showing of the Burlington in 1910 was not disappointing; it simply needed explanation, and when that explanation is understood, the higher costs last year and the apparent lack of increase in operating efficiency seem to be inevitable, and, in a good many cases, temporary, excepting, presumably, the increase in wages.

The following table shows the operations in 1910 as compared with 1909:

	1910.	1909.
Average mileage operated	9,023	9,023
Freight revenue	\$58,224,537	\$52,240,931
Passenger revenue	22,380,306	19,585,305
Total operating revenue	87,869,517	78,612,629
Maint. of way and structures	15,725,461	12,986,773
Maintenance of equipment	15,057,165	13,366,415
Traffic	1,654,452	1,576,361
Transportation	28,340,052	24,554,730
Total operating expenses	63,010,965	54,560,998
Taxes	2,970,737	2,517,018
Operating income	21,723,534	21,376,207
Gross corporate income	24,247,227	22,320,054
Net corporate income	13,308,746	12,371,081
Dividends	8,867,128	8,867,128
Additions and betterments	3,329,006	2,287,081
Surplus	1,112,612	1,266,872

HIGH SPEED LOCOMOTIVES AT THE BERNE CONGRESS.

THE subject of high-speed locomotives in one form or another has been considered a number of times by the International Railway Congress. At the London meeting in 1895 the title of the report was Express Locomotives; at Paris in 1900 it was Locomotives for Trains Running at Very High Speeds; at Washington in 1905 it was Locomotives of Great Power; and at the meeting at Berne in June, 1910, it was The Design of Steam Locomotives for Very High Speeds. This indicates a constant and persistent interest of the railways of the world in the attainment of higher speeds in locomotive service, and a desire to know how it can best be accomplished. These reports, however, cover descriptions of passenger locomotives of the ordinary design, and there are few, if any, references to features that have been especially designed to adapt the locomotive to high speed service. Ten years ago the inquiry was limited to a "regulation speed" of 56 miles per hour, which we suppose refers to the average schedule speed. This year the original inquiry related to "the design of steam locomotives for obtaining a regulation speed of 100 kilometers," or 62 miles per hour; but it was modified for the American reporter, so as to include speeds of 50 miles per hour or more, and it was explained that this change was made on account of the excessive dead weight of American passenger equipment which makes the cars in the average express train weigh over 400 tons.

It seems unfortunate that the continued discussion of this important subject by International Railway Congresses is confined to the description of existing practice, and that the special and original design for very high speed service escapes the attention of the reporters and is not given any prominence in the discussions. The American reporter was not a believer in the necessity of special designs to suit the requirements of high speed, and expressed the opinion that success with locomotives used on long sustained high-speed runs is due to boiler capacity and the ability of the enginemen to secure the highest boiler efficiency at low fuel expenditure. This would imply that

all that is needed is a large boiler, and that the ordinary cylinders, valves and running gear would be equal to the requirements. This is the attitude generally assumed by locomotive builders and many of our motive power officers, and so long as it is maintained there can be little progress in real high-speed locomotive engineering.

In foreign countries a different attitude of mind can be detected, and the locomotives at the Brussels Exposition showed that more attention is given to special design for fast passenger engines by the French, Belgian and Bavarian builders. Ten years ago European railways regarded 56 miles per hour as representing a fast passenger schedule. At the Berne Congress this year the foreign reporters set the pace at 62 miles per hour, and quite a number of railways reported the attainment of such a speed in their schedules. One group of ten railways with representatives from France and Great Britain reported trains having a regulation speed of 62 miles per hour, some of them with a train of a maximum weight of 400 tons. Another group reported that they had locomotives which could reach a speed of 62 miles per hour, but that such speeds were exceptional and only attained in making up lost time.

In such service special attention must be given to the balancing of reciprocating parts, and there is still a diversity in the practice in this particular on foreign lines. These parts are not balanced in the four-cylinder engines of Germany and most French lines, while the Belgian and Midi lines in France balance all reciprocating parts on this type of engine though the pistons move in opposite directions. The flat slide valve in simplest non-balanced form is still used on some foreign passenger engines, though it is usually made of bronze.

The American reporter stated that although laboratory tests have produced considerable data relating to various forms of valves, no conclusion had been reached as to the superiority of either the piston or the flat type of slide valve, or the relative merits of the Stephenson valve gear and the stationary link constant lead gear of the Walschaert type. There is, however, a marked tendency on the part of American builders to use the Walschaert gear, and the same is true of the piston valve. It is the opinion of the foreign reporter that the valve gear should be adapted to piston speeds as high as 17 to 23 ft. per second, while the American reporter regards it as desirable to have the valve gear of passenger locomotives designed for general service, and for this reason he favors the Stephenson gear with variable lead, rather than the fixed link type with constant lead. This is a good illustration of the fact that little progress will be made in adapting the locomotive to very high speed service so long as fast continuous runs are not kept in view as the primary object of the design. In such service there are few stops; the engine runs long distances at top speed and under this condition the Walschaert valve gear, with its constant lead, is not objectionable, and the absence of large and heavy bearing surfaces of eccentrics moving at high velocity is certainly an advantage.

The development of the passenger locomotive in America has been constantly in the direction of a larger boiler and more wheels, and in the Pacific type the boiler has reached dimensions in diameter that are close to track limitations. The six coupled wheels provide sufficient adhesion for the full boiler and cylinder power, and this type of engine is well adapted to the service of a heavy passenger train at moderate speed. It is not the ideal high-speed locomotive, for the six coupled drivers are the very opposite of what is desired, and when high speeds are approached they act as a break in preventing further acceleration. In the brake tests of Atlantic type locomotives on the Atlantic City line it was found that the locomotive could no more than propel itself at speeds approaching 90 miles an hour. The head end resistance is sufficient at such speeds to account for a large part of the consumption of power, but a further explanation is offered in the fact that at very high speeds the centrifugal force of the rods produces such high pressures that the rod and pin friction absorb a considerable portion of the

work. If this is true of the Atlantic type, how much greater is the resistance of the six coupled inside pins in the Pacific type, for not only are the rods heavier, but the number of pins is increased 50 per cent. The friction of the larger driving bearings, 10 $\frac{1}{2}$ in. in diameter and 14 in. long, is to be dealt with as well as the 8 by 14-in. journals on the trailing wheels, which, on account of the smaller diameter of the wheels, attain speeds of 750 revolutions per minute at 75 miles per hour, and the power absorbed at such velocities is much greater than is ordinarily suspected. The high-speed locomotive should, therefore, be no larger than the Atlantic type; the rods should be made of special steel and as light as possible, with pins and journals no larger than necessary for strength. When high-speed express traffic exceeds the capacity of the Atlantic type for one train it would be better practice, so far as locomotive operation is concerned, to haul two sections each with an Atlantic, rather than a heavy section with two Pacifics or one Pacific and one Atlantic, as is now frequently done.

MISSOURI, KANSAS & TEXAS.

IT is as a statement by the new management of extensions and betterments now under way or proposed that the annual report of the Missouri, Kansas & Texas for the fiscal year ended June 30, 1910, is of particular interest. During the past six years the Katy has not added any traffic producing mileage to its system. In June, 1910, about 90 per cent. of the capital stock of the Texas Central was bought by the M., K. & T. The Texas Central runs from Waco, Tex., to Kotan, 267 miles, and was valued by the Railroad Commission of Texas, as of June 30, 1909, at \$19,468 per mile. It originates a large tonnage for movement beyond its rails, and the cotton alone originating on the line has averaged 125,055 bales a year during the past four years. Heretofore almost none of the tonnage originating on the Texas Central has been sent over the M., K. & T., the connection between the two roads being at Waco, where the Texas Central also connects with the International & Great Northern, the Houston & Texas Central, the St. Louis Southwestern and the San Antonio & Aransas Pass. The operations of the Texas Central are to be included in the figures given by the M., K. & T. after July 1, 1910.

The M., K. & T. consists of a number of lines originally patched together to form a system, and the most difficult as well as the most important problem that has confronted the management in the past has been to bring this mileage up to a uniform standard. The fact that no new mileage has been added in six years shows how entirely the efforts of the management have been confined to improvements of existing property. In December, 1909, Edwin Hawley and associates bought control, and Mr. Hawley became chairman of the board of directors, Adrian Joline resigning both as chairman of the board and as president. A. A. Allen was elected president, and the purchase of the Texas Central is the key to the policy of the new management.

Most important of the improvements completed during the year was the grade revision work between Atoka, Tex., and the Red River, 38 miles of this line being double tracked. All that remains to be done on this piece of work is to finish ballasting the second track between Caddo and Durant, about eight miles, and moving the northbound track from the old to the new location, five miles south of Caney. All of the bridges have been renewed in concrete and steel, and the ties on the new bridges are creosoted. This work has made it possible for locomotives which formerly handled a tonnage of 980 to haul 2,000 tons southbound and 1,700 tons northbound. The most important work now under way is the continuance of grade revisions on the section extending north from Atoka to McAlester, 44 miles, and the revision of lines on the Oklahoma & Shawnee division to avoid flood damage. On the St. Louis division it has been necessary to make unusual expenditures in river protection. The roadbed on this division is frequently

softened at numerous points by overflows from the river and will require a revision of grade, raising the track above the high-water mark and replacing much of it to bring it up to the standard of other divisions. Maintenance and improvement work that may be mentioned is the completion of ditching on 545 miles of line, widening embankments on 53 miles and laying 130 track miles with new 85-lb. rail. In June the burning of 235,000 cubic yards of clay ballast was completed, and arrangements have now been made to place it under track.

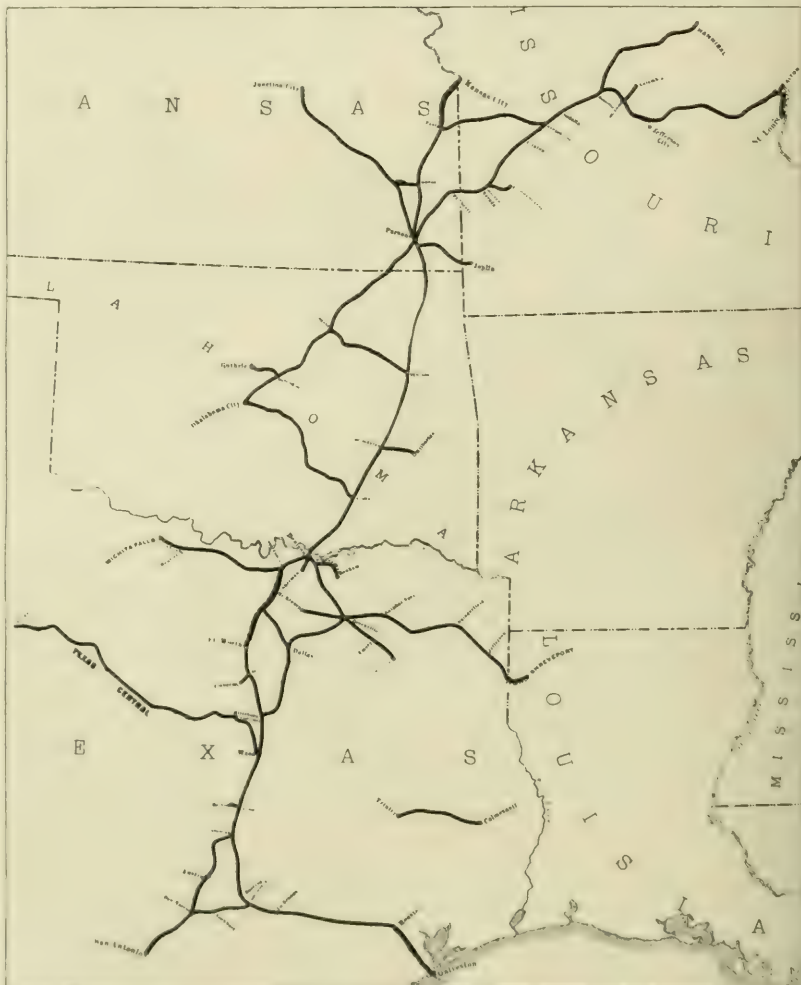
Extensive improvements have been made in station buildings in the past few years. The joint passenger station at Joplin, Mo., which was described in the *Railway Age Gazette* of March 17, has been completed, and during the year a new passenger station and modern freight station have been built at Tulsa, Okla.; new depots have been built at twelve points, and work has been in progress on the new union passenger station at Denison, Tex., which will be ready for operation in a short time. The work is nearly finished on the new outer yard, and inside terminals at St. Louis.

Besides the physical betterment which is being carried forward in such a vigorous manner by those who are now operating the property, there has taken place a much needed readjustment of the finances of the company. This readjustment was not formally authorized by the stockholders until after the close of the fiscal year, but it is described in the annual report, which is dated September 10. At a stockholders' meeting on July 30, 1910, a new consolidated mortgage securing an authorized issue of \$125,000,000 5 per cent. bonds was approved, and the directors were given discretion as to when these bonds may be issued. There are reserved bonds of this issue to refund certain outstanding obligations of the company, and the remaining bonds may be issued for building new line, making additions and betterments to the property and for acquiring, through purchase of securities or otherwise, additional lines for extensions. To pay for the terminals at St. Louis a \$2,000,000 note of the M., K. & T. Terminal Company, endorsed by the M., K. & T., was sold, and to pay for the Texas Central stock the M., K. & T. borrowed \$3,600,000 on its three months' notes. Since the close of the fiscal year the company has sold \$10,000,000 one-year 5 per cent. notes. The proceeds of this sale were used to pay for the \$2,000,000 terminal company note and the \$3,600,000 notes issued in connection with the Texas Central purchase. About \$4,000,000 will be used to pay for additional equipment, which has been ordered for delivery during the present calendar year. Since the note sale took place after the close of the fiscal year, there is in the yearly accounts no mention of discount on securities sold.

In 1910 the Katy earned gross \$96,000,000, which is the largest gross in the history of the company, and is an increase over 1909 of \$1,300,000, or 5 per cent. The increase in gross is

better than at first appears, because 1909 was not an unprofitable year on the M., K. & T. If the gross in 1910 be compared with 1907, for instance, the Katy makes a better showing than many roads which have reported 10 or 12 per cent. increase in gross in 1910, as compared with 1909.

Operating expenses last year amounted to \$19,200,000. This compares with \$17,700,000 in 1909. It is much the same story as with other roads all through the country; wages have increased, more has been spent on maintenance of way and equipment, and transportation expenses have increased with an increased train mileage. After the payment of interest charges the M., K. & T. last year had a net corporate income of \$1,000,000, as compared with \$1,400,000 in 1909, and dividends of 4 per cent. on the preferred stock called for payments of \$520,000 in each year, leaving in 1910 a surplus of \$500,000. The increased train



Missouri, Kansas & Texas.

(Dashed lines show branch rights.)

mileage mentioned above was disproportionately large, because a large quantity of coal was purchased in anticipation of the coal miners' strike, which became effective April 1, causing an unduly heavy movement of company freight, and also because a protracted drought made it necessary to haul water, in many cases, for long distances. While the ton mileage of revenue freight totaled 1,622,000,000 in 1910, an increase of 3,960,000 ton miles, the ton mileage of company freight totaled 363,000,000 in 1910, an increase of 97,000,000 ton miles over 1909.

This would seem to account in a large measure for the fact that the average revenue train load was 216 tons in 1910, as compared with 234 tons in 1909. The freight density on the M., K. & T. is less than what it is on the Kansas City Southern, due to the large branch mileage which the Katy has contracted with the almost total lack of branch mileage on the Kansas City Southern. Last year the M., K. & T. freight density was 528,921 ton miles, an increase of only 1,290 ton miles over 1909. The average revenue per ton per mile was 1.96 cents in 1910 and 1.94 cents in 1909.

There is a greater proportion of tonnage furnished by products of mines and of manufactures and a smaller proportion furnished by agricultural products than might be expected on a road serving the territory covered by the M., K. & T. In 1910 products of mines furnished 36.23 per cent of the total 7,500,000 tons carried, manufactures furnished 24.27 per cent; agricultural products, 19.14 per cent; live stock and animal products, 6.74 per cent; lumber, 9.14 per cent; and miscellaneous articles, 4.48 per cent. L. C. L. shipments furnished 6 per cent of the total tonnage, but 14.90 per cent of the total revenue; and miscellaneous freight, with only about 1½ per cent of the total tonnage, furnished 18.44 per cent of the total revenue.

President Allen, in speaking of the prospects for the current year, says:

"Our industrial department, which was reorganized the early part of the year, has been very active in securing industries and developing the horticultural and agricultural business tributary to our line. The fruit acreage is the largest we have ever had, and the production of peaches unusually high. A large acreage is planted in new orchards, and the fruit industry should increase yearly. We have approximately 85,000 acres along our lines planted to vegetables and fruit. The growing of oranges in south Texas seems to be an assured success, and the acreage planted to this fruit is very large, and should gradually increase. A large acreage has also been planted to figs in south Texas, and a large production of that fruit is being secured. A number of preserving plants have been established for the packing of figs, and others are in contemplation.

"The present outlook for industrial development is encouraging, and, with a good production of corn and cotton, there should be no difficulty in showing a marked industrial development during the year."

An annual report as complete, as frank and as free in its discussion of the operation of the property as is that of the Missouri, Kansas & Texas is an unusually interesting piece of contemporary railway history. It is hard to find a single point to criticize in the form or substance of the 1910 report. There is a full and very interesting discussion of the railway's relations with the public, and this year's operations, as well as its plans for the future—a discussion of these questions both by the chairman of the board and by the president. In addition there is an exhaustive exhibit of the details of the operation of the road. For instance, a detail that adds greatly to the interest of the report from a railway man's point of view is the inclusion of a table showing the revenue and the proportion of total revenue that is furnished by each class of commodities. The publication of such statistics gives quite an unusual impression of frankness.

The following table shows the results of operation in 1909 and 1910:

	1910.	1909.
Average mileage operated.....	3,972	3,972
Freight revenue.....	\$17,093,567	\$16,853,840
Passenger revenue.....	7,681,745	6,964,989
Total operating revenue.....	26,559,346	25,500,915
Maint. of way and structures....	4,095,793	3,370,150
Maintenance of equipment.....	3,310,795	3,379,083
Traffic.....	664,419	587,451
Transportation.....	10,223,674	9,496,851
Total operating expenses.....	19,186,049	17,667,406
Taxes.....	1,012,918	967,309
Operating income.....	6,348,609	6,652,506
Total corporate income.....	6,658,250	6,847,935
Net corporate income.....	1,041,463	1,886,296
Dividends.....	520,000	520,000
Surplus.....	521,463	866,296

NEW BOOKS.

The American Society for Testing Materials. Year Book for 1910. Published by the Society. University of Pennsylvania, Philadelphia, Pa. 300 pages; cloth. Price, \$5.

The first edition of this popular hand-book appeared in 1837. Since that date it has been repeatedly revised by cutting out pages and paragraphs and inserting new ones in their places, and by adding new pages which have been suggested by writers "a," "b," "c," etc., following the page number. Now the whole work has been revised, much of the old matter has been re-written, a large amount of new material has been added, everything has been reset and new plates have been made. The result is the 8th edition (71st thousand), a book which in the choice of material presented and in its arrangement is entirely complimentary to its distinguished author, and which in form and typography reflects great credit on its publishers. The original edition was a book of less than 1,100 pages; the present contains 1,500; the topical index of the first edition occupied 12 pages; that of the present edition occupies 95 pages. References to Acheson's deflocculated graphite, to Dr. Frederick W. Taylor's contribution on the art of cutting metals, to the experiments of Shuman and of Willies and Boyle in utilizing the sun's heat as a source of power, to the multi-stage centrifugal pump, to the low-pressure steam turbine, and to the Melville-McAlpine floating frame reducing gear for steam turbines may be accepted as evidence of the author's success in bringing the work up to date, for these are all matters of recent development. The sections on the steam engine and its various applications are, in the new edition as in the former ones, full and satisfactory. If one is a little inclined to criticize on finding the presentation of data from boiler tests limited to the results of the Centennial trials, which occurred thirty-four years ago, he will consider that a hand-book is not a treatise, and that the data presented is good so far as it goes. But even if the boiler data is venerable and perhaps deficient, the lack is compensated for by good descriptions of newer things, such as the world's greatest chimney at Great Falls, Mont., and systems of water softening. The electrical section, which in a mechanical engineer's hand-book is necessarily brief, is nevertheless in the new edition materially extended as compared with the corresponding section in earlier editions, 72 pages, or about 5 per cent. of the whole book, being devoted to this interest.

In the more permanent departments of knowledge the new edition has lost nothing of value as compared with earlier ones. The mathematical tables and the tabulated values of various constants which have made earlier editions of the book so valuable to engineers are retained, and whenever possible they are improved. For example, the tables of the properties of saturated and superheated steam are condensed from the admirable work of Marks and Davis, recently published.

All in all the revised hand-book is true to its purpose. It presents facts of large significance in small space, and as an index of mechanical engineering practice of the present day it is practically complete.

American Society for Testing Materials. Year Book for 1910. Published by the Society. University of Pennsylvania, Philadelphia, Pa. 300 pages; cloth. Price, \$5.

The American Society for Testing Materials has sent out to its members a year book covering 300 pages in the same style of volume as that containing the annual proceedings. It contains the 28 standards which have been adopted by the society for various forms of iron, steel, lumber and cement; a list of members, arranged alphabetically, and also their geographical distribution; an account of the officers, by-laws, committees and technical problems of the International Association for Testing Materials, with which the American society is affiliated; a summary of the proceedings of the 13th annual meeting; and the annual report of the executive committee. Non-members can obtain the book from the secretary, at the University of Pennsylvania.

Letters to the Editor.

HEAT TREATMENT OF AXLES.

Pittsburgh, Pa., Oct. 25, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In your valued paper of October 21 is an editorial on the Street Railway convention, which was held at Atlantic City. One of your specialists has made a very good article, indeed, out of some of the matters taken up at Atlantic City. I was at this convention the entire time and paid particular attention to the proceedings and meetings of the engineering section.

I am wondering where your representative got hold of the remarks as regards a case on record where the manufacturer agreed to give a certain lot of axles heat treatment, etc. This was our own experience in one case. The question of the heat treatment of axles has been given a great deal of study by us, and we have been fortunate in having, perhaps, more of this work to do than any one else, especially as regards the inspection and testing of the heat treated axles made under the original specifications of the Interborough Rapid Transit Company; these are much more elaborate than the suggested specifications covering heat treated axles presented at the convention.

I criticize very severely the specifications suggested, for the reason that they call for a very particular product, which will have to be made in a very particular manner, and the question of selecting tests to represent any given lot of axles treated together is not specified, which is in my judgment a grave error, for the reason that a given lot of axles treated together should be so treated as to make them uniform, and a test from any lot treated together should be specified.

Unless a test of the heat treated axles is very carefully made, we will have many forms of heat treatment, which do not represent uniformity. In other words, we have been asked to take up the inspection of heat treated axles to be made under very loose specifications, and found when getting on the job that each axle was treated separately, and, of course, changes in temperature produced different results in each axle.

In view of the importance of this subject, we quite agree with the editorial that this whole matter will have to be gone into very carefully, and I believe that you have handled the matter very well, and that your remarks are timely.

HENRY GULICK,
President, Gulick-Henderson Company.

A FRIENDLY CRITICISM OF POOR PASSENGER SERVICE.

Philadelphia, Pa., Oct. 31, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

You were good enough three years ago to print and accompany with editorial comment a communication which I sent you in regard to the side of railway matters turned towards a traveler going to Chicago. Let me give you a briefer experience between Philadelphia and Boston. These details may explain the incredible fact that railways are disliked, in spite of the indubitable fact that no capital in this country has been more useful, none has accomplished more, none has been on the whole more wisely managed, and none has in its control abler men or, I might add, from a wide personal acquaintance, men more agreeable or of a higher stamp and character. The best type of railway man seems to me the best type of American to-day living.

As I leaned over the counter of a ticket agency in this city of one of the largest railways in the world, at a brief purchase of transportation under some difficulties, and asked the very intelligent man who had been trying to adjust the rules to my needs, "Do most go away satisfied?" "No," he said, "nearly all go away sore." Could worse be said? People do not go away "sore" from a department store or a dozen other of

the greater agencies of the social organism. They are apt instead to go away with a certain absurd loyalty with regard to the establishment with which they always deal, and come back to it under personal inconvenience, and go on dealing with it when they move to another city. Yet the railway, which ought to have a loyalty like that of a nation, lets its customers go away "sore" and wakes up when a great period of legislation comes, like that through which we are now passing, with a sudden consciousness that it has no friends anywhere, except those whose self-interest attracts them to its financial operations; and their support is so dangerous that it has done the roads more harm than good at Washington.

What happened to me will explain what leaves people "sore." I wanted to go to Boston on the "Federal." I had a mileage ticket over the Pennsylvania, over whose tracks the Federal was to pass. Could they punch out the transportation to Jersey City and back and let me pay the rest of the transportation? No, they couldn't. If I boarded the Federal with my mileage, would the conductor punch and let me pay from Jersey City? Certainly, but the ticket office could not do it. (This I have since been told was an error.) Why? It made the accounts too difficult. This you and I know is nonsense. I have bought a certain amount of transportation, good on demand. I wanted to add to this transportation. I am in the newspaper business. If a man has bought a certain amount of space from us and wants to add to this space, out of which we can make a little money—and I wasn't being carried at cost to Boston—do we tell him that it is too much trouble to keep the accounts of a little more business? Not much! We meet him in the middle of the road and give him the glad hand.

I bought my round trip ticket and went to the train. It was 30 minutes late, but this was no one's fault except that no way has yet been discovered of arranging transportation so that it will be equal to its work during the rush seasons economically. Instead of leaving at 8:55 as we should, we left at 9:30, baggage adding to the train delay. There was one porter. Not a berth had been made. He was working as hard as he could work by schedule. It was 11:30 before I could get into my berth. What was the reason? There had been a rush of transient travel and nearly every seat in the car had been sold from Washington to meet the overflow from the chair car, and I (with others who had boarded the car all the way on from Baltimore to Trenton) waited while one porter began making berths after the train left Philadelphia. Manifestly, every one of us was irritated at having been deprived of two hours' sleep which we had a right to expect, having paid for the use of a berth from the time we boarded the car.

I reached the Back Bay Station in Boston at 6:55 on time, which is now usual, though a few years ago, before motive power had been improved, this train was frequently late.

I had to leave Boston on the midnight train for New York. I wanted to get my sleeper. Pullman office not open at 7 a.m. I stepped to the ticket agent and asked him if I could leave the money for a berth, and presented to him an envelope on which was written: "Left at the owner's risk," and all the necessary order. He shook his head. "You used to do it." "Yes, but so many people wanted it that there was a rule made prohibiting us from taking any money for the Pullman." Can you match this? A hundred or more people reach the Back Bay station half an hour or more before the Pullman office opens. Each morning some one or several want to buy a berth. Nothing would be easier than to have a system by which the ticket agent would, at their risk, pass on the deposit. No; "so many people want it" that this is a reason for a public service corporation deciding it will not do it, though the two offices are within a yard of each other and are practically responsible to the same authority. So I have to waste time in coming back to the station to get my berth, and naturally have another reason for being "sore."

I board my car in the evening. I leave my hat in my berth. My dress-suit case is in the way. The porter lays the dress-

suit case on top of the hat. I point out the damage. But the porter falls back upon the doctrine of "contributory negligence." "This ain't no palace car," said he, "get 'em in a sleeper is expected to wear their hats till they get into bed." There was the railway spirit at the bottom of the ladder exactly as I had met it on another rung, higher up, as I tried to purchase my ticket.

This meets you at every turn. I have just been to Salem, Va., going by way of Hagerstown at night. I raised the question again of mine, my mileage. I was sold a berth through, but against letting me use my mileage to Hagerstown, there was a rule. When I came back I bought a ticket to Washington and used my mileage the rest of the way without protest. Why should it not be wise for the road to do it both ways? Everyone who knows human psychology knows that mileage is used up more rapidly than the individual ticket. The more mileage books a man buys in the year the better a railway likes it, and the quicker it can get him to use up a mileage book, the quicker he will succumb to that psychosis of the mileage book when it is a temptation and an invitation to travel, which is not the case when cash is to be paid for the next ticket.

Again, partly by "contributory negligence" on my part, in shifting my belongings from one sleeper to another, my hat was left on one car in Washington while I landed in Philadelphia, a hatless man. A hat is a very small matter and attracts no attention on your head, but it is really amazing the amount of attention your head without a hat will attract in a railway station, in a street and in a business building. I spoke to the sleeping car conductor. I know he had had long service because he was so sound asleep. "Ask the ———," This officer explained in great detail, at the West Philadelphia Station—where incidentally I had to stop, and could not go on to Broad street in any way except by taking a cab or placing myself, a hatless man, in a hatted car—I asked the ——— should I go to the office in the Broad Street Station or the main office of the Pullman Company in the Arcade Building. "The station will do it for you." So I got a hansom and reached the Pullman office in the Broad Street Station. The Pullman office there had nothing to do with stray hats. It was the business of the superintendent. I crossed to the Arcade Building and the superintendent was out; the assistant superintendent was out; the boy knew nothing about hats; but after some delay someone appeared whose business it was to set the machinery in motion which would and did recover my hat, which I duly received, a courtesy courteously extended. Now why should the Pullman conductor send me to another man and the other man send me to the wrong office, and the whole machinery creak like this, when everybody concerned ought to have known instantly what should first be done?

These are the experiences—not all the experiences—of two short trips. They are multiplied by all the millions that travel on American railways. The result is an economic loss to the roads, to the country and to every passenger, the aggregate of which is inconceivable. If the roads were only so managed as to attract the loyalty of those who ride on them, there would be no limit to the legislation which they could obtain in order to facilitate their own admirable work which, in the greater enterprises which they conduct, is done efficiently to a degree which is not realized except by those who, like myself, have given years to the subject; and have seen the wretched way in which railways are managed in other countries. Yet for lack of care at the point of contact with your customer, on which every other business lavishes the lubrication of courtesy, so as to try to make it certain that nobody leaves "sore" and everybody leaves satisfied, on the whole the most beneficent agency in modern civilization finds itself at every great crisis, almost friendless in the general mass. Yet, as I said at the beginning, and shall say all my life—for my experience and acquaintance is large and my memories of some, who are now gone, dear to me—an able railway man is on the whole the best and ablest man existing, of American men.

ELECTRICAL OPERATION OF DRAWBRIDGES.*

BY S. F. NICHOLS,†

The first installations of electric motors for drawbridges were on highway bridges, commencing about 1890. In fact, railways were comparatively slow in adopting electric power for this purpose. There are several explanations for this. It is only comparatively recently that steam railways have organized well-equipped electrical departments and employed staffs of trained electrical engineers. On the other hand, the lake cities, Chicago, Cleveland, Milwaukee, etc., having early faced the problems of generating and distributing electric current for light and power, and having electric car lines operating on their streets, were very naturally easily induced to adopt electric power for operating their new bridges, and, in many cases, the older ones. In most of these cases, current was obtained from the street car circuits at very favorable rates. The cars had to cross the city's bridges and it was not a difficult matter to arrange for using the car company's power. The steam railway bridges were not so fortunately located with reference to securing electric power for operation, and the only points where this power therefore could be applied to these structures were in the larger cities where the bridges happened to be located. The great majority of the draw spans being at points remote from the larger cities, it was out of the question even to consider electrical operation without the installation of an independent power plant.

The improvement in electric motors and other electrical apparatus was so rapid, and electric power became so much more available at many points, that motors were put on many existing structures and the machinery for new bridges was laid out with reference to this method of operation.

An added incentive to the adoption of electric power for bridge operation was furnished by the development of the bascule type of drawbridge, the first of which was the Van Buren street bridge in Chicago, followed shortly by the Metropolitan Elevated Railway bridge located beside it. A large percentage of the bascule bridges that have been built have been equipped with electric motors and controlling devices.

ADVANTAGES OF ELECTRICAL OPERATION.

For the amount of horsepower developed, the electric motor is light and compact and is conveniently reversed, running equally well in either direction. It has no reciprocating parts and therefore the mechanical wear and internal friction are almost negligible quantities. It is capable of sustaining a heavy overload for short periods, which enables it to take care of the very difficult problem of accelerating a heavy mass and also of operating the bridge against high wind pressures that may occasionally be experienced. It is almost noiseless in operation. Being compact, it can be located close to the point where the power must be used, thus obviating the necessity of having a large engine room with a heavy floor system above the deck of either the swing or bascule span. This makes it possible to locate the bridge operator at the most convenient position from the standpoint of accessibility, or where the best view can be obtained of the river or railway or highway traffic. The motors can be located on a moving portion of the structure while the operator's house is located on the fixed part. This is one reason why the electric motor has been so important a feature in the development of the bascule bridge, as on a number of present designs the leaf motors as well as the motors operating the locks at the extreme point of the bridge, move with the leaf through its entire angular range of motion. Connection can readily be made between the moving and fixed portions of the bridge by means of swinging loops, flexible joints or commutating devices. The electric motor, furthermore, as at present designed and constructed, requires comparatively little attention, and the possi-

*From a paper presented at the third annual convention of the Railway Electrical Engineers' Association.

†With Geo. P. Nichols & Bro., Chicago, engineers.

bility of its getting out of order and refusing to do its work is very remote where periodical inspection is given.

STANDARD ELECTRICAL EQUIPMENT.

The modern bascule bridge requires one or two motors for the operation of the moving leaf, a motor for the front lock, and in some cases a motor for the rail locks. Frequently, moving rail locks are omitted and the end locks are operated by hand power. Each of these motors is ordinarily provided with a solenoid brake and the motors operating the end lock and rail lock are automatically stopped by the current being cut off and the brake being applied when the lock in its travel reaches the end of its motion in either direction. The current is ordinarily cut off from the leaf motors and the brakes applied when the leaf in opening reaches a point beyond which it is dangerous

it is not usually found feasible to install a mechanical brake, and in order to avoid the possibility of disastrous results attending the failure of the motor brakes to hold the leaf it is customary to install what is called an emergency brake, which will be applied automatically in case the current fails, or may be applied by the operator if desired. This brake is set by springs and ordinarily pulled into release before starting the bridge, and is applied again after the swing is made, not being used as a service brake unless the emergency conditions arise. An electric solenoid has frequently been used for releasing this brake, but a better method has been found in the use of a small electric motor operating a mechanism for releasing the brake, and holding it in release as long as the current is held on the motor. Rupturing the circuit by the operator, or by the loss of current



Strobel Bascule Bridge; Indiana Harbor.

to allow it to travel. The controllers for the operation of the several motors are located in the operator's house conveniently situated, and a switchboard is provided carrying the necessary instruments, switches and circuit breakers or contactors. The motion of the leaf is under the control of the operator at all times except when it reaches the danger point in opening, when the automatic stop acts. The motors for the end locks and rail locks are ordinarily started in the proper direction and run continuously until automatically stopped by the action of the contact switch, which causes the rupturing of the motor circuit at the switchboard. The position of the bridge leaf and locks are shown to the operator by indicator lights conveniently grouped in front of the controller.

Owing to the fact that all the motors are on the moving leaf,

on the line, automatically trips a release and insures instantaneous application of the brake without waiting for the mechanism to go through the reverse motion corresponding to that in releasing. This arrangement is much less liable to derangement than a large solenoid and much simpler to repair in case of trouble.

The equipment for a large swing bridge is somewhat more elaborate than that for a single leaf bascule bridge, owing to the necessity of having a powerful lift or wedge mechanism at each end of the bridge, and the fact that some form of moving rail lock is necessary. Therefore, in addition to the motors required at the center for swinging the span, a motor is necessary at each end for the lift or wedge mechanism, and an additional motor is usually necessary at each end for

the rail locks for the single or double track, as the case may be. On the ordinary swing bridge it is perfectly feasible to use a mechanical brake so that the electric motor brakes and emergency brakes for the swing may be omitted. The operation and control of the wedge motors and rail lock motors is the same as on the bascule spans. The same general arrangement of indicators and automatic stops is applicable to the wedge and rail lock motors.

THE ELECTRIC SYSTEM OF CONTROL.

It will be readily seen that to place the operation and control of a massive drawbridge in the hands of an ordinary and usually low-priced operator involves a possibility of trouble and disaster not pleasant to contemplate. He has before him a few

small levers, the indicators and the switchboard equipment, but cannot see the actual motion of any of the devices that are operated, except that of the span itself. Unless some provision is made to prevent it, it is always possible for him to attempt one operation before another is completed, which might under some conditions wreck the bridge, or bring disaster to railway traffic. To avoid the possibility of such occurrences a system of electric interlocking has been developed so that the control of each motion in the entire operation of the bridge shall be completely interlocked with the next preceding and with the next succeeding one, if any, and with the railway signals in such a way that current cannot be turned on any motor until the pre-

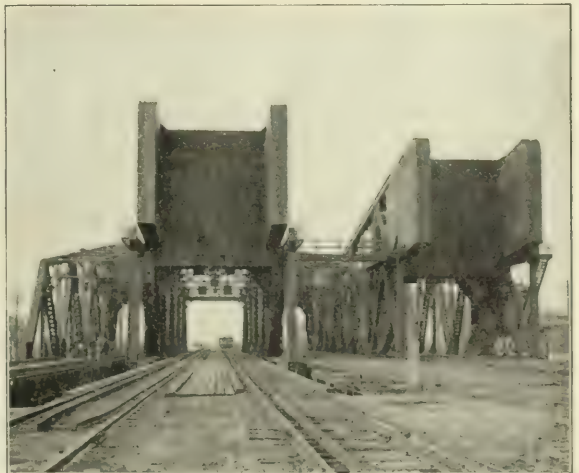


Strauss Bascule Bridge.



Page Bascule Bridge; Hammond, Ind.

ceding motion has actually been performed. In opening, it is impossible for the operator to turn current on to any of the motors on the bridge until such signals and protecting devices as the railway may provide have been set against trains. It is impossible to operate the wedge motors until the rail locks have been drawn. It is impossible to operate the swing motors until the rail locks and wedges have both been drawn. In closing, it is made impossible for the operator to drive the wedges until the span has been swung and is closely enough in line to allow



Scherzer Eight-Track Bridge at Chicago.

the wedges to be safely entered. It is impossible for the rail locks to be driven until the wedges have all been entered, and impossible for the operator to clear the signals for the passage of trains until all of the wedges and all of the rail locks have been fully driven. To attempt to accomplish these results mechanically by interlocking the several levers with each other, would still make it possible for the operator to attempt one operation after the preceding lever had been moved, but before the operation controlled by it had actually been performed.

The electric interlocking is accomplished by the circuits of any one device being held open at all times on a contactor board by the other devices until the proper time for its safe operation. When the other functions preceding the desired operation have actually been completed, the circuits are restored so that the desired motion can be performed by the operator through the proper controller. The same indicator switches on the several devices are ordinarily used for both the electric indication and electric interlocking, and to as large an extent as possible, the same circuits are utilized for the two purposes.

Little attempt is made at electric lighting on railway structures beyond the illumination of the operator's house and providing a sufficient number of lamp openings near the several machinery parts. The government requirements also have to be complied

electrical operation and control of drawbridges without being dependent on the plants and transmission lines of others. Under this scheme two arrangements are possible. One is to have the generating unit of sufficient capacity to supply current direct to the several motors on the bridge as required. The objection to this scheme is that all of the motors on the bridge have a considerable overload capacity and are subject to overloads under a good many conditions. The gasoline engine, on the other hand, has practically no overload capacity other than momentary, and it is therefore necessary to use a large and expensive engine for a comparatively small current consumption. If it is necessary to install the generating plant on the bridge, this means a large engine room and heavy floor construction to prevent excessive vibration. Another plan is to install a storage battery of high enough discharge rate to take care of the operation of the bridge under the most severe conditions and of sufficient ampere-hour capacity to operate the bridge for at least 24 hours without recharging. The gasoline-driven generating unit in this case may be very small, the requirements simply being that it must be able to recharge the storage battery at the desired intervals, it not being necessary for it to supply current direct to the motors on the bridge.

A still better arrangement, however, in the mind of the writer



St. Louis River Bridge.

with; these necessitate having red lanterns on the piers and at specified points on the movable spans. On bascule bridges it is required that the red lights at the front ends of the bridges be changed to green when the bridge has nearly reached the open position. This is sometimes accomplished by a lantern, hung as a pendulum, swinging from behind a red glass to a position behind a green glass as the bridge reaches its nearly open position. It is preferably performed by a double lantern and extinguishing the red and lighting the green by suitable contacts in the leaf indicator switch.

GENERATING AND STORAGE BATTERY PLANTS

The adoption of electric power for the operation of drawbridges has usually been contingent on being able to secure direct current at the standard voltages or two-phase or three-phase alternating current at 60 cycles or 25 cycles. The electrical operation of many important drawbridges, however, is so desirable that even the impossibility of obtaining electric current from existing power plants, but 24-hour service should not deter the engineers from its adoption.

The improvements in gasoline engine design and construction have made it possible to operate, to a great degree of economy, comparatively small isolated electric generating plants. The use of such a plant makes it possible to obtain all the advantages of

is a combination of the last two plans mentioned. This consists of the installation of a storage battery of a sufficiently high discharge rate to operate the bridge under the most severe conditions of wind and weather and of sufficient capacity to give the bridge from 24 to 40 openings. The generating plant consists of two direct connected gasoline engine driven units, the combined capacity of which is sufficient to operate the bridge independent of the storage battery, and either of which is available for the charging of the battery. The advantage of this system is that the bridge may be kept in commission even if the storage battery is discharged or out of service for any reason. It is also possible to charge the battery from either generating unit if the other is out of service from any cause. Furthermore, under extreme conditions it is possible to supplement the storage battery by using either or both generating units connected up with it for supplying current to the bridge. The generators and engines in the two units being duplicates, there is small possibility of both being out of commission at the same time. The engines may be started by turning current from the storage battery on to the generators connected up as motors during the period of starting. In either case the generating plant may be located either on the bridge structure or in a power house built for this special purpose on the shore. The latter arrangement

is likely to require more attendants but has the advantage of providing a more stable support for the storage battery and a better foundation for the generating units. Locating the battery plant on the shore also involves the use of submarine cables for supplying current to the bridge, if it be a swing span.

EQUIPMENT OF THE ST. LOUIS RIVER BRIDGE

One of the most recent installations with which the writer has been connected was the operation and control of a 300-ft. double deck draw span recently built for the Interstate Transfer Railway Co. over the St. Louis river near Duluth, Minn. The span weighs approximately 1,152 tons and is swung by two 25-h.p. 500-volt series motors. The wedges at each end of the bridge are operated by a 15-h.p. motor and the four wedges at the center are operated by a 5-h.p. motor. There are sliding rail joints for double tracks on each deck at either end of the bridge. These, however, are all operated by the end lift mechanism so that no separate motor is required. The swing motors are operated through a series parallel controller and the three wedge motors are operated from one special controller, all three being started at the same time and running until automatically stopped by the rupture of the circuit and the application of the solenoid brakes at the end of the motion of their respective appliances.

clear vision down stream in the opposite direction, and at the same time have an unobstructed view of approaching traffic on both decks of the bridge. The first photograph shows the general view of the draw span and approach spans, with the former swung into a normal open position. The next shows one-half of the draw span and a nearer view of the operator's house, which can also be seen through the structure in the general view. The operator's house is of brick and fireproof construction. The generating plant, consisting of two 15-k.w. 500-700-volt generators each direct-connected to a 30-h.p. two-cylinder gasoline engine, is in the first story directly underneath the operator's room. The storage battery, consisting of 264 cells, 160-ampere-hour capacity, is in the portion of the building extending under the deck of the bridge when opened. The convenience of this scheme will readily be recognized, especially when it is seen that when the bridge is opened the operator can step from his house on to the deck of the bridge or has easy access to the end wedge mechanism from the roof of the battery room.

Owing to the fact that the operator is not on the swing span, it is not possible to employ the usual mechanical brake. At the same time it is extremely necessary that the span be under con-



One End of Swing Span; St. Louis River Bridge.

Electric indication is provided for the motion of the draw span and wedge mechanisms and of each of the 16-rail connections. Electric interlocking also, as before described, is employed throughout. This interlocking extends even to each individual rail lock connection on both decks. Through the use of a contact device at the end of the span, it is made impossible for the wedges to be driven until the span is exactly lined up.

No electric power from outside sources being available, it was decided to install a special generating plant for the sole purpose of operating the draw span. To erect a building on the shore for this purpose would have meant additional operating expense on account of requiring an attendant in the power plant in addition to those on the bridge. The bridge, however, being a double deck structure, there was no place either on or above the bridge where generators or storage batteries could be installed. It was even found impracticable to locate the operator anywhere on the draw span where he could see the river traffic and the approaching traffic on both decks of the bridge. A novel solution was found, however, in building a combined power house and operator's house at the extreme end of the protection pier. The operator's room is located in the top story of the building and at sufficient height so the operator can see approaching boats through the structure of the bridge in one direction, and have a

trol, especially when a strong wind is blowing. This is accomplished by equipping each of the two swing motors with a solenoid brake of sufficient power to retard the motion of the bridge without checking it too abruptly. An additional brake of greater power is installed on each machinery set. This is applied normally by a powerful spring, and each brake is connected with a motor-operated mechanism designed to partially or totally release the same. This motor is connected with a controller in the operator's house, and by its use the operator can apply or release or partially release the brakes at will.

All wiring on the bridge and in the operator's house is entirely enclosed in conduit, there being no open loops even at the motors or controllers. The upper and lower decks of the bridge, all parts of the operator's house and the government signal lanterns are lighted by current from the storage battery.

OTHER RECENT BRIDGES.

There are probably about 15 drawbridges in this country at present operated from storage batteries. There is no question that the number will be greatly increased as the merits of this type of installation become better known.

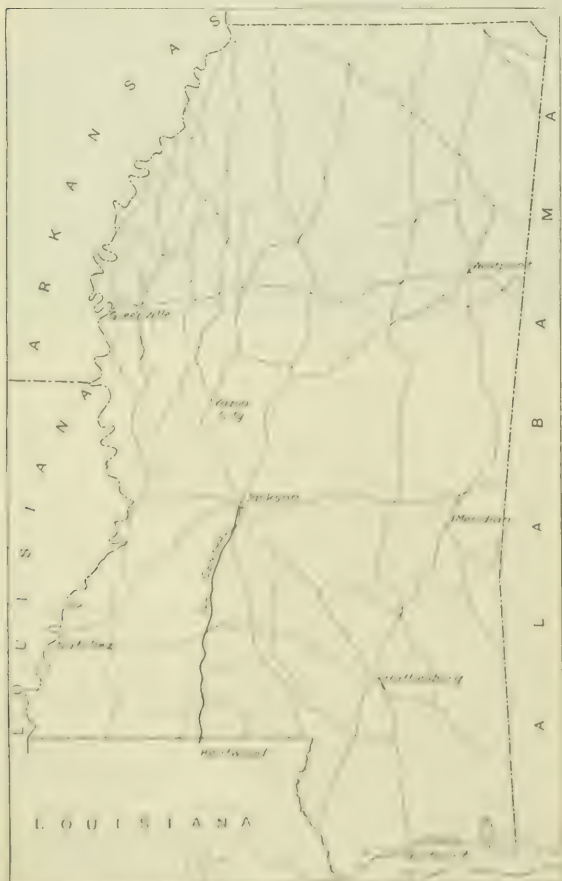
One of the most important and interesting recent installations operated by current from outside sources is the eight-track bridge over the Chicago drainage canal near Campbell avenue, one view

of which is shown herewith. This consists of four independently operated bascule spans, located side by side, two being on the north bank and two on the south bank of the channel. The four spans are controlled from two operators' houses, one on each side of the channel, the controlling, indicating and interlocking equipment being about as described above.

Another illustration shows five double-track bascule spans over the new ship canal near Indiana Harbor, Ind. All five spans are controlled from one operator's house, one common generating and storage battery plant being used for all. Electric power is received from outside sources at 440 volts, three-phase, 60 cycles. All of the bridges, however, are equipped with 220-volt motors. A storage battery is used for delivering current to the bridges and also for signal purposes, consisting of 128 cells, 160 ampere-hour capacity. This battery is charged from two 40-ampere mercury arc rectifiers. There is also a 35-k.w. motor generator set, which may be used for delivering current direct to the bridges, independent of the storage battery, or may be used for charging the storage battery under emergency conditions. The individual switchboards and controllers for operating the five bridges are conveniently located in the same room with the electric signal machines which control the five double tracks passing over the bridges. The same operators attend to the manipulation of the signal machines and the bridge-controlling devices.

DOUBLE-TRACK RAILWAY IN MISSISSIPPI.

The sketch map of Mississippi, given herewith, is printed for the purpose of showing the double track railway in the state.



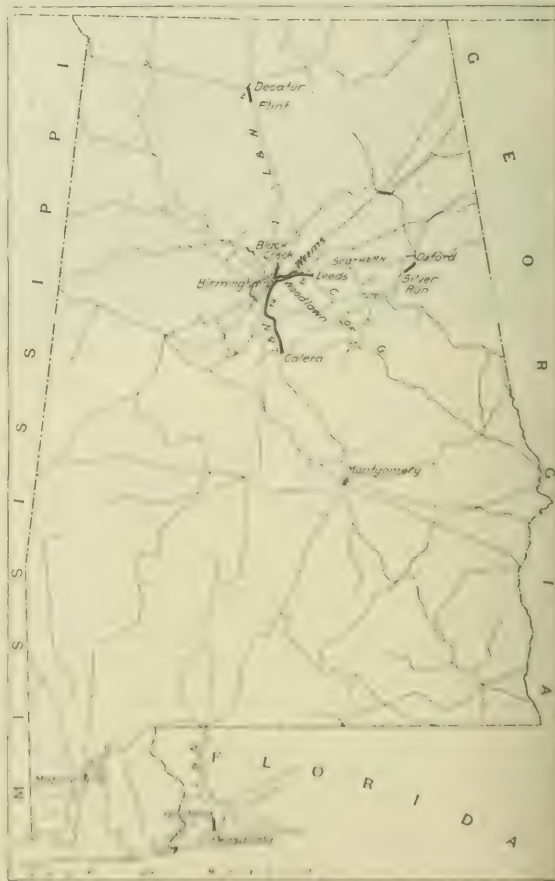
Double-Track Railway in Mississippi.

We find only one such line, that of the Illinois Central, from Jackson southward. The distance from Jackson to Kentwood, La., is 100 miles.

DOUBLE-TRACK RAILWAYS IN ALABAMA AND FLORIDA.

The railway map of Alabama, given herewith, is printed for the purpose of showing all sections of railways in the state on which there is more than one main track. The termini of the section, as shown in the map, are as given below. For the state of Florida no separate map has been made. The double track between Goulding and Pensacola, on the Louisville & Nashville, three miles, is shown in the map now printed. The only other piece of double track we have found in that state was shown in connection with the map of Georgia, published October 28, page 797.

ALABAMA		
Central of Georgia.		
	No. tracks.	Approx. miles.
Birmingham-Leeds	2	19
Louisville & Nashville.		
Decatur-Flint	2	6
Black Creek-Caleda	2	40
Montgomery-Western Ry. Junction	2	2
Mobile-Choctaw	2	1
Seaboard Air Line.		
Birmingham-Woodlawn	2	2
Southern.		
Woodlawn-Weems	2	9
Oxford-Silver Run	2	7



Double-Track Railways in Alabama and Western Florida.

ACCIDENT BULLETIN NO. 36.

The Interstate Commerce Commission has issued Accident Bulletin No. 36, containing the record of railway accidents in the United States during April, May and June, 1919, and also the tables for the year ending June 30.

QUARTERLY RESULTS.

The number of persons killed in train accidents was 137, and of injured, 7,911. Accidents of other kinds bring the total up to 20,650 (766 killed and 19,884 injured). These reports deal only with employees on duty, and passengers. The accident statistics of electric lines are given in a separate table.

Table No. 1.—Comparisons of principal items with last quarterly bulletin and with one year back.

	Passengers, Employees.		Total Persons Reported.	
Accidents.	Killed.	Injured.	Killed.	Injured.
Collisions	5	542	57	621
Deraillments	7	660	54	422
Miscellaneous train accidents, including locomotive boiler explosions	17	14	379	14
Total train accidents	12	1,219	125	1,422
Comparing on assumption			49	695
While doing other work about trains or while attending switches			41	4,289
Coming in contact with overhead bridges, structures at side of track, etc.	3	17	339	17
Falling from cars or engines or while getting on or off	27	607	114	2,957
Other causes	16	833	339	7,920
Total (other than train accidents)	43	1,443	586	15,800
Total all classes	55	2,662	711	17,222

The comparison with the April-June quarter of 1909 (Bulletin 32) shows considerable increases in every item. The explanation of this, so far as any explanation is available, is to be found in the general expansion of railway traffic. The importance of giving particular attention to the causes of collisions and deraillments is well shown by a comparison of the first item in Table 1A with the item below it. By subtracting item 1 from item 2, it will be seen that the number of passengers killed from causes other than train accidents, which means largely from their own fault, are not markedly variable—43, 45, 37; while in the first item—12, 110, 7—the fluctuations are violent; indicating that the measures which have been taken by the railways to prevent passengers from injuring themselves have been much more successful than those which have been taken to prevent the wrecking of trains.

TABLE No. 1A.—Comparisons of principal items with last quarterly bulletin and with one year back.

	Bulletin 36.	Bulletin 35.	Bulletin 32.
1. Passengers killed in train accidents	12	110	7
2. Passengers killed, all causes	45	155	44
3. Employees killed in train accidents	125	242	92
4. Employees killed in coupling	45	57	24
5. Employees killed, all causes	711	945	544
6. Total passengers and employees killed, all causes	723	1,100	588

The total number of collisions and deraillments in the quarter now under review was 2,609, as below:

TABLE No. 2.—Collisions and deraillments.

	Number.	Loss.	Killed.	Injured.
Collisions, rear	206	\$231,825	17	238
Collisions, butting	114	\$256,848	24	419
Collisions, train separating	96	\$13,137	—	65
Collisions, miscellaneous	809	\$341,191	21	441
Total	1,225	\$863,001	62	1,163
Deraillments due to defect of roadway, etc.	220	\$192,796	2	283
Deraillments due to defect of equipment	663	\$367,296	8	146
Deraillments due to negligence of trainmen, signalmen, etc.	95	\$70,915	15	87
Deraillments due to unforeseen obstruction of track, etc.	55	\$2,916	7	112
Deraillments due to malicious obstruction of track, etc.	18	\$9,770	9	71
Deraillments due to miscellaneous causes	333	\$306,082	20	378
Total	1,384	\$1,269,905	61	1,082
Total collisions and deraillments	2,609	\$2,124,506	123	2,245
Total for same quarter of 1909	2,100	\$1,038,642	91	1,842
1908	2,130	\$1,015,309	104	2,008
1907	3,777	\$3,232,673	227	3,655

Following is the usual list of Class A train accidents—all in which the damage is reported at \$10,000 or over, notable cases in which passengers are killed, and those doing damage less than

\$10,000 and down to \$1,000, where the amount of the damage may be of particular interest.

Table No. 2.—Collisions and deraillments of passenger trains during the quarter ending June 30, 1919. (Basis for year ending June 30, 1919. M, miscellaneous; D, deraillment; P, passenger train; F, freight train; C, miscellaneous trains.)

Collisions		Deraillments		Miscellaneous	
No.	Train	No.	Train	No.	Train
1	R. P. & F.	1	1	1,304	54
all injured in derailment, and a passenger killed. The freight train was derailed, and the freight was unable to do so. He had a fusee, but rain was falling and he was unable to light the fusee. He had no lantern. This derailment is noted in the table below, item No. 8.					
2	R. F. & F.	0	2	2,100	32
Collision at end of double track, due to a false light in the switch. The lamp was put in the wrong position on the switch stand in the wrong position. The station operator is held at fault for not discovering the lamp man's error.					
3	B. P. & F.	2	7	2,390	56
Despatcher sent eastbound train over westbound track without first clearing the track of other trains. (See note in text.)					
4	R. P. & F.	0	16	2,400	28
Passenger train (9 p.m.) ran into rear of wrecking train; engineer of passenger acted on a block signal which was cleared for the wrecking train. The signalman was held at fault for not promptly putting the signal in the stop position after the passage of the front end of the wrecking train. The passenger engineer was also at fault for running too fast within yard limits.					
5	B. F. & F.	0	2	3,634	57
Eastbound freight (2:40 a.m.) approached coaling station not under control; engineer, conductor and front brakeman asleep.					
6	B. P. & F.	0	43	3,745	2
Operator failed to deliver order. Conductor and engineer also at fault for not reporting at office for orders.					
7	B. F. & F.	0	3	6,165	9
Conductor and engineer of northbound disregarded a despatcher's order on the assumption that it would be impossible for the southbound train to travel at a certain speed; also the despatcher annulled a "wait order" without notifying the train for whose benefit it had been made. (5 a.m.)					
8	R. F. & F.	1	23	6,775	4
Careless running after passing automatic block signal at "stop."					
9	B. F. & F.	1	3	7,000	59
Engineman of northbound light engine ran past meeting point. (See note in text.)					
10	B. F. & F.	1	0	7,500	7
Extra train northbound (2:30 a.m.) encroached on time of southbound; should have stopped at a blind siding; men claim to have lost their bearings. The superintendent says it would have been easy to locate the siding.					
11	B. F. & F.	0	6	9,500	34
Failure of operator to deliver order. He accepted order to be delivered to conductor whose train was on siding, having told despatcher that the conductor was held, but the train started while the operator was busy, and he was unable to deliver the order, though he tried to do so. (10 p.m.) Age of operator, 21 years; in the service 4 months as station helper and 7 months as operator.					
12	B. F. & F.	0	6	10,047	37
Despatcher (11:43 a.m.) sent order to train No. 30 to run 20 minutes late. The succeeding despatcher (12:06 p.m.) sent this order to an opposing train and made the time 30 minutes instead of 20; this train used 10 minutes too much of the time of train No. 30, and this caused the collision.					
13	B. P. & F.	0	34	12,500	11
Mistake in observing lights of fixed signals at meeting point. (See note in text.)					
14	B. F. & F.	0	2	13,600	33
Nondelivery of orders. (See note in text.)					
15	B. F. & F.	1	2	13,978	8
Extra freight approached station not under control. (10:50 p.m.)					
16	R. P. & F.	1	5	15,200	1
Freight followed passenger train from passing track too closely, disregarding prescribed 5-minute time interval and running at excessive speed. Passenger train ahead had slackened speed because of a cow on track. Freight ran into rear of passenger train.					

No.	Class.	Kind of train.	Killed.	Injured.	Damage to engines, cars & roadways.	Reference to record.	Cause.
17	R	F. & F.	0	0	16,975	29	Double-header freight train not kept under control on descending grade; misunderstanding between engineers as to which should manage the air brakes.
25	B.	F. & F.	2	5	17,850	6	Eastbound train disregarded order to reach B by 2:30 a. m. (See note in text.)
a19	B.	P. & F.	2	2	30,000	38e2	Southbound ran past meeting point. (See note in text.)
a20	B.	P. & F.	3	1	10,000	38e3	Trailer broke away and ran back down grade. (See note in text.)
Tl collisions..15 163 \$192,633							
a Collisions 19 and 20 occurred on electric roads.							

DERAILMENTS.

1	D.	P.	0	10	\$2,035	24	Switch (at electro-pneumatic interlocking) thrown under moving train. Leverman carelessly moved the switch lever too soon, and the detector bar broke, allowing the switch rails to be moved.
2	D.	F.	3	6	2,825	23	Misplaced switch. (See note in text.)
3	D.	P.	0	43	3,140	65	Washout (7:50 p. m.) due to 36-inch pipe culvert becoming clogged with driftwood during an unprecedented rainfall. This derailment was followed by a collision. (See item No. 1 in collision table.)
4	D.	P.	1	1	3,500	63	Excessive speed on curve due to false clear signal at interlocking, where a switch was undergoing repairs. Signalman and signal repairman held responsible for display of wrong signal.
5	D.	P.	0	24	4,700	43	Track being repaired; a flagman of three months' experience sent out to warn all trains; omitted to stop an extra passenger train, assuming that, in accordance with custom, the track foreman would have the track in safe condition for a passenger train; that his function was to stop freight trains only. The engineer of the passenger train is held at fault for not obeying the speed limit rule in force at this place. The passenger was an extra.
6	D.	F.	0	0	5,850	64	Excessive speed due to error of judgment of engineer in handling air brakes on a descending grade of 110 feet to mile; ran off derailing switch.
7	D.	P.	0	28	6,000	41	Defective joint; wreck took fire from stove in baggage car; fire spread by gas which escaped from broken pipes.
8	D.	P.	0	31	6,130	42	Track not in good surface. Speed 45 miles an hour. Tender the first vehicle to jump the track.
9	D.	F.	2	1	9,819	50	Misplaced switch. Agent neglected to put on lamp as night approached; the crew of the preceding train neglected to report absence of the lamp. The superintendent also holds that in view of the absence of the lamp the engineer should have slackened speed more than he did.
10	D.	F.	0	1	9,872	13	Broken rail; fresh break, no fault in manufacture. Wreck took fire from the fire box; oil from the ruptured tender flowed around the fire box, spreading the flames.
11	D.	P.	0	29	17,100	49	Loose engine wheel; speed, 40 miles an hour.
12	D.	F.	0	0	32,100	66	Long pieces of structural iron on platform car were not sufficiently braced, and the load, shifting on its bearings while the train was passing through a bridge, struck the truss, and the bridge (160 feet long) was knocked down; and several cars were wrecked.
13	D.	F.	1	2	35,900	39	Engineer ran past flagman, who warned him to stop on approaching a point where the track was being repaired. The engineer (who was killed) had been using intoxicating liquor.
14	D.	P.	3	25	5,000	25	Rail bent in track maliciously loosened.
15	D.	F.	0	0	3,600	26	Unbalanced load. (See note in text.)

Total deaths
in 1904 110 304
Total injuries
and
derailments 361 380 304

Collision No. 3, between a westbound work train and an eastbound passenger train, was due to lack of care on the part of a dispatcher, a conductor and a telegrapher. A work train had

the right to use both main tracks between B and C. When it was time for an eastbound passenger train to leave B for C, the work train, in order to clear the eastbound track, proceeded to C and from there went back westward on the westbound track. The operator at C omitted to report this movement of the work train to the dispatcher, and the dispatcher, believing the work train to be still on the eastbound track, ordered the passenger train to proceed from B to C on the other track. The flagman of the work train had stopped the passenger train, but had not informed its conductor that the work train had gone to C for the purpose of crossing over to the westbound track, being himself ignorant of this movement. The work train, moving westward, and the passenger train, moving eastward, collided 5 miles east of B. The dispatcher is held blameworthy for not seeing that the westbound track was clear before he allowed any eastbound train to move over it, and the conductor of the work train is blamed for not more fully and carefully instructing his flagman; and the telegrapher at C is blamed for not giving prompt notice to the dispatcher when the work train came to his station. This telegrapher at C had been in that position seven weeks. The other persons concerned were men of experience.

Collision No. 9, in which 1 person was killed and 3 were injured, was between an engine, without train, running north, and a freight train running south. The engineer in charge of the engine northbound, on reaching S, where he was to meet the southbound, according to an order which had been received from the dispatcher, received from the operator at S another copy of the same order, which had been sent to that station to make sure that neither train should go past that point. He did not read this order carefully, or at least not with sufficient care, and assumed that he had received a new order authorizing him to go forward to the next station. He read the order (incorrectly) to the fireman, but the fireman did not read it for himself. When the engine started from the station, the operator assumed that it was the intention of the engineer to go forward a short distance and then set back into the side track and wait for the southbound train; and, because of this assumption, he took no measures to recall the engine.

Collision No. 13, injuring 34 persons, was due to a mistake in observing a signal at the end of a double track. Train No. 3, westbound, should have stopped before passing from the double track to the single track, to meet train No. 2, eastbound; but No. 3 approached at uncontrollable speed and ran about 75 feet beyond the switch. The eastbound train approached at the same moment, and in the resulting collision the mail car of the eastbound train was knocked off a bridge, falling 50 feet to the street below; and the baggage car, which was next behind the mail car, was lifted in such a way that it telescoped the passenger car next behind it. Most of the victims were in this passenger car. Train No. 3 approached the meeting point on a curve to the left and the fireman of the leading engine of this train (which was a helping engine), seeing the green light of the switch, which indicated that the switch was in position for the eastbound train, mistook it for the green light of the semaphore signal which would indicate all clear for the westbound train; he therefore called to the engineer that the road was clear.

As soon as the train had run far enough to enable the engineer to see the semaphore, he saw that the light was not green and applied the brakes, but not in season to prevent the collision. The fireman of the helping engine was 21 years old, and had been in the service of the road about eight months.

Collision No. 14 was due to the neglect of two telegraphers to deliver orders and to bad judgment on the part of an engineer. Westbound extra 9, running from M to A, B, C, D, E, F, etc., left M at 5:45 a. m.; A at 5:59, and arrived at B at 6:16 a. m. At B this train should have stopped short of the switches to keep out of the way of eastbound train 8, which was running on the westbound track from E to B. The operator at M had neglected to deliver to extra 9 the order authorizing

ing this movement. He had fixed it in a loop, expecting that the train would pass without stopping, but before the train arrived he had other duties to perform in connection with other trains, and while he engaged the conductor of train 9 came into his office and the operator told him that there were no orders.

Shortly after he gave the train a clear block signal and the train proceeded. On arriving at B the train found the signal against it; but the engineman sounded the whistle signal calling for the block signal, and the operator gave him a proceed signal and delivered to him a message telling him to move his train for-

TABLE A.—Summary of casualties to persons, year ending June 30, 1910.

	Passengers (a and b)		Persons carried under agreement or contract (c and d)		Total (a, b, c and d)		Trainmen		Trainmen in yards		Yard trainmen (exclusive of crews)		Other employees		Total employees		Total persons reported	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Collisions	57	3,808	21	530	78	4,428	216	1,765	45	657	44	468	50	443	335	3,333	434	7,761
Deraillments	70	2,601	17	345	87	2,946	188	1,272	9	148	22	191	31	267	253	1,892	340	4,814
Miscellaneous train accidents, including locomotive boiler explosions	52	122	20	52	72	162	75	1,086	7	232	3	139	22	134	107	1,560	139	1,732
Total train accidents	179	6,621	58	885	217	7,516	479	4,123	61	1,027	69	798	103	844	715	6,785	913	14,307
Coupling or uncoupling							60	927	40	520	99	1,426	7	112	296	2,995	296	2,995
While doing other work about trains or while attending switches							51	9,296	23	3,050	42	3,606	41	2,296	157	18,240	157	18,240
Coming in contact with overhead bridges, structures at side of track, etc.	2	27	1	6	3	33	57	644	19	241	15	424	5	68	96	1,377	99	1,410
Falling from cars or engines or while getting on or off	137	2,748	10	85	147	2,833	231	5,271	80	2,306	138	4,001	137	1,558	586	13,196	723	16,029
Other causes	54	3,010	10	364	64	3,374	178	391	102	512	111	551	1,232	24,075	1,623	26,029	1,687	29,463
Total (other than train accidents)	183	5,785	21	455	204	6,240	377	17,029	264	6,629	405	10,070	1,422	28,066	2,468	61,827	2,872	68,067
Total (all classes)	362	12,406	59	1,350	421	13,756	1,056	21,152	325	7,656	474	10,868	1,528	28,942	3,383	68,618	3,804	82,374

TOTALS FOR PRECEDING YEAR

Collisions	72	2,716	22	317	94	3,033	145	1,266	39	467	20	284	44	345	248	2,362	312	5,395
Deraillments	30	2,450	7	267	37	2,717	171	996	11	128	14	125	31	199	227	1,448	294	4,165
Miscellaneous train accidents, including locomotive boiler explosions		96		19		115	36	727	4	177	2	94	3	69	45	1,067	45	1,152
Total train accidents	102	5,262	29	603	131	5,865	352	2,989	54	772	36	503	78	613	529	4,877	651	10,742
Coupling or uncoupling							49	735	36	463	67	1,086	9	69	161	2,353	161	2,353
While doing other work about trains or while attending switches							28	7,147	23	2,346	10	2,610	32	2,212	93	14,315	93	14,315
Coming in contact with overhead bridges, structures at side of track, etc.	2	32		4	2	36	54	601	9	243	7	334	6	51	76	1,229	78	1,265
Falling from cars or engines or while getting on or off	129	2,991	8	85	137	3,076	196	3,947	74	1,994	107	2,950	104	1,368	481	10,259	618	13,335
Other causes	52	2,820	13	319	65	3,139	110	517	74	384	86	379	855	17,191	1,125	18,771	1,190	21,910
Total (other than train accidents)	183	5,843	21	408	204	6,251	437	13,247	216	5,430	277	7,359	1,006	20,891	1,906	46,927	2,140	53,178
Total (all classes)	285	11,105	50	1,011	335	12,116	789	16,236	270	6,202	313	7,862	1,084	21,994	2,436	51,804	2,791	63,920

TABLE B.—Casualties to passengers and employees, years ending June 30.

	1910.		1909.		1908.		1907.		1906.		1905.		1904.	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Passengers:														
In train accidents	217	7,516	131	5,865	165	7,430	410	9,070	182	6,778	350	6,498	270	4,945
Other causes	204	6,240	204	6,251	241	5,215	237	4,527	206	4,407	187	3,542	150	3,132
Total	421	13,756	335	12,116	406	12,645	647	13,597	418	11,185	537	10,040	420	8,077
Employees:														
In train accidents	715	6,791	520	4,877	642	6,818	1,011	8,924	870	7,483	798	7,052	844	6,990
In coupling accidents	206	2,985	161	2,353	239	3,121	302	3,948	311	3,503	243	3,110	278	3,441
Overhead obstructions, etc.	96	1,377	76	1,229	110	1,353	134	1,591	132	1,497	92	1,185	116	1,210
Falling from cars, etc.	586	13,196	481	10,259	668	11,735	790	12,565	713	11,253	633	9,237	700	9,371
Other causes	1,780	44,269	1,218	33,096	1,699	33,317	2,116	35,661	1,772	31,788	1,493	24,842	1,429	22,254
Total	3,383	68,618	2,456	51,804	3,358	56,344	4,353	62,689	3,807	65,524	3,261	45,426	3,367	43,266
Total passengers and employees	3,804	82,374	2,791	63,920	3,764	68,989	5,000	76,286	4,225	66,709	3,798	55,466	3,787	51,343

TABLE C.—Collisions and deraillments; damage to cars, engines, and roadway, years ending June 30

	1910.				1909.				1908.			
	Num-ber.	Loss.	Killed.	Injured.	Num-ber.	Loss.	Killed.	Injured.	Num-ber.	Loss.	Killed.	Injured.
Collisions, rear	1,311	\$1,398,763	119	2,324	859	\$933,375	83	1,556	1,397	\$1,298,044	88	1,742
Collisions, cutting	695	1,514,381	194	3,008	485	874,729	159	1,878	795	1,473,618	210	3,143
Collisions, train separating	418	164,883	5	197	386	146,067	6	159	436	165,850	4	214
Collisions, miscellaneous	3,437	1,551,252	115	2,236	2,681	1,154,520	94	1,802	3,735	1,697,687	112	2,613
Total	5,861	4,629,279	433	7,765	4,411	3,108,691	342	5,395	6,363	4,635,199	414	7,712
Deraillments due to defects of roadway, etc.	1,115	914,642	42	1,337	991	708,658	25	1,195	1,429	1,088,261	46	1,588
Deraillments due to defects of equipment	2,734	2,227,352	40	639	2,362	1,875,646	28	631	2,798	2,176,194	37	831
Deraillments due to negligence of trainmen, signalmen, etc.	377	228,843	23	311	307	186,768	25	329	406	273,038	31	376
Deraillments due to unforeseen obstruction of track, etc.	330	464,414	58	825	331	444,308	79	480	381	562,441	67	590
Deraillments due to malicious obstruction of track, etc.	66	165,185	18	227	51	93,037	21	166	90	144,903	24	215
Deraillments due to miscellaneous causes	1,276	1,184,245	159	1,478	1,217	1,063,085	83	1,534	1,572	1,305,624	109	5,112
Total	5,918	5,194,679	340	4,814	5,259	4,371,512	261	4,141	6,671	5,548,461	314	5,122
Total collisions and deraillments	11,779	9,823,958	753	12,579	9,670	7,480,203	603	9,536	13,034	10,183,660	728	12,834

ward so as to clear the cross-over track for eastbound train No. 10. In this message he stated that the eastbound train had left E at 5:55 a.m., but that it could not reach B until after No. 10 was out of the way. He did not say that the eastbound train was on the westbound track, for he assumed that this information had already been given to the westbound train. According to the rules, however, he should have delivered to extra train 9 a copy of the order which was neglected at M. Although he had cleared the block signal to allow extra 9 to pass beyond his cross-over switches, he had not secured the block from D.

The engineman of train 9, a man of long experience, acknowledged that he did not understand the meaning of the message delivered to him by the operator at B, and he is held at fault for not stopping his train and securing an explanation. Having had no orders from the despatcher, and having received a clear block signal, he proceeded from B westward and met the eastbound train near C. At the time of the collision each train was moving about 25 or 30 miles an hour. After extra train 9 left B the operator there informed the despatcher, and it was then discovered that the order giving the eastbound train the right to the westbound track had not been delivered. The operator at B telephoned to the agent at C, who was at his house, and this agent tried to stop the eastbound train, but was a few seconds too late to do so. The operator at M was 23 years old and had been in the service three months. The operator at B was 22 years old and had been in the service two months. The despatcher is charged with exercising poor judgment in arranging for the meeting of extra 9 and another westbound train at B with eastbound train No. 10 after having given eastbound train 8 the right to use the wrong track from F to B. This despatcher is 27 years old and has been an operator about five and one-half years, but he had been employed as despatcher only about four weeks.

Collision No. 18, occurring about 2 a.m., was due either to the fault of the eastbound train in failing to send forward a flagman when it was found impossible to reach B in season to clear the time of the westbound as given in a telegraphic order, or to carelessness on the part of the westbound train in passing B before the time, as fixed in the order, to which it was required to wait at that station. The conductor and the engineman of the eastbound train were both killed, and the stations at which the time was recorded are so far apart that it is impossible to check with satisfactory accuracy the statements as to the times of the two trains. The flagman of the eastbound train was making his first trip in the service of the company and had no watch. The surviving members of the crew of the eastbound train can give no satisfactory testimony. The preponderance of evidence seems to indicate that the eastbound train was at fault.

Collision No. 19, which occurred at about 3 a.m., and in which two persons were killed, was between a southbound electric car drawing two cars of freight and a northbound electric sleeping car. The wreck took fire from some cause not discovered, and its combustible portions were entirely burnt up. The two freight cars were loaded with whisky, which may have been ignited from one of the trainmen's lanterns. The passengers in the sleeping car, of whom there were five, escaped uninjured. The southbound car had orders to stop at L to meet the northbound, but it ran a short distance past the meeting point. The reason for the disregard of orders cannot be determined, as it was the crew of this train—conductor and motorman—who were killed. The conductor had been in the service of the company two and one-half years and the motorman one year.

Collision No. 20 was due primarily to the failure of a coupling. A "trailer" attached to an electric car ascending a steep grade broke away and ran back down the grade a short distance, when it collided violently with a following passenger car. Two passengers were killed. The electric car and the trailer were not equipped with continuous brakes and there was no man on the rear car, and the men on the leading car did not discover that

the cars had parted for some little time after the breakage occurred.

Derailment No. 2, caused by a passenger train running at high speed into a turn-out because of a switch having been left misplaced, was due to a misunderstanding between a conductor and a telegraph operator (signalman), and also to misunderstanding and carelessness on the part of two operators.

A westbound freight train left S at about 5 a.m. The conductor, contrary to the regulations, requested the signalman at the station to close the switch after the train should have passed out of the side track. The conductor, after having got some distance away from the station, saw that the switch had not been closed, and so, on arriving at V, he requested the telegrapher there to communicate with S and make sure that his request had been complied with. The telegrapher at V, speaking to S, said "Did you close the —," when he was interrupted by S, who said "I certainly did." The telegrapher at V repeated to the conductor this partial question and the reply to it. This reply having been accepted as satisfactory, an eastbound passenger train was allowed to proceed from V to S, and, the switch having been left unchanged, this train ran into the side track and was derailed because of the sharpness of the curve, which was safe only for low speed. The foregoing statement as to the conversation over the wire is that which is given by the telegrapher at V. It is denied in many details by the signalman (telegrapher) at S. The man at S also disputes some of the statements of the conductor in regard to what was said when, as reported by the conductor, the original request was made to close the switch.

The derailed engine was overturned and fell against two boarding cars on a sidetrack, killing two and injuring four workmen who were preparing breakfast in the cars.

The signalman at S was 19 years old and had been in the employ of the road eight months; and the signalman at V was 25 years old and had been in the service three years.

Derailment No. 15 was due to the shifting of a load of steel bridge girders. These girders, very long, covered the length of three open cars, and as the train entered a 6 degree curve at a speed of about 15 miles an hour, the load shifted to one side sufficiently to greatly lighten the load on the other side; and in consequence of this one of the wheels on the outside of the curve rode over the rail. The shifting of the girders was made possible by the breakage of one of the bolts which held them in place.

Electric Railways.

The statistics of electric railways show that during the quarter under review, three passengers and five employees were killed and 312 passengers and 23 employees were injured in train accidents, and that the totals, including other accidents, were seven passengers and 12 employees killed and 649 passengers and 106 employees injured. The total number of collisions was 33; damage, \$54,187; total derailments, 49 and damage, \$59,547.

YEARLY TABLES.

The total number of casualties for the year was 86,178 (3,804 killed and 82,374 injured), which includes a small percentage, which did not appear in the quarterly bulletins, the reports from which they are taken having been received after the bulletins were printed.

The totals in Tables A and B for the year ending June 30, 1910, include the aggregate of the four quarterly bulletins; but bulletins 34, 35 and 36 (the last three) do not include accidents on electric railways; so that to make comparison with preceding years the figures should be increased as follows:

Table A	Passengers		Employees		Total	
	Killed.	Injured.	Killed.	Injured.	Killed.	Injured.
Electric roads, Bulletins 34, 35, and 36	29	1,750	35	307	64	2,056
Total	160	15,415	3418	68,925	3,568	84,440

The principal yearly tables are those lettered A, B and C. These are given herewith

TRACING FREIGHT SHIPMENTS.*

BY W. A. MCELLEN,

Traffic Manager, Heath & McMillan Manufacturing Co.

In business, if we lessen the correspondence we are to take care of, we feel that we are economizing; and, further, if we lessen the correspondence of those we deal with, outside of their orders for what we have to sell, we feel as if both sides of the correspondence field have been brought nearer to practical economy.

In the transportation of freight about the United States there has grown a great evil, so nearly absolutely useless that one wonders why the tracing of freight shipments is so generally practiced.

There are several reasons why a shipment does not reach the purchaser as quickly as the purchaser would desire. The first reason, very often, is that the purchase is made after the article is urgently needed, and another reason might be a delay in the mails, causing the order to be slow in arriving at its point of supply. It is possible that a question of the credit of the buyer may be involved, causing delay in the filling of the order. There may be congestion in the office where the purchase is made, and the order delayed there; there may be congestion in the factory or ware-rooms; there may be a shortage of supply of portions of the order; the order itself may be misplaced.

But assuming that all of the above has not occurred, the order has not been delayed in any way and is not wanted in a hurry. There is yet reason to consider the intricacies the shipment goes through to get to its destination. It is one thing to put some money and a bit of paper into a small receptacle strung on a wire with a spring behind it, as is seen in many stores, where they transmit the cash from sales counter to cashier; pull a trigger and see it go direct to its destination; and it is another thing to deliver a small shipment to the railway station of a large city, to be mixed up with a great variety of other shipments, then sorted out, placed in the proper cars, they in their turn to be taken to the classification yards, and the cars themselves assorted out, before they are ready to start on their journey. It means there is much to be done after the railway has receipted for the shipment, but before the shipment is actually on its way to its destination.

A customer either wires or writes, calling attention to the fact that his order placed a few days before has not arrived, and please trace or wire trace. Sometimes these requests are made at the same time the order is given.

As soon as the firm receiving the order receives the request to trace or wire trace, they have someone in their employ make an extra copy of the bill of lading or shipping ticket—that is, after the shipment has been made this is sent to the local or commercial office of the transportation line the shipment moves over. Sometimes this is followed by one or more repeats of the same request to trace the same shipment.

In the meantime, what is the shipment doing? It is traveling on its journey unconscious of the great hullabaloo behind it to hurry it to its destination. It is deaf and it trundles on its way no faster and no slower, because being traced. Why?

Because transportation lines are well organized, have an immense amount of freight to handle and apply the best systems thought out to giving despatch service on every shipment they handle. No one shipment can be taken out of its orderly place and given special transportation to speed it on its way because someone is aching to get it. The idea of that happening is absurd. If one stops to think about it, then, why trace? Because you are in a hurry, it doesn't hurry the shipment, but makes a lot of worry, work and useless correspondence for the purchaser, seller and transportation lines involved.

When a shipment is missing and will not check up with the way-bill, the transportation lines do some looking for it, because if they have receipted for the shipment and cannot deliver it they must pay for it.

It is reasonable when a shipment has not arrived in a reasonable length of time, and has been receipted for a long enough time to be content that it is missing or lost; that it should be industriously traced, and the transportation line involved urged to use its best efforts to deliver the shipment before a claim is filed for the loss.

When one desires to know what time is consumed between starting and finishing point, a tracer will bring that information in the course of time.

What happens when you send a railway office a request to trace a shipment? It is one of many, maybe hundreds, that are arriving at the same office daily, and as they come in they are placed at the bottom of a stack of others; the tracing clerk takes the top one, looks up the way-bill reference and makes inquiry at point of origin and destination as to time of starting and delivery; all of this takes much time and causes a lot of research work on the part of the employees of the transportation line involved. In the course of time the person requesting tracing receives a letter stating the shipment arrived at its destination on a certain date. This information is from two weeks to two months getting around, and only tells one the date the shipment arrived, if it did arrive, but the shipment moved no faster, for it would be impossible for it to move faster, in spite of all of the worry, work and anxiety brought out by the request to trace. In this connection there is little thought given to the immense amount of expense placed on the transportation lines by the useless tracing, which someone must pay for.

ELECTRIC LOCOMOTIVE FOR FREIGHT AND SWITCHING SERVICE.

The Transit Development Co., a subsidiary of the Brooklyn Rapid Transit, has placed in service an electric locomotive which was designed for use in switching and freight service over the Brooklyn Rapid Transit lines and was built by the General Electric Co. and the American Locomotive Co. jointly. The rapidly increasing demand for freight service over the Brooklyn lines and the peculiarities of this service have demanded a locomotive having several special features. The collection of heavy freight from railway terminals and docks and the occasional short, sharp grades encountered, particularly along the water front, have necessitated a heavy type of locomotive, while the distribution of freight to shops and factories as far distant as South Brooklyn and Coney Island, and the requirement that this must not interfere with passenger service, made it imperative that the locomotive should be capable of operating at high speed. To fulfill these requirements it was essential that it should be more heavily motored than one designed for ordinary switching service.

The trucks are of the M. C. B. equalized type, with double elliptic bolster springs and swing bolster, all wearing parts being interchangeable with similar trucks under Brooklyn Elevated motor cars, except the springs, equalizers and such other parts as have required a heavier construction on account of the greater weight to be carried.

The locomotive platform is constructed of longitudinal sills of 10-in. channels and is fitted with cast iron end frames and heavy built up bolsters. The platform is squared and braced by heavy floor plates extending the full width of the locomotive and riveted to the longitudinal sills. The locomotive has been designed for a weight of 55 tons, and the ballast required to bring it up to this weight consists of 10 x 2-in. bars running the entire length of the platform, notched over the bolster plates and bolted to the longitudinal sills.

The cab consists of a main operating cab in the center of the platform, with auxiliary end cabs and side platforms extending out toward the ends of the locomotive. This gives an extended view in all directions to the operator from his operating seat, and on this account was preferred to the box type used on previous Brooklyn Rapid Transit locomotives.

* The locomotive is furnished with high-power motors, the equipment consisting of four GE-212-B motors. The GE-212 is

*From an article in the Paint and Varnish Record.

a commutating pole motor, with a rating on the standard one-hour basis of 225 h.p. These motors have demonstrated their satisfactory operation under severe fluctuation of load and voltage and are needed in the present case in order to meet the requirements presented by heavy tractive effort under starting conditions and high speeds upon the level. The locomotive is capable of exerting a tractive effort of 16,880 lbs. at 20 m.p.h. at the one-hour rating of the motors; or of maintaining a tractive effort of 6,000 lbs. at a speed of 30 m.p.h. In other words, it is capable of operating a 500-ton trailing train on 2 per cent. grades or of pulling the same train at a maximum speed of 30 m.p.h. on the level.

Sprague General Electric type M control has been furnished, which provides three combinations of motors, with a total of eighteen steps. Such a control is demanded by the conditions of service because a high speed is required for level running with through freight and an economical slow speed for heavy switching work. The transfer from one combination of motors

FOREIGN RAILWAY NOTES.

As a result of borings in the district of Talcahuane, in Chili, large coal beds are said to have been discovered. It is estimated that the beds will yield 150,000,000 tons.

The railway employees in France have a national "syndicate" or union, with branches on each of the six great stems. The secretary of that branch which includes the State Railway employees issued a circular instructing the men on the conduct to be followed in case of a strike. If all the employees should not join in the strike, as soon as one is declared, bodies of resolute members of the union must be formed at all important points, determined to stop the running of trains, cost what it may. They must include those familiar with the complications of traffic, and able to select the weak points, and to disable rolling stock, etc., by removing indispensable parts. They must



Electric Locomotive for Freight and Switching Service on the Brooklyn Rapid Transit Lines.

to another has been arranged in connection with the rheostat steps so as to secure a uniform gradation of tractive effort throughout the entire range of control.

Third rail shoes and trolley poles are arranged to collect current either from a third rail or from an overhead trolley, as demanded by the equipment of the various Brooklyn elevated and surface lines. Air compressors are mounted in the main cab. All wiring is in conduit and so arranged as to give the interior of the cab a neat appearance. The following table gives the principal dimensions of the locomotive:

Type of motors.....	GE 215-B
Number of motors.....	4
Gear ratio.....	3.37
Number of driving wheels.....	4
Diameter.....	34 in.
Track wheel base.....	23 ft. 2 in.
Wheel wheel base.....	6 ft. 8 in.
Length main body.....	31 ft. 1 in.
Length motor cars.....	8 ft. 0 in.
Length full length all.....	97 ft. 0 in.
Total weight.....	110,000 lb.
Tractive effort at full power.....	16,880 lb.
Speed at maximum tractive effort.....	17 m.p.h.

look out for the soldiers, who will occupy the stations at the first alarm. All comrades must cherish hatred against those parasites of society, the capitalist class, and spread among other workmen contempt for legal and parliamentary action, and preach boldly the use of extra-legal means; direct action, injury to the service, anti-militarism and anti-patriotism.

An officer of the transportation department of the Russian empire has been trying to learn if it would not be possible to have express trains run a little faster. On the great Nicholas Railway, 400 miles long, between St. Petersburg and Moscow, the fastest train heretofore has been 11 hours on the road. Trials have been made, and it is now announced that one train will hereafter make the journey in nine hours; but doubts are expressed whether, with the present condition of the road, such speed will be safe. As each of the terminal cities has a population of more than a million, it would seem proper to make the road fit for such speed, if it is not already.

General News Section.

The engineers of the Cincinnati, Hamilton & Dayton have been granted an increase of 6 per cent. in wages, effective November 1.

The Burlington has granted an 8 per cent. increase in the wages of its telegraphers. The increase affects 2,765 men and amounts to \$110,000 annually.

At Toledo, Ohio, November 2, the grand jury, in the federal court, found indictments against the Hocking Valley railway, charging the company with illegal discrimination in favor of the Sunday Creek Coal Company. Indictments were also returned against the coal company.

The commission on the issue of railway securities and the capitalization of railways, of which Arthur T. Hadley is chairman, will, it is understood, begin a series of public hearings at Washington about November 28. The hearings will be held in the Senate office building.

The extension of the Hudson & Manhattan Tunnel railway northward from Twenty-third street to Thirty-third street, New York City, was put in operation November 10. A special train with a party of guests was run over the line last week. On the extension farther northward from Forty-second street and thence eastward to the Grand Central Terminal construction is to be begun next spring.

F. H. Clark, general superintendent of motive power of the Chicago, Burlington & Quincy, delivered an address before the students and faculty of the College of Engineering of the University of Illinois on November 3, his subject being "Problems of the Motive Power Department." Mr. Clark graduated from the University of Illinois with the class of '90.

Telephones have been introduced for train despatching on the Shasta division of the Southern Pacific, 291 miles; 206 miles of the main line between Ashland, Ore., and Red Bluff, Cal., and 95 miles on the branch from Weed, Cal., to Klamath Falls, Ore. The dispatcher is at Dunsmuir, 98 miles north of Red Bluff, the southern terminal of the circuit. This entire circuit is composed of copper wire, metallic circuit, weighing 300 lbs. per mile.

The favorable incidents which are entered on the records of the employees of the Illinois Central, as published in the *Illinois Central Employees' Magazine*, include some things not often found in such records. A station agent and a signal maintainer discovered a brake-beam dragging under a car and stopped the train; a station helper discovered the defective condition of a tender truck while the train (No. 3) was standing at his station; a conductor discovered a broken arch bar in the truck of a refrigerator car; a brakeman is credited for quickly discovering that a car of his train was off the track, and a flagman received favorable mention for having discovered a broken rail.

The New York Chamber of Commerce, the Merchants' Association and a number of smaller organizations have sent communications to the New York State Public Service Commission, First district, asking that it defer the letting of contracts for the construction of the proposed tri-borough subways. The Chamber of Commerce, acting on the report of a committee headed by E. H. Outerbridge, asks a reconsideration of the plans on the ground that the cost of the proposed work is more than the city can reasonably bear. It is declared also that money should not be spent for construction until after more complete estimates have been made of the probable cost of equipment and operation.

The strike of express wagon drivers in New York city, Jersey City and Hoboken has been kept up throughout the past week, and, so far as the reporters can gather, the large express companies are seriously crippled in their collections and deliveries. The employment of new men has been hampered by a decision of the mayor of New York to the effect that every man driving an express wagon must have a license from the city; and licenses are granted only after some investigation of the character of the applicant. There has been but little violence during the past week, but innumerable cases of annoyance, and on Election Day

the large express companies, as well as the independent expressmen of some drivers, either had been ordered to strike or else refused to work because of the strike, retaining their own outfit and wagons. The war at the expense of the police department of the city, many policemen being engaged at the voting places. Some of the express companies displayed on their wagons placards reading "Engaged in interstate traffic only," claiming that in interstate traffic the city could not exact licenses. The drivers of taxicabs also joined the strikers in considerable numbers, but some of the taxicab companies, as well as some of the department stores, came to agreement with the representatives of the teamsters' unions.

Losses by fire in the United States and Canada during the month of October, as tabulated by the *New York Journal of Commerce*, amounted to \$37,188,300, an unusually large sum, and the largest total for a month since the San Francisco conflagration. The forest fires of the Northwest contributed \$14,600,000 to this list. Without the forest fires, however, the total is still about \$5,000,000 more than for the same month in 1909. The very long list of fires causing a loss of \$10,000 or more includes the following items referring to railway property:

Tucson, Ariz., railway shops, locomotives and cars..	\$350,000
Yerfolk, Va., railway ferryboat.....	50,000
Indianapolis, Ind., railway freight house.....	120,000
Memphis, Tenn., grain elevator.....	75,000
Southern Ontario, forest fires.....	600,000
Northern Idaho, forest fires.....	4,500,000
Montana, national forests.....	6,000,000
Northern Minnesota, forest fires.....	3,500,000
Jamestown, Cal., railway shops.....	10,000
Galveston, Tex., railway pier.....	155,000
Princeton, Ind., railway machine shop.....	400,000
Sterling City, Cal., railway roundhouse and dwellings.....	50,000
Hannibal, Mo., railway shops.....	100,000
Calumet, Mich., lake steamer.....	150,000
Charleston, S. C., railway freight house.....	25,000
Elliotree, S. C., railway platform and cotton.....	15,000
Topeka, Kan., railway storage yards.....	500,000
Newbern, N. C., railway freight depot.....	125,000

Demurrage Bureaus.

For the recent withdrawal of important railways from demurrage organizations at Chicago, Buffalo and elsewhere three reasons are given, as follows:

1. The railways have on file with the Interstate Commerce Commission, and with the state commissions where required, tariffs covering demurrage rules, for the enforcement of which the railways are responsible.
2. Under uniform rules the statistics heretofore kept by car demurrage bureaus are no longer of any value.
3. The supervision and accounting necessary to see that the filed tariffs are complied with should be placed under the proper departments of the railway company.

These reasons do not appear to me to touch upon the central purpose of the bureaus, which has been to give uniform interpretation to the rules, assure each member that all the other members are "toting fair" in demurrage matters, and to act as an impartial adjuster of claims made by shippers and consignees.

Some of the car accountants used to argue that a considerable economy could be effected by giving them charge of demurrage rules, and abandoning the bureaus. This economy seems only to have considered the payrolls of the bureaus, and gave no heed to the joint and impartial service of the bureaus. It is being discovered now that there is but little economy even in that direction, but the cost to individual roads may be so distributed as to make it appear that a considerable economy has been effected.

It does not always appear to a railway to be to its best interest to enforce demurrage rules. And to say that shippers and consignees in the past few years have come to regard a demurrage rule as a beneficence, sounds very funny to a demurrage manager. Most of them think the penalty obnoxious, except in rare instances when it is applied to the other fellow. Talking generally, shippers will usually admit the reasonableness and the necessity for the demurrage rules; but undertake to collect a demurrage charge from them if you want to learn their real thought.

I have yet to meet a railway man or a shipper who says he

thinks the new order a good one. They all say that it appears to them to be a great mistake. Many of the railways that have followed in the movement have done so reluctantly. Governmental authority has given us the uniform demurrage code and now action is taken to destroy the organization best equipped to maintain uniformity.—A. G. Thomason, in *Wall Street Journal*.

Negotiations Between Western Railways and Brotherhood of Engineers Broken Off.

The representatives of the Brotherhood of Locomotive Engineers who have been negotiating with the officers of 60 Western railways for increases in wages have broken off negotiations. and on November 7 they announced that they would submit to a vote of the members the question of whether the officers of the brotherhood should be authorized to declare a strike. The vote will be canvassed in Chicago on December 10, and, it is said, will be the first of this kind that has been taken by the Brotherhood of Locomotive Engineers since the strike on the Burlington in 1888. The railways concerned are all (with a few exceptions, such as the eastern part of the Wabash) west of a line drawn north and south through Chicago. Practically all of the roads west of this imaginary line are involved. They have 136,000 miles of line, or about 53 per cent. of the total mileage of the country. The total number of members of the brotherhood on these roads is estimated at 33,000, but the total number of locomotive engineers employed by them is about 40,000. These negotiations have been in progress since September 26. The railways have been represented by W. B. Scott (Harriman Lines), chairman; A. W. Trenholm (C., St. P., M. & O.), F. C. Batchelder (B. & O. Chi. Term.), F. E. Ward (C., B. & Q.), G. H. Emerson (Great Northern), Grant Hall (Canadian Pacific), F. C. Fox (A., T. & S. F.), W. A. Durham (M., K. & T.), T. J. Foley (Illinois Central), and H. J. Simmons (El Paso & S. W.). The brotherhood was represented by Grand Chief Warren S. Stone and Assistant Grand Chiefs Cadle, Burgess, Kennedy, Mil's and Corrigan.

Before the negotiations were broken off the railways offered the enginemen increases which would have averaged 9½ per cent. and would have amounted in the aggregate to about \$3,600,000 a year for the 40,000 employees who would have gained by them. This would have been as high a percentage of increase as was awarded by State and Federal boards of arbitration last summer to the Western switchmen and firemen. Mr. Scott gave out a statement in which he said in part:

"The railway managers did not feel that in view of the present earnings of the roads there was any justification for their making such large advances in wages, except that the boards of arbitration had already awarded advances to the switchmen and firemen, and the managers felt that the engineers should be raised in the same proportion, although the net earnings of the railways involved were \$3,500,000 less in July and August, 1910, than in the same months of 1909. In this connection it should not be overlooked that in 1907, only a little over three years ago, the engineers were given increases in wages averaging 8½ per cent. If they had accepted the proposition of the railways their wages would have been made 18 per cent. more than they were a little over three years ago.

"About a week ago Mr. Stone asked the railway managers if they would agree to ask for mediation by Chairman Knapp, of the Interstate Commerce Commission, and Labor Commissioner Neill. The railway managers promptly replied that they were willing to submit the question to mediation. The next day Mr. Stone delivered to the railway managers an ultimatum. Mr. Stone was asked if he had withdrawn his mediation proposition. He said that he had not made any proposition; that he had merely asked if the railway officers would consent to mediation, and announced vigorously that he would not consent to mediation or arbitration on any of the questions involved."

When the representatives first met, the representatives of the enginemen presented demands which would have involved increases averaging 27 per cent. These included an increase of 15 per cent. in the pay of road enginemen, 32 per cent. in the pay of switch enginemen and 15 per cent. in the pay of enginemen on Mallet locomotives. The railways recognized the equity of making certain readjustments on account of the increases that had been granted to other employees, as mentioned above. They asked that the demands of the enginemen be modified, but this request was declined. The railway managers then offered increases ap-

proximating 6 per cent., which were less in percentage but equal in actual money to the advances that had been given to the firemen and switchmen. The enginemen rejected this and renewed their original proposition. The managers refused to consider this, and the enginemen made a modified proposition for an advance of 24 per cent. This being unsuccessful, too, they subsequently made a modified proposition for an advance of 18 per cent. The railway managers indicated that if the employees would make a proposition for an advance approximating 13 per cent. they would consider it. The enginemen then made a proposition which they claimed amounted to 13 per cent., but which really amounted to 16½ per cent. The managers then offered the advance of 9½ per cent., which was a split between the 6 per cent. they had offered and the 13 per cent. which the representatives of the enginemen claimed they were asking. The representatives of the enginemen rejected this proposition.

One of the points on which the managers and the enginemen differed most widely was regarding the differentials that should be established between the wages of the men on Mallet compounds and on other freight engines. The managers were willing to increase the differential between the pay on the two types of engines to 75 cents a day, but the employees insisted on a differential which would have made the pay of men on Mallets almost double that of those on other freight engines. The enginemen also insisted that the authority of their union be extended to matters relating to all kinds of power used on steam railways, and particularly over gasoline motor cars. The railway managers indicated a willingness to give the old enginemen preference when motormen were to be employed, but would not consent to making the positions of engineman and motorman entirely interchangeable.

Another point on which differences developed was regarding the amount of preparatory time that should be allowed enginemen for getting their engines ready for their runs. Enginemen are now required to be at their engines 30 minutes before leaving time. The committeemen wanted this time to be counted in the period during which they were on duty. They also demanded that all time during which they are delayed en route shall be counted as overtime. Of course, the reason for this is that the enginemen are paid on the mileage basis, and if a man ordinarily makes a run of 100 miles in two hours and a half, and on account of a delay of 30 minutes en route the length of time that he is out is increased to three hours they want him to be paid overtime for the extra 30 minutes. The managers refused to agree to pay for preparatory time, etc., except when the man actually worked more than the maximum number of hours constituting a working day.

Electrification Estimates of B. & A.

The Massachusetts legislature has for two or three years been considering whether it would not require the railways entering Boston to electrify their most congested lines, and the special commission which was appointed to attend to the matter has lately received tentative plans from the roads. The plans presented by the Boston & Albany, which are called "studies," are set forth at considerable length in the *Boston Transcript*. The officers of the Boston & Albany say now, as they said two years ago, that if they electrify their line they will have to carry the scheme at least as far as South Framingham, 22 miles, and that it will not pay; net receipts will be reduced. The *Transcript* does not claim to have authentic information as to these plans but its guesses appear to be based on what must have been quite detailed inspiration.

Of the 228 trains to and from Boston over that road, daily, about 65 per cent. begin and end their trips within the district which it is proposed to electrify. The New York Central, which controls the line and which has been using electric traction at New York for several years, would use direct current at Boston the same as at New York, but the art has made such progress since the New York lines were electrified that a current of 12,000 volts probably would be used. It is estimated that the Edison Company, with its enormous units of power, probably could furnish current to the Boston & Albany cheaper than it could itself generate the electricity in a power house of its own. On the four-track line from Boston to South Framingham, the passenger stations are all on the south side of the line and the local trains use the southernmost pair of these tracks; but in electrifying the line and increasing the speed and frequency of

trains, the westbound electric trains would probably be changed to the northernmost track, thus necessitating the establishment of duplicate platforms and buildings at each station, with overhead bridges, or passages beneath the tracks, for passengers crossing from one side of the line to another. It is not probable that the Boston & Albany would be willing to use the subway tracks in the South station, as to do this it would be necessary to cross the New Haven tracks at a point some distance out. Probably, also, it would be necessary to build a new overhead station at the Back Bay in place of the present outbound and inbound stations, which are separate one from the other.

Texas Opposition to Federal Regulation of Securities.

W. D. Williams, of the Texas Railway Commission, has written a letter to William E. S. Griswold, of the commission which was appointed by President Taft to investigate the question of federal regulation of railway securities, opposing the regulation of securities by the federal government. Mr. Williams says that the people of Texas have worked out a system of railway regulation and are operating it "reasonably well and fairly to the satisfaction of our own producers, consumers and middlemen."

He continues:

"If there were no other reason—and there are many—against Federal jurisdiction of railway capitalization, it ought to be sufficient that it takes from Texas the benefit of its 20 years of struggle and effort and subjects it now to the hazard of some new and untried plan. It deprives it of its local control of a matter which vitally affects its local prosperity. It compels it to submit to methods which may and probably will be entirely unsuited to its local necessities. And most of all, with the expansion of Federal jurisdiction, our citizens who are eagerly interested in and entirely qualified for state and municipal affairs, who look at these things close at hand and can trace the effect of local politics in local business and upon the local welfare, find themselves deprived of their power, which is transferred to a distant and national governmental center, where their own wishes are unconsidered and they are themselves without political potency. Their interest in the public good dies and they come more and more to feel as a people who are without a country. More and more they turn their attention to striving for material gains alone and always, in which this unnatural growth of the Federal power continues, the value of our citizens becomes less and less. Wealth may increase, but liberty will surely decay."

Walker D. Hines on the Railway Situation.

Walker D. Hines, chairman of the executive board and general counsel of the Santa Fe, in a recent address at Topeka, Kan., said:

"We all recognize that a new era has come in railway management. I believe that railway officers generally accept in the utmost good faith this new state of affairs and earnestly desire to co-operate with the public and to give the public full information as to railway conditions. I have come in contact to an unusual extent with the presidents and general counsel of practically all of the important railways in the United States and have frankly exchanged views with them upon this subject, so that I think I am especially well qualified to assure you that railway officers do accept the new order of things in the proper spirit.

"But the change which has come about and has caused the public to take such active part in railway management calls for a change of attitude on the part of the public as well as on the part of the railways.

"The first point to which I wish to call your attention is that there is a mistaken notion in the present day that it is unlawful for railway companies to earn more than 6 per cent. upon their value. This idea is repeatedly asserted, but is absolutely wrong.

"It is generally claimed by those who assert this error that the supreme court of the United States has announced the principle that railways and other public service corporations ought not to be permitted to earn more than 6 per cent. upon their value and the supporters of this claim generally cite the supreme court's decision in the New York Gas case. Perhaps you will be surprised when I tell you that neither in this case nor in any other case has the supreme court ever decided any such thing. On the contrary, all that the court suggested in

that case was that the legislature constitutionally could not reduce the rates of the gas company so as to produce less earnings than 6 per cent. upon the company's property.

"The next point to which I wish to call your attention is that the public cannot afford to overlook the fact that a railway company must be continually enlarging and improving its property so as to meet the needs and requirements of the public and promote the public convenience and safety.

"It is the conclusion of the directors of the Santa Fe, to instance one road, that in order to spend the \$50,000,000 a year needed for the improvement and extension of the property so as to meet public requirements and promote public conveniences and safety, it will be necessary to have about \$10,000,000 of surplus earnings after paying a dividend of 6 per cent. on the common stock, and to invest this in the property, and that this will afford a basis for borrowing additional money at the rate of about \$20,000,000 a year to invest likewise in the property, thus affording the sum needed for the improvement of the property.

"To cut down earnings so as to allow only 6 per cent. on the present common stock and to leave no surplus to invest in the property and sustain the company's credit will put an end to the raising of the money needed for the proper development of the property."

University Extension for Engineers.

The United Steam Engineers of Detroit have concluded an arrangement with the University of Michigan, by which the university will co-operate with the engineers in giving instruction in Detroit regularly five days in a week—the university extension idea applied to the instruction of engineers. The plans are now being perfected. The "United Steam Engineers" includes two local societies of the International Union of stationary engineers, two of the National Association of stationary engineers, and one each of the Universal Council of Craftsmen and the marine engineers' association. These bodies are made up of men who run stationary engines, engines on boats, hoisting engines, etc., including, we believe, gas engines. The members of these associations recognize that their work is now of such an exacting nature and its complications are so constantly increasing, that the only way for engineers to keep up-to-date and for their helpers to prepare themselves properly for promotion, is to have improved means of availing themselves of all possible knowledge in their field. It is expected that Dean Cooley, of the engineering schools of the university, will appoint an instructor who will reside in Detroit. Probably this instructor will arrange to hold evening classes at such places, and with such frequency as may be necessary to supply the wants of all the associations interested. It is proposed to provide a three years' course of instruction. It is said that the organizations named have 1,400 members in Detroit.

Mr. Stilwell's Plans.

I am in favor of controlling railways by a fixed policy, making the requirements everywhere the same, and as simple as can be framed in order to execute the laws and guard public safety.

Why cannot specifications, as for building, be mutually agreed upon so that when capital makes up its mind to build a railway it may read the rules governing the investment and if it does not like them—may invest in some other enterprise, or go to Mexico or Argentina or Canada, where the building of railways is cordially invited and heartily encouraged?

If electric headlights are a requisite, insert it in the specifications; then you will not buy acetylene headlights on all your new engines one day and the next have to change them for electric lights. If you must run three passenger trains daily, even though there is not enough business for two, put it in the specifications! If you are not to be permitted to place advertising matter in the stations, put it in the specifications! If you must manure the cattle's hoofs and braid pink ribbons in their tails, in transit, put it in the specifications! If a brakeman is needed at the front while trains are running through cities, put it in the specifications! Let's find or create a correct state standard and then adopt it for all roads throughout the Union.

There are hundreds of instances where the state requirements, as to conditions, are more unfair than the rates.

If the different states would agree to appointment of an arbit-

tration committee comprising 10 or 12 of the representative business minds of the United States; this committee to draft a simple railway law that would be uniform in its requirements, such board would understand how to cut out the driftwood of complications and simplify the law. Then let each state accept it for a 10 or 15-year period.

This plan would bring great prosperity; the following influx of foreign money would be as great as though a Klondike had been discovered in the heart of the United States.

Each road would then understand what it must do through its set specifications, and if it does not approve the restrictions would refrain from building.

The greatest question before the American people is to simply solve the railway problem and to do it quickly—the quicker, the better.—*A. E. Stilwell, president of the Kansas City, Mexico & Orient, in The Bankers' Magazine.*

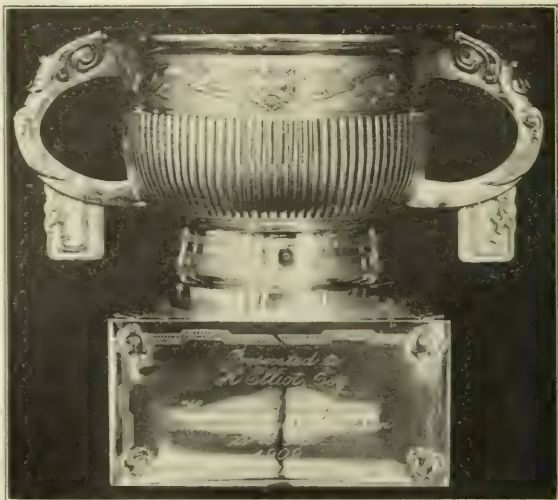
Mr. Kahn's Observations in the West.

In my tour of the West I was impressed by the stupendous business opportunity the section holds out, and by the very great amount of money that will be required to develop this section. The building of railways and of industrial works will call for vast sums, and it is the moderate investor who must supply this money. The rich have not money enough. Rich men are only the instruments through which large enterprises are carried out. The moderate investor will demand safety against attack. It is always the investor of moderate means who is injured by agitation and disturbance. Men of wealth can foresee disaster in time to escape. When trouble threatens, capital runs, and it can run faster than any sprinter. I believe agitation is on the decline, the crisis past. All that business asks is that it shall have stable conditions to work under; that those who shape public policy shall decide what they want to do. Business then will adjust itself to conditions.—*Otto H. Kahn, director of the Union Pacific.*

Japanese Commercial Commissioners Honor Howard Elliott.

When the Honorary Commercial Commissioners of Japan were in the United States last year on their trip around the world, Howard Elliott, president of the Northern Pacific, did a great deal to make their visit to this country pleasant and profitable. He assisted the cities of Seattle, Spokane, Tacoma, Portland and San Francisco in perfecting the arrangements for the entertainment of the commissioners in these cities and se-

"The Honorary Commercial Commissioners of Japan, who, at the invitation of the Associated Chambers of Commerce of the Pacific Coast, made an extensive tour through the United States in the latter part of 1909, occupying three months and covering 11,000 miles and 53 cities, desire to place on record their most grateful recognition of the courtesy and hospitality uniformly extended to them both by the officials and people of



Cup Presented to Howard Elliott.

the United States. They believe that this visit has materially contributed to the consolidation of the bonds of amity and good understanding and the development of trade relations between the two nations, whose continued welfare and prosperity will always be the object of their sincere solicitude.

(Signed)

Shibusawa, Eiichi, Baron
Nakano, Buei
Ito, Michio
Furue, Nagataka
Hara, Rintaro
Hara, Ryuta
Hibiya, Heizaemon
Horikoshi, Zenshiro
Ito, Morimatsu
Ishibashi, Tamenosuke
Iwabara, Kenzo
Iwamoto, Einosuke
Iwawata, Suetaro
Kadono, Tomonosuke
Kanda, Naibu, Baron
Kanino, Kinunosuke
Kawke, Kunio
Kumakura, Taro, Dr.
Maeda, Tokunosuke
Matsukata, Kojiro

Matsumura, Toshio
Mizuno, Kokiichi
Minami, Takajiro, Dr.
Nakahashi, Tokugoro
Naga, Kaichiro
Nishiike, Nariyoshi
Nishimura, Jihei
On, Rokushiro
Orin, Kakei
Sakaguchi, Heibei
Satake, Sakutaro
Shito, Akira
Soda, Kinzoku
Takahashi, Shingoro
Takahashi, Narazo
Taki, Kumejiro
Tamura, Shinkichi
Wada, Toratiro
Zamito, Motosada



Resolution of the Japanese Commissioners.

entured them to the different railway companies. In appreciation of Mr. Elliott's many services to them, the commissioners have just sent him a loving cup, of which a photographic reproduction is given herewith. It has also sent him a resolution on silk, a reproduction of which is also printed herewith. The translation of the resolution is as follows:

What's In a Name?

Following the rejection of the application by the Cincinnati, Georgetown & Portsmouth Railroad Company for remission of taxes, it is probable that the company's charter, which is for a steam road, may be changed. The company has converted its road into an electric interurban railway, but still uses a steam locomotive on some heavy grades in hauling freight. Electric roads in Ohio pay a tax of but one and two-tenths per cent. on their gross receipts while steam roads pay 4 per cent.

Railway Apprenticeships Desired for Chinese Students.

Consul General S. S. Knabenshue, of Tientsin, China, under date of Sept. 3, 1910, states that the president of the Tongshan Engineering and Mining College is desirous of obtaining apprenticeships with American railway companies or railway supply companies for graduates in the course of railway engineering offered by that college. This would enable the Chinese apprentices to become familiar with American railway materials, and would undoubtedly exert some influence in securing future Chinese orders for these materials.

Traffic News.

The Pennsylvania Railroad has announced increases in season ticket fares throughout its New Jersey division.

The committee of the New York Chamber of Commerce, which has had under consideration the subject of uniform bills of lading, expects to take the subject up again at the next session of Congress.

A traffic arrangement has been made by the Western Pacific and the Santa Fe under which the Western Pacific will be able to ticket passengers to points in California reached by the Santa Fe or the Pacific Coast Steamship Company, and these lines in return will be able to ticket passengers eastward to points on the Western Pacific. Under this arrangement the Western Pacific will sell to Los Angeles over the Santa Fe.

The Southern Railway has established a Cotton Culture Department, with headquarters at Chattanooga, and proposes to show the farmers in its territory how to guard against or vanquish the cotton boll weevil. The department is in charge of T. O. Plunkett, and it is proposed to engage practical farmers, who have had experience in dealing with the boll weevil, to devote their entire time to visiting the farmers and telling them how the cotton growers in Texas have succeeded in securing large yields of cotton in spite of the pest.

The western railways have announced their intention of seeking to restore their rates between the Mississippi and the Missouri rivers and between Chicago and Denver to the basis on which they were before the courts suspended the order of the Interstate Commerce Commission in the Missouri river and Denver cases requiring them to be reduced. The commission's order was for two years, and it expired by limitation on November 10. It is anticipated that the commission will suspend the advance and that the case will have to be tried all over again.

Representatives of the railways and the commercial organizations at Chicago have agreed, after prolonged negotiations, on an arrangement of switching rates under which the railways entering that city will absorb practically all switching charges on long distance shipments. Rates which had been in effect for years were abrogated about three years ago, making a heavy advance. The shippers then appealed to the Illinois Railway Commission, which fixed new switching tariffs. The railways appealed to the courts alleging that the commission's rates were confiscatory. The rates now agreed upon are higher than those fixed by the commission but satisfactory to shippers because of the method of readjustment. On the new basis the railways will absorb switching charges in such a way that the same rates will be made to all points within the Chicago district. The line bringing freight in or taking it out of this territory absorbs such connecting line switching charges as may be necessary to make delivery to or receive from industries, warehouses or elevators when the freight charges are \$15 a car or more. When such charges are less than \$15 the rate will include such portion of the switching charges as will leave the carrier the same net revenue as would accrue after absorption of the switching charges in a fifteen dollar charge. The rate for connecting line switching, except on grain, coal or coke, is to be not greater than 1 per cent. per 100 lbs., with a minimum of 60,000 lbs. per car. For switching rates within the city there will be the same carload minimum and the maximum rate will be 1½ cents per 100 lbs.

Freight Car Balance and Performance.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 84, covering car balance and performance for July, 1910, says:

"There was a falling off in traffic during July, and an increase in the number of idle cars, a natural consequence of which was a return of cars to their home lines. This movement resulted in an increase of the home percentage from 62 per cent. to 64 per cent. and a decrease in the loaded mileage to 65.5 per cent. as compared with 68.1 per cent., the June average.

"The car movement cleared up perceptibly, the miles per car per day averaging 22.8, as against 21.5 during the previous

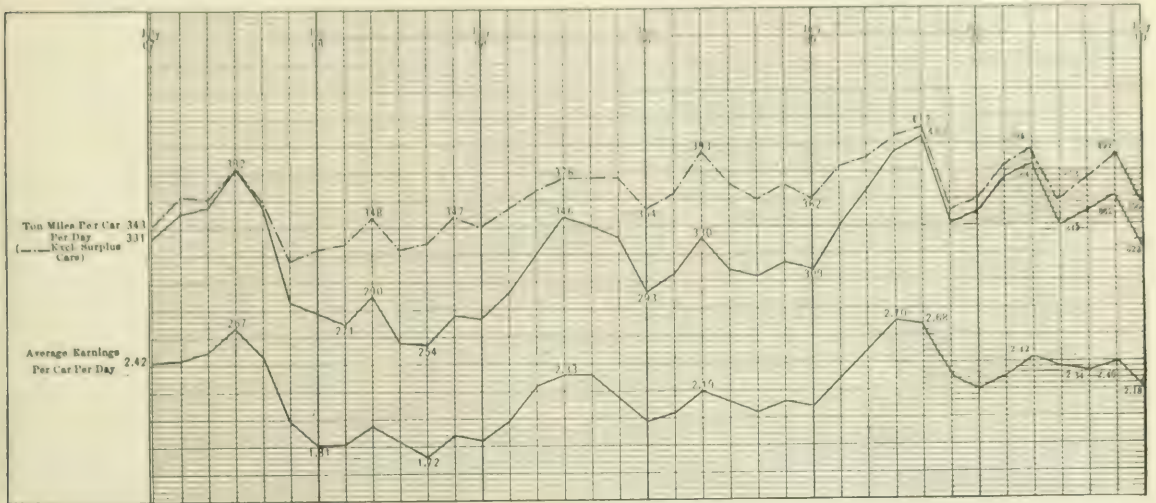
CAR BALANCE AND PERFORMANCE IN JULY, 1910.

	N. Y., N. J., Del., Md., Eastern Pa.	New England	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Ill., Wb., Minn.	Iowa, Mo., Dakota.	Mont., Wyo., Nebr., Colo., Okla., Ariz.	Kan., Tex., New Mex.	Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned	78,499	69,136	78,499	222,021	174,349	168,403	385,800	17,571	133,226	27,555	133,704	102,090	2,139,554
Average number of system cars on line	42,118	440,335	42,118	142,800	100,571	98,020	288,556	6,275	87,724	18,449	66,600	74,420	1,306,607
Railway-owned cars: Average foreign on line	36,385	242,567	36,385	88,317	51,977	42,409	110,501	12,253	46,076	16,567	57,116	27,512	732,270
Total cars on line	78,443	683,102	78,443	231,117	132,448	141,119	330,057	13,327	133,226	35,016	133,716	101,932	2,408,777
Per cent. of cars on line to total owned:													
Home	54	43	54	64	58	59	75	36	65	67	50	73	64
Foreign	46	35	46	40	30	25	28	69	34	60	43	27	34
All railways	100	98	100	101	88	84	103	105	99	127	93	100	98
Private cars on line	3,163	57,022	3,163	10,138	4,050	5,904	16,433	1,846	8,474	2,410	9,510	2,572	101,622
Total, all cars on line	81,606	740,124	81,606	241,255	156,598	147,023	415,490	20,374	141,703	37,426	143,226	104,504	2,510,399
Per cent. of freight engines owned	5.04	5.06	5.04	8.17	7.06	8.65	7.15	3.61	5.74	9.75	6.33	6.86	6.99
Average cars on line per freight engine owned	1,133	10,254	1,133	3,889	2,983	2,611	6,128	468	2,609	751	2,608	2,148	34,502
Total freight-car mileage	39,334,042	190,157,991	39,334,042	161,436,937	119,394,173	112,902,337	286,805,516	28,992,509	90,315,074	28,009,650	114,527,328	72,162,666	1,544,181,911
Average miles per car per day	15.6	22.0	15.6	21.5	21.6	24.8	32.3	46.6	21.5	24.2	27.7	22.3	22.8
Per cent. loaded mileage	74.3	56.7	74.3	66.3	65.4	70.2	69.8	73.3	68.8	66.7	71.8	74.4	65.3
Ton-miles of freight, including Company freight	411,517,571	7,382,987,210	411,517,571	2,254,730,019	1,795,871,118	1,515,627,109	2,144,230,412	409,550,807	1,241,226,492	322,230,569	1,643,917,126	961,749,427	20,064,037,800
Average ton-miles, including Company freight:													
Per car-mile	10.5	15.1	10.5	14.9	15.0	13.5	12.7	14.7	13.7	11.5	14.6	13.3	14.2
Per loaded car-mile	14.3	20.5	14.3	22.5	23.0	18.0	18.3	20.3	19.9	17.2	20.4	17.9	21.9
Gross freight earnings	163	381	163	329	370	335	283	713	295	273	405	297	323
Average daily earnings: Per car owned	\$5,049,659	\$44,314,320	\$5,049,659	\$13,151,782	\$10,306,267	\$9,908,516	\$27,854,904	\$3,320,943	\$9,954,279	\$2,756,748	\$14,764,422	\$6,520,843	\$147,015,783
Per railroad-owned car on line	\$2.08	\$2.06	\$2.08	\$1.91	\$1.91	\$1.90	\$2.33	\$6.11	\$2.37	\$3.26	\$3.56	\$2.55	\$2.24
All cars on line	2.00	1.99	2.00	1.76	2.12	2.17	2.16	5.27	2.25	2.41	3.57	2.26	2.16

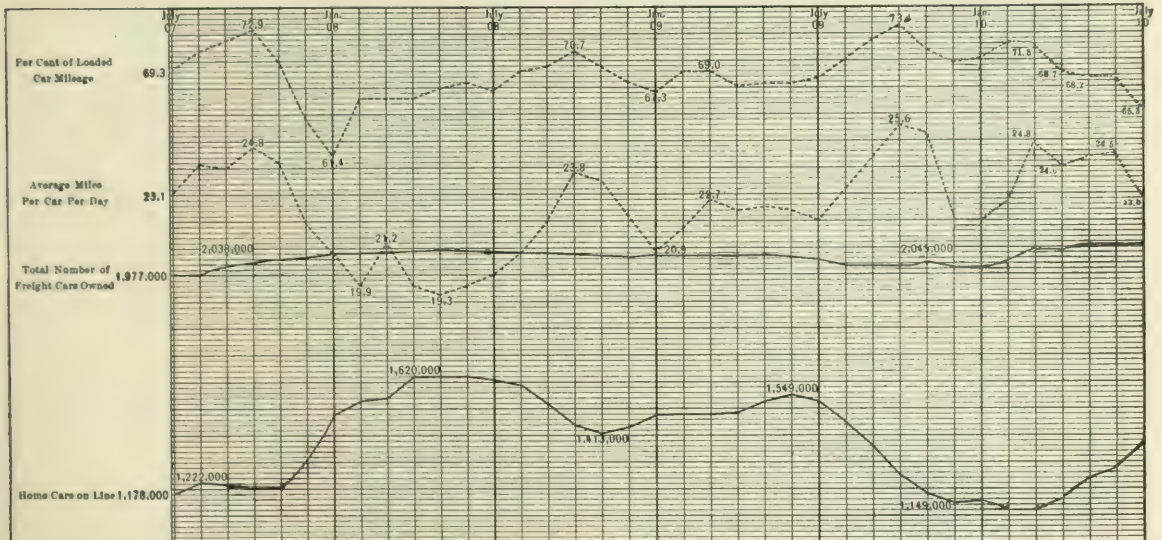
month. The shop cars increased slightly, averaging 0.99 per cent. of the total equipment in service.

The loading per car shows an improvement, averaging 91.9 tons, an increase of 2 tons over June. The combined performance, however, as represented by the ton miles per car per day, shows a falling off to 323 and the earnings per car to \$2.18, both averages being the lowest since July, 1909.

possible that if this change is made the continuation of the line to Quito may be abandoned. There have been other proposals made and a law has been passed by Congress for building a railway from Ecuador to a landing place on the Pacific coast. Playas de Salinas was originally proposed and the former place was selected. The railway from Machala to the cocoa districts is still being worked, but has not progressed at all. The Guaya-



Car Earnings and Loading.



Car Performance.

The accompanying table shows car balance and performance in July and the charts show earning and performance in 1907, 1908, 1909 and 1910.

Bahia Railway Development.

The work on the Bahia Railway has been pushed forward by the French company, and a government commissioner has been sent down to receive the first 9½ miles of the line with the object, it is presumed, of issuing the bonds in payment therefore. It has been reported that several projects are in contemplation for the change of the course of this railway, the principal one being to extend it through some of the cocoa districts round Guayaquil and to bring a branch of it to a terminus in Ecuador. The final decision, however, is not yet known. It is

quail and Quito Railway has taken over the administration and operation of the railway with the ultimate intention of extending it to Cuenca and Loja, and locomotives of the Guayaquil & Quito Railway Company have been sent down for the service of the line, which has already been taken possession of by that company.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 81-A, giving a summary of car shortages and surpluses by groups from June 23, 1909, to Oct. 26, 1910, says: "There is a decrease in the surplus of 4,604 cars, bringing the

total down to 29,131, which is 1,765 cars less than last year. The shortages total 21,896, an increase of 1,377 over last report. For the corresponding period in 1909, the shortage was 36,636. The maximum shortage in 1909 was 39,909, the figure reported for November 10.

"The reduction in surplus is principally in miscellaneous cars, which show a decrease of 3,688, made up chiefly of coke cars in group 2 (eastern), with smaller decreases in refrigerator cars in the central states and stock cars in the South and Southwest. The largest item of increases in the shortage is in flat cars on roads in group 5 (southern).

The accompanying table shows surplus and shortages by groups for the last period covered in the report, and the charts show total surpluses and shortages in 1907, 1908, 1909 and 1910:

INTERSTATE COMMERCE COMMISSION.

An order of the Interstate Commerce Commission requiring a large volume of statistics in detail, both in regard to operation and capitalization, has been issued and is commented on elsewhere in this issue.

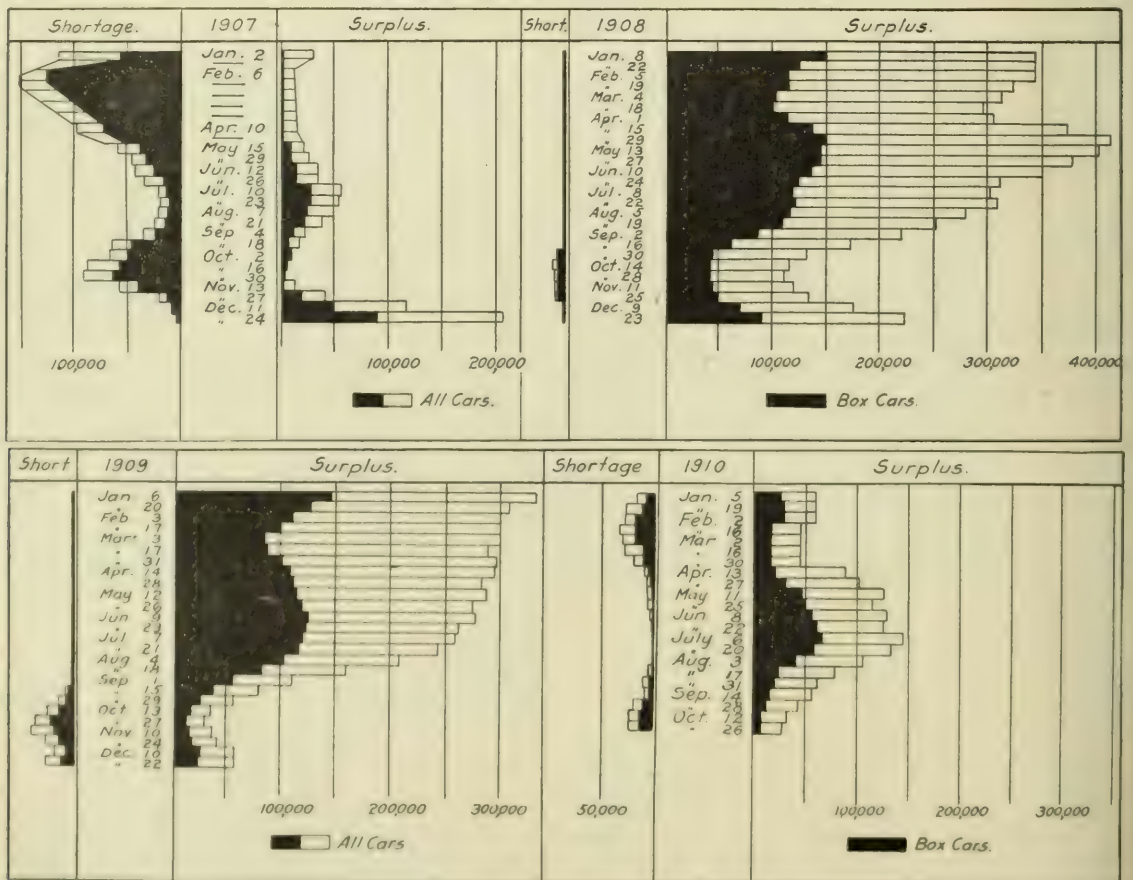
Hearing of the Des Moines Cases Refused.

Commercial Club, of Omaha, v. Anderson & Salline River Railway et al. Opinion of Commissioner Clark.

The complaint was based on the increases in rates to Omaha, following the Des Moines case and the Lincoln Commercial Club case, and many railways were made defendants that were

CAR SURPLUSES AND SHORTAGES.										
Date.	No. of roads.	-Surpluses-				-Shortages-				Total.
		Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.	
Group 1 - October 26, 1910	8	263	132	220	187	802	245	154	151	564
" 2 " " 26, 1910	23	888	85	1,329	4,321	6,523	488	10	643	1,234
" 3 " " 26, 1910	24	1,487	271	385	1,580	3,723	1,444	25	795	2,395
" 4 " " 26, 1910	10	139	62	374	261	827	359	378	1,759	3,073
" 5 " " 26, 1910	17	0	0	61	365	366	2,732	644	1,209	4,651
" 6 " " 26, 1910	22	4,577	753	1,413	2,351	8,994	353	52	287	430
" 7 " " 26, 1910	3	46	16	0	1	80	191	0	165	107
" 8 " " 26, 1910	12	42	73	377	1,022	1,514	1,616	69	134	108
" 9 " " 26, 1910	11	439	138	261	450	1,288	925	51	147	100
" 10 " " 26, 1910	18	334	378	1,343	2,495	4,560	2,018	187	35	503
" 11 " " 26, 1910	4	51	116	15	282	464	2,007	26	0	478
Total	152	8,357	2,024	5,778	13,072	29,131	12,898	1,596	5,335	2,077

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia, and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.



Freight Car Surpluses and Shortages in 1907, 1908, 1909, 1910.

not defendants, in either the Lincoln or the De Munnis cases. No new facts are presented, and no point is raised that was not previously considered. (19 I. C. C., 419.)

Rates on Damaged Shipments.

In re Reduced Rates on Returned Shipments. Opinion by Commissioner Lane.

On complaint as to proposed withdrawal by carriers of their special reduced rates on returned shipments, investigation was held by the commission, but after due consideration the former conclusion of the commission announced in section B, paragraph 67, of Tariff Circular 17-A, is adhered to, which disapproved of the returned shipment rates in general, but justified reduced rates for the return of freight which has been refused by the consignee at destination.

The principle underlying the ordinary transit privilege cannot be relied on in support of the returned-shipment rule. Transit arrangements, in their common form, are susceptible of defense only upon the theory that the inbound and outbound movements are in facts parts of a single continuous transaction; but there is no real connection between an outbound shipment to-day and a "returned shipment" one year hence.

The commission does not feel justified in modifying the terms of its ruling to the effect that shipments refused at destination may be returned at reduced rates within 10 days. The 10-day limit does not seem to be inadequate.

It is axiomatic that rates depend largely upon value, and the commission thinks that no objection could be raised against the establishment of special ratings for the movement of defective or damaged goods; but if this course is adopted the "returned" element should be altogether disregarded, the rating to be predicated entirely upon the low value of the freight. (19 I. C. C., 469.)

Relation of Car Load and L. C. L. Rates.

Commercial Club, of Omaha, v. Baltimore & Ohio et al. Opinion by Commissioner Lane.

The petition attacks car load rates on butter, eggs and poultry from Omaha to points in the Central Freight Association and Atlantic Seaboard territories. The complaint does not undertake to establish the unreasonableness of any specific rate, but rests its case primarily on the ground that the expenses to which railways are subjected in transporting L. C. L. business is greatly in excess of the cost of carrying car load business. Accordingly, if the existing rates yield a sufficient return for the movement of L. C. L. freight, lower rates than those now in existence should be made effective on car load traffic. The admitted difference in the cost of service is entirely consistent with the conclusion that the existing rates are liberal, as far as L. C. L. freight is concerned, and no more than a reasonable charge on carload traffic. Any quantity rate (L. C. L. rate) rests on sound public policy. It enables the small shipper to compete on equal terms with his powerful competitor, thereby counteracting in a measure the prevalent tendency toward a monopoly. The second ground for attacking the carload rate is that it is made up of a combination of locals and is unreasonable for that reason. It is self-evident that the movement of through traffic is less expensive than the movement of local business. In no case, however, has this been the sole ground for reducing a rate, and we have expressly recognized the possibility that the factors comprising through rate may be so low in themselves as to yield a reasonable through charge. (19 I. C. C., 397.)

Rate Advances Made in 1908 Sanctioned.

A. P. Morgan Grain Co. et al. v. Atlantic Coast Line et al. Railroad Commission of Alabama v. Louisville & Nashville et al. Railroad Commission of Georgia v. Atlantic Coast Line et al. Opinion by Commissioner Cockrell.

The three cases are based on a complaint against advances, effective August 1, 1908, made in rates on classes B, C, D and F fresh meats, grain, hay, grain products and packing house products from Ohio and Mississippi river crossings to certain destinations in Southeastern Freight Association and Southeastern Mississippi Valley Association territory. The rates from Louisville, Ky., to Atlanta, Ga., and from Louisville to Birming-

ham, Ala., are typical of the rates that all other rates attacked are related to or based on. Effective September 1, 1907, the rates from Louisville to Atlanta were reduced from what had been, for three years, theretofore (and the true real rates established in 1904) one cent per cent to three cents on class C, three cents on class D and six cents on class F. These rates have never been exceeded since that date, with the exception that the rate on class B, owing to the advances of August 1, 1908, became 50 cents, an advance of one cent. At that time, however, the rate on flour in sacks, any quantity, formerly in class C, even under the advance, is four cents less than on September 1, 1901. On February 1, 1905, rates were reduced to Atlanta but not to Birmingham; and the commission finds that these rates to Atlanta were reduced under compulsion of threatened retaliation by the Georgia Railroad Commission and Georgia shippers who actually put into effect intrastate rates almost exactly one-half the rates theretofore in effect, and concerning which previous rates the Georgia commission had congratulated itself by comparison with other southern states only two months before. Moreover, the railway companies were told that their franchises, rights of way, etc., for an Atlanta terminal would be held up if they did not make a readjustment in favor of Atlanta as compared with Birmingham; and when they made this readjustment by reduction of rates to Atlanta, the necessary permission for carrying on the terminal work was granted. The rate advances of 1908 preserve the same relation between Atlanta rates and the Birmingham rates as existed before, so that before 1905, while the Atlanta rates as advanced are no higher than they were, the rates to Birmingham are actually higher than they were in 1905. The commission, however, finds that the present advances measured by the actual movement of articles in classes B, C, D and F through Ohio and Mississippi river crossings during the calendar year 1907 would only amount to \$589,359 for the five states of Alabama, Florida, Georgia and the Carolinas. The complainants also urge the commission to consider that if these advances are allowed, they will be used as an entering wedge for other advances. The commission is not unmindful of the situation thus placed before it. This report, however, is confined to the specific matters now in issue and is not to be construed as extending beyond them, or as indicating in any degree approval of further advances in rates. The condition of most of the railways in this section of the country is not yet up to the highest standard, and in order that facilities may be improved and extended to the ultimate lasting advantage of the people of the South, it is necessary that the railways be permitted to charge rates that are fully compensatory for the services they perform, so long as such rates have not been shown to be unjust. The commission is unable to hold that an advance is unreasonable, because some part of the benefit thereof will accrue to a carrier that "during the period of the last 10 years has regularly paid interest on its total bonded debt," and in addition thereto has recently paid dividends on its stock. The complaints are dismissed.

Commissioner Lane dissents.

Commissioner Clements dissenting:

In dissenting from the opinion of the majority, a position always to be deplored, it would be perhaps enough to say that it is impossible for me to find justification for the threatened burden on the transportation of this great section of the country, either in the needs of the carriers, the history of rates, or the action of the public to pay 12 cents per capita more for the staples affected. The rates in this case cannot be tested by the rule quoted in the majority opinion from *Smyth v. Ames*, because these rates affected only a part of the carriers in this business. Rates long maintained do not assume the character of a vested right, but a business long conducted under a system of rates voluntarily established does fasten to such rates a presumption of fairness which renders necessary a more convincing proof of unreasonableness where all classes and states are involved than does a single rate, and these proofs, in my opinion, are wanting in this case. With the same solicitude for the development and prosperity of the South, as manifested in the majority opinion, and admitting that these advances will offer no lasting check, it should be borne in mind that the carriers of the Southeast have no such development and prosperity as they have enjoyed under the very rates which in this proceeding the complainants seek to have restored.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

J. T. Pritchard, assistant treasurer of the New York & Long Branch, has been appointed treasurer, with office at New York.

D. W. McLeod, acting auditor of the Gulf, Colorado & Santa Fe at Galveston, Tex., has been appointed auditor, with office at Galveston.

I. I. Campbell, traveling auditor of the Illinois Traction System, has been appointed auditor of debentures, with office at Chicago, Ill., succeeding A. A. Price, who was killed in the Staunton wreck.

William Everdell, Jr., assistant secretary of the Hudson & Manhattan, at New York, has been elected secretary, succeeding Charles W. King, and Kenyon B. Conger has been elected assistant secretary, both with offices at New York.

Clayton Snyder, transfer agent of the National Railways of Mexico at New York, has been appointed assistant secretary, with office at New York, succeeding E. E. Bashford, whose appointment as general purchasing agent at Mexico City, Mex., has already been announced.

Maxwell Evarts, who has been appointed general counsel of the Southern Pacific and the Union Pacific, was born November 15, 1862, in New York City. He graduated from Yale University in 1884 and went to the Harvard Law School. For a time he was engaged in law work in the office of W. D. Guthrie and was for a time assistant United States district attorney. He spent some time in the West on a ranch, and his first railway work was as an attorney for the Southern Pacific in 1893. Shortly after this he gave up private practice almost entirely and has been engaged in law work for the Southern Pacific ever since. His most important work for the Southern Pacific has been in connection with appeals to the United States Supreme Court. At present he argues nearly all of the cases that are carried to the supreme court, either jointly with the counsel that has tried the cases in the lower courts or alone. He takes Judge Lovett's place as general counsel, but is not a member of the various executive committees of the Harriman Lines, of which Judge Lovett was a member when he was general counsel. Mr. Evarts is a man who takes life smilingly and who takes a keen interest in his country place in Vermont. A few years ago he served two terms in the Vermont legislature. Mr. Evarts is the son of the late Secretary of State William Maxwell Evarts.

Operating Officers.

J. A. Cook has been appointed a supervisor of terminals of the Wabash Railroad, with office at Kansas City, Mo., a new office.

Hugh Steele has been appointed general superintendent of the Chicago River & Indiana, succeeding Dexter L. Phipps, and R. B. Browne has been appointed car accountant, succeeding T. P. Convey, both with offices at Chicago.

Thomas R. T. Orth, assistant to vice-president and general manager of the Wichita Falls Route, at Wichita Falls, Tex., has been appointed superintendent, succeeding J. J. Cotter, resigned, and his former position has been abolished.

A. W. Kelso, superintendent of the Chicago, Rock Island & Pacific at Des Moines, Iowa, has been appointed superintendent, with office at Fairbury, Neb., succeeding C. L. Brown; and Mr. Brown has been transferred to Des Moines as superintendent, succeeding Mr. Kelso.

A. L. Robinson, trainmaster of the Wabash Railroad, in charge of the Sixth, Seventh and Eighth districts at Decatur, Ill., has been appointed trainmaster in charge of the Ninth and Thirteenth districts, with office at Decatur, succeeding A. F. Helm, promoted. C. E. Ochiltree, chief dispatcher at Decatur, succeeds Mr. Robinson, and W. F. Shepherd succeeds Mr. Ochiltree.

H. P. Reigart, assistant general manager of the Virginian Railway, at Norfolk, Va., who resigned from that position on November 7, to go into other business, will perform special work for the company until December 31, 1910, on which date the position of assistant general manager will be abolished. All correspondence heretofore addressed to him should in future be sent

to Richmond, Va. — president and general manager, Norfolk.

Traffic Officers.

J. H. French has been appointed a commercial freight agent of the Canadian Pacific, with office at Portland, Ore.

P. G. Fredford has been appointed a traveling passenger agent of the Missouri Pacific, with office at Dallas, Tex.

R. G. Cook has been appointed assistant general eastern freight agent of the Erie Railroad, with office at New York, succeeding J. D. Abrams, resigned.

Griswold Wilson has been appointed a traveling freight agent of the Chicago, Burlington & Quincy, with office at Cleveland, Ohio, succeeding W. S. Dewey.

J. H. McKennon, traveling passenger agent of the Canadian Northern, at Winnipeg, Man., has been transferred to Toronto, Ont., succeeding Osborne Scott.

T. H. Simmons has been appointed a commercial agent of the Chicago, Rock Island & Pacific, with office at Cedar Rapids, Iowa, succeeding W. S. Williams.

J. L. Lashley has been appointed a traveling freight agent of the Georgia, Southern & Florida, with office at Cordele, Ga., succeeding T. E. Harris, resigned.

Richard De Treville has been appointed a traveling passenger agent of the Louisville & Nashville, with office at Evansville, Ind., succeeding June Stone, resigned.

M. G. Murphy has been appointed general traveling passenger agent of the Canadian Pacific, reporting to the passenger traffic manager, with office at Montreal, Quebec.

Fred J. Kemper has been appointed traveling freight agent of the Missouri Pacific, with office at Cincinnati, Ohio, succeeding A. G. Bush, resigned to engage in other business.

J. C. Reister, traveling freight agent of the San Antonio & Aransas Pass at San Antonio, Tex., has been appointed general agent in the freight department, with office at San Antonio.

H. C. Cantwell has been appointed a traveling passenger agent of the Illinois Central and the Yazoo & Mississippi Valley, with office at Memphis, Tenn., succeeding Walter Byrnes, promoted.

O. L. Winslow, traveling freight agent of the Missouri, Kansas & Texas at Chicago, has been appointed a commercial agent, with office at Detroit, Mich. T. J. Clark succeeds Mr. Winslow.

John L. Hohl has been appointed a traveling freight and passenger agent of the Denver & Rio Grande, with office at St. Louis, Mo., succeeding J. H. Harper, resigned to accept service elsewhere.

Harry O. Hartzell, assistant chief clerk in the freight traffic department of the Baltimore & Ohio, at Baltimore, Md., has been appointed industrial agent, with office at Pittsburgh, Pa., succeeding G. W. Dudderar, resigned.

T. Franks, commercial agent of the Missouri, Kansas & Texas at Waco, Tex., has been appointed a commercial agent, with office at Austin, Tex. W. D. Morgan, traveling freight agent at Houston, Tex., succeeds Mr. Franks.

A. T. Benjamin, whose resignation as superintendent of the Saratoga and Champlain divisions of the Delaware & Hudson has been announced in these columns, has been appointed freight agent of the Delaware & Hudson at Troy, N. Y.

Frederick Sobatta, freight solicitor of the Union Line, Pennsylvania System at St. Louis, Mo., has been appointed a traveling freight solicitor at Dallas, Tex., succeeding George H. Fyler, promoted. Francis P. Gross succeeds Mr. Sobatta.

H. C. Yutzy, traveling freight agent of the Minneapolis & St. Louis at Minneapolis, Minn., has been appointed a commercial agent, with office at Minneapolis, succeeding M. J. Hannam, resigned to accept service with another company.

R. H. Dozier, soliciting freight agent of the Seaboard Air Line, at Tampa, Fla., has been appointed a commercial agent, with office at Jacksonville, succeeding E. B. Freeman, resigned to go to another company. L. Barwick succeeds Mr. Dozier.

M. J. Hannam, commercial agent of the Minneapolis & St. Louis and the Iowa Central at Minneapolis, Minn., has been appointed a commercial agent of the St. Paul & Des Moines, with office at Minneapolis, succeeding F. B. Stubbs, resigned to engage in other business.

J. F. Hartsough, general agent of the Louisville & Nashville

at Chicago, has been appointed division freight agent, with office at Atlanta, Ga., succeeding J. A. Ridgely, promoted. F. S. Griffin, general agent at Detroit, Mich., succeeds Mr. Hartsough, and J. H. Fitch succeeds Mr. Griffin.

George Clark Wells, whose appointment as assistant to passenger traffic manager of the Canadian Pacific, with office at Montreal, Que., has been announced in these columns, was born April 15, 1866, at Brockville, Ont. Mr. Wells was educated in the public and high schools of his native town. He began railway work March 6, 1882, on the Grand Trunk, and until May, 1892, was in the passenger department. He then went to the Canadian Pacific and was in the passenger department of that road at Montreal as rate clerk for three years. In June, 1895, he was appointed chief rate clerk, and three years later he was made chief clerk in the passenger traffic department. He was appointed assistant general passenger agent of the eastern lines in November, 1904, which position he held at the time of his recent appointment as assistant to passenger traffic manager.

Charles Edward McPherson, whose appointment as assistant passenger traffic manager of the western lines of the Canadian Pacific, with office at Winnipeg, Man., has been announced in these columns, was born June 7, 1862, at Chatham, Ont. He began railway work with the Grand Trunk in May 1876, as a ticket clerk at Toronto. He was later made traveling passenger agent, and in 1881 was appointed assistant general agent in Canada of the Chicago, Rock Island & Pacific. Five years later he was made general traveling agent of the Canadian Pacific and in 1887 was appointed district passenger agent. He was promoted to assistant general passenger agent at St. John, N. B., in 1891, and in 1895 was transferred with the same title to Toronto, Ont., where he remained four years. From July, 1899, until the date of his recent appointment he was general passenger agent of the western lines at Winnipeg.



C. E. McPherson.

Engineering and Rolling Stock Officers.

Rudolph Ellzey has been appointed master mechanic of the Kentwood & Eastern, with office at Kentwood, La., succeeding John May, resigned.

C. R. Dobson has been appointed a general foreman in the car department of the Rock Island Lines, with office at Cedar Rapids, Iowa, succeeding C. Setzekorn, resigned.

G. H. Watkins has been appointed an assistant master mechanic of the Pennsylvania Railroad, New Jersey division, at Meadows, N. J., succeeding Edwin Schenck, Jr., promoted.

G. M. Gray, mechanical engineer of the Bessemer & Lake Erie at Greenville, Pa., has been appointed superintendent of motive power, with office at Greenville, succeeding E. B. Gilbert, who has been appointed special agent of the motive power department.

H. C. May, master mechanic of the Louisville & Nashville at South Louisville, Ky., has been appointed superintendent of motive power of the Chicago, Indianapolis & Louisville, with office at Lafayette, Ind., succeeding O. S. Johnson. The appointment of Mr. Johnson as superintendent of motive power was announced in these columns on October 11.

Purchasing Officers.

J. F. Farrell, purchasing agent of the Michigan Central, the Detroit & Charlevoix and the Toledo Terminal at Detroit, Mich., has been appointed general agent of the Michigan Central and other New York Central Lines west of Buffalo, N.

Y., with office at Detroit, succeeding W. F. Goltra, resigned. Mr. Farrell will continue also his duties as purchasing agent of the Michigan Central. R. A. Bury has been appointed assistant general tie agent of these companies, with office at Detroit.

George F. Wilder has been appointed purchasing agent of the Chicago, Milwaukee & Puget Sound, with office at Seattle, Wash., succeeding D. F. Buckingham.

OBITUARY.

A. G. Robinson, formerly general agent in the passenger department of the Chicago & Alton at Chicago, died at Chicago on October 30.

Alexander D. Joslin, auditor of passenger receipts of the Illinois Central, with office at Chicago, died at Chicago on November 4. Mr. Joslin was born May 13, 1848, at Norwalk, Ohio. He received a high school education and began railway work in 1864 as a clerk in the Norwalk shops of the Lake Shore & Michigan Southern. Two years later he went with the Illinois Central as junior clerk and was later made bookkeeper. Since 1874 he has been in the accounting department in charge of passenger accounts, first with the title of chief passenger clerk. He was later appointed to ticket auditor and then to auditor of passenger receipts.

William C. Ennis, for many years in the mechanical department of the New Jersey Midland, the New York, Susquehanna & Western, the Central New England and other roads, died at his home in Paterson, N. J., October 29, at the age of 65. Mr. Ennis began his life work as an apprentice in the Danforth Locomotive Works, and he was master mechanic on the two roads first above named for 25 years. When the Susquehanna passed into the control of the Erie he went to the Central New England. For a number of years past he had been with the American Locomotive Company, and had also done technical work for the New Jersey State Railroad Commission. He was an honorary member of the American Railway Master Mechanics' Association. Mr. Ennis is survived by Mrs. Ennis and one daughter and by five sons. All of the sons are engaged in engineering, namely: Prof. William D., head of the department of Mechanical Engineering in the Polytechnic Institute of Brooklyn; Joseph B., chief designing engineer of the American Locomotive Co.; J. E., in the sales department of the same; Herbert, in the engineering department of the American Car & Foundry Co., and Roy C., a student of engineering in the Polytechnic Institute of Brooklyn.

Sir Clifton Robinson, of England, managing director and engineer of the London United Electric Tramways, and a director of a number of other railway lines, died November 6 in New York. Sir Clifton was born at Birkenhead, near Liverpool, England, January 1, 1818. He came to America in 1866 and was engaged in street railway construction for about five years, when he returned to England. He was then engaged in engineering work, constructing street car lines in Cork, Ireland. He was appointed general manager of the Bristol Tramways, and was later manager of the tramways of Edinburgh, Scotland. In 1884 he started work on the Highgate cable tramways. He then returned to America to carry out the work of building a system of electric lines at Los Angeles, Cal., and later designed and constructed the London United Electric Tramways System. In 1895 he constructed the first electric tramway at Bristol, England. He also built and reorganized the Dublin Southern District Electric Tramways in 1896, and the Middlesbrough, Stockton & Thornaby Electric Tramways in 1898; and in 1902 he took part in the construction of the great tube railway system of London. In 1906 he designed and put into operation a system of through booking between tramways and railways in London. Three years later he was engaged by the American Street Railway Association to report on the general situation with regard to street railways in the United States. He took charge of the work of changing the cable lines to electric lines in the city of Bristol in 1891, and was also active in the work of converting street car lines in other cities for the use of electricity. In 1904 he was made managing director of the United Tramways Company of London, which was converted into an electric system. He was the author of several treatises on tramways, for one of which, the "World's Tramways," he received the silver medal of the Society of Arts in 1902.

Railway Construction.

New Incorporations, Surveys, Etc.

ARKANSAS, OKLAHOMA & TEXAS.—Incorporated in Arkansas, to build from a point in Sebastian county, Ark., southeast to the Chicago, Rock Island & Pacific, about 5.5 miles. The incorporators include: H. Demmon, C. H. Finley, J. F. Read, S. T. Moore and A. Johnson.

ARKANSAS, OKLAHOMA & WESTERN.—This company is said to be making plans to build an extension from Rogers, Ark.

ARIZONA, TEXAS & SANTA FE.—The Pecos & Northern Texas, Plainview branch, of the Lubbock district, has been extended from Lubbock, Tex., south to Lamesa, 70 miles.

This company is relaying the tracks between Los Angeles, Cal., and Barstow, 141 miles. The company is also building a new freight yard at Barstow, and is cutting down the Barstow hill to allow easy entrance into the city.

ATLANTIC COAST LINE.—This company has plans made for laying 85-lb. rail between Waycross, Ga., and Albany.

BUFFALO, ROCHESTER & EASTERN.—The New York Public Service Commission, Second district, will resume the consideration, on November 30 and December 1 and 2, of the application of the B., R. & E. for permission to build from Buffalo, N. Y., east to Troy. A decision is not looked for until January, 1911. (Sept. 2, p. 439.)

CALIFORNIA ROADS.—Seth Hartley, Escondido, Cal., is back of a project to build a line from San Bernardino, Cal., south via Escondido, to San Diego, about 100 miles. The promoters expect to have the line in operation in about one year.

CHESAPEAKE & OHIO.—The Paint Creek branch of the Huntington division has been extended from Mahan, W. Va., to Kceferton, five miles.

CHICAGO, BURLINGTON & QUINCY.—The report of this company for the year ended June 30, 1910, shows that work on the line from Herrin, Ill., south to Metropolis, 57 miles, is about finished. Since the close of the year this line has been put in operation. Work is under way on extensions as follows: Kirby, Wyo., southeast to Powder creek, 104 miles; Lincoln, Neb., west to Milford, 18 miles; Scribner, Mont., northwest to Fromberg, 25 miles, and from Hudson, Colo., northwest to Greeley, 26 miles. New second-tracks were constructed in Illinois and Nebraska, and numerous side and passing tracks have been laid at various places. Additional land has been secured just outside the city of Chicago for yard facilities and land for additional terminal facilities at Denver has also been bought. Large additions have been made to the shops at Havelock, Neb., and improvements have been made to terminal facilities at Lincoln. (See report of this company elsewhere in these columns.)

CHICAGO, MEMPHIS & GULF.—Contracts are said to be let to C. T. Bondurant, Hickman, Ky., and to W. L. Mozley, Memphis, Tenn., for grading work on 10 miles, from Hickman southwest towards Tiptonville, Tenn. The work is to be finished by January, 1911. (Feb. 4, p. 280.)

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.—The Kennedy line of the Wisconsin division has been extended from Kennedy, Wis., north to Kaiser, five miles.

CHICKASHA TERMINAL.—See Oklahoma Central.

ERIE RAILROAD.—An officer writes that a contract has been given to the Ferguson & Edmondson Co., Brookville, Pa., for second-track work between Ashland, Ohio, and Nankin, about four miles. It is expected to have the improvements finished by January, 1911.

GALLATIN VALLEY.—This road now extends from Bozeman, Mont., west via Bozeman Hot Springs, to Three Forks, 33.3 miles, with a branch from Bozeman Hot Springs to Salesville, 4.7 miles.

GEORGIA & FLORIDA.—A contract is said to have been given to J. F. Lamb, Thomasville, Ga., to build 1.5 miles of line through the city of Valdosta, Ga.

Hudson & Manhattan.—Regular train service has been started on the extension of the subway to 344 street, in the borough of Manhattan, New York City.

MESARA ELECTRIC.—Incorporation has been asked for in Minnesota, with \$50,000 capital, to build from Virginia, Minn., west to Hibbing, and eventually to Gilbert. The incorporators include: O. Mitchell, A. C. Gillette, W. D. Bailey, J. A. Sinclair, F. M. Emanuelson, C. M. Van Norman and E. E. Hewitt, all of Duluth.

METHOW VALLEY & WASHINGTON NORTHERN.—Organized in the state of Washington, with \$1,000,000 capital, to build a line from Spokane, Wash., west through the Methow valley to Puget Sound. E. W. Rollins, S. P. Valentine, J. C. Platter, C. G. Andrews and H. W. Henry are incorporators.

MIDLAND VALLEY.—This company, it is said, is ready to start work on an extension of the Glenpool branch to Sapulpa, Okla., 10 miles.

MINIHOCA & SOUTHWESTERN.—See Oregon Short Line.

MISSOURI-OSAGE.—Incorporated in Missouri with \$250,000 capital, to build from Linn, Osage county, Mo., west to Wardsville, Cole county, 25 miles. The directors include: H. C. Avis, A. K. Prince, P. Nelson, A. Dur, all of St. Louis, and M. A. Greding, Alton, Ill.

MISSOURI RIVER & NORTHERN.—This company has filed with the State Railway Commission of South Dakota a plat of its survey recently completed from Chamberlain, S. Dak., northeast to Huron. The organization and surveys have been carried out by a local company. It is understood that the project is backed by the Great Northern.

NEVADA-CALIFORNIA-OREGON.—An officer writes that work is now under way by the Hall Construction Co., Los Angeles, Cal., and Richardson & Nugent, on an extension of this road. The work is being carried out from Alturas north to Lakeview, Ore., 50 miles. Contracts are to be let at once for about 20 miles of heavy work, and contracts for an additional 20 miles will be let soon. The line will carry live stock and lumber. (July 15, p. 1143.)

NEVADA COPPER BELT.—An officer writes that work is now under way by P. J. Conway, Bridgeport, Cal., building an extension of this road. The company now operates a line from Wabuska, Nev., east to Mason, 14 miles, and is building an extension south and west, in all 38 miles. Maximum grades will be 1.5 per cent. The line will carry copper, ore, mine supplies and farm products. (July 22, p. 174.)

NEW ORLEANS, MOBILE & CHICAGO.—This company has under consideration the question of building an extension, it is said, from Beaumont, Miss., southwest to New Orleans, La.

NEW YORK, CHICAGO & ST. LOUIS.—According to press reports, this company is planning to make improvements near Conneaut, Ohio. The plans call for putting in six new storage tracks. A new roundhouse may also be built.

NEW YORK, NEW HAVEN & HARTFORD.—An officer writes that a contract has been given to C. W. Blakeslee & Son, New Haven, Conn., for 20 miles of double-tracking work between Shelton, Conn., and Hawleyville.

NORTH LOUISIANA & GULF.—This company will build an 11-mile extension west, it is said, to a connection with the Louisiana & Northwestern.

NORTHWESTERN RAILROAD.—See Oregon Short Line.

NUCES RIVER VALLEY.—According to press reports, contracts have been let for building the first section of 60 miles, from Beeville, Tex.; the work is to be started by December 1. The plans call for a line from Beeville, west via Clarksville, Simmons, Texas, Tilden, Cotulla and Carrizo Springs to Eagle Pass. W. A. Frisby, president, and G. A. Hull, consulting engineer, Beeville. (October 14, page 711.)

OKLAHOMA CENTRAL.—An officer of the Chickasha Terminal Railway, which was organized to build a terminal system around Chickasha, Okla., 4.8 miles, to include a station to cost \$25,000,

writes that a contract has been let to C. L. King, and work is now under way. Grading and bridge work is finished, and track is laid on three miles. There are two steel bridges, each 160 ft. long. Charles F. Raney, engineer, Chickasha. (Dec. 10, p. 1167.)

OREGON SHORT LINE.—A new branch of the Minidoka & Southwestern has been opened for business from Twin Falls, Idaho, west to Rogerson, 28.8 miles.

A new line, called the Northwestern Railroad, has been opened for business from Blakes Junction, Ore., near Blakes, north to Homestead, 57.9 miles.

PECOS & NORTHERN TEXAS.—See Atchison, Topeka & Santa Fe.

ROCK ISLAND SOUTHERN.—An officer writes that a right-of-way is being secured from Monmouth, Ill., south to Macomb, for building an extension to the latter place. It is proposed to eventually extend the line south to St. Louis.

ST. FRANCOIS COUNTY (ELECTRIC).—This company was recently organized in Missouri with \$250,000 capital. An officer writes that the projected route is from De Lassus, Mo., north via Farmington and Esther to Flat river, about 15 miles. W. M. Horlan, Farmington, may be addressed.

ST. LOUIS, BROWNVILLE & MEXICO.—A new branch, called the Collegeport branch, has been opened for business from Buckeye, Tex., southwest to Collegeport, 16 miles. (Sept. 23, p. 559.)

ST. MARYS & KINGSLAND.—This company has amended its charter, it is said, to build from St. Marys, Ga., via Waycross, to Adel or Sparks, about 150 miles.

SEABOARD AIR LINE.—The Dunnellon branch is now in operation between Archer, Fla., and Dunnellon, 40.8 miles. The line formerly in operation from Keysville Junction, via Edeson, Ga., to Nichols, has been extended to Mulberry, 4.2 miles, and trains are now being operated from Edeson Junction, which is 0.2 miles from Edeson, via Bradley Junction to Agricola, 12.1 miles.

STEARNS COAL & LUMBER CO. LINES.—An officer is quoted as saying that the company proposes to extend this line some 20 or 30 miles into coal and timber lands along the south fork of the Cumberland river in Kentucky and Tennessee. J. S. Stearns, president, Ludington, Mich.

SUMTER & CHOCTAW.—A contract is said to have been given to M. N. Sikes, Livingston, Ala., for building an extension from Edna, Ala., south to Rohjohn, about five miles.

UNION PACIFIC.—The Topeka branch, heretofore in operation between Menoken, Kan., and Onaga, has been extended from Onaga to Carden, and is now open for traffic.

VIRGINIAN RAILWAY.—A contract has been given to Carpenter & Boxley, Roanoke, Va., it is said, for grading and putting in the masonry for viaducts between Cirtsville, W. Va., and Harper. The improvements now being carried out include a revision of line and grade on this section.

WICHITA FALLS & NORTHWESTERN.—The Panhandle division has been extended from Hollis, Okla., west to Wellington, 21 miles.

WISCONSIN & NORTHERN.—An officer writes regarding the report that the company will build about five miles of line through the Menominee-Indian reservation in Wisconsin, that the line will probably be built next spring. (Oct. 21, p. 760.)

Argentine Railway Notes.

The railway from Apostoles to Posadas, in the Territory of Misiones, was opened on August 16.

The new rapid service between Buenos Aires and Rosario was inaugurated on September 1. It requires but five hours for the journey.

The San Juan-Serrezuela railway was opened on August 7; the Central Northern railway is also planning to extend its line from La Banda to Santiago del Estero.

Work is being pushed on the line from Bahía Blanca to Carmen de Patagones. The extreme southern part of the Province of Buenos Aires appears to be developing rapidly.

Of the railway from Puerto Desado to Nahuel Huapi, 40 miles were completed on August 22. Puerto Desado has now over 1,000 people. A large schoolhouse is soon to be erected there, and other establishments are planned to meet the growing needs of this Patagonian center.

Railway Financial News.

ATLANTIC, QUEBEC & WESTERN.—A cable despatch says that the Charing Cross Bank of England, which closed October 17, had advanced the Atlantic, Quebec & Western £1,500,000, the value of the claim being doubtful.

CHICAGO & SOUTHEASTERN.—See Southern Indiana.

CHICAGO SOUTHERN.—See Southern Indiana.

CUBA RAILROAD.—The New York Stock Exchange has listed \$600,000 conditional first mortgage 5 per cent. bonds of 1902-1952. The proceeds of the sale of these bonds is being used chiefly to pay for construction work on the Marti-San Luis-Dayamo-Manzanillo extension.

LORAIN, ASHLAND & SOUTHERN.—The Industrial Railroad Company of Lorain, Ohio, and The Lorain & Ashland Railroad Company have been consolidated under the name The Lorain, Ashland & Southern Railroad Company. Articles of consolidation have been filed with the Secretary of State. The capital stock is to be \$250,000.

MISSOURI, KANSAS & TEXAS.—A majority of the Texas Railroad Commissioners having disapproved of the proposed five-year lease of the Texas Central by the M. K. & T., the application has been withdrawn.

NEVADA COUNTY NARROW GAGE.—This company has declared a dividend of 2½ per cent. The company operates a three-foot gage road running from Colfax, Cal., to Nevada City, 22 miles. The San Francisco News Bureau says that this is the first dividend declared for some time, owing to the expenses entered into by the company in building the new cut-off between Grass Valley and Colfax.

NEW YORK CENTRAL & HUDSON RIVER.—The New York Public Service Commission, Second district, has authorized the Dunkirk, Allegheny Valley & Pittsburgh and the New York Central & Hudson River to modify the terms of a lease of the D., A. V. & P. to the New York Central. Under the modified lease the New York Central agrees to pay rental, in addition to 1½ per cent. per annum on \$1,300,000 of the stock, the interest on such bonds as may from time to time at the request of the New York Central be issued to refund its bonded indebtedness and for other corporate purposes. The commission has also authorized the Dunkirk, Allegheny Valley & Pittsburgh to make a mortgage to secure its 4½ per cent. 50-year first mortgage bonds to an amount not exceeding \$5,000,000. The company is authorized at the present time to issue bonds at par to the amount of \$2,900,000 to refund (a) first mortgage bonds of the Dunkirk, Warren & Pittsburgh, \$1,000,000; (b) second mortgage bonds of the Dunkirk, Warren & Pittsburgh, \$400,000; (c) third mortgage bonds of the Dunkirk, Warren & Pittsburgh, \$200,000; (d) first mortgage bonds of the Warren & Venango \$1,000,000; (e) second mortgage bonds of the Warren & Venango, \$300,000.

NORTHERN CENTRAL.—Minority stockholders, acting with the waters' committee, have begun a suit for the accounting of the sale by the Northern Central in 1894 of \$500,000 stock of the Union Railroad to the Philadelphia, Baltimore & Washington at par.

RUTLAND RAILROAD.—The minority stockholders' committee, William C. Taylor, secretary, New York, has issued a notice that the committee is about to bring suit for the benefit of all stockholders depositing their securities with the committee against certain of the former directors, and will also endeavor to enforce the New York Central to give proper recognition of the rights of the Rutland in traffic arrangement between the New York Central and the Rutland.

SOUTHERN INDIANA.—The road was sold under foreclosure at Terre Haute on November 3, for \$1,263,333. Representatives of the reorganization committee bought the property, and a new company, the Chicago & Southeastern, is being formed to take over the property of the Southern Indiana and also the Chicago Southern, which was sold on November 4 at Danville, Ill. The price at which the Chicago Southern was sold was \$1,600,000.

Supply Trade Section.

Kenneth Seaver has been appointed chief engineer of the Harrison-Walker Refractories Company, Pittsburgh, Pa.

The O. M. Edwards Company, Syracuse, N. Y., advises that its New York office has been removed to the New York Life building, room 1232, 346 Broadway.

The Buffalo Brake Beam Company, New York, announces the removal of its St. Louis offices from the Lincoln Trust building to suite 1443, Syndicate Trust building.

W. H. Dooley has been appointed superintendent of the Gadsden Car Works, Cincinnati, Ohio, succeeding J. P. McCuen, who retired at his own request because of poor health.

The Chicago Steel Car Company, Chicago, has recently received orders for an aggregate of 2,500 underframes, including 1,000 steel underframes for beef cars to be built by Swift & Company, Chicago.

The McKeen Motor Car Company, Omaha, Neb., shipped a 70-ft. motor car for the Rock Island Lines to Waurika, Okla., on October 31. This makes the ninetyeth McKeen motor car in service in this country and Mexico.

The Duff Manufacturing Company, Pittsburgh, Pa., has purchased the plant of William Forgie, Washington, Pa., including the business and all rights and privileges of making the oil well jacks originated by William Forgie. Most of the machinery has been transferred to the Duff factory.

The Forsyth Brothers Co., Chicago, has acquired 23 acres at Harvey, Ill., on which it has started to put up a plant. The property is located near several trunk lines from which switches will be run to the plant. It is expected that at least one building, with new machinery, will be ready for occupancy before the first of the coming year.

J. S. Coffin, vice-president of the American Brake Shoe & Foundry Company, will, on December 31 next, retire from active official service with that company in order to devote himself more closely to the affairs of the Franklin Railway Supply Company, of which he is president, and the American Arch Company, of which he is chairman, as well as the Locomotive Superheater Company and other allied interests. Mr. Coffin will, however, retain his financial interest in the American Brake Shoe & Foundry Company, and also his membership on the board of directors.

The opening of the new works of the Jones & Laughlin Steel Company of Pittsburgh, Pa., at Aliquippa, Pa., a few miles down the Ohio river from Pittsburgh, marks the entrance of that company into several new fields of production, including tin plate and wire products. The wire plant, which started in operation a few days ago, is running full time on an extensive line of new J. & L. products. These include wire nails, barbed wire, fence staples and various brands of fence wire, as well as special grades of basic and bessemer wire for screw stock, bolts, rivets and nails. The plant is of the latest design and the most modern appliances and processes have been installed. The rod mill has been in operation to its full capacity for several weeks rolling the ordinary grades, together with high carbon, screw stock, bolts, rivets and rods. The new J. & L. tinplate mill at Aliquippa, which started some weeks ago, is also busy. The sales head of the wire department is George A. Mason, personally known throughout the trade because of his long service with another company. Associated with him in the sales department are Thomas C. Ham and George E. Quigley, men of experience in the wire business.

TRADE PUBLICATIONS.

Clark Blow-off System.—The advantages of this system are considered in a catalogue issued by the Horace L. Winslow Co., Old Colony building, Chicago, Ill.

Denver & Rio Grande.—Little Land of Colorado is the title of a booklet which aims to acquaint the public with the agricultural resources of Colorado and New Mexico.

Lake Shore & Michigan Southern.—The latest illustration of the Lake Shore & Michigan Southern includes, in addition to the usual information, a drawing of the new Grand Central station in New York with some facts about it.

Steam Power Stations.—A partial list of the steam power stations, illustrated by both drawings and half-tone illustrations, designed and built by the Stone & Webster Engineering Corporation, Boston, Mass., is given in an attractive booklet published by that company.

Locomotive for Passenger Service.—Record No. 67 from the Baldwin Locomotive Works, Philadelphia, Pa., presents illustrated descriptions of a number of locomotives recently built by that company for passenger service, including American, Atlantic, 10-wheel and Pacific types.

Composite Telephone and Telegraph System.—Bulletin T-206, just issued by the Western Electric Company, New York, describes its composite telephone and telegraph system for railway service, which has been devised for the purpose of transmitting messages simultaneously over grounded telegraph lines.

Terminal Improvements of the Pennsylvania and Long Island Railroads.—The work done by Westinghouse, Church, Kerr & Co., of New York, in connection with the New York terminal and improvements of the Pennsylvania and Long Island Railroads is considered at length in a 61-page, 6x9 in., illustrated publication issued by Westinghouse, Church, Kerr & Co.

Wire Nails and Wire Products.—The Jones & Laughlin Steel Company, Pittsburgh, Pa., has issued its first catalogue on wire nails and wire products. It is an attractively illustrated booklet of 32 pages and contains much detailed information about the various brands of wire nails, wire rods, barbed wire, staples, annealed wire, galvanized wire and other wire products now being manufactured in the new Aliquippa works.

RAILWAY STRUCTURES.

BALTIMORE, MD.—An officer of the Pennsylvania Railroad writes regarding the reports that a new passenger station is to be built in Baltimore, that a report has been made by Isham Randolph to the Board of Estimate, recommending the construction of a new downtown station at the corner of North and Saratoga streets, and the building of a tunnel under Lexington street, from the Baltimore & Potomac tracks, in the western suburbs, to the proposed new station. No other action than the presentation of the report has been taken.

BOYLES, ALA.—An officer of the Louisville & Nashville writes that a contract has been given to the Monarch Construction Co., St. Louis, Mo., for building a power house at Boyles, near Birmingham. The steel work for this building has been let to the Louisville Bridge & Iron Co. Additional work is being carried out by the company's men on new shop buildings. (Jan. 21, p. 167.)

CHICKASHA, OKLA.—See Oklahoma Central under Railway Construction.

CHICO, CAL.—The roundhouse and other buildings of the Butte County Railroad at Chico were destroyed by fire on October 19.

COLUMBUS, OHIO.—The Baltimore & Ohio is considering plans for the construction and equipment of modern shops, probably at some point northwest of the Ohio river. Columbus, Ohio, is mentioned as the place where these shops may be located, and this seems likely, since the company's extensive Mount Clare

shops at Baltimore take care of equipment operating on the eastern end of the system, leaving that portion northwest of the Ohio river without strictly modern shops, except at New Castle Junction, Pa., and those are somewhat limited in their capacity. The proposed extension of shop facilities is made necessary by the increased amount of equipment in service, and in all probability by the desire to centralize repairs for the lines west of Pittsburg as well.

COBOURG, ONT.—The Canadian Northern Ontario has given a contract to Martin Jex & Co., Cobourg, it is said, for putting up a station in Cobourg.

DEL RIO, TEX.—The Kansas City, Mexico & Orient has announced the location of its new passenger station and round-house.

FLUSHING, N. Y.—An officer of the Long Island Railroad writes that no decision has yet been reached by the New York Public Service Commission, First district, on the application of the Long Island for the elimination of nine grade crossings on the Northside division, through the village of Flushing, from Flushing creek, easterly to and including the highway known as Broadway, immediately west of the Broadway-Flushing station. The scheme involves raising the railway tracks between Flushing creek and Main street, Flushing, and depressing the tracks easterly from that place to a point about half way between Murray Hill and Broadway station. The elimination of the grade crossings at Broadway and 22d street is to be effected by a partial depression of the railway and a partial elevation of the two streets in question. If the work is ordered by the Public Service Commission it will cost about \$1,000,000 to make the improvements.

HARPER, W. VA.—See Virginian Railway under Railway Construction.

JOPLIN, Mo.—A contract was given in June to the Manhattan Construction Co., of New York and Joplin, Mo., for putting up the union terminal station to be used and built jointly by the railways entering Joplin. The building will be two stories high, 100 ft. x 300 ft., and located at the corner of Main street and Broadway. The building, which is to be of reinforced concrete fireproof construction, finished inside with enameled terra cotta, marble and oak trim, is to cost about \$100,000. It is expected to have the building ready for business April 1, 1911. (March 17, p. 660.)

LONG BEACH, CAL.—The Pacific Electric will build a new station at Long Beach.

MARYSVILLE, CAL.—The Northern Electric will build a combined freight and passenger station at Marysville.

MILLERTON, OKLA.—The state commission has ordered the St. Louis & San Francisco to build a new passenger station.

MONTREAL, QUE.—According to press reports, the first step was taken recently by the Grand Trunk to provide Montreal with a large passenger terminal to replace the present Bonaventure station. Work was started recently demolishing the buildings on a portion of the property which is to be used as a site for the new terminal. The company has secured all the property between the present station and Cathedral street to the east and bounded by Chabolle square and St. James street. It is thought that the Intercolonial Railway will join in the scheme for the new terminal.

An officer of the Canadian Pacific writes that work is now under way by C. E. Deakin, Montreal, on a stone exterior fireproof passenger station at Windsor street. The structure is to be 15 stories high, 70 ft. x 430 ft., and will cost about \$2,000,000. (Aug. 12, p. 297.)

OAKDALE, CAL.—The Northern Electric will build a steel bridge over Little Chico creek, to replace the present wooden structure.

PENSACOLA, FLA.—An officer of the Louisville & Nashville writes that the company is not at present making plans for the proposed passenger station, to cost about \$200,000, at Pensacola. The improvements are simply contemplated and it may be some time before the work will be carried out. (May 27, p. 1328.)

RIVERSIDE, CAL.—The Atchison, Topeka & Santa Fe Coast Lines is putting up a new freight house at Riverside.

SACRAMENTO, CAL.—The Southern Pacific has appropriated \$400,000 for building a new passenger station at Sacramento. Construction work is to be started next year.

ST. LOUIS, Mo.—The new Mississippi river bridge of the Illinois Traction System was dedicated November 10.

SPRINGFIELD, OHIO.—The Cleveland, Cincinnati, Chicago & St. Louis is considering building new car shops.

STILL RIVER, MASS.—An officer of the Boston & Maine writes that contracts have been given to the New England Construction Co., Springfield, for the foundations, and to the American Bridge Co. for the steel superstructure of a bridge. The plans call for a riveted through truss bridge, 127 ft. 6 in. long, to be built over the Still river.

TIA JUANA, MEX.—The San Diego & Arizona has given contracts to C. W. Corbaley, Los Angeles, Cal., for the bridge over the Tia Juana river, to be 500 ft. long, and another bridge over the Matanuca creek, to be 180 ft. long.

TOPEKA, KAN.—The Atchison, Topeka & Santa Fe is preparing plans for a new passenger station on the north side at the Santa Fe junction.

TUCSON, ARIZ.—Residents of Tucson have offered the El Paso & Southwestern a right-of-way and station property in Tucson, valued at \$150,000, to induce the company to extend to that place.

WAUSAUKEE, WIS.—Work has been started by the Chicago, Milwaukee & St. Paul on a new passenger station at Wausaukee.

FOREIGN RAILWAY NOTES.

An indication of the interest taken by the Central government in the future of railways in China is afforded by the establishment in September, 1909, in connection with the Ministry of Communications at Peking, of a school for training railway officers. The school is built for 600 students, but the number is at present limited to 350, who come from all parts of the empire and vary in age from 18 to 25. There are about 30 teachers, including one British, one American, two French and two Germans. Most of the teachers are returned Chinese students from abroad, and they are well paid. The full course is three years and the students are divided into three sections according to the foreign language, English, French or German, taught them in addition to other subjects. The curriculum includes Chinese language, drill, geography, history of Chinese railways, mathematics, drawing, chemistry, physics, ethics of commerce, traffic management, railway bookkeeping, elements of engineering, steam and electricity, workshop administration and railway company law.

The most important railway construction in course of development with reference to South Italy is that which will connect Rome and Naples by an express route. This line was to have originally been completed in 1923-24 at a cost of about \$25,000,000. With a view, however, to materially benefit Naples, the government has determined to accelerate the work and bring about its completion within a period of five years, and to connect the new station of the express line at Naples with the present central station and make it available to the public within four years. This new quick route to Rome lies as follows: First section Rome to Fiume Amaseno, 47.8 miles; second section, Fiume Amaseno to Formia, 26 miles; third section, Formia to Minturno, 7.4 miles; fourth section, Minturno to Naples, 41.6 miles; besides the urban section connecting the Fuorigrotta station with the central Naples. Most of the first section is now in the hands of the contractors. In this section there are two big tunnels, that of the Orso and Vivola. The first should be completed about the end of 1911 and the latter in March, 1913. The whole line will be double track. The section Formia-Minturno is over the present line Sparanise-Gaeta, and will only require the laying down of a second pair of rails, the line for which is practically ready.

Late News.

The items in this column were received after the classified departments were closed.

F. E. Marsh, assistant master mechanic of the Pennsylvania Railroad, at Altoona, Pa., has been appointed assistant master mechanic at the Altoona, Pa., shops.

The New York, New Haven & Hartford will apply to the Vermont Legislature for permission to build the 10-mile line for the Ticonderoga & Malone from South Vermont, Vt., to Brattleboro. (April 15, p. 1044.)

Bids will be asked for in 30 or 60 days by the Iowa Traction Co., recently incorporated in New Jersey with \$2,000,000 capital, to build an electric line from Oskaloosa, Iowa, via Barnes City, Montezuma and Malcom to Tama, 65 miles. There will be four steel bridges on the line. George E. Woodhouse, president, Oskaloosa.

The 600 miles of the Pacific Electric Railway, together with the power plants, cars and other equipment, has formally passed into the control of the Southern Pacific. The transaction precedes the retirement of H. E. Huntington, who began in 1900 the development of what is now the largest system of inter-urban railways in this country. This gives the Southern Pacific control of nearly all of the interurban lines centering in Los Angeles, approximately 700 miles.

A leading manufacturer of steel rails estimates that rail orders during the last half of this month and December will aggregate a total of more than 500,000 tons. He bases his opinion on the belief that the Pennsylvania, Harriman and New York Central Lines will distribute their orders within the period mentioned. The Pennsylvania, according to reports, may contract for approximately 120,000 tons. Nearly all orders will be contingent upon an increased tonnage should the railways desire to enlarge their original contracts.

About 50 railway officers went to Urbana, Ill., November 7, in a special train provided by Vice-President Park, of the Illinois Central, and were shown over the University of Illinois. The trip was made to see the work being done for the benefit of railways by the university. A meeting in the afternoon was addressed by President James, Deans, Goss and Kinley, Professors Schmit and Stoek telling of university railway work. D. C. Buell read a paper describing the educational work of the Union Pacific. President Delano, of the Wabash, also gave a talk. On motion of W. L. Park, seconded by Vice-President Ashton, of the Chicago & North Western, a resolution was adopted pledging the support of the Illinois railways to the university in its effort to get the Illinois legislature to make adequate appropriation for enlarging the university's railway work. Almost all railways in Illinois were represented by one or more officers designated by their presidents. The trip was organized by Mr. Delano.

A strike vote among the engineers on 61 railways west, south and north of Chicago is expected to follow the breaking off of wage negotiations between the railways and the officers of the Brotherhood of Locomotive Engineers. These have been in progress since September 26. Warren S. Stone, president of the Brotherhood, said he believed that the vote will favor a strike unanimously. The result of the poll will be known by December 10. Immediately after, he said, a final opportunity would be given the railways to meet the engineers, and if their demands were still ignored, every engine west of Chicago in every branch of service would stop running within five hours. Engineers' demands approximated 27 per cent. increase. This was finally reduced to 17 per cent. The railways were willing to grant 10 per cent., amounting to an increase in the pay rolls of the 61 roads of \$3,840,000 annually. The \$6,528,000 increase demanded, the railways' representatives asserted, could not be conceded. Warren S. Stone has announced that he would not consent to mediation or arbitration on any of the points involved.

(See editorial comment on the western railway situation elsewhere in this issue.)

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Detroit, Toledo & Ironton has ordered 12 consolidation locomotives from the American Locomotive Company. They will weigh 219,000 lbs. in working order and will have 22 x 30-in. cylinders and 57-in. drivers.

The New York, Ontario & Western has ordered six consolidation locomotives from the American Locomotive Company. They will weigh 202,000 lbs. in working order and will have 21 x 32-in. cylinders and 55-in. driving wheels.

The Richmond, Fredericksburg & Potomac has ordered four Pacific type locomotives from the American Locomotive Company. They will weigh 235,000 lbs. in working order and will have 22 x 28-in. cylinders and 73-in. driving wheels.

CAR BUILDING.

The Solway Process Company is said to have ordered a number of 50-ton tank cars from the Pressed Steel Car Company.

The Jamison Coal & Coke Company, Oliver building, Pittsburgh, Pa., is in the market for 400 fifty-ton steel hopper cars.

The Merchants Despatch Transportation Company is reported in the market for 1,000 refrigerator cars. This item is not confirmed.

The Pittsburgh, Shawmut & Northern is said to be in the market for 2,300 coal cars and 500 box cars. This item is not confirmed.

The Pennsylvania Railroad is said to have placed an order with its Juniata shops for the building of 500 steel underframe box cars. This item is not confirmed.

The Long Island has ordered 50 motor cars, 30 steel passenger coaches, 10 steel parlor cars, 5 combination passenger and baggage cars and 5 combination mail and baggage cars for 1911 delivery.

IRON AND STEEL.

The Erie is said to have contracted for 30,000 tons of steel.

The Virginian is in the market for 2,000 tons of bridge steel for viaducts.

The Norfolk & Western has ordered 15,000 tons of steel from the United States Steel Corporation.

The Philadelphia & Reading has ordered 2,000 tons of bridge steel from the American Bridge Company.

The Oregon Trunk Line has placed an order for 1,700 tons of bridge steel from the American Bridge Company.

The Chicago, Milwaukee & St. Paul has ordered 125 tons of rods for Howe truss bridges from the American Bridge Company.

The Florida East Coast has ordered 7,000 tons of fabricated steel, to be used in the construction of spans to connect the Florida Keys, from the American Bridge Company.

General Conditions in Steel.—Steel business thus far this month has been light, but it is expected that it will improve now that the election is over. The rail makers have adopted the method of quoting prices per pound instead of per ton on both standard and light sections. In the case of standard sections this does not make any change in price, as they are quoted at 1½c. per pound, which figures \$28 per gross ton at mill, the same price that has been in effect for some years.

The projected railway from Caiman to Paseo de los Indios, in the Chubut, will probably not be begun until 1911. Meanwhile the wool industry of this territory is rapidly developing, and it is stated that representatives of United States mining companies are to investigate the mineral possibilities of this little-known part of South America.

ANNUAL REPORT

CHICAGO, BURLINGTON & QUINCY RAILROAD COMPANY—FIFTY-SIXTH ANNUAL REPORT.

Chicago, July 1, 1910.

To the Stockholders of the Chicago, Burlington & Quincy Railroad Co:

Departing from the practice of previous years, there has been omitted at the beginning of this report the consolidated Income Account for all roads operated and controlled. In lieu thereof separate Income Accounts are given of the Colorado & Southern Lines and of the Q. O. & K. C. R.R.

OPERATING REVENUES.

	1910.	1909.
Freight revenue	\$58,224,537.48	\$52,240,920.60
Passenger revenue	22,330,305.83	19,583,305.02
Mail revenue	2,330,215.66	2,314,566.25
Express revenue	2,216,049.24	2,026,990.25
Miscellaneous transportation revenue	1,803,949.06	1,675,211.92
Revenue from operations other than transportation	812,440.69	682,504.12
Joint facilities	102,019.28	87,131.20
Total operating revenue	\$87,869,517.24	\$78,612,629.36

OPERATING EXPENSES.

	1910.	1909.
Maintenance of way and structures	\$15,725,461.20	\$12,986,773.27
Maintenance of equipment	15,057,165.39	13,366,415.08
Traffic expenses	1,654,451.73	1,576,860.83
Transportation expenses	28,340,051.74	24,584,729.67
General expenses	2,233,834.82	2,076,718.92
Total operating expenses	\$63,010,964.88	\$54,560,997.77
Net operating revenue	\$24,858,552.36	\$24,051,631.59
Net deficit from outside operations	164,282.15	158,406.71
Total net revenue	\$24,694,270.21	\$23,893,224.88
Taxes accrued	2,970,736.78	2,517,017.52
Operating income	\$21,723,533.43	\$21,376,207.36

OTHER INCOME.

	1910.	1909.
Rents	\$745,786.35	\$653,749.44
Miscellaneous interest	1,777,907.46	2,907,907.11
Total other income	\$2,523,693.81	\$2,943,846.55
Gross corporate income	\$24,247,227.24	\$22,320,051.91

DEDUCTIONS FROM GROSS CORPORATE INCOME.

	1910.	1909.
Rents	\$1,764,512.90	\$1,807,790.05
Miscellaneous interest	1,077.95	89,847.53
Interest accrued on funded debt	8,506,015.82	7,855,507.16
Sinking funds	666,874.39	675,828.56
Total deductions	\$10,938,481.06	\$9,948,973.30
Net corporate income	\$13,308,746.18	\$12,371,080.61
Dividends	\$8,867,128.00	\$8,867,128.00
Appropriations for betterments	3,329,006.47	2,237,080.86
	\$12,196,134.47	\$11,104,208.86
Balance	\$1,112,611.71	\$1,266,871.75

Charges to Capital Account aggregating \$5,658,156.93 were made during the fiscal year for additions to the property. Of this amount \$959,822.23 was expended for the line from Herrin to Metropolis, Ill., which is practically completed and will be opened for traffic before the close of the calendar year. Extensions are in progress from Kirby, Wyo., to Powder River, Wyo., upon which \$2,091,258.35 has been expended so far; from Lincoln, Neb., to Milford, Neb., expended to date, \$76,354.95; from Scribner, Mont., to Fromberg, Mont., expended to date, \$35,058.58; and from Hudson, Colo., to Greeley, Colo., expended to date, \$7,409.60.

New second tracks, where urgently needed, have been constructed in Illinois and Nebraska, and numerous side and passing tracks have been laid at different points on the system.

Additional land has been procured just outside the city of Chicago for needed yard facilities, and land for additional terminal facilities at Denver has also been purchased.

Large additions have been made to shops at Havelock, Neb., and improvements have been made in terminal facilities at Lincoln, Neb.

The following statistical tables have been compiled in the form required for the annual reports of carriers to the Interstate Commerce Commission:

CAPITALIZATION.

CAPITAL STOCK.

No. of shares.	Total par value authorized and outstanding.	Dividends declared during the year.
1,108,391	\$110,839,100.00	Rate. 8% Amount. \$8,867,128.00

FUNDED DEBT.

Total par value.

Designation of bond.	Authorized.	Outstanding.	In treasury, in sinking funds, or pledged as collateral.	In hands of public.	Interest accrued during year.
Mortgage	\$209,435,000	\$190,368,800	\$22,638,000	\$167,730,200	\$7,618,700.62
Collateral trust	7,968,000	7,310,200	4,406,500	2,903,700	292,743.98
Plain or debenture	16,647,000	12,177,000	2,457,000	9,720,000	599,571.22
Total	\$234,050,000	\$209,856,000	\$29,502,100	\$180,353,900	\$8,506,015.82

EXPENDITURES FOR NEW LINES AND EXTENSIONS AND EQUIPMENT, AND FOR ADDITIONS AND BETTERMENTS, DURING THE YEAR.

ACCOUNT.	New lines and extensions.	Additions and betterments.	Total expenditure.
I.—ROAD.			
Engineering	\$148,890.33	\$16,561.70	\$191,489.84
Right of way and station grounds	332,449.43	720,759.41	1,053,208.84
Real estate	2,096,161.77	Cr. 65,400.93	Cr. 65,400.93
Grading	52,670.22	367,258.97	2,932,180.59
Ties	308,689.70	96,184.46	32,670.22
Bridges, trestles and culverts	42,673.10	164,903.24	1,056,774.69
Turnouts	43,765.28	213,901.37	207,020.40
Frogs and switches	6,078.37	42,468.75	663,611.88
Track fastenings and other material	34,672.81	68,760.02	71,441.00
Ballast	15,775.46	16,130.47	486,357.87
Tools, hazing and outfitting	37,086.32	117,801.30	127,463.54
Rock way bonds	12.68	72.88	248,932.68
Forming right of way	7,944.21	16,084.20	85.56
Clearing and grading	6,709.42	3,202.03	24,045.95
Interlocking and other signal apparatus	122.58	84,491.73	155,019.61
Telegraph and telephone lines	5,901.52	1,085.98	167,816.71
Signal buildings and fixtures	1,304.34	79,306.91	126,643.74
Shops, engine houses and turn tables	3,018.46	372,428.66	196,390.56
Shop machinery and tools	598.90	49,401.74	647,121.48
Water systems	4.62	Cr. 20,119.32	61,738.19
Gas systems	108.12	30,669.21	81,955.51
Street improvements	70.07	1,244.47	38,759.32
Dock and wharf property		7,098.51	1,352.59
Electric light plants	3.80	25.88	70.07
Gas generating plant	509.15	27,580.36	7,098.51
Miscellaneous structures	8,040.26		25.88
Transportation of men and material	178.73	126.25	30,010.15
Injuries to persons			8,040.26
Total	\$3,177,069.99	\$2,356,055.19	\$3,000,920.75
II.—EQUIPMENT			
Steam locomotives			\$29,432.62
Passenger train cars			132,228.70
Freight train cars			Cr. 958,140.00
Work equipment			1,070,036.34
Total		\$111,890.34	\$184,465.00
III.—GENERAL EXPENDITURES			
Law expenses	\$403.87		\$89.50
Other expenditures	10,991.61	\$1,000.00	33,334.32
Total	\$11,395.48	\$1,000.00	\$53,623.82
Grand total	\$8,189,285.47	\$2,468,055.19	\$3,399,006.47

TRAFFIC STATISTICS

ITEM	1910		1909		Increase or decrease	
	Dollars and whole numbers	Cents and decimals	Dollars and whole numbers	Cents and decimals	Dollars and whole numbers	Cents and decimals
PASSENGER TRAFFIC						
Number of passengers carried during year.....	21,412,745		20,477,420		Inc.	935,325
Number of passengers carried one mile.....	1,189,811,415		1,066,476,600		Inc.	123,334,815
Number of passengers carried one mile, per mile of road.....	181,809		111,900		Inc.	69,909
Average distance carried, miles.....	53	81	47	25	Inc.	6
Total passenger revenue.....	\$22,380,306	83	\$19,883,306	62	Inc.	\$2,497,000
Average amount received from each passenger.....	\$1	01025	90055		Inc.	00071
Average receipts per passenger per mile.....		01881	01484		Inc.	00007
Total passenger service train revenue.....	\$27,566,795	71	\$21,544,772	99	Inc.	\$6,022,023
Passenger service train revenue per mile of road.....	\$3,055	19	\$2,720	66	Inc.	334
Passenger service train revenue per train mile.....	\$1	51109	\$1	44443	Inc.	06666
FREIGHT TRAFFIC						
Number of tons carried of freight earning revenue.....	27,867,618		25,000,000		Inc.	2,867,618
Number of tons carried one mile.....	7,485,144,216		6,620,416,365		Inc.	864,727,851
Number of tons carried one mile, per mile of road.....	824,016		733,715		Inc.	90,301
Average distance haul of one ton, miles.....	266	80	264	21	Inc.	2
Total freight revenue.....	\$58,224,587	48	\$52,240,920	60	Inc.	\$5,983,667
Average amount received for each ton of freight.....	\$2	08033	\$2	08499	Inc.	00034
Average receipts per ton, per mile.....		00782		00789	Dec.	00006
Freight revenue per mile of road.....	\$6,452	86	\$5,789	69	Inc.	663
Freight revenue per train mile.....	\$2	98566	\$3	05713	Dec.	07147

ITEM	1910		1909		Increase or decrease	
	Dollars and whole numbers	Cents and decimals	Dollars and whole numbers	Cents and decimals	Dollars and whole numbers	Cents and decimals
TOTAL TRAFFIC						
Operating revenues.....	\$87,869,517	24	\$78,612,629	36	Inc.	\$9,256,887
Operating revenues per mile of road.....	\$9,788	33	\$8,712	39	Inc.	\$1,075
Operating revenues per train mile.....	\$2	38445	\$2	39716	Dec.	01271
Operating expenses.....	\$63,010,964	88	\$54,560,997	77	Inc.	\$8,449,967
Operating expenses per mile of road.....	\$6,983	33	\$6,046	82	Inc.	\$936
Operating expenses per train mile.....	\$1	70988	\$1	66375	Inc.	04613
Net operating revenue.....	\$24,858,552	36	\$24,051,631	59	Inc.	\$806,920
Net operating revenue per mile of road.....	\$2,755	00	\$2,665	57	Inc.	89
Average number of passengers per car mile.....	16	.....	17	.....	Dec.	1
Average number of passengers per train mile.....	65	.....	62	.....	Inc.	3
Average number of passenger cars per train mile.....	6	02	5	65	Inc.	37
Average number of tons of freight per loaded car mile.....	16	99	17	08	Dec.	09
Average number of tons of freight per train mile.....	331	26	387	44	Dec.	56
Average number of freight cars per train mile.....	32	66	33	09	Dec.	43
Average number of loaded cars per train mile.....	22	44	22	69	Dec.	25
Average number of empty cars per train mile.....	9	28	9	48	Dec.	20
Average mileage operated during year.....	9,023	06	9,023	09	Dec.	03

MILEAGE STATISTICS.

ITEM	1910.	1909.	Increase or decrease.
Miles.	Miles.	Miles.	
Locomotive Mileage—Revenue Service.			
Freight locomotive miles.....	20,664,263	17,533,620	Inc. 3,130,643
Passenger locomotive miles.....	17,832,270	16,079,035	Inc. 1,753,235
Mixed locomotive miles.....	912,212	1,270,023	Dec. 357,811
Special locomotive miles.....	14,372	10,604	Inc. 3,768
Switching locomotive miles.....	9,858,473	8,162,678	Inc. 1,695,795
Total revenue locomotive mileage.....	49,331,590	43,055,965	Inc. 6,275,625
Non-revenue service locomotive miles.....	2,379,048	1,849,330	Inc. 529,718
Car Mileage—Revenue Service.			
Freight car miles:			
Loaded.....	437,559,610	387,679,481	Inc. 49,880,129
Empty.....	180,914,529	162,025,877	Inc. 18,888,652
Caboose.....	18,518,939	16,821,177	Inc. 2,697,762
Total freight car miles.....	636,993,078	565,526,535	Inc. 71,466,543
Passenger car miles:			
Passenger.....	46,949,693	41,837,410	Inc. 5,112,283
Sleeping, parlor and observation.....	25,683,330	21,510,726	Inc. 4,172,604
Other passenger train cars.....	37,103,965	32,429,171	Inc. 4,674,794
Total passenger car miles.....	109,736,888	95,777,307	Inc. 13,959,581
Special car miles:			
Freight, loaded.....	157,000	131,454	Inc. 25,546
Freight, empty.....		43	Dec. 43
Caboose.....	13,443	8,496	Inc. 4,947
Passenger.....	49,119	40,845	Inc. 8,274
Sleeping, parlor and observation.....	653	8,901	Dec. 3,248
Other passenger train cars.....	2,571	1,172	Inc. 1,399
Total special car miles.....	222,786	185,411	Inc. 37,375
Total revenue car mileage.....	746,952,752	661,489,253	Inc. 85,463,499
Non-revenue service car miles.....	17,209,298	13,070,576	Inc. 4,138,722
Train Mileage—Revenue Service.			
Freight train miles.....	18,595,294	15,823,841	Inc. 2,771,453
Passenger train miles.....	17,336,310	15,695,928	Inc. 1,640,382
Mixed train miles.....	906,073	1,264,375	Dec. 358,302
Special train miles.....	12,907	9,912	Inc. 2,995
Total revenue train mileage.....	36,851,084	32,794,056	Inc. 4,057,028
Non-revenue service train miles.....	1,788,271	1,414,590	Inc. 373,681

EQUIPMENT.

EQUIPMENT.					Average tractive power all locomotive and average capacity all freight cars.
ITEMS.	No. on June 30,	No. added during year.	No. retired during year.	No. on June 30,	
Locomotives—Owned:					
Passenger	416	50	466	.....	.....
Freight	919	62	857	.....	.....
Switching	338	12	350	.....	.....
Total locomotives	1,673	62	62	1,673	24,236 lbs.
Cars owned—Passenger service:					
First-class cars	630	5	625	.....	.....
Combination cars	225	3	228	.....	.....
Dining cars	28	4	32	.....	.....
Parlor cars	7	4	11	.....	.....
Baggage, express and postal cars	227	.....	227	.....	.....
Other cars in passenger service	42	6	36	.....	.....
Total	1,159	11	11	1,159	.....
Freight service:					
Box cars	26,297	229	26,068	.....	.....
Flat cars	1,268	18	1,250	.....	.....
Stock cars	6,991	7	6,984	.....	.....
Coal cars	14,077	316	13,761	.....	.....
Tank cars	6	.....	6	.....	.....
Refrigerator cars	1,512	200	1,712	.....	.....
Other cars in freight service	100	.....	100	.....	.....
Total	50,251	200	570	49,881	33,566 tons
Company's service:					
Officers' and pay cars	31	.....	31	.....	.....
Gravel cars	488	5	483	.....	.....
Derrick cars	33	2	35	.....	.....
Caboose cars	648	13	666	.....	.....
Other road cars	3,297	557	3,854	.....	.....
Total	4,497	577	5,069	.....	.....
Total cars owned	55,907	788	586	56,109	.....

GENERAL BALANCE SHEET.

JUNE 30, 1910.

ASSETS.

LIABILITIES.

Property Investment—Road and Equipment:

Road	\$310,827,652.06	
Equipment	53,378,553.17	
General Expenditures	1,454,543.37	\$374,655,748.60
Reserve for Annual Depreciation—Credit	9,965,231.84	
Total		\$364,690,516.76

Securities:

Securities of Proprietary, Affiliated and Controlled Companies, Pledged—		
Stocks	19,344,014.38	
Securities Issued or Assumed, Pledged—		
Pledged Debt	31,000.00	
Securities of Proprietary, Affiliated and Controlled Companies, Unpledged—		
Stocks	7,503,624.44	
Funded Debt	722,050.00	8,225,674.44
Total		\$ 27,000,688.82

Other Investments:

Advances to Proprietary, Affiliated and Controlled Companies for Construction, Equipment and Betterments		401,845.46
Miscellaneous Investments—		
Physical Property	1,482,513.21	
Securities Unpledged	1,321,134.03	2,803,647.24
Total		\$3,205,492.70

Working Assets:

Cash	9,103,246.56	
Securities Issued or Assumed, Held in Treasury—		
Funded Debt	13,058,700.00	
Marketable Securities—		
Stocks	747,572.12	
Funded Debt	47,543.75	795,115.87
Loans and Bills Receivable		2,037,300.85
Net Balance Due from Agents and Conductors		2,114,516.85
Miscellaneous Accounts Receivable		4,453,959.68
Materials and Supplies		8,969,701.53
Other Working Assets		26,641.59
Total		\$ 40,559,182.98

Deferred Debit Items—

Advances—		
Temporary Advances to Proprietary, Affiliated and Controlled Companies	612,763.10	
Working Funds	275,575.91	
Other Advances	31,172.46	919,511.47
Insurance Paid in Advance		134,924.08
Cash and Securities in Sinking Funds	16,263,637.43	
Securities in Provident Funds	496,538.89	
Other Deferred Debit Items	7,530,523.99	
Total		\$ 25,345,135.86
Grand Total		\$461,401,017.07

Capital Stock:

Common Stock	\$110,839,100.00
--------------	------------------

Mortgage, Bonded and Secured Debt:

Funded Debt—		
Mortgage Bonds—		
Held by Company	\$ 12,978,000.00	
Not Held by Company	177,390,800.00	190,368,800.00
Collateral Trust Bonds—		
Held by Company	54,700.00	
Not Held by Company	7,255,500.00	7,310,200.00
Plain Bonds—		
Held by Company	26,000.00	
Not Held by Company	12,151,000.00	12,177,000.00
Total		\$209,856,000.00

Working Liabilities—

Traffic and Car-service Balances due to Other Companies	746,291.58
Audited Vouchers and Wages Unpaid	8,426,378.40
Miscellaneous Accounts Payable	588,970.22
Matured Interest and Dividends Unpaid	2,168,762.50
Matured Mortgage, Bonded and Secured Debt Unpaid..	11,100.00
Other Working Liabilities	57,430.09
Total	\$ 11,998,932.79

Accrued Liabilities Not Due—

Unmatured Interest and Sinking Fund Payments	1,518,398.28
Taxes Accrued	72,000.00
Total	\$ 1,590,398.28

Deferred Credit Items—

Operating Reserves	791,674.82
Liability on Account of Provident Funds	496,538.89
Other Deferred Credit Items	188,339.20
Total	\$ 1,476,552.91

Appropriated Surplus—

Additions to Property Since June 30, 1907, through Income	8,752,501.94
Reserves from Income or Surplus—	
Invested in Sinking Funds	28,230,587.89
Not Specifically Invested	4,569,567.18
Total	\$ 41,562,656.61

Profit and Loss—

Income Account	41,785,373.25
Profit and Loss	42,302,008.33
Total	\$ 84,087,376.58

Grand Total	\$461,401,017.07
-------------	------------------

MILEAGE.
MILEAGE OF ROAD OPERATED.

State.	Main line.	Branches and spurs.	Total.	Operated under lease.	Total line
Illinois	356.25	1,278.48	1,634.73	48.31	1,678.04
Iowa	274.55	1,090.43	1,364.98	73.47	1,438.45
Wisconsin		222.57	222.57	.58	223.10
Minnesota		23.61	23.61	14.84	38.45
Missouri		1,121.62	1,121.62	11.63	1,133.25
Kansas		299.32	299.32	.82	299.14
Nebraska	191.61	2,659.17	2,850.78	22.87	2,873.15
South Dakota		283.37	283.37		283.37
Wyoming		482.77	482.77		482.77
Montana		187.28	187.28	12.62	199.90
Colorado		394.88	394.88	84.97	429.35
	822.41	8,003.00	8,825.41	214.56	9,039.97

State.	Single Track.	Second Track.	Third Track.	Yard Track and Sidings.	Total.
Illinois	1,694.73	59.56	28.35	878.12	2,760.46
Iowa	1,364.98	244.53		316.63	1,926.14
Wisconsin	222.57	8.40		69.10	300.07
Minnesota	23.61			30.08	53.69
Missouri	1,121.62	109.69		417.51	1,648.82
Kansas	299.32			23.44	322.76
Nebraska	2,659.17	1.40		638.71	3,199.30
South Dakota	283.37			64.56	347.93
Wyoming	482.77			126.75	609.52
Montana	187.28			54.64	241.92
Colorado	394.88			119.47	514.75
	8,825.41	481.62	28.55	2,672.61	12,108.20

Following is the report of the General Auditor with statements prepared by him:
By order of the Board of Directors

DARIUS MILLER,
President.

INCOME ACCOUNT.
OPERATING INCOME.

RAIL OPERATIONS.

Operating Revenues:

Revenue from Transportation:		
Freight	\$58,224,537.48	
Passenger	22,380,305.83	
Excess Baggage	320,068.24	
Mail	2,230,215.66	
Express	2,216,049.24	
Milk	311,241.22	
Other Passenger Train	8,915.52	
Switching	1,157,011.90	
Special Service Train	82,062.02	
Miscellaneous Transportation	74,650.16	\$86,955,057.27

Revenue from Operations other than Transportation:

Station and Train Privileges	6,238.50
Parcel Room Receipts	6,907.50
Storage Freight	44,116.56
Storage Baggage	20,650.60
Car Service	295,119.16
Telegraph and Telephone Service	202,503.37
Rent of Buildings and Other Property	99,367.19
Miscellaneous	137,307.12
Joint Facilities Dr.	19,388.15
Joint Facilities Cr.	114,407.43
Total Operating Revenues	\$87,860,517.84

Operating Expenses:		
Maintenance of Way and Structures	\$15,294,461.39	
Maintenance of Equipment	1,000,460.39	
Leasing Expenses	1,664,461.33	
Transportation Expenses	2,500,000.00	
General Expenses	2,500,000.00	62,959,383.11
Net Operating Revenue		\$71,800,522.66
Operating Expenses:		
Revenue	780,487.74	
Expenses	944,461.39	
Net Operating Loss		163,973.65
Total Net Revenue		\$71,636,549.01
Operating Income		\$71,472,575.36

[illegible]

OTHER INCOME		
Rents, Allowances, and License of		
Cinema Rights		2,844.12
Other Rents and License		
Joint Production	617,181.27	
Miscellaneous Rents	129,460.96	746,642.23
Dividends Received on Stocks		
Owned or Controlled		698,578.00
Interest Received on Funded		
Bonds Owned or Controlled		289,232.08
Interest on Other Securities,		
Loans and Accounts	790,097.48	2,528,698.81
Gross General Income		\$24,247,227.24

<div style="text-align: center;"> DISBURSEMENTS OF THE COMMISSIONER OF THE GENERAL LAND OFFICE </div>		
Disbursed, December 31, 1909		
2 per cent, payable October 1, 1909	2,216,782.00	
2 per cent, payable January 1, 1910	2,216,782.00	
2 per cent, payable April 1, 1910	2,216,782.00	
2 per cent, payable July 1, 1910	2,216,782.00	8,867,128.00
Appropriations for Betterments:		
Expended during the year	2,329,066.47	12,196,134.47
Balance for year		\$ 1,112,611.71

FUNDED DEBT OF THE CHICAGO, BURLINGTON & QUINCY RAILROAD COMPANY.

Designation of Bond or Obligation	Term Date of Issue.	Date of Ma- turity.	Total Par Value Authorized.	Total Par Value Outstanding.	Total Par Value Held by Company—			Total Par Value not Held by Company.	Interest—		
					In Treasury.	Pledged as Collateral.	In Sinking Funds.		Rate.	When Payable.	Amount Accr'd d'r'g the Year.
MORTGAGE BONDS.											
C. B. & Q. R. R.:											
General Mortgage	1903	1938	\$53,680,000	\$53,680,000	\$12,198,000	.....	.....	\$41,482,000	4	M. & S.	\$1,920,469.93
Illinois Division	1899	1949	50,835,000	50,835,000	384,000	.....	.....	50,451,000	3½	J. & J.	1,779,225.00
Illinois Division	1899	1949	34,165,000	34,165,000	189,000	.....	.....	33,976,000	4	J. & J.	1,366,600.00
Iowa Division Mortgage Sinking Fund Bonds	1879	1919	3,000,000	2,277,000	.....	.....	.....	2,277,000	5	A. & O.	113,850.00
Iowa Division Mortgage Sinking Fund Bonds	1879	1919	12,502,000	6,098,000	21,000	.....	.....	6,077,000	4	A. & O.	246,388.18
Nebraska Extension Mortgage Sinking Fund Bonds	1887	1927	29,441,000	23,134,000	125,000	\$31,000	.....	22,978,000	4	M. & M.	935,743.32
B. & M. R. R. R. in Nebraska:											
Consolidated Mortgage Sinking Fund Bonds	1878	1918	13,751,000	13,613,000	61,000	.....	\$8,983,800	4,568,200	6	J. & J.	816,885.00
Republican Valley R. R.:											
Mortgage Sinking Fund Bonds..	1879	1919	2,643,000	932,800	.....	.....	645,800	287,000	6	J. & J.	56,904.00
Hannibal & St. Joseph R. R.:											
Mortgage Bonds	1881	1911	8,000,000	5,551,000	.....	.....	.....	5,551,000	6	M. & S.	359,057.67
Tarkio Valley R. R.:											
Mortgage Bonds	1880	1920	430,000	38,000	.....	.....	.....	38,000	7	J. & D.	3,365.84
Nodaway Valley R. R.:											
Mortgage Bonds	1880	1920	388,000	45,000	.....	.....	.....	45,000	7	J. & D.	3,791.66
Lincoln & Northwestern R. R.:											
Mortgage Bonds	1880	1910	600,000	.....	.....	.....	.....	.....	7	J. & J.	12,320.00
COLLATERAL TRUST BONDS.											
C. B. & Q.:											
Sinking Fund Bonds (Denver Extension)	1881	1922	7,968,000	7,310,200	54,700	.....	4,351,800	2,903,700	4	F. & A.	292,743.98
PLAIN BONDS.											
C. B. & Q.:											
Sinking Fund Bonds	1881	1921	4,300,000	3,667,000	26,000	.....	2,431,000	1,210,000	4	M. & S.	146,730.23
Illinois Bonds	1883	1913	9,000,000	8,510,000	.....	.....	.....	8,510,000	5	M. & M.	438,075.54
B. & M. R. R. R. in Nebraska:											
Sinking Fund Bonds	1880	1910	3,347,000	.....	.....	.....	.....	.....	4	J. & J.	14,765.45
Total			\$234,050,000	\$209,856,000	\$13,058,700	\$31,000	\$16,412,400	\$180,353,900	.....	.....	\$8,506,015.82

COLORADO & SOUTHERN LINES.
COMBINED INCOME ACCOUNT FIGURES OF COMPANIES COM-
PRISING THE "COLORADO & SOUTHERN LINES."

YEARS ENDED JUNE 30.
OPERATING REVENUES.

1910		1909
\$12,040,828.29	Freight Revenue	\$10,600,743.01
3,918,092.98	Passenger Revenue	3,756,694.54
170,391.82	Mail Revenue	169,460.84
324,657.66	Express Revenue	266,644.76
249,187.27	Miscellaneous Transportation Revenue	218,829.73
	Revenue from Operations other than	
72,652.85	Transportation	67,787.27
2,169.76	Joint Facilities	252.02
\$16,777,980.73	Total Operating Revenue	\$15,080,412.17

OPERATING EXPENSES.

\$2,188,644.76	Maintenance of Way and Structures	\$2,162,560.10
2,521,272.66	Maintenance of Equipment	2,447,906.42
274,271.16	Traffic Expenses	277,663.79
5,378,794.21	Transportation Expenses	4,811,851.02
500,472.19	General Expenses	525,706.28
\$10,863,454.98	Total Operating Expenses	\$10,225,687.61
\$5,914,525.75	Net Operating Revenue	\$4,854,724.56
22,323.59	Net Deficit from Outside Operations	7,134.90

\$5,892,202.16	Total Net Revenue	\$4,847,589.66
477,869.64	Taxes Accrued	393,906.76
\$5,414,332.52	Operating Income	\$4,453,682.90

OTHER INCOME.

\$41,582.18	Rents	\$21,893.32
605,034.65	Miscellaneous Interest	685,698.62
\$646,636.83	Total other Income	\$707,591.94
\$6,060,969.35	Gross Corporate Income	\$5,161,274.84

DEDUCTIONS FROM GROSS COR-
PORATE INCOME.

\$390,258.25	Rents	\$226,559.66
22,985.78	Miscellaneous Interest	59,391.89
2,661,033.74	Interest Accrued on Funded Debt	2,638,620.74
35,058.19	Sinking Funds	37,843.38
\$3,109,336.06	Total Deductions	\$2,962,415.67
\$2,951,633.29	Net Corporate Income	\$2,198,859.17
\$1,300,000.00	Dividends	\$1,300,000.00
\$1,651,633.29	Balance	\$898,859.17

The Colorado & Southern Railway Company owns a beneficial interest in one-half of the total Capital Stock of The Colorado Midland Railway Company, and also owns one-half of the Capital Stock of The Trinity & Brazos Valley Railway Company. The results of the operations of those properties for the years ended June 30 are:

1910		1909
	The Colo. Midland Ry. Co.	
\$132,293.19	(Deficit)	\$47,086.74
	The Trinity & Brazos Val. Ry. Co.	
933,436.01	(Deficit)	902,023.85
\$1,065,729.20	Total	\$949,110.59
Deducting one-half of this deficit from the surplus of the Colorado & Southern Lines, the result is:		
	Colorado & Southern System	
\$1,118,768.69	(Surplus)	\$424,303.88

QUINCY, OMAHA & KANSAS CITY R. R. CO.
INCOME ACCOUNT, YEARS ENDED JUNE 30.
OPERATING REVENUES.

1910		1909
\$570,103.68	Freight Revenue	\$527,842.88
236,062.94	Passenger Revenue	211,846.82
26,375.60	Mail Revenue	26,460.96
24,182.86	Express Revenue	19,656.08
6,585.81	Miscellaneous Transportation Revenue	7,647.38
	Revenue from Operations other than	
8,757.17	Transportation	8,273.92
\$872,068.06	Total Operating Revenue	\$801,728.04

OPERATING EXPENSES.

\$316,641.65	Maintenance of Way and Structures	\$316,441.11
165,211.21	Maintenance of Equipment	143,850.72
17,342.66	Traffic Expenses	18,635.55
387,507.68	Transportation Expenses	372,286.82
34,337.90	General Expenses	35,547.93
\$921,341.10	Total Operating Expenses	\$786,761.63
\$49,273.04	(Deficit) Net Operating Revenue (Surplus)	\$14,966.41
36,128.85	Taxes Accrued	29,910.32
\$85,401.89	(Deficit) Operating Income (Deficit)	\$14,943.91

OTHER INCOME.

\$77,797.09	Rents	\$22,308.29
1,286.19	Miscellaneous Interest	1,244.79
\$79,083.28	Total other Income	\$23,553.08
\$6,318.61	(Deficit) Gross Corporate Income (Surplus)	\$8,609.17

DEDUCTIONS FROM GROSS COR-
PORATE INCOME.

\$44,941.86	Rents	\$41,554.12
\$51,259.97	(Deficit) Net Corporate Income (Deficit)	\$32,944.95
\$35,504.92	Appropriations for Betterments	\$31,735.17
\$86,704.89	(Deficit) Balance	\$64,680.12

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED WEEKLY, EVERY FRIDAY EXCEPT IN THE MONTH OF JULY, AT THE RAILWAY AGE GAZETTE BUILDING, 30 EDITION ST., NEW YORK.

CHICAGO: PUBLISHED BY THE RAILWAY AGE GAZETTE CO., INC. CLEVELAND: Witham & Biddle. LONDON: Office of the Agent, Chambers, Westminster.

W. H. B. BROWN, President. HENRY LEE, Secretary. L. A. SORRELL, Treasurer. The business of the company is the office of the officers.

EDITORS:

W. H. B. BROWN, President	RAY A. WRIGHT	B. B. ABRAMS
S. A. O. O'NEILL	G. L. FOWLER	W. L. HESTER
W. H. B. BROWN, President	WILLIAM FORESTER	E. W. ARNOLD
RAY A. WRIGHT	S. W. DENNIS	H. H. SWEET
CLEVELAND: Witham & Biddle		

Subscription prices for weekly issue and special double editions: Single copies, 10 cents; New York, 15 cents; elsewhere, 20 cents. Foreign, 30 cents. Canada, 25 cents. Mexico, 20 cents. The year's subscription, \$5.00 a year; 6.00 a year; 12s. 6d. a year; 15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00. Entered at the Post Office at New York, N. Y., as mail matter of the

VOLUME 49. FRIDAY, NOVEMBER 18, 1910. NUMBER 21.

CONTENTS

EDITORIAL	981
The Election and the Railways	983
Chicago, Milwaukee & St. Paul	984
Hocking Valley	986
New Books	988
LETTERS TO THE EDITOR	988
Reporting Revenue on Exchange Ticket Orders	988
ILLUSTRATED	989
Lahlo & Washington Northern	989
Test of Jacobs-Shupert Firebox	965
Test of Jacobs-Shupert Firebox	971
Double Track Railways in Wisconsin	972
Tests for Color Vision in New South Wales	973
MISCELLANEOUS	974
Railway Education in Illinois	962
The Indiana "Railroad Convention"	969
Results with Gasoline Section Cars	974
Chicago Railway News	974
GENERAL NEWS SECTION	976
SUPPLY TRADE SECTION	987

WITH the holding of the election a very curious state of affairs has ensued in Connecticut bearing on the long fight of more than four years' standing over the creation of a new public utilities commission. All through the campaign that question figured prominently. Candidates were "heckled" about it, a state business men's association pushed the issue and campaign orators on the stump dilated much on the theme. Yet in the actual election of legislators they were chosen far less on a basis of their views on public utilities than for their favor of one or the other of two candidates for United States senator. The election resulted in the choice of a candidate of one party as governor, and a legislature controlled in both branches by the other party, which, by what seems, unfortunately, an inexorable law of partisanship, will shrink from allowing an opposing executive to appoint members of a new commission. Then the important matter of the form and method of appointment becomes a complication at the outset. Finally the railway employees of the state, solicitory to protect their increased wages, are appa-

rently to join hands with the corporations and staff a new line on the machine as representatives of several thousand votes and a power at the polls. All that stands, though in somewhat novel aspects that intrusion of politics into an economic issue which, all over the country, has been so baleful an influence on railway commissions and corporate bodies. And beyond the limits of the legal mechanism of the commissions and their powers and functions under statutes, is the more vital matter of their membership as selected by the appointing power. If Connecticut, after her long and distressful experience with a bad agency, commissioning emerges next year with a good law and a good commission, it will be good fortune in the face of present omens, which indicate grave doubts on her securing any new commission at all. It looks now, indeed, like a repetition of the travesty of last year, when, after mighty legislative throes, no new commission was born and the old "political" commission stood pat and smiled.

IN the first paragraph of our comments on the annual report of the Northern Pacific, published in our issue of October 28, the figures for total operating revenue were, through an error, given in place of the figures for total operating expenses. Total operating expenses of the Northern Pacific amounted to \$45,987,405 in 1910 and to \$38,020,005 in 1909. It is proper to point out in this connection that notwithstanding the unavoidable increase in operating expenses in 1910, as compared with 1909, the operating ratio of the Northern Pacific was 61.71 per cent., which is a lower operating ratio than any other road west of the Mississippi, with the exception of the Union Pacific and the Great Northern. The Great Northern had an operating ratio of 60.93 per cent. last year, and the Union Pacific, 52.02 per cent. Stating the same thing in another way, the Northern Pacific was able to save more out of each dollar of revenue than was any other road in the West, with the exception of the two named above.

THE New York State Public Service Commission, Second district, has ordered the New York Central to change the time of passenger train No. 72, an accommodation running from Syracuse to Albany in the afternoon. It appears that formerly this train left Utica at 5:10 p. m. after a stop of 20 minutes; and there was another one which left there two hours later. When business fell off because of the competition of a new electric road, about four years ago, the later train was taken off, and No. 72 was held in Utica until six o'clock. This inconvenienced a lot of workmen living at Fort Plain and other places east of Utica, and it is on their complaint—which appears to have been four years in coming to a head—that the commission has told the railway company that it must either change No. 72 back to its earlier hour or else put on another train. In a similar case, on the Delaware & Hudson, the commission has ordered the restoration of a train which ran north to Glens Falls in the morning, returning in the evening, a number of commuters complaining that the discontinuance of the train, which had been running for more than six years, compelled them to leave their families and board at the place of their work (Glens Falls). It appeared at the hearing that only five "commuters" used this train. What, in such cases, can the unhappy passenger traffic manager do? Theory and practice are difficult to harmonize. The traffic manager who tries to give people in country districts as good facilities as he provides for suburban territory, where there are fifty or a hundred times as many passengers, ought to be commended for his friendly attitude toward the people, even if he falls in his ambition to promote everybody's happiness; but "vested right" steps in, and the only commendation that he receives is an order to continue his experiment forever, whether it pays or not. Quite possibly a commission order is in many cases a salutary lesson for the passenger agent, for he sometimes forgets that the railway and the passenger are not equally well situated to retreat

from a bad bargain. The passenger may be obliged to stay for the rest of his life in his new situation. In this Utica case, the New York Central showed not only that the patronage of train No. 72 had fallen off because of the introduction of trolley competition, but also that there was other business which needed accommodation but which would not be reasonably satisfied by a train starting before six o'clock. The Delaware & Hudson showed that the village of Gansevoort, whence came the complaint, has a population of about 170, and that the trains had been run at a decided loss for a number of years. For the first eight months of this year the entire earnings of these trains amounted to less than 40 cents a mile, varying from 18 cents to 39 cents, while the cost of running them was \$1.35 a mile. During ten days of the past summer the maximum number carried at any one time was nine; the minimum nil. Possibly, we have not got all the facts in this case; but at this distance it looks as though the only way to impart respectability to a commission order like that here issued would be to establish state ownership, and done with it. State ownership makes many absurd things seem reasonable—on the surface. With that change accomplished, how simple would be the problem! Put on the trains freely and then if the receipts were not satisfactory the legislature at Albany could make up the lack by a tax on the incomes of the denizens of Wall Street.

MEGALOMANIA.

["Megalomania (*Pathology*). A form of mental alienation in which the patient loses reasonable consciousness."] *—*

MR. ROOSEVELT is a very great man. He has been a near candidate for the highest title, Our First Citizen, which we have to confer in this country. He has enjoyed a greater popularity than any one, possibly excepting General Grant, had during his life time. And he seemed to have fairly earned that high esteem by his incomparable activities and advocacy of the homely virtues. His undertakings to promote hostility between wage earners and other earners have been much discussed as being developments of his character. This is not reasonable; his defections seem rather to indicate a mental lesion which needs quite different treatment, and consideration of it may be useful now when a sincere effort is being made for more frankness and a better understanding between corporations and their fellow citizens.

It is now plain that, as Senator Root predicted, the rebuff at the election will simply add intensity to Mr. Roosevelt's activity and probable candidacy two years hence. It is fair to reckon with him now as a public man, seriously and kindly.

We believe there is no question of his sincerity, at least of his belief in his own sincerity; of his earlier motive for activity in politics, a desire to do good which in the beginning far outshadowed personal ambition; of his belief in his theories; integrity of purpose; courage; ability and volubility; and these combined with his physical powers have made him the most effective stump speaker in the land. In all these respects he is quite like Mr. Bryan, but unlike in that Mr. Bryan's truthfulness, personal integrity and loyalty have never been questioned, while Mr. Roosevelt's record in these respects is becoming a large and painful one, and it is not consistent with his other admirable qualities.

He has urgently solicited and received from many corporations large contributions of money for election expenses and large expenditures of money and service for personal expenses. A few railway and other company instances have been publicly and generally mentioned in this connection. The number is much larger. The amounts of money so paid have been very large. Presidents, or other officers, who authorized such payments, undoubtedly put them forward as Free transportation and free special trains demanded by the highest officer in the land were deemed to be competent not to be refused, although they were contrary to the letter of the law. Contributions of great sums, personally solicited for campaign purposes, were

wisely made if they helped in the election of an upright, judicial and learned reformer, such as Mr. Roosevelt was believed to be in comparison with Mr. Bryan.

The really great reform desired, and well worth paying for, was a strict enforcement of existing laws, and in particular those against special privileges, the non-enforcement of which left railways helpless under competitive conditions. This was the hope and promise of the Roosevelt campaigns; for he promised, when promoted from the vice-presidency, to enforce the Elkins law and so protect the railways against each other and against the irresistible combinations for compelling rebates. There may have been contributions, both of transportation and of money, made under stress; ignoble acts, if you please to call them so, but the conscientious officer knows that fear of unrighteous attack, of unjustifiable injury to his stockholders must be taken into account; and Mr. Roosevelt's repeated emphatic proclamations that in prosecutions he would make sharp distinctions between "good" and "bad" corporations had a sinister meaning, not to be lightly dissociated with personal relations and campaign contributions. The protection of Paul Morton from prosecution in the Atchison rebate cases was by many construed to be formal notice of Mr. Roosevelt's policy at that time.

It makes no difference, for present purposes of consideration, whether these acts were inspired by fear or by hope. The railways were emerging. Trunk line associations, presidents' agreements, rebates and all forms of secrecy and mystery were commercial failures. No homilies were needed to show enlightened railway officers that, in the increasing intensity of the struggle for supremacy by cities and communities classed as trade centers, the control of rate making was surely passing away from the railways, and that publicity was the only available engine for determining where that control should rightly rest. Roosevelt and his type seemed distinctly preferable to the less accomplished Bryan.

But now there are two Richmonds in the field; the exponent of the Ten Commandments and the discoverer of the fetching literary paraphrase of the Golden Rule, "the square deal," scouts truth, ignores every correction of his misstatements, finds liars in plenty among all who disagree, chills to his warmest friend, the President of the United States, and clings only to those who, and for only so long as they, worship him and his inconsistencies.

In the late campaign he repeated and clung to certain specific damaging accusations against three candidates. He was furnished and there was widely published complete evidence of his untruths. He ignored and repeated them, and the people elected these three men governors of their respective states.

His conscience is probably the most satisfactory bureau in his highly departmental organization. It is not a water-tight compartment, inaccessible except through its conventional channel; it pervades and liquifies a stoppage in any other department at a single impulse from the starting valve. It was an emollient to the sporting section when the African expedition needed to be financed. It made corporation officers and high financiers attractive and useful, when needed, and painted them black for popular view. It is Napoleonic in quick justification of methods for helping the fight, while blinding the sight of wounded and dead—the feelings hurt and reputations destroyed by recklessness.

Seven years ago Assistant Postmaster General Tyner was accused of complicity in mail frauds. Pending trial, Mr. Roosevelt sent to Congress a memorandum condemning him as a lawbreaker. On trial Mr. Tyner was proved innocent. At the age of 77 years, after nearly 40 years of public service, and on his death bed, he wrote this letter to Mr. Roosevelt:

"Mr. commanding hearts are torn, and though my voice is so feeble and my clear conscience I want from day to day the conscience summons, and I cannot close my eyes without I am praying to you, Mr. President, as the chief accuser, to endeavor, if so be you can, to fight the great wrong which you have unwittingly done me."

The prayer was not granted.

Was the message he sent to the Pope by Bellamy Storer—

confirmed by Archbishop Ireland a manufactured narrative, a lie. Among the hundred or public men he has denounced as liars, when they quoted his statements and promises, are those men who told the truth? Are all the judges, who interpret the constitution and the laws in decisions disagreeable, unfaithful and incompetent? To confess error, to admit a mistake, to exonerate an unjustly accused dying man, require only the qualities of courage and honesty. Mr. Roosevelt's courage is as undeniable as is, we believe, his intention to be honest, but his malady is serious.

Medical authorities classify mental derangements under four heads: Mania, dementia, or fatuity, melancholy and phrenia. Mania is characterized by a disorder of one or several of the faculties. It is "manifested by extravagant, gay, gloomy or furious emotions; the gestures and words seem automatic."

Megalomania is defined to be: "A form of mental alienation in which the patient has grandiose delusions."

THE ELECTION AND THE RAILWAYS.

THE effect of the recent general election on the railway business can hardly fail to be good. The Mann-Elkins act passed by the last Congress was very much the most radical federal law for the regulation of railways ever passed. The republican administration and republican candidates for re-election to Congress pointed to it as one of the achievements of their party which entitled it to support at the polls. The argument had no perceptible effect unless it was the opposite of that intended. The republican candidates went down to defeat almost everywhere. Chairman Mann, of the house committee on interstate and foreign commerce, who put his name on the bill, managed to pull through, but by a greatly reduced majority. Some may say that the people objected to the measure because it was not radical enough; but we note that Governor Stubbs, of Kansas, who has been particularly strident and active in agitating against the railways, was elected by a largely reduced majority and ran a good deal behind his ticket; and that in Iowa, where anti-railway agitation, fomented mainly by Senator Cummins, has been chronic for some years, the number of republican congressmen elected was considerably reduced and the "insurgent" candidates for state offices were elected by heavily reduced majorities.

One of two constructions must be put on these results. Either the people meant positively to condemn the railway legislation passed by the republican party, or they took so little interest in it that it attracted far less votes than the party's tariff and other policies repelled. As for that very large element which is connected with railways and railway supply concerns, there is no question but that it did mean to condemn the numerous anti-railway measures that have been passed; and, as it has large voting power, its attitude probably accounts in a much larger measure than most politicians realize for the results in many places. On either theory it is evident the politicians greatly over-estimated the amount of public sentiment for radical railway legislation and that their enthusiasm for it is apt to cool. Therefore, there seems ground to hope that there is not much danger of further harmful railway legislation during the session of the old Congress which begins next month.

A second point favorable to the railway industry is that the next Congress will consist of a democratic house and a republican senate. With a national election only two years off, both houses of the new Congress are pretty sure to devote most of their time to playing the great American game of politics. The democrats won the recent election mainly because the people were discontented with the Taft administration and disgusted with the Payne-Aldrich tariff law. Political strategy naturally will, therefore, suggest to the democrats the expediency of passing an extreme tariff measure which they know the republican senate will not accept and for which they will get the credit and for the rejection of which the republican senate will get the blame, and of doing all they can to harass and embarrass the republican

administration. This leads us to the message the alarming prospect of being given a two-year's rest from having to spend, discuss, and adapt themselves to the new form of federal regulation.

In the good old days when Mr. Bryan led the democratic party, railway men thought that they were most apt to get a square deal from the republican party, but after Mr. Roosevelt's star became ascendant in the republican party, that party showed itself to be open to the same line of "loving kindness" in harassing the railways that most railway men, as such, now politically speaking, "play no favorites." They have learned that the railways have no friends in either political party except while they are freely distributing passes and contributing large sums to campaign funds, and that those, like Mr. Roosevelt, who are the largest beneficiaries of these contributions are apt, when they think they can gain anything by it, to turn into their most censorious critics and most reckless and ruthless assailants. So, as far as railway men are concerned, it is not a case of "loving either were t'other dear charmer away." With them it is a case of trying to decide which party is apt to bedevil them the least. As for some years they have received nothing but injury from either, they are apt to pronounce a "plague on both your houses," and instead of going to the political parties for protection, go to the people for it. That is where they should have gone long ago and where they ought always to go in future. And if, meantime, those connected with railways and railway supply concerns continue, regardless of party, to "lay for" the politicians who attack the railways it will be a matter of only a short time until the roads will be able to get a "square deal."

The result of the election is apt to hearten the railways to some extent and in some measure to increase their expenditures for improvements and extensions. But the railway industry was not waiting on the election. It was and still is waiting on the decisions of the Interstate Commerce Commission in the cases involving advances in freight rates. On the whole, proper legislation for revision of the tariff would benefit the railways, because the existing tariff laws tend to increase the cost of almost everything that they buy. There is no certainty, however, that anything will be done that will tend to reduce their expenses, and, therefore, before they begin to increase largely their expenditures they want to know what increases they are going to have in their earnings.

CHICAGO, MILWAUKEE & ST. PAUL.

THE Chicago, Milwaukee & St. Paul Railway Company has issued its own securities, on account of the cost of building its Pacific coast extension, to the total amount of \$127,000,000. Of this amount \$99,000,000 was common stock of the St. Paul, on which the company is paying 7 per cent. dividends. The remaining \$28,000,000 was 4 per cent. bonds. The total yearly interest requirements, therefore, on these securities amounts to \$8,051,736, or at the rate of \$670,978 per month. The Chicago, Milwaukee & Puget Sound, the subsidiary operating the Pacific coast extension, has issued its own securities to the St. Paul in payment for advances for construction. During the 11 months ended June 30, 1910, the Chicago, Milwaukee & Puget Sound earned net operating income at the rate of \$477,771 per month. The annual report of the Puget Sound shows that actually the Puget Sound company paid the St. Paul only at the rate of 4 per cent. on \$100,000,000 for the use of money that the St. Paul had put into the extension. The \$28,000,000 St. Paul bonds were not outstanding during the entire fiscal year, but if the extension is to carry itself in the present year it will have to earn \$671,000 per month, after paying operating expenses and taxes, which is something over \$190,000 per month more than it earned in 1910.

The Pacific coast extension runs through a territory in places very thinly settled; but it is a territory capable of great future development. The operating and traffic statistics of the Puget Sound clearly reflect the character of the territory through which the road runs. For instance, the average haul of each ton of revenue freight was 596 miles. This is probably one of

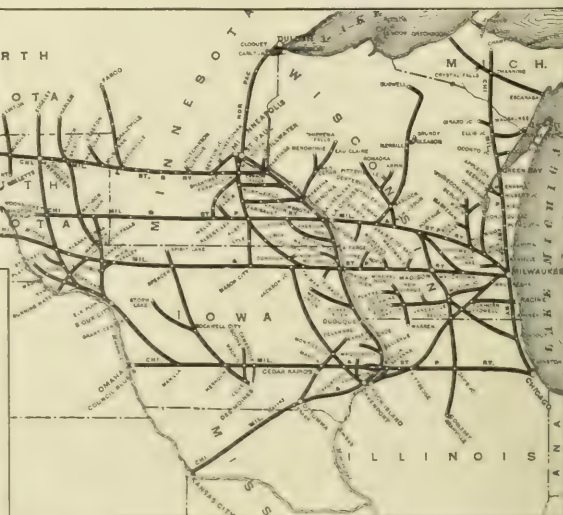
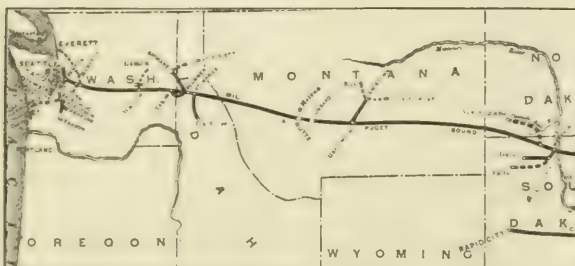
the longest average hauls of any road in the country. The St. Paul's own average haul for revenue freight was 174 miles; and the Canadian Pacific, which has some points of resemblance to the Pacific coast extension, had an average haul of 378 miles.

The Puget Sound carried 1,500,000 tons of freight in the 11 months ended June 30, and of this 29.76 per cent. was products of lumber and 21.44 per cent. was manufactures. Products of mines furnished only 16.41 per cent. of the total tonnage. As might be expected from the large percentage of manufactures, the company received 1.046 cents, a fairly high average revenue per ton per mile. The St. Paul's own statement of commodities carried shows some changes, due, apparently, to the business turned over to the St. Paul by its subsidiary. Of the total 30,699,000 tons carried in 1910, 6,056,000 tons, or 19.73 per cent., was furnished by manufactures. This compares with a total tonnage of 27,500,000 tons in 1909, of which manufactures furnished 4,899,000 tons, or 17.81 per cent., of the total tonnage. The tonnage of lumber, however, did not show the increase that

of this review show the results of operation of the St. Paul and of the Puget Sound in 1910.

The balance sheet of the St. Paul is not in the form prescribed by the Interstate Commerce Commission, but is prepared in the same manner as previous balance sheets. It shows bonds and stocks of other companies owned at a book value of \$146,950,000, comparing with \$105,470,000 bonds and stocks of other companies held on June 30, 1909. Cash on hand totaled \$5,500,000 in 1910, as against \$1,900,000 in 1909. There is, however, \$4,000,000 bills payable on the 1910 balance sheet, with no bills payable in 1909.

The Puget Sound's balance sheet shows that it has \$100,000,000 capital stock, of which the St. Paul owns all but directors' shares; and a funded debt of \$123,000,000, all of the securities representing this debt having been issued to the St. Paul; and these securities presumably bear interest at 4 per cent. As liabilities in addition to its capital stock and funded debt, the Puget Sound owes the St. Paul \$15,900,000. The railway, prop-



might have been expected. In 1910 3,850,000 tons of forest products were carried, which is 12.55 per cent. of the total tonnage; while in 1909 3,710,000 tons of products of forests were carried, which is 13.50 per cent. of the total 1909 tonnage. The St. Paul received an average revenue per ton per mile of 8.341 mills in 1910 and 8.382 mills in 1909.

Total freight earnings of the Puget Sound for the 11 months amounted to \$9,600,000. This is 89 per cent. of total operating revenues, passenger earnings not yet having reached a normal proportion. The total freight revenue of the St. Paul amounted to \$44,900,000 in 1910, which is 69 per cent. of total operating revenue; in 1909 the freight revenue was \$42,300,000, or 71 per cent. of total operating revenue. Total operating revenue in 1910 was \$64,800,000; in 1909, \$59,900,000.

Operating expenses of the St. Paul in 1910 amounted to \$44,800,000, an increase of \$6,100,000 over 1909. The greater part of the increase in operating expenses came in the cost of conducting transportation. Transportation expenses last year amounted to \$26,300,000, an increase of \$4,600,000 over 1909. Maintenance of way cost \$8,500,000 in 1910, an increase of \$1,200,000 over the previous year; and maintenance of equipment cost \$7,700,000, an increase of \$450,000. The following table shows the unit costs of maintenance:

	1910.	1909.
Repairs, per locomotive	2,361	2,006
" " freight car	64	68

This is for repairs only and does not include renewals, depreciation or superintendence charges.

The St. Paul added a considerable quantity of passenger equipment last year, but it was not delivered before June 30.

The Puget Sound's operating expenses last year totaled \$8,000,000. Transportation expenses amounted to \$3,000,000. Naturally, maintenance of way was comparatively inexpensive, since most of the sums spent on roadbed, station buildings, etc., were chargeable to construction costs. The sum spent in the 11 months for maintenance of way and structures was \$160,000. maintenance of equipment cost \$890,000. The table at the end

Chicago, Milwaukee & St. Paul and Pacific Coast Extension.

The lines from St. Paul to Portland and from Portland to Spokane are owned by the Northern Pacific.

erty and franchises of the Puget Sound are carried at a book value of \$236,300,000. The company had \$1,500,000 cash on hand on June 30, 1910.

The following table shows the results of operation of the St. Paul in 1910, compared with 1909:

	1910.	1909.
Average mileage operated	7,512	7,512
Freight revenue	\$44,900,137	\$42,241,651
Passenger revenue	14,786,744	12,774,882
Total operating revenue	64,846,894	59,897,463
Maint. of way and structures	8,472,805	7,388,605
Maint. of equipment	7,724,569	7,270,774
Traffic	1,122,711	1,334,006
Transportation	26,347,283	21,764,471
Total operating expenses	44,790,997	38,731,239
Loss	3,999,373	3,438,676
Operating income	17,734,144	18,737,549
Gross corporate income	5,192,587	18,967,918
Net corporate income	18,681,784	13,112,200
Dividends	16,231,453	11,802,296
Surplus	2,450,331	1,309,904

The following table shows the results of operation of the Puget Sound for the 11 months ended June 30, 1910:

Average mileage operated	1,434
Freight revenue	\$9,582,570
Passenger revenue	985,407
Total operating revenue	10,765,704
Maint. of way and structures	459,048
Maint. of equipment	880,372
Traffic	314,777
Transportation	3,488,842
Total operating expenses	5,142,869
Loss	5,622,835
Operating income	5,255,483
Gross corporate income	5,255,483
Net corporate income	5,140,006

COLORADO & SOUTHERN

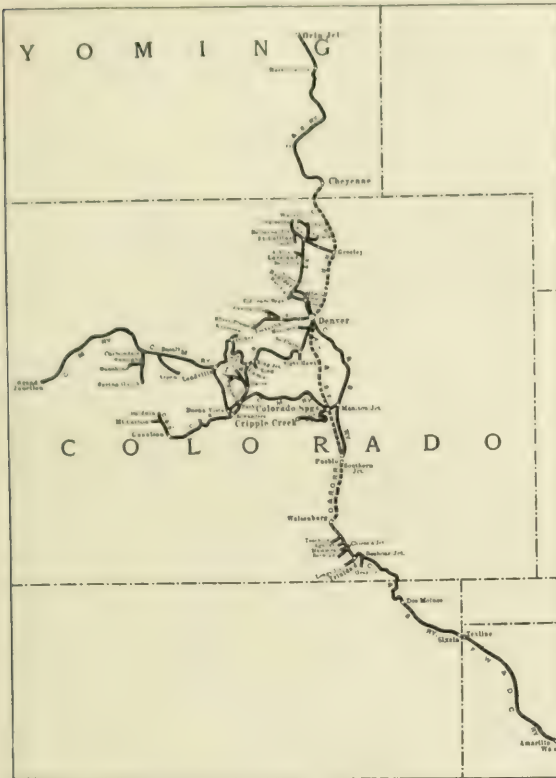
THE Colorado & Southern performs two important services for the Burlington and, by the same token, for the state of Colorado. It brings Denver, the southwestern terminus of the Burlington, as near to telewater as is Chicago. It taps the great mineral wealth of Colorado with a network of branches or con-

equipment cost last year \$29,199, as against \$1,600 in 1909. During the year the company ordered 27 locomotives and 129 freight train cars, and is building in its shops at Denver 240 freight train cars. This equipment has been coming in since June, and contracts call for the delivery of all of it before December.

Last year the company earned gross \$16,800,000, an increase of \$1,700,000 over 1909. Operating expenses last year amounted to \$10,860,000, an increase of \$640,000 over the year before. The operating ratio was therefore 64.75 in 1910 and 67.81 in 1909. Comparatively few roads have been able to show a decreased operating ratio in 1910. On the other hand, the increase in operating expenses came almost entirely from increased cost of transportation. This expense amounted to \$5,380,000 in 1910, consuming 32 per cent. of gross revenues. This is an increase of \$567,000 over 1909 transportation expenses, and in that year transportation expenses amounted to but 31.91 per cent. of gross. Maintenance of way last year cost \$2,190,000, an increase of \$26,000; and maintenance of equipment cost \$2,520,000, an increase of \$73,000. After the payment of taxes and rentals the company had available for interest and dividends in 1910 \$5,600,000, as against \$4,900,000 in 1909.

Four per cent. dividends were paid on the first and second preferred stock and 2 per cent. on the common. The payment of but 2 per cent. on the common stock marks a conservative policy of establishing a thoroughly strong profit and loss credit before the Burlington is ready to seek a more adequate return on its investment. Last year there was a surplus of \$1,650,000 credited to profit and loss, and the company could have paid 4 per cent. dividends on its common stock and still have had a larger credit to profit and loss than the surplus of \$899,000 credited in 1909.

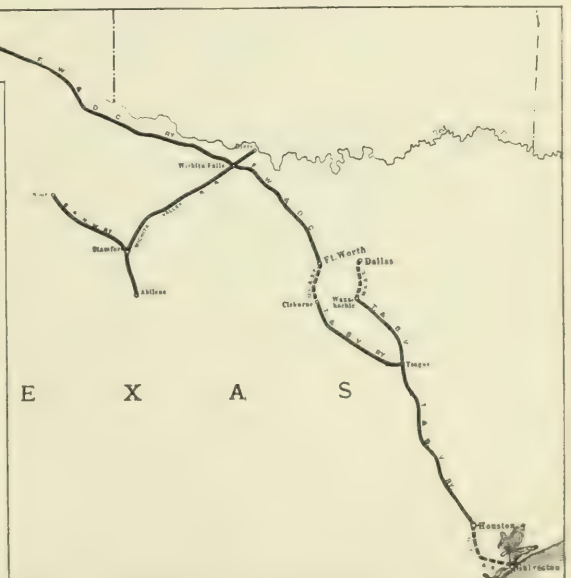
The balance sheet also shows the company in a stronger position at the end of last year than it was at the beginning. Current assets totaled \$2,500,000, of which \$1,670,000 was cash, in 1910; and \$1,750,000, of which \$560,000 was cash, in 1909. Cur-



Colorado & Southern System.

paratively short lines, giving an outlet to this mineral and coal and giving the Burlington an important feeder. The Chicago, Burlington & Quincy bought, early in 1909, a controlling interest in the Colorado & Southern. The growth of the Colorado & Southern since it was lopped off the Union Pacific has been nothing short of wonderful. When the road was in the hands of a receiver 17 years ago it was in as bad physical condition as the worst of the Denver & Rio Grande's lines. It had no outlet of its own for traffic, and it operated in a country that fairly bristled with railway impossibilities. Under independent management the lines from Colorado were extended by purchase or construction until the road reached Houston, on the Gulf. In the meantime the natural wealth of Colorado gave the company the incentive, and the management had the foresight and perseverance to put its mountain lines into excellent shape.

In 1910 the Colorado & Southern system operated 1,673 miles of standard gage road and 389 miles of narrow gage, all of the narrow gage line being in Colorado. The road is a far larger carrier of low grade commodities, especially coal and ores, than is generally realized. The lines in Colorado are the heavy carriers of coal and ores. The long main line extending down into Texas is mainly dependent on through traffic between Colorado and the Gulf and on agricultural products. In 1910 the crops were not particularly good through most of the territory served by the Colorado & Southern, and there are indications in the annual report that the company needed additional facilities for handling the low grade traffic offered. For instance, hire of



rent liabilities at the end of last year were \$2,475,000, with no bills payable; and in 1909 current liabilities totaled \$2,244,000, with an additional \$100,000 bills payable.

A highly interesting feature of the Colorado & Southern's report is the distinction made between traffic statistics for narrow gage lines and for standard gage. The total number of revenue

cent originated in the Hocking Valley in 1910 and 2 per cent. was received from connections, in 1909, 37 per cent. originated in the road and 43 per cent. was received from connections. As was mentioned, 68 per cent. of the total tonnage is bituminous coal, and products of mines, including bituminous coal, furnished 80.3 per cent. of the total tonnage. The most important class of commodities is manufactures, which furnished 9.0 per cent. of the total tonnage, or 1,068,000 tons, in 1910. This compares with 838,000 tons furnished by manufactures in 1909.

All roads operating through the West Virginia coal fields showed large increases in tonnage carried in 1910 as compared with 1909; and those with connections to the Lakes showed a proportionately greater increase in westbound movement as compared with eastbound. This was due in part to the require-

ment on a 61 per cent. basis, as compared with a 66 per cent. basis in 1909 and a 69.9 per cent. in 1908. In the year previous to 1908 its operating ratio was 100.

Transportation expenses last year amounted to \$21,000,000, an increase of \$3,400,000 over 1909. The total expense for maintenance are shown in the table at the end of these comments; and the following table shows the unit costs of maintenance in 1909 and 1910.

	1909	1910
Maintenance of way and structures	\$1.40	\$1.45
Repairs to equipment	1.00	1.05
Depreciation	1.00	1.05
Superintendence charges	1.00	1.05

The cost of one round trip on track, the cost of using and switch tracks being taken as equal to the cost of maintenance of one mile of main track.

The figures for repairs, only, and does not include expenses, depreciation or superintendence charges.

Over \$1,400 per track mile bespeaks a high standard of maintenance of way.

When the plan for putting the Toledo & Ohio Central and the Hocking Valley under joint control was abandoned, the small amount of H. V. preferred stock deposited was returned to the owners and the total \$15,000,000 stock outstanding was called for payment at par. This retirement of preferred stock was opposed by the holders of one-tenth of one per cent. of the stock; but the United States circuit court upheld the plan of the company, and the total \$15,000,000 preferred stock has been retired.

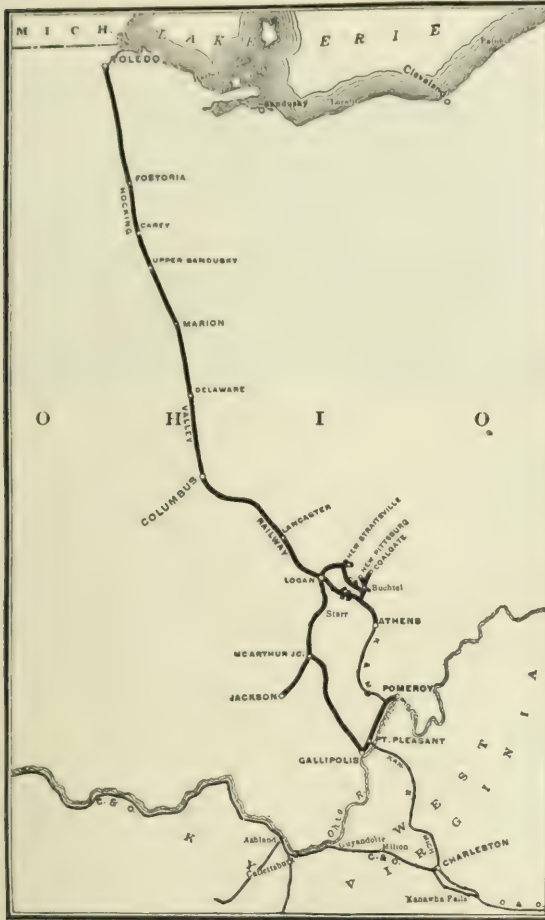
On June 30 there was \$11,000,000 common stock outstanding and \$19,900,000 bonds and \$2,687,000 equipment trust obligations. The common stock is at the rate of about \$34,000 per mile owned, and the funded debt and equipment obligations at the rate of about \$69,700 per mile owned. To retire the preferred stock the company borrowed on its notes \$2,500,000, and received from the Lake Shore & Michigan Southern \$10,200,000 for its \$4,510,000 stock of the Kanawha & Michigan and the bond of the Middle States Construction Company, exchangeable into all of the outstanding stock of the Toledo & Ohio Central. This year's report says that these securities were in the treasury of the company as free assets.

This being the case, the balance sheet, as given in the annual report for 1909, appears to be a misleading statement of assets and liabilities. Securities owned are carried on the 1909 balance sheet at \$1,956,635. After the sale of securities, realizing more than \$10,000,000, the company had in its treasury unpledged \$2,700,000 on June 30, 1910. In making this criticism of the 1909 balance sheet it is necessary, of course, to keep in mind that the management has entirely changed since the 1909 balance sheet was published.

On the retirement of the \$15,000,000 preferred stock, the directors proposed to increase the common stock outstanding by an issue of \$15,000,000 additional common stock. A stockholders' meeting to vote on this question was called, but, on the petition of the holders of a small amount of stock, action by the stockholders was enjoined, and the meeting has been adjourned from time to time pending a court review of the temporary injunction.

The company's plans, which call for the issue of this \$15,000,000 stock, include extensive improvements to the existing property. As has been pointed out, the road was worked almost up to its full capacity last year. The Chesapeake & Ohio has a large tonnage of coal which it is now shipping over other lines, notably the C., H. & D., north to the Lakes, a good part of which it can send over the Hocking Valley as soon as that road is in physical shape to handle this increased tonnage. The amount that the C. & O. could profitably send over the Hocking Valley is estimated at between one and two million tons a year. To handle this it is almost certain that a large part of the Hocking Valley main line would have to be double-tracked and its other facilities increased.

If the company had had the entire \$26,000,000 common stock outstanding that it is proposed to issue it would have earned 9.7



Hocking Valley.

The Kanawha & Michigan is shown by a light line running from Point Pleasant to a connection with the C. & O.

ments of Gary and other manufacturing plants recently established in the Middle West, and probably in part to the coal miners' strike in Illinois and some other Middle Western states. The Hocking Valley's earnings, both gross and net, were the largest in the history of the road. Last year its total operating revenues amounted to \$7,600,000, an increase over 1909 of \$1,700,000, or 28.76 per cent. Operating expenses amounted to \$4,650,000, an increase of \$728,000, or 18.54 per cent., over the previous year. After the payment of expenses, taxes and rentals the company had available for interest \$3,650,000, an increase over the previous year of \$993,000, or 37.35 per cent. In 1910 the road operated

per cent. on this stock. The common dividend is now at the rate of 4 per cent.

The following table shows the operations of the Hocking Valley in 1910, compared with 1909:

	1910.	1909.
Average mileage operated.....	350	347
Freight revenue.....	\$6,430,798	\$4,831,809
Passenger revenue.....	869,102	829,911
Total operating revenue.....	7,569,330	5,878,414
Maintenance of way and structures.....	774,463	674,229
Maintenance of equipment.....	1,392,223	1,216,160
Traffic.....	89,296	90,310
Transportation.....	2,151,156	1,796,841
Total operating expenses.....	4,654,281	3,926,084
Taxes.....	287,469	235,738
Operating income.....	2,627,580	1,716,593
Gross corporate income.....	3,652,096	2,698,087
Net corporate income.....	2,539,765	1,515,990
Dividends.....	973,028	1,040,000
Betterments.....	79,655	.....
Surplus.....	1,566,737	396,334

*In 1910 rentals, amounting to \$66,473, had been deducted. The 1909 rentals were included with interest, and were not deducted before arriving at gross corporate income.

NEW BOOKS.

Good Roads at Low Costs. By D. Ward King. Published for free distribution by the Pennsylvania Railroad Company, Philadelphia.

This pamphlet of nine pages is the latest feature of the campaign which is carried on by the traffic department of the Pennsylvania Railroad to stimulate the business of the road by instructing farmers along its line in the economical handling of their products. The special topic of this pamphlet is a drag, made of logs, invented by Mr. King, designed to keep country roads in order and maintain the ditches at their sides with the least possible expense. The idea is to scrape the earth from the ditches to the center of the road after each rainstorm. Mr. King exhorts each farmer to take care of the road from his own house to that of the nearest neighbor.

Supplement to the Iron and Steel Works Directory. 168 pages; 6 in. x 8 1/2 in.; cloth. James M. Swank, General Manager, American Iron & Steel Association, 261 S. Fourth street, Philadelphia, Pa.

The American Iron and Steel Association has completed a 1910 supplement to its well-known directory to the iron and steel works of the United States, all information being brought down to March, 1910. The supplement gives complete lists of new plants built and new companies organized since the appearance of the 1908 directory, also the most important changes in offices and officers of firms and companies that have taken place in that time. It also contains complete lists of Bessemer, open hearth and crucible steel and steel casting works; iron and steel rails, structural shapes, wire rods, skelp, plates and sheets, black plates and tinplates, and terne plates. The new features include a complete list of the manufacturers of billets, and sheet and tin plate bars, of muck and scrap bars, of iron and steel merchant bars, of rolled iron and steel concrete bars; and a list of the electric steel works of the country which have been completed or are building or are projected.

De la détermination des tarifs de transport en chemin de fer. Par H. D. Willard. Published by the Bureau de Commerce.

The testimony given by President Willard at the hearing by the Interstate Commerce Commission at Washington, D. C., on October 13 is published in full in this pamphlet. The testimony when given served to enhance his already great reputation as a practical student and an extraordinarily clear and able expositor of railway problems. Reading of the pamphlet will leave fully a deep and lasting impression as the hearing of it did. No better statement ever had been made of the things that are needed to raise credit of American railways to, and keep them on, a firm foundation and to bring about needed improvement and extension of their facilities.

Letters to the Editor.

MARVIN HUGHITT.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The account of the career of Marvin Hughitt, lately president and now chairman of the board of directors of the Chicago & North Western, in the issue of the *Railway Age Gazette* of October 28, is a splendid tribute; but it omits one strong and important characteristic of his business career. Those who have been privileged to come into closer relations with him in the business of the great corporation of which his has been the guiding hand for more than a quarter of a century have always been lifted into a higher and purer atmosphere when in his presence by reason of his recognition of the guiding hand of the Creator of the universe over the affairs of men. His power to remove the tension from the members of his official staff in times when care and anxiety made the load heavy to carry, by a word of assurance based on the care of the Almighty for His creation and creatures, was marvelous.

Times are changing, and the time is approaching when the story of the career of a man of his noble type in the press and periodicals will contain some reference to this feature of such a character, and it would seem appropriate that the story of the career of Marvin Hughitt should be rounded out with such a reference. His influence for good, reaching as it does from the cyclonic disturbances in the Stock Exchange in Wall street to the roundhouses along the lines of the North Western system, is a testimonial to this element in his high character.

ONE WHO KNEW HIM WELL.

REPORTING REVENUE ON EXCHANGE TICKET ORDERS.

Montreal, Que., November 12, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I was glad to see that the above subject was dealt with on page 834 of the *Railway Age Gazette* of November 4. I believe that a reasonable discussion of the subject through your columns, if you are disposed to open them for such a purpose, will be productive of good, and will, most likely, tend to facilitate a settlement of what at present appears to be a somewhat involved matter.

The method of settlement for exchange ticket orders which has been in effect for many years past has become unreasonably burdensome to certain lines, and it is small wonder that they sought relief from the conditions with which they have to deal. Unfortunately, the remedy which has been suggested is about as bad as the disease, and does not do away with the trouble.

It is high time that the lines which have been in the habit in years past of drawing exchange ticket orders on their connections should make a change, and place on sale an interline issue of tickets that will properly take care of the business offering at the stations and ticket offices along their lines. If this is done it will automatically place the accounting for the business where it belongs.

Traffic and accounting officers of some of the lines, which have in the past been drawing exchange orders in large numbers, are taking action along the lines I have mentioned, and if others can only be induced to do the same thing, the accounting for exchange ticket orders will soon be settled in the proper way. Otherwise, the matter will probably drift along until a delegation goes before some state, province or interstate commission, and complains that modern carriers are using ancient ticket orders, and as soon as an inquiry is addressed to a few lines by an officer of a commission we shall be treated to the humiliating spectacle of a lot of railway officials trying to remedy (just before, or immediately after, they are told to do so) an abuse which has been steadily growing, and for which no remedy has been found, because up to a comparatively recent date no strong protest has been made.

J. H. SHEARING.

Author of Passenger Receipts, Canadian Pacific.

THE IDAHO & WASHINGTON NORTHERN.

In building to the Pacific coast the big transcontinental lines have reached out into adjacent territory wherever possible to secure additional tonnage. An occasional section, however, has been overlooked, and it is such an instance that gave the builder of the Idaho & Washington Northern an opportunity to tap one of the richest timber belts and mining districts in the far West.

As shown by the accompanying map, the I. & W. N. serves the Spirit valley district, a section heretofore entirely without transportation facilities, and the Pend Oreille river valley, which has had only steamer service, and that for but a portion of the year. This entire district contains valuable timber lands, some



Completed Roadbed.

of the finest stands of white pine to be found in the West being located in these valleys. The lower Pend Oreille district is among the largest cedar producing regions in the world and has long been known for its cedar poles. In the Spirit valley one company owns 750,000,000 ft. of standing timber. Large, modernly equipped sawmills have been built at Spirit Lake, Idaho, and Lone, Wash., each having a daily capacity of 250,000 ft. In addition to these, there are 27 sawmills located along the line of the I. W. N., having a total output of 1,500,000 ft., all of which tonnage naturally will flow to this line. In addition to the lumber interests, which will furnish such a large tonnage, the Pend Oreille valley contains between 60,000 and 70,000 acres of rich agricultural land well suited for development in dairy and hay ranches. At Metaline Falls, the point to which the road is now being extended, a large cement mill is being built. Inexhaustible deposits of clay, lime and shale, combined with cheap electric power developed from the waters of Sullivan Creek, will give this mill command of the entire cement market in the Spokane country. The mill will have a daily capacity of 2,000 barrels, and expects to begin operation early in 1911. Another important source of tonnage will be the Metaline silver-lead mines, located on both sides of the Pend Oreille river surrounding Metaline Falls. There will also be a considerable tonnage of brick and tile products from the large clay deposits in the Pend Oreille valley. It will thus be seen that the new road has ample tonnage assured.

The I. & W. N. has experienced an exceptional passenger traffic since the opening of the road, tapping as it does districts heretofore without transportation facilities. Many valuable homesteads are being taken up along the valley and the population is increasing rapidly now that transportation facilities are available. In addition to the settlers and homeseekers, the summer resorts reached by the road have proven quite a factor. Twin Lakes and Spirit Lake, which are numbered among Spokane's most beautiful resorts, are but 33 and 43 miles from Spokane, respectively, and have proven very popular, many

thousand persons being built over according to the company's plan. The I. & W. N. controls the Pend Oreille Navigation Company's line of steamers, which formerly operated between Newport and Lone. Regular service on the river was discontinued upon the opening of the I. & W. N. in 1909, but the steamer excursion to Bear Canyon during the summer months have been continued in connection with the I. & W. N. from Spokane, and the patronage of the past summer has been such that the capacity of the steamer was taxed to the limit allowed by the United States marine laws.

From McGuire's Station, a point in the Spokane valley 22 miles east of Spokane, Wash., the I. & W. N. passes in a northerly direction through Spirit valley, 43 miles to Newport, Wash., thence northward down the Pend Oreille valley, 51 miles to Lone, the present terminus.

From Grand Junction in the Spokane valley the company has trackage rights for passenger trains over the Spokane-International Railway entering Spokane, where the depot facilities of the O. R. & N. company are utilized. The Spokane-International handles the freight business between Spokane and Grand Junction. The Chicago, Milwaukee & Puget Sound is now building its line between Cœur d'Alene and Spokane. This line will be completed during the fall of 1910, and the I. & W. N. will then connect with it at McGuire's, and through trackage rights for both freight and passenger trains will be had over the new line into Spokane, and the new Union depot will eventually be used as a terminal.

The Idaho & Washington Northern was incorporated under the laws of the state of Idaho, March 25, 1907, and actual construction was begun April 1 of the same year at Clagstone Junction, from which point on the Spokane-International material and supplies were received. Owing to the large amount of railway construction then going on in the northwest, it was decided to utilize the company's own forces rather than wait for contractors. Not one foot was contracted, either in bridge work or



Passenger Station.

grading, and so rapidly was the construction work carried forward that the road between Grand Junction and Newport was completed and in operation, and regular passenger and freight service installed, November 25, just eight months from the date of incorporation of the road. The completeness and thorough construction of the roadbed was such that the first passenger trains made 35 miles per hour, including stops.

The I. & W. N. roadbed is ballasted throughout with a minimum of 8 in. of first-class gravel and is laid with 75-lb. rails. A. S. C. E. section, Wolhaupter rail joints, with tie plates on curves. No engineering difficulties were encountered between McGuire's Station and Newport, the maximum grade being 1 per cent. and the maximum curvature 6 deg. The alignment



Atlantic Type Locomotive; Idaho & Washington Northern.

has an unusually large percentage of tangent, which is exceptional in the location of railway lines in this part of the country.

In 1908 surveys were made for the extension of the I. & W. N. northward from Newport to Ione, a distance of 51 miles. Actual construction was begun during the spring of 1909, and train service was inaugurated through to Ione on November 8, 1909. From Newport northward the road follows the west bank of the Pend Oreille river, and the construction was found to be much heavier than that encountered south of Newport. For a distance below Newport the earth formation is clay, with layers of quicksand. Some trouble was experienced from slides in cuts and in finding bottom for trestle piling. Several timber trestles were found necessary north of Newport varying in height to 80 ft. and in length up to 1,500 ft. The longest trestle crosses a bay or arm of the river, and, as difficulty was experienced in reaching bot-

tom, the number of piles per bent was increased to 14, running from 60 to 80 ft. in length. No trouble has since been experienced. The maximum grade between Newport and Ione is .3 per cent., and the maximum curvature is 3 deg. The construction of this portion of the road also necessitated a 1,100-ft. tunnel at Blueslide.

Work on the Metaline extension, a distance of ten miles from Ione northward to Metaline Falls, is now being pushed to completion and entails the heaviest construction of the entire line. At the lower end of Box Canyon two miles north from Ione the road is to cross the Pend Oreille river on a steel bridge 500 ft. in length, 140 ft. above the surface of the river, consisting of a first span of 145 ft.; main span, 280 ft., and an 80-ft. girder.

The bridge is being constructed with deck span and by the cantilever method because the character of the river and walls

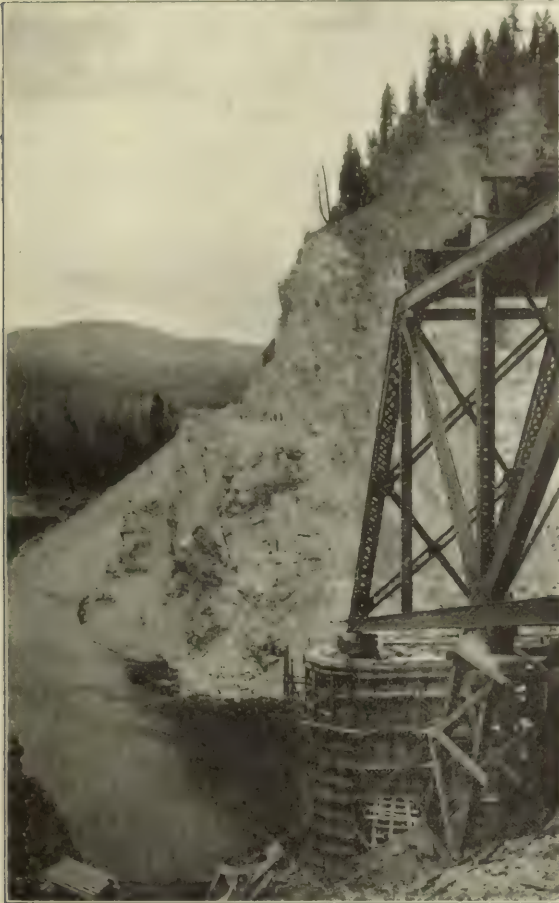


Pend Oreille River Bridge; Idaho & Washington Northern.

of the canyon make this work impossible. The trusses of the main span are 80 ft. in depth and 22 ft. center to center. The first, or 143 ft. span, which is composed of five panels, near 28 ft. 3 in. long and one 32 ft. long, rests on a reinforced concrete base. The advantages of cantilever construction for erecting the 280 ft. span was obtained by tying back the span to the 143 ft. span by means of temporary cross-brays and placing a distributed weight of about 480 tons of railway steel upon the latter to act

equipment, yet the I & W. N. road is on steel track, 8 ft. 6 in. full-girdered cars with seating capacity for 48 passengers, motor trucks of 100 tons, hauled by the electric lighting system and built by the Pullman Company. The passenger engines used are ten-wheel and Atlantic type. Freight engines are consolidation type, with 22 in. x 30 in. cylinders, and the freight equipment is all of 80,000 and 100,000 lbs. capacity.

The company's shops are located at Spirit Lake, Idaho, and are complete and modernly equipped. They consist of a nine-stall roundhouse, with 75-ft. steel turntable; a machine shop, 70 ft. x 210 ft.; store house, 42 x 124 ft.; paint shop, 45 ft. x 108 ft.; blacksmith shop, 40 ft. x 97 ft., and a ten-pocket gravity coal chute. The shops were built and equipped by Westinghouse, Church, Kerr & Co. With the exception of the coal chute, which is of frame construction, all the buildings are of brick, with concrete foundations. All the machines are of the latest type and are driven by individual electric motors. The entire area of the machine shop is served by a ten-ton, three-motor traveling electric crane. The power for the shops is supplied from an outside source, being 3-phase, 440-volt current. The operation of the air compressor is controlled automatically.

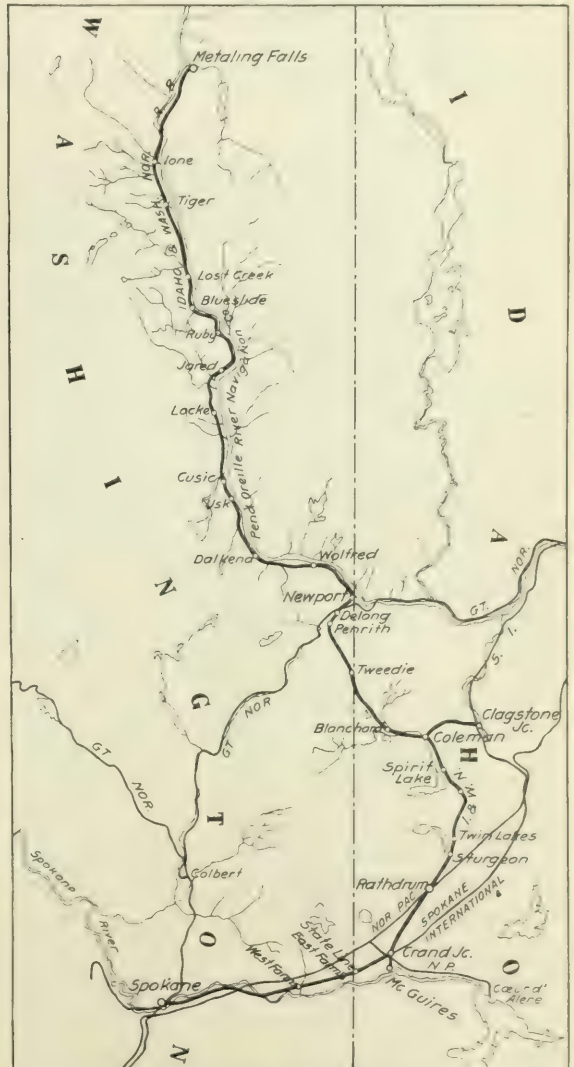


Construction Work.

as a counterbalance until the main span reaches the pier on the opposite side of the river. The bridge will cost about \$100,000. The work of erecting the bridge started July 10 and was completed about October 1.

The construction work from the canyon northward is also heavy and includes the boring of two short tunnels and the building of four trestles, ranging from 40 to 110 ft. in height, and up to 1,000 ft. in length. The grade from the canyon northward is now nearly completed, and as soon as the steel bridge is finished the road will be completed to Metline Falls in a very short time, probably by November 1.

At Spirit Lake, Rathdrum and Newport separate freight and passenger depots have been built, the latter being of brick and surrounded by attractive grounds or parks. Commodious buildings of uniform design have been built at all other stations, with the idea of comfort and convenience for the traveling public. This idea has also been carried out in the road's equipment. It could hardly be expected that a railway built primarily for the tonnage of forests and mines would have the best in passenger



Idaho & Washington Northern.

and the motor set requires practically no attention, the result being that the services of an engineer are dispensed with, and the machine is watched and cared for from the tool room.

The roundhouse is equipped with a complete system of protection against the consequences of runaway or carelessly handled engines. At the end of each roundhouse track near the outer wall is a depressed stop. At a distance of 20 ft. from the turntable end of each roundhouse track is a derail automatically operated by the turntable lock, being normally closed. The act of locking the turntable for any track automatically opens the derail for that track. This device is from a design by the present general manager of the road.

The position of the I. & W. N. is unique in that it is not a feeder for any one of the big lines exclusively, but that it is entirely independent and has traffic agreements with all five transcontinental roads reaching the Spokane country. As will be seen on the map, it connects at Newport with the Great Northern, at Clagstone and Grand Junction with the Spokane-International, at Rathdrum with the Northern Pacific, and at McGuire's with the Cœur d'Alene division of the Spokane & Inland Empire Electric Railway.

The executive officers of the I. & W. N. R. R. are located at Spirit Lake, Idaho, and the traffic department officers are at Spokane, Wash.

We are indebted to R. F. Blackwell, vice-president and general manager of the Idaho & Washington Northern, for material and illustrations for this article.

RAILWAY EDUCATION IN ILLINOIS.

A movement which may have an important influence on education for railway work in Illinois was started by a trip made to the University of Illinois at Urbana by a party of railway officers at a meeting held there November 9. The party making the trip was organized by F. A. Delano, president of the Wabash. W. L. Park, vice-president and general manager of the Illinois Central, furnished a special train which took the party from Chicago to Urbana and back. The party included the following: F. A. Delano, president, and C. W. Litsey, chief clerk to president, Wabash; W. L. Park, vice-president and general manager; M. K. Barnum, general superintendent of motive power; A. S. Baldwin, chief engineer, and H. Battisfore, superintendent, Illinois Central; R. H. Aishton, vice-president, and J. W. McEachern, Chicago & North Western; H. G. Hetzler, president, Chicago & Western Indiana; E. C. Field, vice-president James of the university presided, and made an address, in W. A. Nettleton, general superintendent motive power, and W. J. Tollerton, assistant general superintendent motive power, Rock Island Lines; L. C. Fritch, chief engineer, Chicago Great Western; E. D. Bronner, superintendent of motive power, Michigan Central; J. Q. Van Winkle, general manager; G. P. Smith, chief engineer, and Wm. Garstang, superintendent of motive power, Big Four; F. A. Lehman, assistant to vice-president, and A. F. Robinson, bridge engineer, Atchison, Topeka & Santa Fe; S. T. Park, superintendent of motive power, Chicago & Eastern Illinois; S. M. Rogers, vice-president and purchasing agent, Elgin, Joliet & Eastern; F. H. Clark, general superintendent motive power, and A. W. Newton, general inspector permanent way and structures, Burlington; C. F. Loweth, superintendent and engineer of bridges and buildings, and L. R. Clausen, superintendent, Chicago, Milwaukee & St. Paul; W. W. Ryder, general superintendent of telegraph, and A. R. Ayers, mechanical engineer, Lake Shore & Michigan Southern.

After arriving at Urbana the party was shown over the campus and given special opportunity to inspect the agricultural and engineering work being done at the university. In the afternoon a meeting was held in the engineering building. President James of the University presided, and made an address, in which he said in part:

"We do not imagine, of course, that we college professors can settle the great practical problems which our railway men,

for example, have to face from day to day, but we are quite sure that we can make some contributions by the scientific study of these phenomena in the midst of which you are at work which will be of assistance to you in the solution of these problems. Just as Professor Talbott is, by his investigations into the habits and qualities of reinforced concrete, every day adding something to our knowledge which is of use in the structural part of your business, so we believe that by similar patient, careful, scientific study we may be able in the long run to add something to the means you have of determining a scientific policy in the department of administration, in the department of rate making, etc.

"If we can make such contributions and can train young men so that they will get this scientific attitude and are equipped with this scientific information, you will find them more useful and more helpful as assistants, and when they come to take your places they will be better equipped for the great problems which they will have to solve than they would be without this training.

"Twenty-five years ago, when a professor in the University of Pennsylvania, I urged very strongly upon the leading railway men in the city of Philadelphia that they should join with the University of Pennsylvania in organizing, developing and maintaining a great school of railway engineering and administration for the study of the scientific side of those underlying principles upon which the highest type of successful practice and efficiency must be based, whether consciously or not.

"They were kind enough to consider the matter at some length, but as one of the Pennsylvania Railroad men said: 'There is no such thing as a science in rate-making. Our only problem is to get the largest possible return under a given set of conditions, considering our colleagues of the same railway, considering other railways, considering the public along the lines, considering the lines through the rest of the country, considering the attitude of investors domestic and foreign.'

"My reply at that time was: 'My dear sir, if it is true that there are no principles underlying rate-making which can be ascertained and made the subject of study and consideration, if it be true that the attitude of every individual rate-maker and of every individual road is simply to get the utmost return out of the community, then of course the wildest kind of crazy so-called defender of the rights of the people or the rights of shippers has just as good stand in the court of reason as the most careful, thoughtful, and conservative railway official. Such a proposition is a confession of bankruptcy on the part of railway administration and railway officials which will surely call forth in the long run such a revulsion of sentiment in the public mind as to bring about a crisis in the whole business of railway development, operation and administration.'

"I believe my prophecy is coming true. There is no branch of business more important than that of transportation. There is no department in which the interests of more people are fundamentally involved, and no system of administering this great department of transportation can be successful or satisfactory which does not try to ascertain the great underlying principles upon the basis of which investors, railway administrators, shippers and consumers may find, if not complete satisfaction—owing to their conflicting interests—at least a basis for a reasonable understanding.

"Some people think that the present railway system is going to break down and that our only solution is government ownership and operation. Even if that were true it would not change or alter in the slightest degree the necessity of the development of this kind of a center of investigation and research and training which we have in mind, for of course the government would break down absolutely and completely in a comparatively short time if it did not have trained men, if it did not insist on trained men to do this important work.

"The achievements of the railway men in the United States in the last generation have been remarkable. I do not believe,

for any part, but any set of men of any nation could have brought about more astonishing or better results under the conditions than the men who have had control of our railway system. But conditions are changing very rapidly in such a way as to affect every aspect of the business, and we must change our method of training men for the service of the railways in the next generation if our successors are to solve these railway problems even as well as we have done."

President DeLoach spoke very briefly, saying that he and other railway men in Illinois were much interested in the future of the university. Those in charge of the university, he said, are the trustees of public property, and all the people of the state are concerned in the use of the moneys spent by it. Illinois has the largest mileage of railways of any state in the union except Texas, and they pay 10 per cent. of the total taxes collected in the state. They are interested in what use is made of the money, not only because they contribute so much of it, but also because they have a special interest in what the citizen of tomorrow is going to be, and, therefore, he felt that the railways should do all they can to hold up the hands of the university authorities.

Edward C. Schmidt, professor of railway engineering, talked on "The University Work in Railway Engineering," telling of what has been done and what it is hoped to do.

Professor Arthur N. Talbott spoke on "The Work of the University in Materials Testing, and Its Relation to the Railway Interest." Professor Talbott said in part:

"Since the engineering experiment station was established research work along the line of materials testing has been done by the laboratory of applied mechanics, and much of this is of interest to railway men—in fact, a considerable amount has been done in cooperation with railways. The extensive work in reinforced concrete, investigations in which the attempt has been made to develop the principles upon which this new form of construction depends, is probably known to those of you who are interested in reinforced concrete work, and a very large field remains unexplored. As illustrations of work applicable to railway construction may be mentioned the tests of concrete piles, both the rolled pile and the molded pile, which are now being used by the C. & B. & Q. and the C. & N. W., and other railways, and also the field tests of the large slabs of beams of reinforced concrete which were used by the Illinois Central in the construction of the subways at Grand Crossing, Ill., constructions which by reason of their newness required special attention to give knowledge of their properties. The extensive tests of culvert pipe, both cast iron and reinforced concrete, were participated in by the St. Paul, the Burlington, the Illinois Central, the Santa Fe, and the Rock Island. The use of timber in wooden trestles is a different problem from that of 20 years ago, and the tests of timber stringers made here have given desirable information on conditions now existing. These tests were made possible through the cooperation of the Illinois Central and the Rock Island. The Burlington, the Wabash, and the Illinois Central assisted materially in the tests of steel columns, the latter furnishing an engine, train and crew for eight days. It is believed that these tests throw an important light on the action of bridge columns under load and that the new method of testing brought out is of importance to the engineering profession. After having tests made on steel columns embedded in concrete, the Wabash reinforced towers of two of its steel trestles with concrete coating. An investigation of the new process of welding by the oxyacetylene flame has shown in an independent, impartial way the advantages and limitations of this process—in a manner which may not be expected by the promoters of the process. A bulletin describing the results will soon be printed. In hydraulics an extensive series of tests was made on all the forms of locomotive water columns in use in this country, in cooperation with the Maintenance of Way association and the Big Four, and it is of interest to note that the form of water column or standpipe in most general use by the railways was the one giving the highest loss of head, a loss that was ridiculously high. It may be worth adding that these manu-

facturing companies are if not recording the details, at least ought to have done long ago. Among other tests of interest to railway men may be mentioned those of our company, built and built under reported records of stress, track bolsters, car wheels, wire rope over sheaves, track spikes, tie plates and ties, and the transmission of pressure through earths and ballasts.

"Enough has been said to show that the University of Illinois may be of service to railways. What I want to suggest is that with proper support the university may be of much greater service to you. Although the first province of the university is to give instruction, it also has a great opportunity to be of public service to the community. The editor of a great engineering journal has recently written me urging the importance of having in every large district of manufacture and trade a competent, authoritative and absolutely impartial institution of tests, public and of recognized authority, where manufacturer, purchaser, dealer and consumer may go to get tests and information, and where research and investigation may be carried on. Part of this work would be in the interest of scientific knowledge and part directly in the interest of the one having the work done and being paid for by him, as in the case with the great Prussian testing station at Lichterfelde. With our great industrial development the need for such an institution is increasing. My correspondent urges that as Illinois has made the first step in establishing the engineering experiment station, it would seem fitting that the work be broadened and that Illinois should also develop a great public testing laboratory. Evidently the opportunities for public service are numerous. It means, however, larger facilities and more resources for men and operation. The crowded condition of our quarters is apparent, but we are trying to do the best we can with our present arrangements. I hope, however, that we may continue to be of service to the railway interests and that ways will develop by which we may do more. Having been in the railway service, I feel that I can appreciate some of your problems. Your new problems arising every day will be of more importance than those already solved, and the University of Illinois wishes to be helpful in making their solution."

Dr. David Kinley, dean of the School of Business Administration, spoke on "The Courses in Railway Administration and Accountancy," saying in part:

"Hitherto the greatest problems of railway development have been problems of construction; today they are problems of organization and management. Before, they were engineering; now they are administrative. This statement does not minimize the importance of new construction, nor of the engineering difficulties involved; nor does it leave out of sight the important problems of maintenance. It simply emphasizes the fact that the minds of railway managers today are busy with problems of organization and administration, especially in their connection with finance.

"This is not a peculiarity of the railway situation. All businesses, especially those organized in a corporate form on a large scale, are feeling the necessity of an improved organization, of better understanding and integration of costs and income, expenses and revenue, and also a more definite statement of their relations to the public. In all industrial lines the American people in the past have had so much elbow room and such rich resources that there has been a large margin for waste and indifferent management. Till recently we have all lived, so to speak, in a régime of economic plenty and license. It is hardly worth while to save a penny if the saving of it costs two. Our railways have had their share in this economic ease, although, of course, to railway men that time is a long forgotten past!

"Now they are face to face with serious problems of adjustment to a public opinion which no longer views with patience the loose management which it has permitted, if not encouraged, in the past; and railway men are therefore hard at work trying to adjust their organization and financial conditions to this new point of view. They find themselves perplexed at times to meet the demand for additional taxes in the face of an even louder

demand for a reduction of rates and the control of rate-making by a semi-public body. They are wondering how they can organize traffic so as to reduce costs; how to adjust rates so as to invite traffic at these reduced costs, and to find a sufficient margin between expenses and income to keep their plant from deteriorating, furnish a little for extensions, and pay something at least in the way of dividends to clamoring stockholders. In short, the great questions, or rather some of them, are concerned with better accounting, better organization of traffic, better operation of trains—meaning by 'better' in each case reduced cost, improved service, and larger net income.

"Obviously such problems can be met most successfully by those who have been trained in the sciences which underlie these matters. I would not depreciate in the slightest degree the skill and knowledge born of long practice alone. But if it is possible for new men to anticipate experience, and through education to solve some problems with less empirical experimentation, it will be an advantage.

"I am aware that there are some who insist that it is impossible for the universities to train young men for the kind of service needed. If by 'prepare' we mean that a young university graduate can be turned out ready to be entrusted with the duties of the general manager or treasurer, the head accountant or the traffic manager, or positions of similar responsibility, all university men will admit at once that it cannot be done. If, however, we mean by 'preparation' imparting a knowledge of the scientific principles underlying those administrative duties, and some knowledge of present organization and methods, I believe that it can be done. The question really amounts to this: Is it possible to give a young man an education which will make him immediately valuable to a superior officer because he has some acquaintance with the principles and organization of that superior officer's business, and also has been trained to logical processes of working and thinking? I think the answer is yes.

"What kind of training will do this? The matter of primary importance, of course, is training in judgment and power to think. The student must be taught how to handle a mass of data on a given subject so as to present the facts in their proper relations and show what they teach. He must be able to make correct inferences or to present the data so that his superior officers can do so. The ability to do this implies both good judgment, logical power, and at the same time a sense of discrimination of the relative importance of the various facts, as well as some knowledge of the character of the data. In other words, it is possible to train a student to study a problem of administration, arrange the factors involved in it, and make a solution. Training of this kind will stand him in good stead when new problems are presented in railway work.

"A second part of the training needed to make a young man early valuable in railroading is knowledge. He may get a power of logical thinking, a discriminating judgment, as a railway man once said to me, from the study of Greek roots. It is far better for him to get it from the study of subjects which at the same time give him as much knowledge as possible concerning the matters he is to think about. In other words, it is possible to train a railway student to think correctly, while at the same time giving him some knowledge of rate-making, so that at least he will be able to tell a commission or the public what the principles are on which a system of rates may be made up, even though he may not be able to explain a particular rate.

"The heart of the work of the student of railway administration is in social and industrial economics, theoretical and applied, and in accountancy. The knowledge of general economics is fundamental. It must be followed by a study of applied economics relating to such subjects as costs of production, industrial and corporate organization, methods of wage payments and other labor matters, and in accounting, both general and as applied to railway problems. The young man needs to be trained on the side of social economics, to a better knowledge of taxation, the study of markets, routes of trade, materials of commerce, possible sources of industrial development to supply

traffic, and many other things of similar character. This implies a study of public and private finance, the relation of government to railways, methods of regulation and control, and the mutual duties and obligations of the railways and the public.

"Certain it is that the difficulties of today and tomorrow in the life of railway men are questions of policy, internal and public. The men who can best grapple with them will be men trained in the principles of sciences that underlie policies. Therefore, it is to the interest of the railways as well as to the interests of the public to do what they can to promote the proper training of young men who are in the future to occupy the positions that you fill today."

D. C. Buell, director of the educational bureau of information of the Union Pacific, described this bureau, the work it is doing and the results it has been getting. The bureau and its work have been fully described in past issues of the *Railway Age Gazette*. Professor H. H. Stoek spoke on "University Extension Work through Miners' and Mechanics' Institutes," and Dr. W. F. M. Goss, dean of the College of Engineering, made an address, pointing out the need for enlarging the facilities of the university. He said in part:

"The College of Engineering has 1,300 students enrolled. It has graduated 1,500 men, and there are more than 2,000 others who have been members of classes that have graduated. Forty-three per cent. of all the students in attendance at Urbana are enrolled in the College of Engineering. More than half of the men who are enrolled as students in the university belong to this college.

"The college, except for its department of physics, has had no appropriation for buildings since 1894. In the sixteen years which have since passed the attendance of students has doubled, and a similar expansion has taken place in every direction; its instructional staff has doubled, the number and variety of research problems which are undertaken have vastly increased, and the work of instruction has been extended to meet the legitimate demands resulting from the progress of the arts. Notwithstanding all these developments the increase in buildings has been meagre, chiefly in the form of shedding, which could be supplied from the small sums which from time to time could be saved from the funds appropriated for maintenance.

"At the present moment the College of Engineering, disregarding its building for physics, boasts of a total of 125,000 sq. ft. of floor space. This is nearly three acres, but it amounts to only 100 sq. ft. per student for all purposes. Compare this with one of the colleges of Oxford, for example, with Magdalen College which has twelve acres of buildings and 180 students, or an allowance for all purposes of more than 3,000 ft. per student. Similar comparisons with the better institutions of our own country will suffice to demonstrate the crowded condition under which the students of the College of Engineering of the University of Illinois do their work. You have yourselves seen something of the important work Professor Talbot is doing in materials testing and you can readily appreciate the disadvantages under which that work is now proceeding because of lack of room. You will also, I am sure, sympathize with me in the desire to have the youth of the state enjoy facilities whereby they may receive instruction along lines of importance to the transportation interests of the state. We need greatly to increase our facilities for testing rails, air brake equipment, fittings and fixtures of every sort in car construction. We need a locomotive testing plant by the use of which students may become familiar with the action of one of the most common and at the same time one of the most important machines the world has ever seen. Without the testing plant we can do nothing in this line. We need facilities for testing electric motors and cars, and all the various details of electric fixtures employed in the construction of railway equipment. We need room sufficient to permit us to handle certain track and signal problems which cannot now be entered upon, and we should make a beginning in formulating instruction involving the more scientific aspects of aerial flight.

"As I look out upon the field of engineering in this state of

Herein and study the various activities which engage the attention of its people, I discover that nearly one fourth of all the people in the state are dependent upon the transportation interests for their support. This fact coupled with the knowledge that our state is second among all the states in the Union in its railway mileage, convinces me that our college can not better serve the state than by emphasizing the scientific and technical aspects of the great transportation industry, by instructing students to understand the problems of the railways, and by promoting research, the results of which will add to the efficiency in the operation of railways. Now the question I want to ask is whether this interpretation is a fair one. If you think it is not a fair one, then of course it would be folly for me to attempt to develop it, and a frank statement from you to that effect will permit me to turn my attention to other lines offering greater promise. If, on the other hand, you think my interpretation is a fair one, then I shall be glad to do what I can to persuade our trustees to place this matter before the legislature. There would be of course no disposition to disturb you or to annoy you with small matters in our campaign with the legislature. We only ask that we may know what your convictions are on the subject which I have presented, and that you stand ready to express these convictions if the occasion arises when it would seem desirable for us to have you do so."

At the conclusion of Dr. Goss's talk, W. L. Park moved that the meeting adopt a resolution expressing it as its sense that the railways of the state should cooperate with the president and trustees of the university in getting the legislature to make such appropriations as may be necessary to enable it to enlarge its facilities and faculty adequately to fit men for railway work. R. H. Aishton, vice-president of the Chicago & North Western, seconded the motion, saying that the railways have come to recognize the fact that educational training is necessary to increase the efficiency of men already in their service, and that special education and training to fit men for that service before they enter it is even more necessary. The resolution was adopted. As the railway men present were there as representatives of their lines appointed by their presidents, this made certain that the railways of Illinois will vigorously cooperate with the university authorities in their efforts to get the desired legislation.

For several years special instruction has been given at the university in civil engineering and the mechanical engineering of railways. In further recognition of the importance of this work there has recently been established a School of Railway Engineering and Administration, under the direction of which there are now given courses designed to train men for service in the financial, operating and traffic departments, as well as in the engineering departments of steam and electric railways. Five courses are at present offered: in railway civil engineering, railway mechanical engineering, railway electrical engineering, railway transportation and railway traffic and accounting.

The university has excellent laboratory and other facilities for carrying on this work. The instruction is also facilitated by the cooperation of the three steam railways and the electric inter-urban road which enter Urbana, with which most cordial relations exist. The Engineering College owns and operates two test-cars, one for steam roads and the other for electric roads, in addition to which all other resources of the College of Engineering, the School of Commerce and the Engineering Experiment Station are available for the promotion of this work.

The attendance at the College of Engineering has increased as follows:

Year.	Men.	Women.	Total.
1903-04.....	801	4	805
1904-05.....	843	9	852
1905-06.....	953	8	961
1906-07.....	1,101	7	1,108
1907-08.....	1,182	5	1,187
1908-09.....	1,244	6	1,250
1909-10.....	1,297	6	1,303

Fifteen hundred have been graduated; 2,000 others have been students in the classes that have graduated; 43 per cent. of all students in Urbana are in the college.

TEST OF JACOBS-SHUPERT FIREBOX.

Water in transportation, and safety appliances of all kinds for the conservation of life and property, are receiving much attention at the time, so that any new invention offering a means of greater safety and safety than heretofore used is of course of great practical interest. The test of the Jacobs-Shupert firebox, made by the Bureau of Engineering, Illinois, on November 29, 1910, under the direction of H. B. Shupert, owner of tests, is of interest in this connection. This type of firebox was described in the *Engineering Gazette* of May 26, 1909, page 1123.

In April, 1909, a Jacobs-Shupert firebox was completed and placed in freight service on a Santa Fe type locomotive. It has given good service and has demonstrated all the claims made for it so far as evaporation, efficiency and low cost for repairs are concerned. The results of its performance have justified its application to 32 engines now in active service and 66 engines on order. The fireboxes in service have demonstrated so thoroughly and so satisfactorily the claims made for this form of construction that it was deemed advisable to demonstrate whether or not they would stand the severe stresses, without the usually disastrous results that occur with fireboxes of ordinary construction, when the water is lowered below the crown sheet and the crown sheet is overheated. A further object was to determine whether extreme pressures occur when cold water is injected into a firebox with an overheated crown sheet. Ordinarily the claim is made that an explosion occurs only when cold water is injected, although Professor Thurston, who was an authority on the subject of boiler explosions, stated that only once was he able to produce an explosion by the injection of cold water into a highly heated boiler. He stated, however, that explosions from this cause were more frequent in locomotive than in stationary boilers.

In an ordinary firebox the strength of the crown sheet with its numerous stays is very much reduced when overheated. On account of increased temperature the holding power of the staybolts is decreased 65 to 75 per cent. The result of an increase of stresses in the metal due to temperature changes, in addition to the stresses due to usual boiler pressure, together with the decrease in the holding power of the staybolts, causes the crown sheet to be forced from the staybolts. The sheet once opened is at the mercy of all the latent energy of the boiler, with the consequent collapse of the interior of the firebox. The test was made to demonstrate that the Jacobs-Shupert firebox was of a substantially safe construction for high pressures and such unusual conditions of service.

Firebox and Boiler.—The Jacobs-Shupert firebox selected for the test was originally applied to the boiler of one of the Santa Fe type engines, but has been in stationary service since November, 1909. As shown by the illustration, it is a large firebox and boiler, being capable of evaporating 50,000 pounds of water per hour in road service. The dimensions, heating surface and proportions are as follows:

Boiler and Firebox.		
Total length, ft.....	39	
Height, ft.....	11	
Weight, lb.....	75,000	
Capacity, cu. ft.....	722	
Water capacity, gal.....	1,250	
Water space, cu. ft.....	780	
Steam space, cu. ft.....	142	
Pips, number.....	3	
Flues.		
Number.....	274	
Outer diameter, in.....	2.5	
Thickness, in.....	0.125	
Length, ft.....	19.5	
Total fire area, sq. ft.....	4,408	
Firebox.		
Sections, number.....	11	
Length, inside, in.....	109.6	
Width, inside, in.....	79.5	
Depth, front end, in.....	76.7	
Depth, back end, in.....	76.7	
Volume, cu. ft.....	359.7	
Fire area, sq. ft.....	60	
Thickness, inner section, in.....	0.118	
Thickness, outer section, in.....	0.5	
Heating surface, sq. ft.....	265	

Boiler.	
No. of sections	3
Diameter of smallest ring, in.	84
First and middle rings	0.9375
Top and bottom rings	0.875

The characteristic feature in the construction of this firebox is the elimination of all staybolts on the crown and side sheets.

eighty yards away. Oil was used for fuel, and a special valve was introduced so that it could be shut off quickly.

The usual working pressure of these boilers is 225 pounds, and the pops were set as close to that as practicable. No provision was made for carrying away the steam generated, except by allowing the boiler to blow off. Compressed air was piped to the stack to produce sufficient draft to maintain combustion

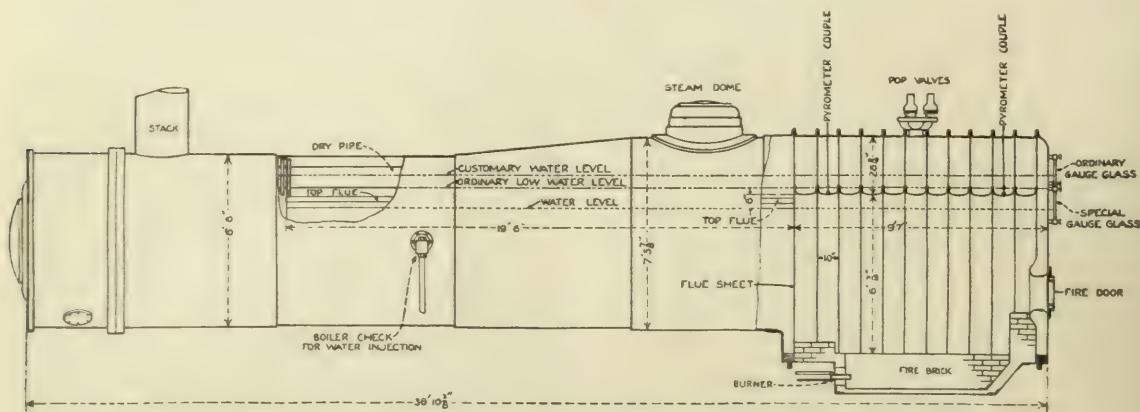


Fig. 1—Diagram Showing General Arrangement of Boiler and Location of Testing Apparatus.

The firebox in process of construction, ready to rivet, with one outer section in position is shown in Fig. 3; another view, Fig. 4, plainly shows the large openings in the stay sheets for water circulation. The interior of the firebox nearly completed, Fig. 5, shows the great amount of heating surface free from staybolt heads. The sectional construction provides for the expansion of the arches so that enormous stresses may not be set up by great changes in temperature. The sections are supported by stay sheets, properly perforated to allow for the horizontal circulation of water and steam. The stay sheets are shielded from the fire side of the box and are thus protected from the action of the active flames.

Preparations for the Test.—The test was made on one of the largest boilers, with no special changes except for the purpose

and keep up the pressure. Two pressure gages were used so that one might check the other. A lever was connected to the blow-off of the boiler, so that it could be operated from a point near the pump, in order that the water might be lowered in the boiler. A second or special gage glass was attached to the boiler head to indicate the level of the water relative to the top of the crown sheet during the test.

Two pyrometer couples were inserted in the steam space of

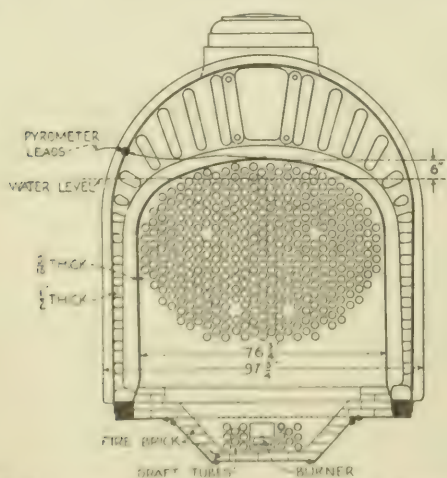


Fig. 2—Cross-section of Boiler through the Firebox.

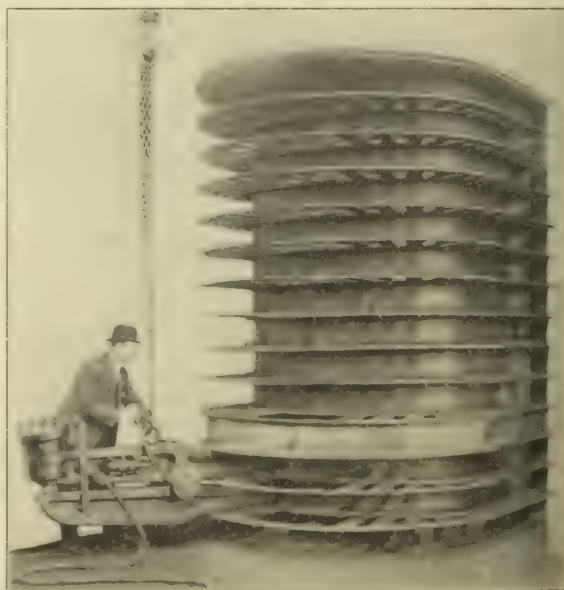


Fig. 3—Jacobs-Shupert Firebox in Course of Construction.

to permit and make conditions that might occur in service. The boiler was set up in a position in Fig. 6, at a point north of the T. & P. bridge, and was ready to be tested at a point in the middle of the bridge, where the fire and pressure could be tested. Water was turned into it by a pump, to the left and

the firebox with leads extending to a proper shelter, where temperature readings were made. The pyrometer couples were placed in the second sections from the back and the front of the firebox, and indicated the temperature of the crown sheet on the steam side. The line of projection of the lower portion of

the crown sheet was pointed up the back head of the boiler, as shown in Fig. 7. The location of the safe glasses, pressure gauges and pyrometric leads are also shown.

A position of safety was provided for witnesses of the test, such that the water level and gauge pressure could be seen with the aid of fixed glasses and telescopes. Observers taking read-

ings are representatives of the government and railway test.

Tests of the crown sheet for some hours had been running on September 26, 1910, between the first seven o'clock. The boiler had been fired up for some time previous to the test, and the tests were registering intermittently with the boiler pressure at 25 pounds. The water level lowered until it stood only one inch above the crown sheet, when all the witnesses, except two, retired to a distant place of observation. The water was

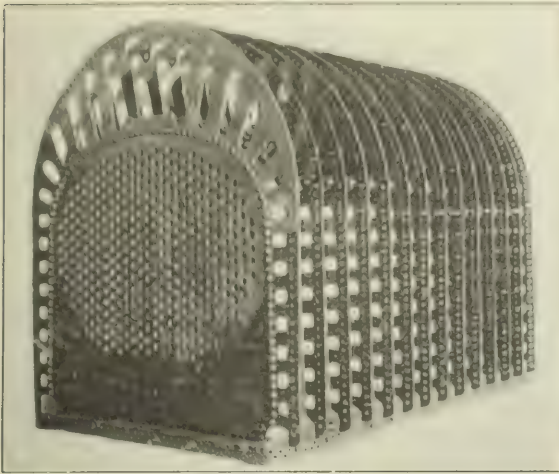


Fig. 4—Another View of Firebox in Course of Construction.

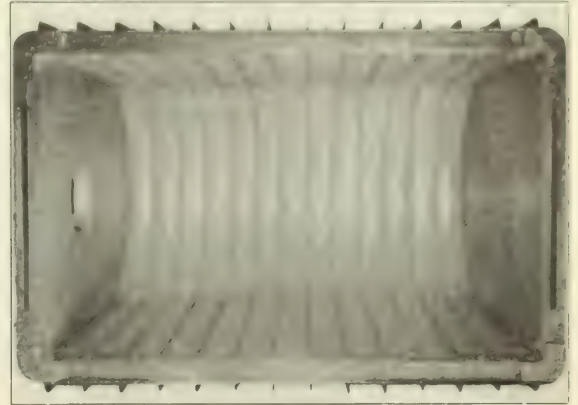


Fig. 5—Interior of Jacobs-Shupert Firebox nearly Completed.

ings were provided with a steel shell, placed on a flat car a little to the left and back of the boiler head. This shell was cabled to the track and braced so as to eliminate, as far as possible, the element of danger in case of explosion. A photograph, Fig. 8, taken immediately after the test, shows the boiler, the oil tank supplying oil for fuel, and the protection shield used by the engineer of tests and his assistant, who took observations during the test. The leads from the pyrometer couples are shown entering the door in the shield, while the temperatures on the top of the crown sheet were indicated on the pyrometer placed on the floor, directly before the observers. E. L. Gibbs, inspector of safety appliances, and Frank G. Ewald, an inspector of the Interstate Commerce Commission, were present on this occa-

then lowered until it was level with the top of the crown sheet. During the period of the lowering of the water the safety valve popped continuously and the boiler pressure was maintained constant.

The water was blown off to 4 in. below the top of the crown sheet in three minutes, and at the rate of 1,210 pounds per minute. Two minutes after the crown sheet was bare the firebox showed the effects of expansion due to the heating of the crown sheet, by very slight openings in the stay sheets near the middle of the firebox. The leaks from these openings were slight and would not be considered of any consequence in ordinary service. The reason for the opening of these stay sheets was due to the construction, which allowed them to be butted



Fig. 6—Boiler Ready for the Test.

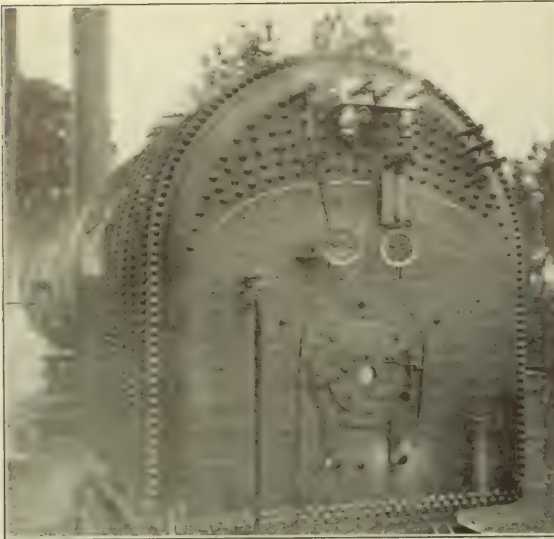


Fig. 7—Boiler Under Test with Water $4\frac{1}{2}$ In. Below Top of Crown Sheet.

together instead of being formed from one piece, as is the present practice.

The crown sheet heated up gradually at an average rate of 67 deg. per minute for a period of ten minutes, at which time the temperature of its front section was 1,125 deg. Fahr., and at the back section was 1,065 deg. The pressure as shown by both gages was 230 pounds, although all the pops were blowing off. The water level was 6 in. below the top of the crown sheet. In Fig. 7 a photograph is shown, taken a short time after the crown sheet was bare, with the water level showing $4\frac{1}{2}$ in. below the crown sheet, and the gages standing at 225 pounds pressure. The pops were blowing off at that time, and the photograph also shows a slight steam leak occurring a little below the pyrometer leads. Toward the end of the test, when practically all of the crown sheet was bare and a large amount of hot metal was exposed, the steam from the blow-off was considerably superheated.

Ten minutes after the crown sheet was bare, and it had been

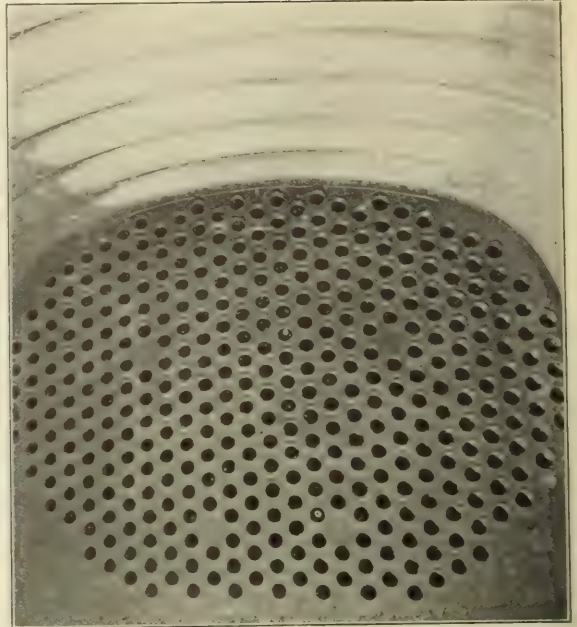


Fig. 9—Flue and Crown Sheets After the Test.

heated to a temperature of 1,125 deg., water at 60 deg. was forced into the boiler. The fire was cut off at this time, as it was not deemed advisable to continue it with the exposed crown sheet during the period of filling the boiler with cold water. Simultaneous with the injection of the water into the boiler the pressure dropped a few pounds and the water fell in the lower gage glass so that it was not visible.

Several witnesses approached the firebox when the water was still 3 in. below the crown sheet and observed that the crown sheet was still red. Eight and one-half minutes after the pumps were started the water was at the crown sheet, the pressure at that time being 215 pounds. Within fifteen minutes after the close of the test the interior of the firebox was inspected by George Austin, general boiler inspector, Santa Fe System; Frank W. Shupert, boiler foreman, and others. They reported

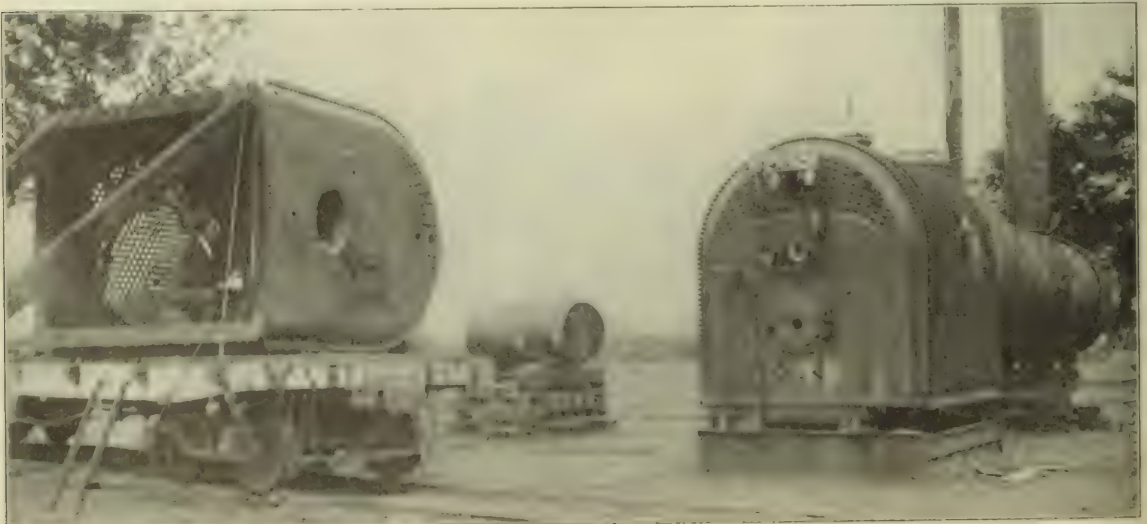


Fig. 8—Boiler After the Test Showing Location of Fuel Oil Tank and Protection Shield.

no distortion of section, not opening of seams, but indication of an overheated crown sheet, such that in a firebox of ordinary construction would cause a dangerous explosion.

Observations. The following observations of temperature, pressure and water level were made during test:

Time	Small Firebox		Pressure, lbs. per sq. in.	
	Front	Back	Right	Left
6:14 a. m.	400	400	100	100
6:21 a. m.	400	400	100	100
6:40 a. m.	400	400	100	100
6:48 a. m.	400	400	100	100
6:50 a. m.	400	400	100	100
6:51 a. m.	400	400	100	100
6:52 a. m.	400	400	100	100
6:53 a. m.	1125	1065	230	230

Pressure of steam 8 lbs. per sq. in. at 6:14 a. m., 6:21 a. m., 6:40 a. m., 6:48 a. m., 6:50 a. m., 6:51 a. m., 6:52 a. m., 6:53 a. m. at 6:53 a. m.

Results of Test. As soon as the boiler cooled down sufficiently the water was removed, the boiler dismantled and the fire pan removed. Three hours after the test had been concluded the boiler was turned over, and an opportunity was afforded for a more rigid inspection to determine its exact con-

dition. It will be seen that eleven tubes were entirely out of water, while eight were only slightly in contact with the hot water.

Deductions and conclusions. As a result of this test, and experience with locomotive fireboxes of ordinary construction, the following deductions and conclusions were drawn:

The Jacobs-Shupert sectional firebox is stronger than an ordinary locomotive firebox with the sheets held together by staybolts. The overheating of the crown sheet of the Jacobs-Shupert firebox does not decrease the holding power of the staybolts and rivets, owing to the protection afforded by its being shielded from the flames. The ordinary firebox with its numerous staybolt heads fully exposed to the intense heat of the flames has its strength reduced sixty-five to seventy-five per cent., due to the overheating of a crown sheet in case of low water in the boiler. The Jacobs-Shupert firebox is not subject to undue stresses, due to changes in temperature, because of provision being made for free expansion of the individual sections. Its form of construction gives protection from explosion and consequent danger in case of the water being below the crown sheet and the crown sheet getting red hot. Its form of construction is such that in case of rupture the firebox will not be entirely torn apart, as results with ordinary fireboxes, thereby causing a dangerous explosion. The firebox was subjected to a pressure, temperature and low water test, such as would have caused a violent explosion in case of an ordinary firebox.

THE INDIANA "RAILROAD CONVENTION."

The third Annual Indiana Railroad Convention (managed by the State Railroad Commission) was held in Indianapolis, November 9, 1910. About 100 superintendents, engineers and conductors were present. Chairman Wood of the State commission welcomed the railway men to the convention and stated that its object was to consider the conservation of man by the prevention of accidents. He referred to the death of Elmer Reeves, a member of the second annual convention and chairman of the committee to supervise the accident reports. Mr. Reeves lost his life when his engine was derailed.

The "Prevention of Accidents" was the subject of an address by A. M. Schoyer, general superintendent of the Pennsylvania Lines West of Pittsburgh, Northwest system. Extracts from this address are given in another column.

"The Conservation of Men" was the subject of a talk by Ralph C. Richards, general claim agent of the Chicago & North Western. Mr. Richards said that while it was commonly thought by the public that the greater number of injuries and deaths resulted from collisions and derailments, the railway officer knew that from ten to fifteen times as many were caused in the same length of time by what are termed, "little accidents," or accidents in which one employee was killed or injured at a time and about which the public learned little. The best way to reduce railway fatalities, said Mr. Richards, was to employ good men and then educate them for the duties of the service. It is folly to make rules against certain practices on the part of employees, and then sit by and watch the rules violated time after time without offering to discipline the men for infraction.

Mr. Richards spoke of the block system and the installation of safety devices, but declared that the first requisite was the choice of men. Choose good men and then see to it that they are educated to the work of obeying the rules of the road and the law of the land. It is unjust to criticize the roads for employing old men and foreigners. Old men, many of whom have become incapacitated for their work, are given places as watchmen and they are far more reliable than younger men. He spoke a good word for the foreign born employee; they are faithful and reliable. The companies cannot afford to provide pensions to take care of their aged men and so have to place them at crossings. Men from 60 to 70 years old give good service in that line.

At the request of Chairman Woods Mr. Richards explained the North Western's plan of organizing committees of safety to

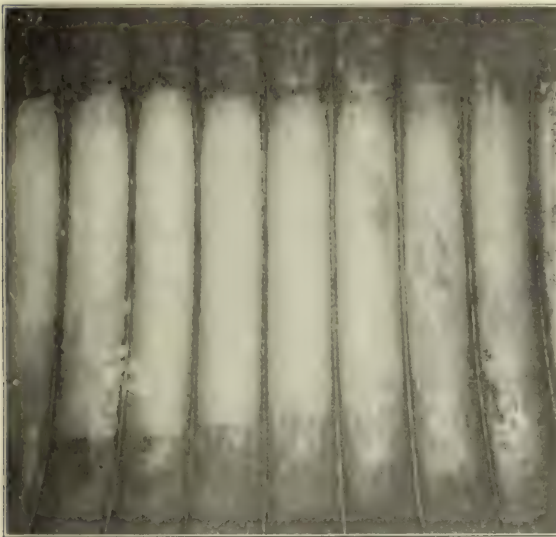


Fig. 10—Partial View of Crown Sheet After the Test.

dition. Several photographs were taken to show the condition of the sections and that portion of the crown sheet that was overheated, as well as the condition of the flues and flue sheet. The whitened portions of Figs. 9 and 10 show the parts of the crown sheet that were overheated during the test.

Close examination of the sections showed no distortion due to overheating in any portion. There were no leaks between the sections and no flue leaks. An inspection of the interior of the boiler on top of the crown sheet showed the characteristic blue color that accompanies the overheating of a crown sheet. The intensity of the color increased towards the center of the sections, showing that the temperature was much higher at the central portion than at sections where the pyrometers were located.

The boiler tubes, as may be noted from Fig. 9, were not inserted in the back flue sheet in the usual manner, but were welded in by the oxy-acetylene process. The diagrams, Figs. 1 and 2, show the general dimensions of the boiler and the location of various pieces of apparatus during the test. On these diagrams the customary water level is shown as well as the ordinary low water level, which indicates the danger point to the engineer. A line has also been drawn to show the actual low water level as recorded during the test when the water was 6 in. below the crown sheet. By reference to the cross

save the lives of employees. The loss of a brakeman or other employee means something to a railway. A new man must take his place and this increases the hazard to other employees. He advocated a department to employ men and a rigid plan of educating them to do the work assigned. It takes less time to prevent an accident than to make a report of it afterwards.

The "loan shark" in his relation to railway men and railway safety was discussed and with one accord denounced. He is a menace to the public by preying on railway men who, harassed by his methods, forget train orders, become careless and contribute to accidents. Often they flee to another state, leaving the road short of experienced men. By resolution the railroad commission was instructed to recommend that the next Legislature pass a law to curb the operations of loan sharks.

The matter of accommodation to passengers and the necessity of keeping the billboards in good shape at stations was discussed freely. It was admitted that station agents frequently became careless of their duty, would write illegibly on the boards and become arrogant when questioned by passengers.

The appointment of an advisory board for the year was left with the railroad commission. An interesting illustrated lecture was given at night by Col. B. W. Dunn, of New York, on the best methods of handling explosives for shipment.

MR. SCHUYLER'S ADDRESS.

The scientist tells us today that the battle with disease is three-quarters won when its direct cause is discovered. After the germ is located its destruction is inevitable. The same thing must be true with a matter of this kind. To prevent railway accidents they must be analyzed until the main cause has been located, and the efforts of the doctors must be applied to the destruction of that cause.

It is somewhat difficult to locate the germ for accidents to travelers on the highway. This class must be largely due to carelessness on the part of the public, assisted, occasionally, by similar carelessness on the part of crossing men or other railway employees.

In England the traveler on the highway, in his vehicle, approaches a crossing at grade. He finds the way barricaded by substantial gates. There may be no train in sight—and there usually is not—but the vehicle stops and waits until the gate-keeper, usually advanced in years and in a greater or less state of decrepitude, comes out of the house, carefully looks up and down the line, unlocks the gate and lets the patient traveler by. It will make no difference to the gate-keeper that another vehicle is in sight approaching the crossing. The gates are again closed and locked, the gate-keeper again enters his house, and when the next traveler approaches the same procedure is gone through with. If a passenger train be due, whether in sight or not, the gates usually remain down until that train passes, which occasionally is discomfiting when the train is late and the crossing watchman or watchwoman, as the case may be, has not been notified. American travelers would not stand such procedure for a minute. They demand that the gates be up and the crossing open at all times except when trains are passing. In Great Britain and on the Continent the gates are down and the crossing is closed at all times except when a vehicle or a traveler is passing.

On the subject of trespassers one of the common statements is that if the railways of this country were to build walls and fences around their tracks, as is done abroad, there would be fewer accidents. That is true. The railways of Great Britain are surrounded by a splendid and impenetrable wall; that wall is the law of the land. It is a misdemeanor to walk on the tracks. And the law is enforced. There is little or no trespassing on any of the railways there. In this country there is practically no law against trespassing on the tracks. In a large city in a neighboring state a number of men and women were injured and several killed, while trespassing on the railway in the pursuit of a large clam-baiter, and where road work was being done. The poor, unfortunates were endeavoring to augment their scanty supply of food from the road which fell to be soiled along

the right of way. Warnings were unavailing; removal by force merely resulted in the immediate return of the trespassers or of their relatives, and so it was determined to arrest a few of these persons found in the yards and have them arraigned for stealing coal. What was the result? The prisoners were set free, the railway company paid the costs, and the police officers of the road were notified that if they brought any more persons before the magistrate on that charge they would be imprisoned themselves!

* * * Many accidents to workmen who do not understand English could be prevented by having interpreters who can talk to them and show them the dangers, and by a more thorough course of education of the green men employed; also by better supervision. In other words, if we tell the men what we expect, how to take care of themselves, how to do the work and then see that they do it, undoubtedly we shall greatly reduce this very prolific cause of accident.

The carelessness of the employee is a matter with which we have to deal. What causes it? Take one of the smaller causes of accident, the so-called boiler explosions. Every year scores of men practically commit suicide or manslaughter because they will not obey the rules which prohibit dependence on the water glass or because they forget the matter of water for the boiler, or because they recklessly take chances. Only one thing can kill this "germ"—require absolute obedience to the rules.

The railway companies are increasingly careful as to safety appliances, partly due to the stringent national and state laws and partly to their own initiative. Safety appliances on cars and switches, stations and shops, are more carefully looked after and more uniform in character than ever before. The railways are adopting block systems almost universally. Some roads are adopting expensive lock-and-block systems. Others are adopting the almost equally expensive automatic system. There is, however, a simple block system which is, in the judgment of the speaker, applicable to most roads and which is less expensive, namely, the single-track block (simple manual) system as outlined in the rules of the American Railway Association. These rules are so clear, so easily understood and so readily enforced that they can be put into effect anywhere with splendid results.

* * * There is a mistaken idea that the most expensive systems must be used everywhere * * *.

Another "ounce of prevention" can be used by the railways in the original choice of men. There are times when the pressure of business is felt and the need of additional men to handle the business is burdensome, when railway officers feel inclined to let down the bars and employ all applicants. When this is done, it is followed, sooner or later, by accidents which, if carefully investigated, could clearly be shown to result from the choice of improper men. The pressure of "organization" is undoubtedly felt by many roads in this matter, thus limiting their choice of men. It is essential to the safety of railway operations that the choice of men should be unrestricted, and that the greatest care should be exercised by the companies, who are alone responsible to the public. After these men are employed they must be educated carefully and painstakingly, they must be shown how to perform their duties, and they must be trained in the rules and regulations and examined in them; and then, the right men having been chosen and educated, after thorough and proper examination, the great work of discipline commences; and this is where the railway company must again use the greatest care.

The railway organizations of the men are usually called "brotherhoods." Being brothers, they feel that they must stand by each other, and feeling that they must stand by each other, the effort of the organization is to see that its members retain their positions, or having been discharged or suffering severe penalties for violation of rules or neglect of duty, that they be reinstated or that the penalty be lightened. The quarterly and annual reports of many of the leading brotherhoods contain long lists of men who have been reinstated in their positions or whose penalties have been lightened by reason of the efforts of the

brotherhood. One of the greatest evils of our life in this country today is the interference with discipline on the part of organizations or of others. Every time a man who is responsible for an accident has had his sentence shortened or has been returned to duty after being discharged, by reason of the interference of his brother employees or his organization, or of other, it is inevitable that other accidents of a similar nature will occur—not by the action of that employee, but through the negligence of others who will be led to feel that they can successfully neglect the rules or their duty and be relieved from the results by the strength of the organization or friends behind them.

The railway organizations have done great things for the morals of the men, and the character of the men has been improved by them. Without organizations, probably, many infractions would have taken place in the way of pay or conditions, which at the present time do not exist. But when an organization attempts to interfere in the matter of discipline or attempts to cause the companies to review their disciplinary action, carefully taken after accident or infraction of rule, then they are interfering with the safety of the public and of their fellow employees; and such interference should not be tolerated.

GRAPHIC COMPARISONS OF TONNAGE.

BY F. A. PARKER.

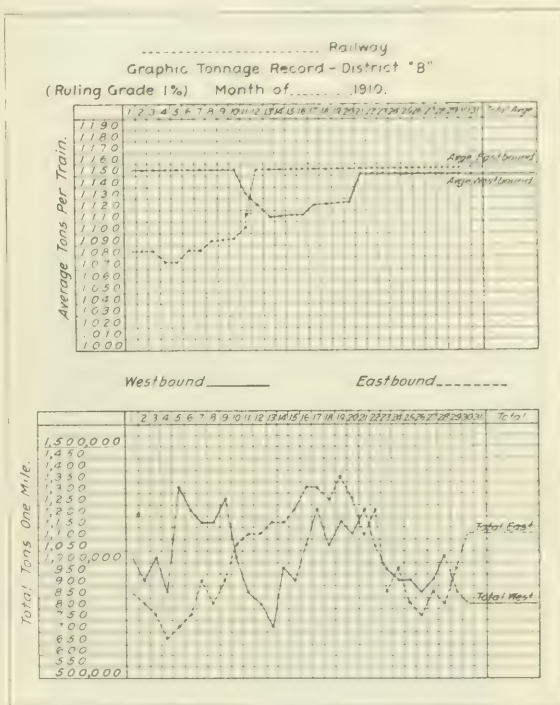
On nearly all trunk lines and particularly on certain districts a constant change of varied extent and time interval between turning points is taking place in the direction of business. For example, on district "B" for the first week of the month we moved 25,000 tons one mile westbound, against only 20,000 tons eastbound, while on the next week the direction of business reversed, as was likewise the case during the third and fourth weeks of the month; all of which sums up to the fact that this district suffered a variation of about 20 per cent. between the directions of business all the month; and, obviously, grades being equal both directions, engines were running 20 per cent. light all the month to balance power. The monthly statement, however, will show for the above example that practically equal gross tonnage was handled in each direction. Explanations of low tonnage per train and consequent increased cost of train service are naturally in order, but unless an explanation can be presented which will readily appeal to the comprehension of a Missourian the case is usually lost.

The above condition also gives the mechanical department a thrust, due to the fact that consumption of coal is computed on both a basis of tonnage per train as well as engine miles and that an engine is burning practically as much coal in balancing power 20 per cent., light as with a full train. The mechanical department then stands open to criticism for a condition over which it has no control and with no data from which to explain. Of course, we can tell them that a boat came in at the Gulf with six trains of bananas, and before we could have returned engines with trains in the natural course of events the second boat was due, and the power to meet the second boat was in a manner necessarily hurried away from traffic which the importance of the second boat would not permit it to remain for, but with no better final result than a cross haul of lights. Again, in another phase, we can tell them that the power to meet a certain day's heavy run of fruit and meat was obviously run away from business in the opposing direction, with the result of another little cross haul of lights. But the mechanical man as well as the average operating man goes away with his head swimming with these explanations, and even if he is convinced (I myself would not be, and I doubt very much if he is) he has nothing to show his superior why cost of train service is so high or why (apparently) an excessive amount of fuel has been used.

This is why a graphical method showing the exact condition of the volume and direction of business by days would be the

most efficient of explanation, and would be given in connection with a monthly tonnage statement.

Revelation of the total ton mileage made in a certain direction in a certain day, that quotient from the total ton mileage divided by total train mileage for that day, compared with a similar computation of the opposite direction, determines the true direction of business. The higher of the above true average tonnage per train is the ruling direction of business. Conditions may be such that for a day or perhaps two days or a little longer the volume of business in the negative direction will possibly exceed that of the ruling direction, and yet the maximum train haul in the desired direction of traffic can be maintained, it being apparent to the director in charge of power that the slight reversal is only temporary and that if the nature of business will permit, and if sufficient power is at hand, the turning point may be overcome without reversing the direction of light power. In the extreme phases of the direction of business we come to a sample of the graphical chart, as shown accompanying this article. The only absolutely correct way to



Graphic Tonnage Record.

handle the matter would be to have reports from the superintendent of car service, in whose office ton mileage would be computed direct from wheel reports, same as the monthly tonnage statements; but inasmuch as this, together with the monthly statement, would be later than ordinarily desired it would be much more desirable to have the figures computed on the train dispatcher's tally sheets, as in the case of the Rock Island form, on which ton mileage for the benefit of the mechanical department (in comparing coal results with each engineer's record) is made on the train dispatcher's tally sheets. From such a form the total ton mileage, divided by the total train mileage in each direction, equals the true tonnage per train for that direction and can be quickly entered up each day on the graphical chart already prepared, thus reflecting the true condition of affairs day by day. At the end of the month a tracing and blue print of it could easily be made and mailed to the proper officers.

DOUBLE TRACK RAILWAYS IN WISCONSIN.

The railway map of Wisconsin given herewith is printed for the purpose of showing the lines in the state having two or more main tracks. The termini of the several lines as shown on the map are given in the list below. The map also shows the double track lines in the northern peninsula of Michigan, all belonging to the Chicago & Northwestern, as shown below:

WISCONSIN.

Chicago, Milwaukee & St. Paul.

	No. tracks.	Approx. miles.
Chicago, Ill. to Milwaukee.....	2	85
Milwaukee to La Crosse.....	2	198

Chicago & Northwestern.

	No. tracks.	Approx. miles.
Including C., St. P., M. & O.		
Illinois State Line to St. Francis.....	2	35
St. Francis to Bay View.....	4	1
Bay View to Milwaukee.....	2	3

	No. tracks.	Approx. miles.
Milwaukee to Lake Shore Jct.....	2	35
Illinois State Line to St. Francis.....	2	35
Janesville to S. Janesville.....	2	35
At Fond du Lac.....	2	35
At Oshkosh.....	2	35
Milwaukee to N. Greenfield.....	2	35
Evansville to Elroy.....	2	97
At Green Bay.....	2	97
Sheboygan Cut-Off.....	2	97
Sheppard to Wright.....	2	44
Merrillan to Eau Claire.....	2	44
Northline to Hudson.....	2	24
Spoooner to Trego.....	2	24

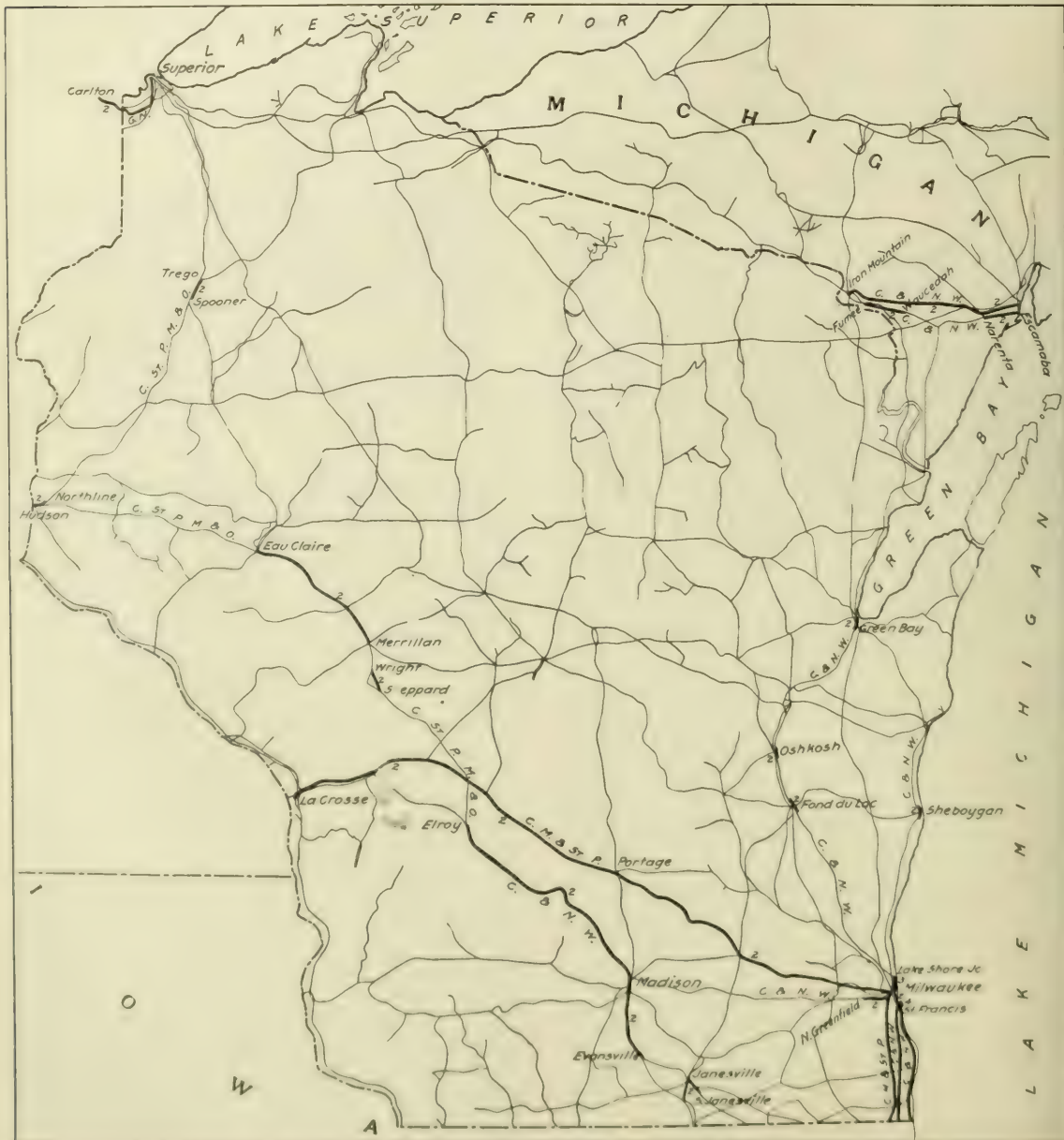
Great Northern.

Superior, Minn., to Carlton.....	2	31
----------------------------------	---	----

NORTHERN MICHIGAN.

Chicago & Northwestern.

Escanaba to Narenta.....	2	9
Waucedah to Fumee.....	2	13
N. Escanaba to Iron Mountain.....	2	21



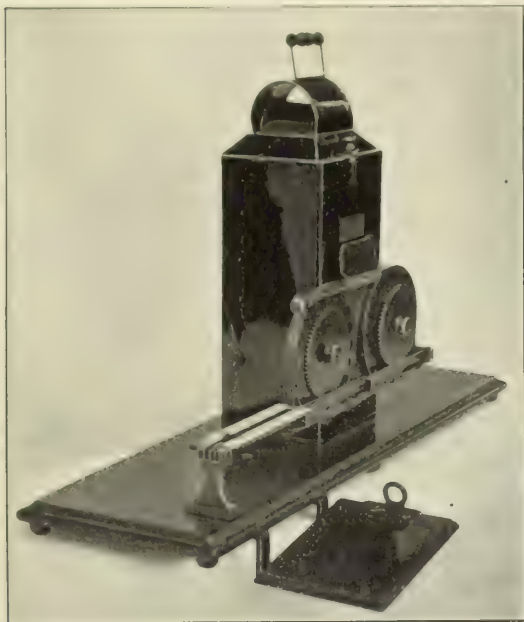
Double Track Railways in Wisconsin and Upper Michigan.

TESTS FOR COLOR VISION IN NEW SOUTH WALES.

BY DR. G. H. TAYLOR,

Medical Officer, N. S. W. Government Railways.

Since 1906 the tests for color sense of candidates for employment in the New South Wales Government Railway service have been Holmgren's wools and Williams' lantern. The testing of men for color vision on the running lines has been by Williams' lantern alone. Experience having shown that owing to the disks



Eye-Testing Lantern; New South Wales Government Railways.

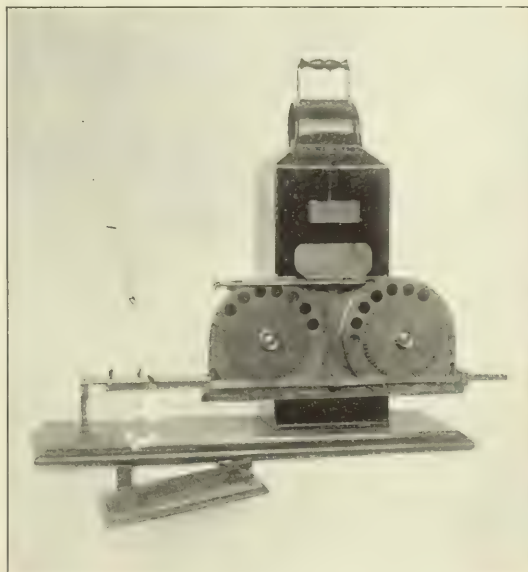
moving in a regular sequence the colors in the Williams lantern could be learned by a person with defective color sense, experiments were entered upon in order to devise some modification whereby any color or combination of colors could be shown at the will of the examiner. As a result of these experiments the lantern shown in the photograph was designed and made by the interlocking engineer of the New South Wales Railways, Charles Wilkin. The colored glasses in the Williams lantern are retained, but by the introduction of a second disk various combinations can be shown at the will of the examiner. The disks are rotated by handles at the side of the lantern. Pointers attached to these handles indicate on a vernier the numbers of the lights shown. The original numbers are retained, so that no alteration has been necessary in the method of keeping the records.

Any method of color testing depreciates in value when it is used to tutor intending candidates, and this is openly done in regard to Holmgren's wool test and the old Williams lantern. It is remarkable how a candidate in whom a defective color sense has been clearly demonstrated, even a defective sense of red, can be tutored in the wools and the old lantern to deceive an examiner. As his sense of shade, however, is never reliable, he may suddenly, after naming correctly a number of red and green disks, name a red, green or white. If examined by a method new to him, detection is not difficult. The key to a candidate's color sense is undoubtedly his sense of green. The smallest degree of defect revealed by the modified lantern is failing to see color in the two pale greens and calling them white. This defect is not invariably confirmed by Nagel. The two pale greens show one with a little more color in it than the

other. When a candidate, with both of these in some manner one white and other green, is exhibiting a more serious color defect. This is, in the case I have tested, confirmed by examination with Nagel, the distinction being that the candidate in naming one white and the other green is using his sense of shade and not his sense of color. The source of opinion that occasionally occurs in defective examination of a candidate by Holmgren's wools is due in a majority of cases to atmospherical conditions. In an unsatisfactory light a man with a feeble color sense may fail in his green test and satisfy the examiner under more favorable conditions of light. In the Nagel test, which is a severe one, but which could be learned by an incomplete color blind, a good light is absolutely necessary. In a failing light or in gas light persons with normal color sense confuse the gray spots with green. If a candidate confuses red with green or green with red he is recognized by public opinion as a color blind. If he sees no color in red and calls red white, there is also a certain degree of appeal to the ordinary man; but if he confuses pale green with white in the lantern test, or if in matching green in Holmgren's his only mistake is to pick gray or brown wools, the uneducated man is not impressed.

A color blind engine driver is protected from mistake under favorable conditions (1) by his perception of shade, the signal lights used, red and green, being of a standard pattern; (2) by his exact knowledge of the locality of distant and home signals; they are not flashed upon him suddenly; (3) by the color sense of his fireman. In shunting operations, however, where a confusion between white and green may at least imperil the life of a shunter, he must act promptly, guided entirely by his sense of green.

About 12,000 men have been examined in the medical officer's rooms in regard to color sense since my appointment two years



Front View of Lantern.

ago. Of these, 4.92 per cent. were found to have defective color sense; classified as red blind, 2.16 per cent.; green blind, .12 per cent.; incomplete color blind, 1.12 per cent., and feeble color sense, .41 per cent.; and 1.12 per cent. failed only in the lantern, the failures in the lantern being subsequently confirmed by Nagel's method. I am satisfied that a man should not be admitted to the railway service as a worker on the running lines who in any degree has a defective sense of red or green, and

the service and working on the running lines must be regarded as unfit if it can be shown that he fails to recognize green under conditions that 95 per cent. of ordinary candidates, consisting almost entirely of youths and young men, practically all of them wage earners, and certainly not educated in color in the great majority of cases, never fail to recognize.

No man is rejected whose only error is that he cannot detect green in the two pale green disks of Williams' lantern, this being his only error, and not repeated when he is shown their contrast to two whites.

Prior to the adoption of the modified lantern 42 per cent. with defective color sense not detected by Holmgren's tests were discovered by the old lantern. The new lantern increased the percentage by .7 per cent.

RESULTS WITH GASOLENE SECTION CARS.

Last spring, in discussing the use of gasoline section cars on the Santa Fé and the St. Paul (*Daily Railway Age Gazette*, March 15, p. 556) we called attention to the plans of the Northern Pacific for putting several cars in service. We are indebted to A. M. Burt, superintendent of the Dakota division of the Northern Pacific, for the following account of the results of this experiment during the past summer.

About June 1 three gasoline section cars were put in service on the Dakota division, the cars being assigned to branch lines where the traffic is thin and where there are few obscure curves. In each case two sections were consolidated under one section foreman, the longest section as consolidated being 22 miles and the average 18.3 miles. The section foremen take a great deal of interest in the cars, and it has been quite a surprise to find how few delays occur on account of trouble with the motor. The service record of the three cars for the four months they have been in service, to September 30, is as follows:

	Per car per month.
Amount of delay account trouble with motor.....	32 minutes
Gasoline consumed.....	597 gallons
Oil consumed.....	25 1/2 gal.
Repairs.....	1 1/2 gal.
	\$4.00
Repairs.....	0.00

It is impossible to estimate accurately the saving that has been effected, as we have no accurate measure of the work done per man, but from my observation it seems unquestionable that one foreman and five laborers with a motor car will do fully as much work as two foremen with three laborers each without the car. On this basis the account to date would stand as follows:

Four months' pay of one section laborer, at \$1.50 per day.....	\$156.00
Less supplies for four months, at \$4.60 per month.....	18.40
	\$137.60

The cars therefore have much more than saved their entire first cost in the four months they have been operated.

The saving shown above is considerably more than we can expect to average the year around on account of the small amount of work done during the winter months and also on account of the fact that repairs will have to be considered as the cars grow older. Up to this time no cars have been put in service on the main line, and I am not fully convinced that it is advisable to install them where a heavy traffic is handled on a single track. Eventually we shall probably come to this, but it seems desirable to go a little slow and educate the men gradually.

Some of the incidental advantages of the motor car for the North Dakota railroads are:

(1) Better labor supply. In summer we depend largely on Holmby and Gerdner for section laboring, and they will not work in areas of less than five or six men on account of difficulty in furnishing their own subsistence in smaller crews. This makes too large a gang for the average branch line section, but with

the long sections handled with the motor car crew of this size can be used to advantage.

(2) The men are fresh when they arrive at the place to begin work instead of tired from an hour or more of hard pumping against a Dakota wind.

(3) Small improvements can be handled to advantage by bunching two or three section crews instead of having to use an extra gang, and on occasion men can be concentrated on a weak place at a long distance from section headquarters. One small piece of track laying was done this summer by sending a yard crew 13 miles to help the regular section crew. They were always at work before 8 o'clock and did not quit until 5:15. In another instance a section crew worked for about two weeks helping the adjoining section foreman, on account of very heavy tie renewals and shortage of labor, and this work was done from 12 to 15 miles from section headquarters, with less than an hour's loss of time for the trip in either direction.

To make the installation of motor cars a success it is very essential to have a roadmaster thoroughly interested in the subject. All cars on a roadmaster's district should be of the same make and pattern to minimize the number of repair parts carried and lessen the difficulties in educating the section foreman, and an extra car should be provided and held at the roadmaster's headquarters as a relief car on the same principle as relief engines are maintained for locomotives in regular service.

FOREIGN RAILWAY NOTES.

The report of the chief commissioner of the New South Wales, Australia, government railways and street railways for the fiscal year ended June 30, 1910, shows a total surplus of \$2,761,392, an increase over the previous year of \$486,501. Of the total surplus \$2,538,320 was earned by the railways and \$222,972 by the street railways. For the preceding 12 months the figures were \$1,647,015 and \$384,786, respectively. The gross earnings increased from \$24,436,323 to \$26,660,750, an improvement of 9.09 per cent. The return per average mile open for traffic, after paying working expenses, increased from \$2,833 to \$2,960. The railway mileage open for traffic on June 23, 1910, was 3,643, 17 miles having been added; total expenditures \$237,777,191. Passengers increased from 53,051,556 to 53,644,271, and yielded an increased revenue of \$501,557. Other increases were: General merchandise, 139,025 tons; wool, 6,687 tons; live stock, 27,013 tons; hay, straw, chaff, 29,266 tons. Of coal and coke 1,321,823 tons less were carried, due to the coal miners' strike, but other minerals increased by 53,291 tons. This reduced carriage of coal and coke reduced the total freight carried by 905,891 tons, but the earnings from all sources increased by \$2,222,308. During the last three years 198 locomotives, 288 passenger cars, 2,170 general freight cars, 350 cattle cars and 301 sheep cars have been purchased, and 45 locomotives, 155 passenger cars, 1,136 freight cars, 45 cattle cars and 55 sheep cars are now under order. The street railways have also shown increased profits; 165 1/4 miles of line were open for traffic at the end of June, and there had been added to the capital expenditure \$2,022,081, bringing it to \$22,680,353. The total earnings amounted to \$5,761,860, an increase of 8.02 per cent. The percentage of expenditure to receipts was 82.96 as compared with 79.77 in 1908-9. During the year 201,151,021 passengers were carried.

The French colonial press finds new cause for enthusiasm in the completion of still another railway leading from the Atlantic to the interior of Africa. The new line, which runs from Koussery, the port of French Guinea, to Kourou on the Niger, is upward of 300 miles long and will henceforth be the shortest route from the ocean to the navigable Niger.

At the present time freight for Timbuktu, and all the Niger river ports, is landed at Dakar in Senegal, transferred by rail to St. Louis, at the mouth of the Senegal, thence transhipped to Senegal river steamers.

AMERICAN RAILWAY ASSOCIATION.

The fall session of the American Railway Association was held at the Planters' Hotel, St. Louis, Mo., November 16. There were present 198 delegates, representing 179 members. The executive committee reported that the membership now comprises 346 members, operating 252,888 miles of road, an increase of 3 members and 1,416 miles. Associate membership comprises 85 members, operating 4,160 miles, and increase of 4 members and 1,207 miles. The committee further reported that Fairfax, Harrison, Chicago, Indianapolis & Louisville, and H. E. Byrum, Chicago, Burlington & Quincy, had been elected members of the committee to fill vacancies.

The committee on transportation presented a report submitting several questions and answers concerning practice under the Standard Code and the standard form of detour contract duly approved by the association. The committee recommended that the detour contract be revised, and the following resolution was adopted: "Resolved, That the charge for detouring movements in which the foreign company supplies its own engines, enginemen and firemen be advanced from fifty cents to one dollar per train mile, and for such movements in which the home company supplies engines, enginemen and firemen the rate be advanced from one dollar to two dollars per train mile; and that the committee on transportation be authorized to make changes in the detour contract necessary to conform to those rates."

The committee on maintenance presented a report of progress, and gave a summary of replies received to circular No. 1024, showing the number of freight cars fitted with air brakes and of engines equipped with power brakes in use July 10, 1910, as follows: "Number of members reporting, 339. Freight cars in service, 2,272,482; fitted with air brakes, 2,251,025; not so fitted, 21,457. Engines in service, 62,250; equipped with power brakes, 62,223; not so fitted, 27. Of new equipment, other than passenger, under contract or construction, freight cars to be fitted with air brakes, 122,296; engines to be equipped with power brakes, 2,103."

The committee on the safe transportation of explosives and other dangerous articles included, in its report, a report from B. W. Dunn, chief inspector to the executive committee of the bureau. The committee also submitted copies of the several circulars issued since the last meeting of the association respecting the transportation of explosives and other dangerous articles. The committee further reported that W. S. Tinsman, Chicago, Rock Island & Pacific, and R. H. L'Hommiedieu, Michigan Central, had been elected to fill vacancies on the committee.

A progress report was presented by the committee on electrical working. On the recommendation of the committee on relations between railroads, the association adopted a memorandum for the guidance and information of employees in handling railway business mail. The committee stated that the circular in question was formulated by the Association of Transportation & Car Accounting Officers in conjunction with the Post Office department.

The Chicago, Rock Island & Pacific, the Philadelphia & Reading and the Wabash were elected members of the committee on the safe transportation of explosives. The Baltimore & Ohio and the Chicago Great Western were elected members of the committee on electrical working. C. W. Kouns, Atchison, Topeka & Santa Fe, and J. M. Gruber, Great Northern, were elected members of the committee on nominations.

The association decided to hold its next meeting in New York, April 19, 1911.

Directors of the Lehigh have voted to authorize the listing of Lehigh stock on the New York Stock Exchange. Lehigh is one of the few important railway stocks not heretofore traded in on the New York exchange. The matter has been before the board of the Lehigh for years.

NATIONAL ASSOCIATION OF RAILWAY COMMISSIONERS.

The twenty-second annual convention of the National Association of Railway Commissioners was held at Washington this week, beginning Tuesday morning. Twenty-one states represented at the roll call and about ninety commissioners and other officers were present. Chairman Knapp of the Interstate Commerce Commission, in an address of welcome, called attention to the importance of earnest and intelligent cooperation of the commissioners of each state with those of other states and of all state commissioners with the federal commissioners. Except as such cooperation shall give the country good administration and protect the public from bad practices, the demand for government ownership of the railways and public service corporations will increase. Mr. Knapp, however, expressed confidence that the commissions would "make good," and he recounted the progress that had been made during the past twenty years, or since he first became a member of the federal body. Rebates, passes and other demoralizing practices have been practically outlawed and railway managers have abandoned their former policy of defiance and derision, and now accept governmental regulation as a public necessity.

M. S. Decker, of New York, member of the Public Service Commission for the Second District of that state, and president of the convention, outlined the subjects on which action ought to be taken. He emphasized particularly the need of investigating the whole system of express service and express rates. The question of a parcels post should also be investigated by the commissioners. As telephones and telegraphs are now under the jurisdiction of the Interstate Commerce Commission, the commissioners of the several states should inform themselves fully on the subject. Referring to the radical change that has been effected in rate matters, by which secret rebates are now "as rare as counterfeiting or train robbery," Mr. Decker pictured a still further advance, saying: "Who may say that tomorrow we shall not put in practice through government supervision and cooperation, sought by the carriers themselves and fully sanctioned by the force of public sentiment, methods of rate construction under which many of the great problems that now perplex us will almost magically disappear?" Mr. Decker also strongly urged the extension of the same methods of inspection and supervision of boilers over many states, which he declared, would result in much saving of life.

The committees on railway statistics and on simplification of railway tariffs placed their reports before the association and they were adopted.

The committee on railway statistics said that replies to inquiries as to the desirability of changing the fiscal year from June 30 to December 31 did not indicate any strong desire, either on the part of railway commissioners or of the carriers interested, in favor of a change of the date for closing the fiscal year. In view of such a situation they decided it would be unwise to recommend making the change.

Other reports submitted to the association for action during the present session are the following: On shippers' claims; on common carriers; on rates and rate making; on railway taxes and plans for ascertaining the fair value of railway property; and on powers, duties and work of state railway commissioners.

The new railway built by the French in Africa runs straight from the seacoast to the Niger, and thus eliminates the changes from rail to water and vice versa at St. Louis and Kayes on the Senegal route. Kurussu, the point where it reaches the Niger, is about 300 miles above Kulikoro, where the Niger becomes navigable for larger river steamers. An extension of the line from Kurussu to Kulikoro will therefore be necessary before the new route can compete with the older for passenger and mail service. For freight and supplies that can be shipped in barges the new route will doubtless at once replace the older.

General News Section.

The Philadelphia & Reading has made an increase of 5 per cent. in the wages of certain station agents, telegraphers and men in interlocking signal cabins.

The Long Island Railroad has just distributed \$450 in premiums for excellence in track work. The first premium for the best supervisor's division went to Frank Turner, and the second to C. King.

Freight brakemen of the Pennsylvania Railroad who have been in the service of the company five years are to be given season passes, and those who have been in the service ten years will have such passes for themselves and wives.

The New York State Health Commissioner has ordered the New York, New Haven & Hartford and the New York Central to close the washrooms on all trains passing through the limits of the Croton watershed, where the water supply of the city of New York might be polluted.

The voters of South Dakota, who at the election last week voted on a proposition to compel the use of electric headlights on locomotives, rejected it by a considerable majority. Final returns have not yet been received, but it appears that the majority against the proposed law will be at least 15,000.

The National Civic Federation is to hold its eleventh annual meeting in New York City January 12, 13 and 14. The federation discusses the regulation of corporations and of railways and municipal utilities; compensation for industrial accidents and arbitration. The state councils, organized by the federation, will meet to discuss the unification of the laws of different states.

The Chicago Great Western announces that the offices of the president, vice-president, general manager, general freight agent, general purchasing agent and purchasing agent are now in the eleventh story of the People's Gas building, Adams street and Michigan avenue, Chicago. The offices of the accounting engineering, and treasury departments will remain in the Grand Central station, Fifth avenue and Harrison street.

Purdue University, Lafayette, Ind., has just opened new buildings for instruction in mechanical drawing, descriptive geometry and shop work, and dedicatory exercises were held November 12, with addresses by President Stone, Dean Benjamin and Hon. M. W. Mix. The main building is three stories high and contains 25,000 sq. ft. of floor space; and the shops cover 43,000 sq. ft. of ground. The new accommodations are sufficient for 750 students, half in the shops and half in the other departments; and the lecture room has seats for 300.

The New Jersey State Board of Assessors has completed the assessment of railway property for 1910. The figures show an increase of nearly \$18,000,000 in assessed valuation, and on account of this increase and an increase in the average tax rates the railways this year will pay in taxes practically half a million dollars more than last year. The total assessed valuation of railway property for this year is \$296,921,520, as against \$279,059,611 last year. On this year's assessment the roads will pay in taxes \$5,542,611, of which \$4,103,630 goes to the state and \$1,438,980 goes to the various localities as tax on second-class property.

The Board of Estimate of New York City is considering the proposal, which has been laid before it by the State Public Service Commission, for the operation by the city of the "Steinway" tunnel, from Forty-second street, Manhattan, to Brooklyn; but, according to a statement given out, the board is delayed because the Public Service Commission did not present a complete plan. The commission seems to have given the plan informal approval, but to carry it out the city must act in accordance with the offer of the Interborough Rapid Transit Company, which proposes to convey the tunnel to the city for nothing; but one of the conditions of the offer is that the Interborough shall have the privilege of building additional main tracks throughout the length of its Third avenue and Second avenue elevated lines.

The strike of express wagon drivers and helpers in New York City was terminated by the return of the men to work on Monday last. It is agreed that differences concerning hours, wages, etc., shall be at once taken up, and that any changes

fixed upon shall go into effect December 1. The companies agree to take back the strikers without prejudice, except in the cases of individuals who have been guilty of unlawful acts, and to make no discrimination against any applicant because of his membership in a labor union. On Tuesday thirty of the strikers complained to the mayor of New York that they had been refused reinstatement, and the mayor undertook to investigate their cases. It appeared that these thirty had been leaders of the strikers, but they say that they have not been guilty of any overt acts.

The annual statement of the Pullman company shows that for the fiscal year ended July 31, 1910, earnings from cars amounted to \$35,365,321, and earnings from manufacturing, rentals, interest, etc., amounted to \$3,515,484. This gave the company \$38,880,805 revenue in 1910; this compares with total revenue in 1909 of \$33,801,156. Earnings from cars in 1909 totaled \$31,686,999, and from manufacturing, etc., \$2,114,156. Operating expenses in 1910 totaled \$20,839,570. This is greater by approximately \$2,300,000 than the expenses in 1909. After the payment of depreciation, interest paid to other companies in sleeping car associations, and after the payment of \$8,798,996 dividends, the company had a surplus in 1910 of \$5,134,502. In 1909 \$3,999,070 dividends were paid, and the surplus was \$2,949,131. The company had cash on hand of \$13,752,450 in 1910 and of \$11,618,522 in 1909. Accounts receivable last year totaled \$9,637,776, and in 1909 \$3,871,706. Accounts payable amounted to \$5,383,741 in 1910, and to \$3,860,706 in 1909.

The Upper Berth.

The announcement that the Pullman company has decided to abide by the order of the Interstate Commerce Commission and charge a smaller price for upper than for lower berths will generally be hailed with satisfaction. Should the company in its generosity go so far as to fix the charge for the upper berth at three-fourths that of the lower there would be still further reason for gratification.

To charge the same for the second-story shelf, with which those who came late were obliged to content themselves as for a first floor reservation has always been unreasonable. The new arrangement will afford more economical accommodation to those compelled to consider the question of expense, and will likewise give larger opportunity to those whose architecture is such that without a derrick the upper berth closely approaches the unattainable.

There is a possibility, of course, that those who are compelled to take an upper berth, either for economic reasons or because they are too late to secure a lower, will be compelled to submit to a larger measure of contemptuous scorn from the colored divinities who preside over the affairs of travelers by night; but even that may be, in a measure at least, averted by continuous and loudly uttered protestations at the cruelty of the fate which condemns one to travel up aloft.

For those whose accommodations are circumscribed by lack of opportunity rather than by lack of funds, the saving in actual financial outlay which will result from occupancy of the upper berth will at least permit of the purchase of one small measure of liquid consolation at the prevailing prices on Pullman buffet cars, so that considered from every point of view it seems a safe prediction that the traveling public will be happier because the Pullman company has kindly consented to heed the peremptory order of the Interstate Commerce Commission.—*New York Tribune.*

That "Awful Arbitrary" at St. Louis.

Shrinks to high heaven about the Terminal's so-called "arbitrary" on St. Louis commerce are veritably "great noise and little wool" when you know the facts. I have noted that some shoe manufacturers of this city have been leading the outcry against the Terminal. I have thought that maybe the arbitrary was a great burden upon our great shoe business. So I made inquiry, and here you are:

There were manufactured in St. Louis last year 24,282,042 pairs of shoes of a value of \$43,300,824.

Traffic News.

The Duluth, Missabe & Northern and the Canadian Northern now run sleeping cars through regularly between Duluth and Port Arthur via Fort Frances.

Bulletin No. 81, which has been issued by the Bureau of Statistics of the Department of Agriculture, contains a forty-year review of freight transportation on the Great Lakes.

The Interstate Commerce Commission has received from Detroit a complaint against the Pere Marquette and other railways in Michigan, charging that the enforcement of the Michigan demurrage rules on interstate traffic is unjust.

The Chicago, Milwaukee & St. Paul, which owns and operates the sleeping cars used on its lines, announces that on the lines from Chicago to Minneapolis, Chicago to Kansas City and Chicago to Houghton, Mich., steel sleeping cars are now in use.

The announcements by the Pennsylvania Railroad that its ferry from Jersey City to Brooklyn, around the southern end of Manhattan, will be discontinued November 27, brings out the fact that this ferry is made use of by many truck wagons of large warehouses in Brooklyn. With no direct ferry these wagons will have to go through Manhattan, and make two ferry voyages.

The Department of Agriculture has issued two bulletins giving information about dry farming. A statement issued by the department says that the data collected on this subject is not yet complete, but in view of the urgent demand of settlers and of the need of more accurate information about climate and rainfall, these bulletins have been issued to meet as well as possible the present wants.

The New York Central has modified its rules for storage charges on baggage remaining at stations over twenty-four hours by the addition of a clause providing for the waiving of charges when, by reason of strikes or riots [such as have occurred in New York City during the past two weeks], the removal of baggage is rendered impossible. The rules now provide that all baggage thus stored is at the owner's risk.

Lumber merchants in San Francisco have brought suit in the United States Circuit Court against the Southern Pacific and other roads, alleging disobedience of the order issued by the Interstate Commerce Commission in November, 1906, ordering reductions in the rates on lumber from Portland, Ore., to San Francisco. The order of the commission specified 75 cents, but the complaint says that the roads are charging 85 cents.

The Boston & Albany announces that new cars are to be provided for the B. & A. section of the 20th Century Limited trains, and that these trains will have a stenographer, a barber and a lady's maid. In connection with the publication of this announcement in the Massachusetts papers it is said that the average number of passengers on the 20th Century train from Boston to Albany is 14, and from Albany to Boston 19. These trains have been running since August 15, 1909.

According to a consular report, a line of steamships is to be established between Sydney, New South Wales, and Valparaiso, Chili, to connect there with the railway across the Andes, under arrangements by which passengers and mail will be carried from Australia to England in 27 days. The Atlantic voyage will be made by the Royal Mail Steamship Line sailing from Buenos Ayres and Montevideo. The time between Australia and England by way of the Indian ocean is usually 31 days.

The National Industrial Traffic League has adopted resolutions holding that the "administration of the act to regulate commerce requires a certain knowledge that can be had only by persons who have had a wide experience in traffic matters, and that, therefore, the Commission should have at least two members possessing the experience and traffic knowledge mentioned." And the League petitions President Taft to appoint at least two traffic men when pending changes in the personnel of the Interstate Commerce Commission are made.

The center of corn production in the United States for several years past, if we remember correctly, has been Omaha. At least Omaha has had the most money Corn Exposition. Now,

however, the Western metropolis will have to look out for its laurels. It has a rival in rock-ribbed New England. At the New England corn exposition, held at Worcester last week, a prize of \$500 went to P. C. Davis of Granby, Mass., for having raised 103¾ bushels of corn on a single acre. This was the final measurement of dry, yellow, flint corn. The corn at the time of harvest measured 127 bushels, shelled.

The New York, New Haven & Hartford announces that its midnight express trains between New York and Boston will hereafter be divided into two sections each way, the second section leaving at one o'clock, and arriving at destination at seven o'clock; thus running through six hours and arriving at about the same time as the first section, which starts at twelve o'clock. The second section will have no cars but sleeping cars, and one of these will be "de luxe"; that is to say, the sleeping rooms will have brass bedsteads, and the fare for such a room will be \$12 for one passenger, or \$16.75 for two passengers. The transportation fare is \$4.75 for each passenger, from which it appears that the cost of the room is \$7.25.

The Lehigh Valley, announcing the opening of the Hudson & Manhattan underground railway to Thirty-third street, New York city, and the discontinuance after November 27 of the ferry connections from Lehigh Valley trains in Jersey City (Pennsylvania station) to Twenty-third street, New York, and to Fulton street, Brooklyn, gives notice that baggage from stations on its line checked to New York will be delivered at Desbrosses street station. The ferry connections will be to Desbrosses street and Cortlandt street, and baggage for Cortlandt street must be so designated. Passengers reaching New York by Lehigh Valley trains and destined for Brooklyn are advised to take the Hudson tube to the Hudson Terminal in Manhattan and thence to go by the Interborough subway to Borough Hall, or by surface street cars over the Brooklyn Bridge.

The St. Louis & San Francisco has completed arrangements for interchange of traffic with the National Railways of Mexico over the recently completed international bridge connecting Brownsville Tex., and Matamoros, Mex. By the traffic agreement entered into several months ago between the Frisco and the Houston & Texas Central and other Southern Pacific lines in Texas, the use of the Southern Pacific tracks provides the absent link in the Frisco system between the main line and the St. Louis, Brownsville & Mexico. The National of Mexico has extended one of its branches into Matamoros, and this will be the main line for the through traffic between the two countries. Through passenger trains from New Orleans to the City of Mexico will soon be put on, and through cars will probably be run from Chicago, St. Louis and Kansas City to the Mexican capital. Freight trains are already running.

John S. Runnells, vice-president and general counsel of the Pullman company, in an interview at Chicago November 10 said that if the Interstate Commerce Commission, on rehearing the testimony in the cases involving the reasonableness of the Pullman company's rates, shall reaffirm its holding that there should be a difference between the rates for upper and lower berths, it is probable that the Pullman company will establish the desired differential. He said that some of the reductions ordered by the Commission, particularly in the rates for lower berths, are felt by the company to be too great, and that additional evidence will be presented to the Commission to show that this is true. Complaints regarding the reasonableness of the rates and the profits of the Pullman company have been filed with the Interstate Commission by the state railway commissions of Indiana, Arkansas and Oklahoma, and a hearing will be held in Chicago, November 30.

With its new time-table to go into effect November 27, when through trains will run to and from Seventh avenue, New York City, the Pennsylvania Railroad will shorten slightly the times of many of the trains. The eighteen-hour train to Chicago, which now leaves Jersey City at 4:14, will leave New York at 4:00. Under the present time-table passengers for this train leave New York by the Twenty-third street ferry at 3:55; by the Cortlandt street ferry at 4:00, and from Church street, by the trains of the Hudson tubes, at 4:05. Other trains are changed in a similar way. There is a new train to Chicago at 8:34 p. m., running through in 25 hours, and the Chicago Limited (5 p. m.) is to run through in 22 hours, or two hours less than now.

On the same date the 20th Century Limited of the New York Central, which is now an all steel train, will be changed so as to leave New York at four o'clock, the same as the Pennsylvania train, and it will arrive in Chicago at 8:55, the same time with the Pennsylvania. The New York Central will also put on a twenty-two hour train, leaving New York at five o'clock.

Switching Rate Agreement at Chicago.

The following is the text of the agreement regarding switching rates at Chicago, which has been reached by representatives of the railway and the Chicago Association of Commerce, the Chicago Board of Trade and the Illinois Manufacturers' Association:

AGREEMENT CONCERNING CHICAGO SWITCHING RATES.

- A. Chicago rates to apply on all loaded traffic to and from all industries, warehouses and elevators, provided such private sidings are located within the Chicago territory as defined below in section B, the limit hereof, the traffic upon the traffic out of and distant to also be such connecting line switching charges as may be necessary to make delivery to or receive from such industries, warehouses and elevators, when freight charges are \$15 per car, or more, and where freight charges are less than \$15 per car the rates will include such amount as will insure the same net revenue as would accrue after abatement of switching charges above authorized out of a charge of \$15 per car.
- B. Definition of Chicago Territory. On and within the following described boundary: Commencing at Lake Michigan at a point directly east of Clarke Junction, Ind., thence from Clarke Junction southwardly through Calumet to Grasselli, Ind., inclusive; then via the Indiana Harbor Belt and C. & N. W. to and including Osborn, Ind.; thence via the N. Y. C. & St. L. to Hammond, Ind., inclusive; thence westwardly to Liberty, Ill., inclusive; thence northwest to Duane, Ill., thence southwardly to and including Harvey; thence north west through Blue Island, Ill., inclusive; thence northwardly on and via the Indiana Harbor Belt through Chicago Ridge, Argo and McCook to Lagrange, Ill., inclusive; thence north through Broadview, Bellwood and Proviso to Franklin Park, Ill., inclusive; thence south east on and via the C. & N. W. to Chicago city limits; thence east along the Chicago city limits to Lake Michigan, also including Weber and Greenwood Avenue stations on the Mayfair cut-off of the C. & N. W.
- C. Connecting Lines' Switching. On traffic other than grain, coal and coke, the connecting lines' switching charge of the delivering or initial road to be not greater than 1 cent per 100 lbs., minimum weight 60,000 lbs.
- D. Connecting line switching is hereby defined to be:
 - (1) The movement of a loaded car from an elevator, warehouse, industry or place of business located upon any private siding to any connecting road at a junction point, or
 - (2) The movement of a loaded car from any connecting railway at a junction point to any elevator, warehouse, industry or place of business located upon any private siding.*It is further agreed that the limits of the Chicago territory as defined above, and the rates at which the traffic originates or to which the traffic is destined is without Chicago territory.*

INDUSTRIAL SWITCHING.

- A. Industrial switching is hereby defined to be the movement of a loaded car from an elevator, warehouse, industry or place of business located upon any private siding to another elevator, warehouse, industry or place of business located upon any private siding, when point of origin and destination are both within the Chicago switching limits as defined in paragraph B, below:
- B.—Chicago switching limits to be as follows:
 - Penna. Co.—Indiana Harbor, Ind., Clarke Junction, Ind., Hammond, Ind., Liberty, Ill., and north and west of these points.
 - P. C. & St. L.—Dalton, Ill., and north thereof.
 - L. S. & M. S.—Indiana Harbor, Ind., and north and west thereof.
 - M. C.—Gibson, Ind., and west and north thereof.
 - C. I. & S.—Osborn, Ind., and north thereof.
 - N. Y. C. & St. L.—Osborn, Ind., and west and north thereof.
 - I. H. Belt—Commencing at and including Indiana Harbor, Ind., then south through Calumet, Grasselli and Gibson, Ind., to Osborn, Ind., inclusive; west of Gibson, through Hammond, Ind., Calumet Park and Dalton, Ill., to Blue Island, Ill., inclusive; thence northwardly through Chicago Ridge, Argo, McCook, Lagrange, Broadview, Bellwood and Proviso, Ill., to Frank Park, Ill., inclusive, including its branches within these boundaries.
 - C. B. & O.—Clyde, Ill., and east thereof.
 - C. & N. W.—Fortieth avenue, Chicago, shops and east and south thereof, including its Wood street, Sixtieth street and Stock Yards lines; north of Chicago shops through and including Cragin to Mayfair, thence southeast to and including Deering.
 - C. M. & St. P.—Galewood and east and south thereof; Mayfair and east and south thereof; south of Wilson avenue.
- C.—Industrial Switching Charge:
 - (1) Maximum industrial switching charge between two industries located on the same road, 1½ cents per 100 lbs., minimum weight 60,000 lbs.

It is further agreed that the limits of the Chicago territory as defined above, and the rates at which the traffic originates or to which the traffic is destined is without Chicago territory.

The adoption of the foregoing code of rules is being opposed by a small minority of shippers, but it is believed that as it has the backing of all the large railway and shipping interests it will finally prevail.

Crop Conditions.

The United States Department of Agriculture has made the following general review of crop conditions:

The harvests of 1910 have been nearly completed, with results exceeding the expectations during the growing period. Preliminary estimates have been made of the production of most of the important crops, from which it appears that the aggregate production of crops in 1910 are approximately 7.6 per cent. greater than the crops of 1909—and about 9.1 per cent. greater than the average annual production of the preceding five years.

The aggregate of this year's crop production in each state, based on preliminary estimates, is given below; the first figure after each state indicates the total crop production in 1910, as compared with total production in 1909; the second figure indicates production in 1910, compared with the average production in the preceding five years; 100 representing last year's production in the first case, 100 representing the average annual production of the preceding five years in the second:

Maine 120, 114; New Hampshire 128, 115; Vermont 118, 117; Massachusetts 113, 110; Rhode Island 113, 107; Connecticut 118, 118; New York 114, 109; New Jersey 119, 113; Pennsylvania 119, 109.

Delaware 147, 134; Maryland 122, 110; Virginia 118, 121; West Virginia 99, 112; North Carolina 116, 123; South Carolina 115, 133; Georgia 104, 111; Florida 106, 116.

Ohio 104, 110; Indiana 107, 115; Illinois 104, 115; Michigan 98, 108; Wisconsin 82, 85; Minnesota 90, 111; Iowa 107, 105; Missouri 111, 113; North Dakota 40, 47; South Dakota 84, 98; Nebraska 99, 96; Kansas 95, 95.

Kentucky 101, 113; Tennessee 118, 117; Alabama 130, 120; Mississippi 134, 120; Louisiana 116, 116; Texas 143, 143; Oklahoma 115, 101; Arkansas 131, 125.

Montana 89, 160; Wyoming 102, 149; Colorado 79, 93; New Mexico 83, 119; Arizona 76, 98; Utah 98, 106; Nevada 149, 183; Idaho 95, 120; Washington 82, 93; Oregon 102, 111; California, 122, 116.

The preliminary estimates of production in 1910, with comparisons, of such crops as have been estimated quantitatively by the bureau of statistics, with their average farm prices on November 1, 1910, and November 1, 1909, are as follows:

CROPS.	PRODUCTION (000 omitted).			PRICE (¢).	
	1910 Preliminary.	1909.	Av. 5 Yrs. 1904-1908.	Nov. 1, 1910.	Nov. 1, 1909.
Corn	bu. 3,121,381	2,772,376	2,695,517	52.6	62.2
Wheat	" 691,769	737,189	655,866	90.5	99.9
Oats	" 1,096,396	1,007,353	874,863	34.9	41.0
Barley	" 158,138	170,284	155,134	61.5	53.3
Rye	" 32,088	32,239	30,504	71.6	73.6
Buckwheat ..	" 17,084	17,438	14,830	65.9	71.6
Flaxseed	" 15,050	25,856	25,822	229.4	139.8
Potatoes	" 328,787	376,537	295,707	55.7	57.8
Hay	tons 60,116	64,938	62,570	\$11.96	\$10.35
Tobacco	lbs. 967,150	949,357	678,422	.....	.....

(a). Cents per bushel except hay.

Prices for important crops averaged, on November 1, about 5.4 per cent. lower than a year ago.

Journal of the American Medical Association, 1910, 15: 1171-1172.

1960	1,436,187	1,437,2	1,438,3	1,439,4	1,440,5	1,441,6	1,442,7	1,443,8	1,444,9	1,446,0	1,447,1	1,448,2	1,449,3	1,450,4	1,451,5	1,452,6	1,453,7	1,454,8	1,455,9	1,457,0	1,458,1	1,459,2	1,460,3	1,461,4	1,462,5	1,463,6	1,464,7	1,465,8	1,466,9	1,468,0	1,469,1	1,470,2	1,471,3	1,472,4	1,473,5	1,474,6	1,475,7	1,476,8	1,477,9	1,479,0	1,480,1	1,481,2	1,482,3	1,483,4	1,484,5	1,485,6	1,486,7	1,487,8	1,488,9	1,490,0	1,491,1	1,492,2	1,493,3	1,494,4	1,495,5	1,496,6	1,497,7	1,498,8	1,499,9	1,500,0	1,501,1	1,502,2	1,503,3	1,504,4	1,505,5	1,506,6	1,507,7	1,508,8	1,509,9	1,510,0	1,511,1	1,512,2	1,513,3	1,514,4	1,515,5	1,516,6	1,517,7	1,518,8	1,519,9	1,520,0	1,521,1	1,522,2	1,523,3	1,524,4	1,525,5	1,526,6	1,527,7	1,528,8	1,529,9	1,530,0	1,531,1	1,532,2	1,533,3	1,534,4	1,535,5	1,536,6	1,537,7	1,538,8	1,539,9	1,540,0	1,541,1	1,542,2	1,543,3	
Mileage operated in September 36																																																																																																								
1960—1,436,187; 1961—1,437,200; 1962—1,438,300; 1963—1,439,400; 1964—1,440,500; 1965—1,441,600; 1966—1,442,700; 1967—1,443,800; 1968—1,444,900; 1969—1,446,000; 1970—1,447,100; 1971—1,448,200; 1972—1,449,300; 1973—1,450,400; 1974—1,451,500; 1975—1,452,600; 1976—1,453,700; 1977—1,454,800; 1978—1,455,900; 1979—1,457,000; 1980—1,458,100; 1981—1,459,200; 1982—1,460,300; 1983—1,461,400; 1984—1,462,500; 1985—1,463,600; 1986—1,464,700; 1987—1,465,800; 1988—1,466,900; 1989—1,468,000; 1990—1,469,100; 1991—1,470,200; 1992—1,471,300; 1993—1,472,400; 1994—1,473,500; 1995—1,474,600; 1996—1,475,700; 1997—1,476,800; 1998—1,477,900; 1999—1,479,000; 2000—1,480,100; 2001—1,481,200; 2002—1,482,300; 2003—1,483,400; 2004—1,484,500; 2005—1,485,600; 2006—1,486,700; 2007—1,487,800; 2008—1,488,900; 2009—1,490,000; 2010—1,491,100; 2011—1,492,200; 2012—1,493,300; 2013—1,494,400; 2014—1,495,500; 2015—1,496,600; 2016—1,497,700; 2017—1,498,800; 2018—1,499,900; 2019—1,500,000; 2020—1,501,100; 2021—1,502,200; 2022—1,503,300; 2023—1,504,400; 2024—1,505,500; 2025—1,506,600; 2026—1,507,700; 2027—1,508,800; 2028—1,509,900; 2029—1,510,000; 2030—1,511,100; 2031—1,512,200; 2032—1,513,300; 2033—1,514,400; 2034—1,515,500; 2035—1,516,600; 2036—1,517,700; 2037—1,518,800; 2038—1,519,900; 2039—1,520,000; 2040—1,521,100; 2041—1,522,200; 2042—1,523,300; 2043—1,524,400; 2044—1,525,500; 2045—1,526,600; 2046—1,527,700; 2047—1,528,800; 2048—1,529,900; 2049—1,530,000; 2050—1,531,100; 2051—1,532,200; 2052—1,533,300; 2053—1,534,400; 2054—1,535,500; 2055—1,536,600; 2056—1,537,700; 2057—1,538,800; 2058—1,539,900; 2059—1,540,000; 2060—1,541,100; 2061—1,542,200; 2062—1,543,300; 2063—1,544,400; 2064—1,545,500; 2065—1,546,600; 2066—1,547,700; 2067—1,548,800; 2068—1,549,900; 2069—1,550,000; 2070—1,551,100; 2071—1,552,200; 2072—1,553,300; 2073—1,554,400; 2074—1,555,500; 2075—1,556,600; 2076—1,557,700; 2077—1,558,800; 2078—1,559,900; 2079—1,560,000; 2080—1,561,100; 2081—1,562,200; 2082—1,563,300; 2083—1,564,400; 2084—1,565,500; 2085—1,566,600; 2086—1,567,700; 2087—1,568,800; 2088—1,569,900; 2089—1,570,000; 2090—1,571,100; 2091—1,572,200; 2092—1,573,300; 2093—1,574,400; 2094—1,575,500; 2095—1,576,600; 2096—1,577,700; 2097—1,578,800; 2098—1,579,900; 2099—1,580,000; 2100—1,581,100; 2101—1,582,200; 2102—1,583,300; 2103—1,584,400; 2104—1,585,500; 2105—1,586,600; 2106—1,587,700; 2107—1,588,800; 2108—1,589,900; 2109—1,590,000; 2110—1,591,100; 2111—1,592,200; 2112—1,593,300; 2113—1,594,400; 2114—1,595,500; 2115—1,596,600; 2116—1,597,700; 2117—1,598,800; 2118—1,599,900; 2119—1,600,000; 2120—1,601,100; 2121—1,602,200; 2122—1,603,300; 2123—1,604,400; 2124—1,605,500; 2125—1,606,600; 2126—1,607,700; 2127—1,608,800; 2128—1,609,900; 2129—1,610,000; 2130—1,611,100; 2131—1,612,200; 2132—1,613,300; 2133—1,614,400; 2134—1,615,500; 2135—1,616,600; 2136—1,617,700; 2137—1,618,800; 2138—1,619,900; 2139—1,620,000; 2140—1,621,100; 2141—1,622,200; 2142—1,623,300; 2143—1,624,400; 2144—1,625,500; 2145—1,626,600; 2146—1,627,700; 2147—1,628,800; 2148—1,629,900; 2149—1,630,000; 2150—1,631,100; 2151—1,632,200; 2152—1,633,300; 2153—1,634,400; 2154—1,635,500; 2155—1,636,600; 2156—1,637,700; 2157—1,638,800; 2158—1,639,900; 2159—1,640,000; 2160—1,641,100; 2161—1,642,200; 2162—1,643,300; 2163—1,644,400; 2164—1,645,500; 2165—1,646,600; 2166—1,647,700; 2167—1,648,800; 2168—1,649,900; 2169—1,650,000; 2170—1,651,100; 2171—1,652,200; 2172—1,653,300; 2173—1,654,400; 2174—1,655,500; 2175—1,656,600; 2176—1,657,700; 2177—1,658,800; 2178—1,659,900; 2179—1,660,000; 2180—1,661,100; 2181—1,662,200; 2182—1,663,300; 2183—1,664,400; 2184—1,665,500; 2185—1,666,600; 2186—1,667,700; 2187—1,668,800; 2188—1,669,900; 2189—1,670,000; 2190—1,671,100; 2191—1,672,200; 2192—1,673,300; 2193—1,674,400; 2194—1,675,500; 2195—1,676,600; 2196—1,677,700; 2197—1,678,800; 2198—1,679,900; 2199—1,680,000; 2200—1,681,100; 2201—1,682,200; 2202—1,683,300; 2203—1,684,400; 2204—1,685,500; 2205—1,686,600; 2206—1,687,700; 2207—1,688,800; 2208—1,689,900; 2209—1,690,000; 2210—1,691,100; 2211—1,692,200; 2212—1,693,300; 2213—1,694,400; 2214—1,695,500; 2215—1,696,600; 2216—1,697,700; 2217—1,698,800; 2218—1,699,900; 2219—1,700,000; 2220—1,701,100; 2221—1,702,200; 2222—1,703,300; 2223—1,704,400; 2224—1,705,500; 2225—1,706,600; 2226—1,707,700; 2227—1,708,800; 2228—1,709,900; 2229—1,710,000; 2230—1,711,100; 2231—1,712,200; 2232—1,713,300; 2233—1,714,400; 2234—1,715,500; 2235—1,716,600; 2236—1,717,700; 2237—1,718,800; 2238—1,719,900; 2239—1,720,000; 2240—1,721,100; 2241—1,722,200; 2242—1,723,300; 2243—1,724,400; 2244—1,725,500; 2245—1,726,600; 2246—1,727,700; 2247—1,728,800; 2248—1,729,900; 2249—1,730,000; 2250—1,731,100; 2251—1,732,200; 2252—1,733,300; 2253—1,734,400; 2254—1,735,500; 2255—1,736,600; 2256—1,737,700; 2257—1,738,800; 2258—1,739,900; 2259—1,740,000; 2260—1,741,100; 2261—1,742,200; 2262—1,743,300; 2263—1,744,400; 2264—1,745,500; 2265—1,746,600; 2266—1,747,700; 2267—1,748,800; 2268—1,749,900; 2269—1,750,000; 2270—1,751,100; 2271—1,752,200; 2272—1,753,300; 2273—1,754,400; 2274—1,755,500; 2275—1,756,600; 2276—1,757,700; 2277—1,758,800; 2278—1,759,900; 2279—1,760,000; 2280—1,761,100; 2281—1,762,200; 2282—1,763,300; 2283—1,764,400; 2284—1,765,500; 2285—1,766,600; 2286—1,767,700; 2287—1,768,800; 2288—1,769,900; 2289—1,770,000; 2290—1,771,100; 2291—1,772,200; 2292—1,773,300; 2293—1,774,400; 2294—1,775,500; 2295—1,776,600; 2296—1,777,700; 2297—1,778,800; 2298—1,779,900; 2299—1,780,000; 2300—1,781,100; 2301—1,782,200; 2302—1,783,300; 2303—1,784,400; 2304—1,785,500; 2305—1,786,600; 2306—1,787,700; 2307—1,788,800; 2308—1,789,900; 2309—1,790,000; 2310—1,791,100; 2311—1,792,200; 2312—1,793,300; 2313—1,794,400; 2314—1,795,500; 2315—1,796,600; 2316—1,797,700; 2317—1,798,800; 2318—1,799,900; 2319—1,800,000; 2320—1,801,100; 2321—1,802,200; 2322—1,803,300; 2323—1,804,400; 2324—1,805,500; 2325—1,806,600; 2326—1,807,700; 2327—1,808,800; 2328—1,809,900; 2329—1,810,000; 2330—1,811,100; 2331—1,812,200; 2332—1,813,300; 2333—1,814,400; 2334—1,815,500; 2335—1,816,600; 2336—1,817,700; 2337—1,818,800; 2338—1,819,900; 2339—1,820,000; 2340—1,821,100; 2341—1,822,200; 2342—1,823,300; 2343—1,824,400; 2344—1,825,500; 2345—1,826,600; 2346—1,827,700; 2347—1,828,800; 2348—1,829,900; 2349—1,830,000; 2350—1,831,100; 2351—1,832,200; 2352—1,833,300; 2353—1,834,400; 2354—1,835,500; 2355—1,836,600; 2356—1,837,700; 2357—1,838,800; 2358—1,839,900; 2359—1,840,000; 2360—1,841,100; 2361—1,842,200; 2362—1,843,300; 2363—1,844,400; 2364—1,845,500; 2365—1,846,600; 2366—1,847,700; 2367—1,848,800; 2368—1,849,900; 2369—1,850,000; 2370—1,851,100; 2371—1,852,200; 2372—1,853,300; 2373—1,854,400; 2374—1,855,500; 2375—1,856,600; 2376—1,857,700; 2377—1,858,800; 2378—1,859,900; 2379—1,860,000; 2380—1,861,100; 2381—1,862,200; 2382—1,863,300; 2383—1,864,400; 2384—1,865,500; 2385—1,866,600; 2386—1,867,700; 2387—1,868,800; 2388—1,869,900; 2389—1,870,000; 2390—1,871,100; 2391—1,872,200; 2392—1,873,300; 2393—1,874,400; 2394—1,875,500; 2395—1,876,600; 2396—1,877,700; 2397—1,878,800; 2398—1,879,900; 2399—1,880,000; 2400—1,881,100; 2401—1,882,200; 2402—1,883,300; 2403—1,884,400; 2404—1,885,500; 2405—1,886,600; 2406—1,887,700; 2407—1,888,800; 2408—1,889,900; 2409—1,890,000; 2410—1,891,100; 2411—1,892,200; 2412—1,893,300; 2413—1,894,400; 2414—1,895,500; 2415—1,896,600; 2416—1,897,700; 2417—1,898,800; 2418—1,899,900; 2419—1,900,000; 2420—1,901,100; 2421—1,902,200; 2422—1,903,300; 2423—1,904,400; 2424—1,905,500; 2425—1,906,600; 2426—1,907,700; 2427—1,908,800; 2428—1,909,900; 2429—1,910,000; 2430—1,911,100; 2431—1,912,200; 2432—1,913,300; 2433—1,914,400; 2434—1,915,500; 2435—1,916,600; 2436—1,917,700; 2437—1,918,800; 2438—1,919,900; 2439—1,920,000; 2440—1,921,100; 2441—1,922,200; 2442—1,923,300; 2443—1,924,400; 2444—1,925,500; 2445—1,926,600; 2446—1,927,700; 2447—1,928,800; 2448—1,929,900; 2449—1,930,000; 2450—1,931,100; 2451—1,932,200; 2452—1,933,300; 2453—1,934,400; 2454—1,935,500; 2455—1,936,600; 2456—1,937,700; 2457—1,938,800; 2458—1,939,900; 2459—1,940,000; 2460—1,941,100; 2461—1,942,200; 2462—1,943,300; 2463—1,944,400; 2464—1,945,500; 2465—1,946,600; 2466—1,947,700; 2467—1,948,800; 2468—1,949,900; 2469—1,950,000; 2470—1,951,100; 2471—1,952,200; 2472—1,953,300; 2473—1,954,400; 2474—1,955,500; 2475—1,956,600; 2476—1,957,700; 2477—1,958,800; 2478—1,959,900; 2479—1,960,000; 2480—1,961,100; 2481—1,962,200; 2482—1,963,300; 2483—1,964,400; 2484—1,965,500; 2485—1,966,600; 2486—1,967,700; 2487—1,968,800; 2488—1,969,900; 2489—1,970,000; 2490—1,971,100; 2491—1,972,200; 2492—1,973,300; 2493—1,974,400; 2494—1,975,500; 2495—1,976,600; 2496—1,977,700; 2497—1,978,800; 2498—1,979,900; 2499—1,980,000; 2500—1,981,100; 2501—1,982,200; 2502—1,983,300; 2503—1,984,400; 2504—1,985,500; 2505—1,986,600; 2506—1,987,700; 2507—1,988,800; 2508—1,989,900; 2509—1,990,000; 2510—1,991,100; 2511—1,992,200; 2512—1,993,300; 2513—1,994,400; 2514—1,995,500; 2515—1,996,600; 2516—1,997,700; 2517—1,998,800; 2518—1,999,900; 2519—2,000,000; 2520—2,001,100; 2521—2,002,200; 2522—2,003,300; 2523—2,004,400; 2524—2,005,500; 2525—2,006,600; 2526—2,007,700; 2527—2,008,800; 2528—2,009,900; 2529—2,010,000; 2530—2,011,100; 2531—2,012,200; 2532—2,013,300; 2533—2,014,400; 2534—2,015,500; 2535—2,016,600; 2536—2,017,700; 2537—2,018,800; 2538—2,019,900; 2539—2,020,000; 2540—2,021,100; 2541—2,022,200; 2542—2,023,300; 2543—2,024,400; 2544—2,025,500; 2545—2,026,600; 2546—2,027,700; 2547—2,028,800; 2548—2,029,900; 2549—2,030,000; 2550—2,031,100; 2551—2,032,200; 2552—2,033,300; 2553—2,034,400; 2554—2,035,500; 2555—2,036,600; 2556—2,037,700; 2557—2,038,800; 2558—2,039,900; 2559—2,040,000; 2560—2,041,100; 2561—2,042,200; 2562—2,043,300; 2563—2,044,400; 2564—2,045,500; 2565—2,046,600; 2566—2,047,700; 2567—2,048,800; 2568—2,049,900; 2569—2,050,000; 2570—2,051,100; 2571—2,052,200; 2572—2,053,300; 2573—2,054,400; 2574—2,055,500; 2575—2,056,600; 2576—2,057,700; 2577—2,058,800; 2578—2,059,900; 2579—2,060,000; 2580—2,061,100; 2581—2,062,200; 2582—2,063,300; 2583—2,064,400; 2584—2,065,500; 2585—2,066,600; 2586—2,067,700; 2587—2,068,800; 2588—2,069,900; 2589—2,070,000; 2590—2,071,100; 2591—2,072,200; 2592—2,073,300; 2593—2,074,400; 2594—2,075,500; 2595—2,076,600; 2596—2,077,700; 2597—2,078,800; 2598—2,079,900; 2599—2,080,000; 2600—2,081,100; 2601—2,082,200; 2602—2,083,300; 2603—2,084,400; 2604—2,085,500; 2605—2,086,600; 2606—2,087,700; 2607—2,088,800; 2608—2,089,900; 2609—2,090,000; 2610—2,091,100; 2611—2,092,200; 2612—2,093,300; 2613—2,094,400; 2614—2,095,500; 2615—2,096,600; 2616—2,097,700; 2617—2,098,800; 2618—2,099,900; 2619—2,100,000; 2620—2,101,100; 2621—2,102,200; 2622—2,103,300; 2623—2,104,400; 2624—2,105,500; 2625—2,106,600; 2626—2,107,700; 2627—2,108,800; 2628—2,109,900; 2629—2,110,000; 2630—2,111,100; 2631—2,112,200; 2632—2,113,300; 2633—2,114,400; 2634—2,115,500; 2635—2,116,600; 2636—2,117,700; 2637—2,118,800; 2638—2,119,900; 2639—2,120,000; 2640—2,121,100; 2641—2,122,200; 2642—2,123,300; 2643—2,124,400; 2644—2,125,500; 2645—2,126,600; 2646—2,127,700; 2647—2,128,800; 2648—2,129,900; 2649—2,130,000; 2650—2,131,100; 2651—2,132,200; 2652—2,133,300; 2653—2,13																																																																																																								

The Needs of Co-operation Between the Government and the Railways.

In discussing with a representative of *The Wall Street Journal* the cause and effect of the present difficulty American Railways are experiencing in selling securities on favorable terms, J. C. Stuart, vice-president and general manager of the Erie, said: "The time has come when a basis of co-operation such as has never existed must be established between the railways and the public."

A complete understanding must be reached. Those who own the railways must recognize the temper of the present day public mind. Out of date tactics must be abolished. Buying railways indiscriminately regardless of public opposition must be done away with. The one with control idea is no longer tenable. What is needed is the proper co-operation of the owners and the managers of railways with the regulating bodies appointed by the people of this country, and if those who are in power in the railroads appreciated this and carefully entered into such co-operation I believe railway securities could be made as stable as any other investment in the country, or even more so.

"The same method should be adopted in this country that is in vogue abroad. Railway securities should be issued in small denominations and sold over the counter to the poor people and working classes who now put their money in the savings banks, getting therefore a nominal interest. These would be only too glad to get 4 per cent. or 5 per cent. on their money if the opportunity was put within their reach. At present they get a smaller return which represents but a portion of the income the savings banks derive from investing the peoples' savings largely in railway securities.

"Intelligent regulation will solve one of the largest problems with which the railways now have to deal. Intelligent co-operation on the part of the railways will be a help to this solution and issuance of railway securities in denominations that will put them within the reach of the working class of moderate means will be another."

Ships Favored at New Orleans.

By constitutional amendment, approved November 8, the state of Louisiana will exempt oversea steamship lines domiciled or to be domiciled at a Louisiana port from all municipal parish and state taxes during a period of fifteen years. J. W. Porch, father of the measure, believes that the people of the Mississippi valley will finance at least one big steamship line between New Orleans and China, and the Philippines, Japan and other Far Eastern countries. Two extensive projects are under consideration for the installation and operation of steel barge lines between Kansas City, St. Louis and New Orleans. The commissioners of the port of New Orleans now have authority to issue bonds and with the proceeds erect and operate a system of modern waterside machine equipped warehouses, the idea being to utilize the public credit and the publicly owned harbor frontage to the maximum extent in upbuilding Mississippi valley commerce through the port of New Orleans.

Long and Short Haul.

The long and short haul clause of the amended act bill will be discussed before the Interstate Commerce Commission at its offices in Washington November 28, according to a notice issued by the commission.

The following questions arising under the fourth section of the act to regulate commerce as amended June 18, 1910, will be considered:

Does this section apply to export and import rates, transshipment rates, proportional rates, excursion rates, commutation rates, or any of them?

Is it a violation of this section if a carrier maintains rates which are in conformity with the rule of the fourth section, and in connection therewith provides for absorption of switching charges on competitive business but not on non-competitive business, with the result that the rate from the more distant competitive point, minus the switching charge which is absorbed, makes a total charge less than that on like shipment from a shorter distance, intermediate, non-competitive point, plus a

switching charge which would have to be paid on the non-competitive business to reach the same delivery point?

If a carrier has been authorized to maintain from the non-competitive intermediate points rates higher than from more distant competitive points, and a new intermediate station is opened, would it violate this section of the act, or the permission, if the carrier established rates to and from the new station the same as, or in harmony with, the rates to and from the nearest intermediate station?

If a carrier is authorized to maintain rates to or from a given point, which are not in conformity with the fourth section, and it constructs a branch-like connection with the main line at such point, and establishes rates to and from stations on such branch line by adding locals or arbitraries to the rates to and from the junction point, would such branch-line rates be in violation of the law or the permission?

The commission will not at this session consider the merits of any particular application or class of applications for relief under the provisions of the fourth section, but only the meaning and application of the section in the respects above mentioned.

INTERSTATE COMMERCE COMMISSION.

The Interstate Commerce Commission has appointed John T. Marchand as an attorney. Mr. Marchand was formerly for several years in the service of the commission in the investigation of criminal offences against the Interstate Commerce law.

Reparation Awarded.

Nelson D. Stilwell v. Lehigh & Hudson River Railway et al. Opinion by Commissioner Cockrell:

Tariff of initial carrier naming advanced rate did not properly cancel lower rate named in tariff of another carrier to which rate initial carrier was a party. (19 I. C. C., 404.)

Fred W. Green, receiver for Ionia Wagon Co., v. Alabama Great Southern et al. Opinion by Commissioner Prouty:

Rates on hickory spokes from Fort Payne, Ala., and Chattanooga, Tenn., to Cincinnati, Ohio, found unreasonable when compared with the rates on hard-wood lumber. (19 I. C. C., 458.)

Complaints Dismissed.

S. T. Fish & Co. v. New York, Chicago & St. Louis et al. Opinion by Commissioner Cockrell:

Complaint of misrouting not sustained. (19 I. C. C., 452.)

Sikston Mercantile Co. v. Boston & Maine et al. Opinion by Commissioner Cockrell:

Complainant's allegation of misrouting not sustained. (19 I. C. C., 422.)

Proposed Hearings and Suspensions of Tariffs.

The commission is to give hearings next week on the question of issuing regulations for telephone, telegraph and cable companies, in accordance with the law passed last June. None of these companies has as yet filed tariffs with the commission.

The commission has suspended until March 31, tariffs filed by the Illinois Central and other roads showing increased rates on freight between the Mississippi and Missouri rivers. These tariffs are those restoring reductions which were made in the Burnham-Munger case.

The commission has suspended tariffs filed by the Chesapeake & Ohio on coal to Toledo, Ohio.

The commission has suspended until March 1 tariffs filed by the railways on freight from Ohio river points to New Orleans.

Misrouting Justified.

S. M. Isbell & Co. v. Lake Shore & Michigan Southern et al. Opinion by Commissioner Cockrell:

Initial carrier held not responsible for misrouting shipment via an Ohio river crossing taking higher combination than might have been obtained via another Ohio river crossing using, as a factor, a special commodity rate south of the river, the initial carrier not being a party to the rates named by the line south of the river. Complaint dismissed. (19 I. C. C., 448.)

Terminal Rates from Central to Trunk Line Territory.

Albert Preston v. Chesapeake & Ohio et al. Opinion by Commissioner Clark:

A rate of 20.5 cents charge from Rockhouse, Ky., to Brockwayville, Pa., previous to July, 1907, is attacked, because it was higher than the rate from Buffalo and Salamanca to Rockhouse, Brockwayville being an intermediate point. Buffalo and Salamanca are terminal rate points between Central Freight Association and Trunk Line territory, and since the shipment moved before the amendment of the long and short haul clause and was not therefore a violation of the act, it was not unreasonable. This case affords no adequate foundation for a determination of the rate adjustment for this important territory. (19 I. C. C. 406.)

Rates on Bread and Cake.

Oak Grove Farm Creamery v. Adams Express Co. et al. Opinion by Commissioner Prouty:

Complainant alleges that defendants' rates on cake are unreasonable as compared with their rates on bread. Defendants may properly apply a somewhat lower rate on bread than on cake; but the present rates on cake are unreasonable and should not exceed the regular merchandise rates, excluding the weight of the hamper in which the cake is shipped.

Defendants' tariffs provide that the bread rate shall apply to mixed shipments of bread and cake, but not unless at least 50 per cent. of the shipment consists of bread. Complainant contends that this rule bars it from making mixed shipments, while it permits certain of its competitors who bake both bread and cake to obtain the bread rate upon shipments of bread and cake; held, that the above rule of defendants discriminates against complainant, and is unjust and unreasonable, and should be discontinued. (19 I. C. C., 454.)

STATE COMMISSIONS.

The Railroad Commission of Louisiana has reduced the present rate on piling from St. Tammany to New Orleans, which is 5½ cents per 100 lbs., and on cross ties from Rio to Slidell, which is 5 cents per 100 lbs., to 3 cents per 100 lbs.

The New York Public Service Commission, second district, has made an order requiring the Rutland Railroad to show cause at Albany on November 14 why it should not be required to run its train No. 6 on schedule time. An investigation of the running time of this train showed that for the period of 15 months from June, 1909, to and including August, 1910, at no time excepting during the month of June, 1909, has this train arrived on time at Chatham to exceed ten days in any month, and the delays have averaged from 20 to 38.2 minutes per day run.

The Railroad Commission of Louisiana, in a case brought by the Jalmeke Navigation Company against the Texas & Pacific, finds that rates on gravel and sand from Thompson's Spur to New Orleans and intermediate points are too low and are unremunerative. The facts show, the commission believes, that a contractor, Thompson, built a spur from a sand and gravel pit to a connection with the Texas & Pacific, and that since he was able to ship a large amount of business, the railway company granted him very low rates on sand and gravel, making the rate theoretically open to any one; but since Thompson owned the only gravel pit at Thompson's Spur, from which the rate applied, in practice the rate of \$12 a carload was not remunerative and discriminated against other producers of gravel. The rate had been in effect for five years without any complaint against it, and the defendants claimed that this rate was fixed by water competition.

The Pennsylvania State Railroad Commission has decided that the charge of 80 cents per ton for the transfer of freight between industrial sidings on the Pennsylvania Railroad and the lines of the Philadelphia Reading at Harrisburg is unreasonable. One of the points made by the defendants was that it was necessary to charge a high rate for the transfer of freight from industrial sidings located on its own lines to the lines of its competitor so as to prevent the routing of freight over the competitor's line in preference to the company's own line. The

commission holds that the connecting carrier has no right to dictate the route of incoming or outgoing shipments; its only privilege is to direct the movement asked of its own lines and to charge and receive just remuneration. The commission is not unmindful of the fact that a railway company's control of its terminals is so absolute that it can refuse to receive shipments near its terminals from a competing line for delivery at its terminals; but that has reference to delivery at its own proper terminals and not on a private siding of an industry located on its lines in such terminal districts. The commission, being without power to order, recommends that the transfer of carloads of sixth-class freight be reduced from 80 cents to 35 cents per ton.

The Railroad Commission of Louisiana, on November 23, 1910, will consider the adoption of a uniform mileage tariff of rates to apply on shipments of lumber, staves, and stave bolts, and the following rates are proposed:

Distances.	Car Loads.	Rates.
25 miles and less	5c.
50 miles and over 25	5½c.
75 miles and over 50	6c.
100 miles and over 75	6½c.
125 miles and over 100	7c.
150 miles and over 125	8c.
175 miles and over 150	8½c.
200 miles and over	9c.

The Railroad Commission of Louisiana, will, at a general session to be held November 22, 1910, consider the adoption of a uniform mileage tariff of rates on sand and gravel, between points in the state of Louisiana, at the following rates:

Single Loads.	Car Loads.	Cents.
25 miles and less	1
75 miles and over 25	1½
125 miles and over 75	2
150 miles and over 125	3
175 miles and over 150	4
200 miles and over 175	5
225 miles and over 200	6
250 miles and over 225	6½
275 miles and over 250	7
300 miles and over 275	7½
Over 300 miles	8

The Public Service Commission, second district, has ordered the New York Central and Hudson River Railroad Company to change the time of its passenger train No. 72, known as the Albany accommodation, so that it will leave Utica at 5:10 P. M. instead of 6:05 P. M., and stop at the stations now accommodated on its present schedule. The company is given the option of either changing the time of this train or running another train upon the time ordered. The change is required to be put into effect on or before Sunday, November 20. The order was made following the complaint of William Schermerhorn, et al of St. Johnsville and other points along the line between Utica and Albany. Complainants are workmen living in the village of Fort Plain, etc., and employed in the city of Little Falls. They are obliged to use train No. 72, and that under the present arrangement they are obliged to wait an hour before any train can take them to their homes, making them arrive there at a late and inconvenient hour.

The New York Public Service Commission, second district, has ordered the Delaware & Hudson in order to accommodate passenger travel at Gansevort, Saratoga county, to run, beginning November 14, 1910, its present passenger train No. 71 at Saratoga Springs instead of at Fort Edward, for one trip and that train for that trip shall leave Saratoga Springs at 6:05 A. M., and to extend the running of its train No. 86 for one trip from Fort Edward to Saratoga Springs, train reaching Saratoga Springs at 6:55 P. M. The order followed a complaint made by 28 residents of Gansevort, who stated that they were daily commuters and working at Fort Edward, Hudson Falls and Glens Falls, and that by reason of the taking off of trains Nos. 71 and 86 they were unable to continue their residence at Gansevort. The trains in question had been running from six to eight years prior to September, when they were taken off.

COURT NEWS.

The four cases involving the constitutionality of the employers' liability law passed by Congress in 1908, which are now before the Supreme Court of the United States, will not be argued until January 16.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

R. T. Tullywood has been appointed auditor of the Western Allegheny, with office at Pittsburgh, Pa., succeeding R. S. Wilson, resigned to go into secret service.

S. J. Beardslee, claim agent of the Minneapolis & St. Louis and the Iowa Central at Minneapolis, Minn., has been appointed claim attorney with office at Minneapolis. S. W. Patton succeeds Mr. Beardslee.

G. C. Lary, vice-president of the St. Joseph & Grand Island at St. Joseph, Mo., has been elected president, with office at St. Joseph. The office of president has been vacant since the retirement of W. T. Van Brunt in 1908.

The following officers of the Chesapeake & Ohio have had their authority extended over the Hocking Valley: F. M. Whitaker, vice-president in charge of traffic; G. B. Wall, assistant to president, and L. F. Sullivan, comptroller, all with offices at Richmond, Va.

J. E. Muhlfeld, whose election as vice-president and general manager of the Kansas City Southern with office at Kansas City, Mo., has been announced in these columns, was born September 18, 1872. He graduated from Purdue University in December, 1892. He began railway work in May, 1890, as assistant to the civil engineer of the Peru & Detroit, now the Winona Interurban Railway, and resumed his college work at Purdue in October of the same year. From June to September, 1891, and for the same months of 1892 he was employed at the Ft. Wayne shops of the Wabash as a machinist apprentice. After graduation he returned to the Wabash as a machinist apprentice and was promoted as follows: To machinist and gang foreman, locomotive engineer and fireman, roundhouse foreman, general foreman of the locomotive and car department at Tilton, Ill., and general foreman on the Buffalo division at St. Thomas, Ont. In February, 1899, he was appointed master mechanic on the Western division of the Grand Trunk at Port Huron, Mich., and two years later was transferred with the same title to Montreal, Que. Later, in 1901, he was made superintendent of machinery and rolling stock of the Canadian Government roads at Moncton, N. B., which position he held for a year. He was then made assistant to the general superintendent of motive power of the Baltimore & Ohio, and from February to June, 1903, was superintendent of motive power of the same road at Newark, Ohio. He was then appointed general superintendent of motive power, which position he held until November, 1908. From the latter date until the date of his recent election he has been doing steam railway expert work.

Operating Officers.

L. W. Berry has been appointed superintendent of the New York & Long Branch, with office at Long Branch, N. J.

G. E. Geer has been appointed train master of the Western division of the Chicago Great Western, with office at Clarion, Iowa.

W. G. Curren has been appointed superintendent of car service of the Kansas City Southern, with office at Kansas City, Mo., succeeding J. P. Spivey, assigned to other duties.

William B. Jones, superintendent of transportation of the Chicago, Indianapolis & Louisville, with office at Lafayette, Ind., has resigned, and that office has been abolished.

W. W. Waits has been appointed superintendent of terminals of the Southern Railway, in charge of the Atlanta, Ga., terminals, with office at Inman yards, succeeding G. A. Bradley, resigned.

T. A. McKinstry, assistant superintendent on the Salt Lake division of the Southern Pacific lines east of Sparks, at Ogden, Utah, has been transferred to Imlay, Nev., succeeding B. A. Campbell, resigned. H. W. Wistner succeeds Mr. McKinstry.

John McGie, division superintendent of the Chicago, Rock Island & Pacific at El Reno, Okla., has been appointed superin-

tendent of the Chicago, Rock Island & Gulf, with office at Ft. Worth, Tex., succeeding M. McKersien, resigned. Frank Tinsman, trainmaster on the Oklahoma division, succeeds Mr. McGie.

E. J. Wright, assistant superintendent of the Western division of the New York Central & Hudson River, at Syracuse, N. Y., has been appointed superintendent of the Hudson division with office at New York, succeeding F. T. Slack. H. E. Brown, assistant superintendent of the Hudson division, at New York, succeeds Mr. Wright, and D. B. Fleming, trainmaster at West Albany, succeeds Mr. Brown.

E. Raymond, division superintendent of the Atchison, Topeka & Santa Fe at Chillicothe, Ill., has been appointed general superintendent of the western district of the eastern lines, with office at Newton, Kan., succeeding H. W. Sharp, appointed division superintendent at Newton. George E. Ayer, division superintendent at Newton, succeeds Mr. Raymond. Payson Ripley, trainmaster at Newton, has been appointed a division superintendent, with office at Chanute, Kan., succeeding J. L. Barnes, appointed general agent, with office at Chanute.

Traffic Officers.

Le Grand White has been appointed a traveling freight agent of the Baltimore & Ohio, with office at Baltimore, Md.

J. H. Cummings, traveling freight agent of the Chicago, Great Western, at Lincoln, Neb., has been transferred to Omaha.

W. C. B. Allen has been appointed general agent of the Kansas City Southern, with office at Mena, Ark., succeeding Guy B. Wood, promoted.

W. A. Wayman, agent of the Erie Railroad, at Omaha, Neb., has been appointed agent at Kansas City, Mo., succeeding R. G. Cook, promoted.

J. H. Meglemry has been appointed traveling freight agent of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Birmingham, Ala., succeeding W. A. Shropshire, resigned.

C. F. Smith, traveling freight agent of the Louisiana Railway & Navigation Company at Oklahoma City, Okla., has been appointed general agent, with office at Dallas, Tex., succeeding E. L. Whitney, assigned to other duties. P. J. Rupp succeeds Mr. Smith.

L. H. Saunders, contracting freight agent of the Missouri, Kansas & Texas at Houston, Tex., has been appointed a traveling freight agent, with office at Houston, succeeding W. D. Morgan, promoted.

Wm. Penn, traveling passenger agent of the Pennsylvania Lines at Des Moines, Iowa, has been appointed a district passenger agent, with office at Terre Haute, Ind. E. F. Copperthwaite succeeds Mr. Penn.

H. B. Holbert, division freight agent of the Chicago Great Western at St. Paul, Minn., has been appointed division freight agent, with office at Des Moines, Iowa, succeeding Frank Cassidy, assigned to other duties.

E. W. Green, and not J. M. Green, has been appointed a commercial agent of the Missouri, Kansas & Texas, with office at Pittsburgh, Pa., succeeding Paul Gruber, resigned. This corrects an item in our issue of November 4, page 885.

Clyde Hogsett has been appointed a traveling freight agent of the Missouri Pacific, with office at Salt Lake City, Utah, succeeding Fred J. Kemper, whose appointment as traveling freight agent at Cincinnati, Ohio, has been announced in these columns.

Claude C. Hill, district passenger agent of the Minneapolis, St. Paul & Sault Ste Marie at Chicago, has been appointed general traveling agent, with office at Chicago, succeeding R. S. Elsworth, transferred to Minneapolis, Minn., as city passenger agent.

John C. Stone, district freight and passenger agent of the Southern Pacific at Sacramento, Cal., has been appointed chief clerk in the traffic department at San Francisco, succeeding E. W. Clapp, promoted. James O'Gara, city ticket agent at San Francisco, succeeds Mr. Stone.

C. H. Mann, city ticket and passenger agent of the Louisville & Nashville at Mobile, Ala., has been appointed a traveling passenger agent, with office at Houston, Tex., succeeding John F. Sullivan, resigned to accept service with another company. R. J. Hamilton succeeds Mr. Mann.

L. W. Price, division passenger agent of the St. Louis & San Francisco at Joplin, Mo., has been appointed general baggage agent, with office at Springfield, Mo., succeeding W. M. Dyer, assigned to other duties. F. R. Newman, district passenger agent at Denver, Colo., succeeds Mr. Price, and W. L. Evans, district passenger agent at Jacksonville, Fla., succeeds Mr. Newman.

Rolla R. Mitchell, whose appointment as general freight agent of the Kansas City Southern, with office at Kansas City, Mo., has been announced in these columns, was born October 30, 1874, at Ottawa, Kan. He graduated from the University of Kansas in 1896, and began railway work in September, 1897, with the Kansas City, Pittsburg & Gulf as a clerk in the general freight office. He was later made contracting agent at Texarkana, Tex., and in 1900 was appointed general agent at Memphis, Tenn., of the Kansas City Southern, successor of the Kansas City, Pittsburg & Gulf. The next year he was transferred to Shreveport, La., where he remained until 1906. He was then appointed assistant general freight agent, with office at Texarkana, from which office he was promoted to general freight agent.

Engineering and Rolling Stock Officers.

William Michel, engineer maintenance of way of the Hocking Valley, has been appointed chief engineer with office at Columbus. He will also continue to perform the duties of the engineer maintenance of way.

The jurisdiction of W. D. Taylor, chief engineer of the Chicago & Alton, the Toledo, St. Louis & Western, the Minneapolis & St. Louis and the Iowa Central, has been withdrawn from the two latter roads, and R. G. Kenly, the engineer of maintenance of way of the Minneapolis & St. Louis and the Iowa Central, has been appointed chief engineer of those roads, with office at Minneapolis, Minn.

G. W. Preston, roadmaster of the St. Louis & San Francisco at Amory, Miss., has been transferred to Birmingham, Ala., succeeding J. H. Cooper, deceased. J. T. Gannon has been appointed acting roadmaster at Amory, succeeding Mr. Preston.

Purchasing Officers.

The jurisdiction of E. S. Wortham, purchasing agent of the Chicago & Alton, the Toledo, St. Louis & Western, the Minneapolis & St. Louis and the Iowa Central, has been withdrawn from the two latter roads, and W. G. Manchester has been appointed purchasing agent and general storekeeper of the Minneapolis & St. Louis and the Iowa Central, with office at Cedar Lake (Minneapolis), Minn. L. A. Williams will continue as storekeeper of the Minneapolis & St. Louis, with office at Minneapolis; and H. V. V. Chapman as storekeeper of the Iowa Central, with office at Marshalltown, Iowa.

OBITUARY.

Ashley J. Elliott, manager of the Illinois and Iowa Demurrage Bureau and secretary of the Peoria division of the American Association of Railway Superintendents, with office at Peoria, Ill., died at Peoria on November 10.

Frank Grundy, president of the Temiscouata Railway and vice-president of the Quebec Central, died November 14 at his home in Sherbrooke, Que. Mr. Grundy was born March 28, 1846, at Bury, Lancashire, England. He began railway work in 1870 as a clerk on the Manchester, Sheffield & Lancashire Railway. From 1881 to 1884 he was with the East Lancashire Railway, and then for about nine years was with the Oxford, Worcester & Wolverhampton, afterwards the Western Midland Railway, and now the Great Western of England. From 1863 to 1868 he was manager on the Mid Wales and Swansea & Carmarthen railways, and Milford docks. He was appointed general manager of the Quebec Central of Canada in 1889 and five years later was made vice-president of that road.

Railway Construction.

New Incorporations, Surveys, Etc.

BRITISH COLUMBIA & ALASKA.—See British Columbia Railway & Development Company.

BRITISH COLUMBIA RAILWAY & DEVELOPMENT CO.—This company was incorporated in Delaware with \$12,000,000 capital, and has secured control of the British Columbia & Alaska Railway, which was given a charter in March of this year to build from Vancouver, B. C., to the northern boundary of that province, over 1,000 miles. A reconnaissance of the entire line has been made, which shows that the proposed line will have easy grades. Two engineering parties, under the supervision of L. M. Rice, of Seattle, Wash., and Vancouver, have completed surveys recently, over the section that will connect the Canadian Pacific with the Grand Trunk, about 300 miles, and it is expected to begin construction work on this section early next spring. The directors include: J. O. Clifford and J. W. Kendrick, Chicago.

CAPE GIRARDEAU, CHARLESTON & HICKMAN.—An officer writes that contracts have been let to Louis Houck, Cape Girardeau, Mo., to build from Kelso or Ancil, at a point near the approach of the Southern Illinois & Missouri bridge over the Mississippi river, south via Charleston and Aniston to Dorena, opposite Hickman, Ky., 50 miles. G. Houck, president, and J. F. Brooks, chief engineer, Cape Girardeau.

CHICAGO, INDIANA & SOUTHERN.—The double-tracking work between Indiana Harbor, Ind., and Danville, Ill., 45 miles, it is said, is nearing completion.

CHICAGO, MILWAUKEE & PUGET SOUND.—See Chicago, Milwaukee & St. Paul.

CHICAGO, ROCK ISLAND & PACIFIC.—An officer writes that surveys are being made for a line from the Winterset branch at Carlisle, Iowa, southeast to Dallas, Marion county. The construction of the line has not yet been authorized.

CHICAGO, MILWAUKEE & ST. PAUL.—The report of this company for the year ended June 30, 1910, shows that work is under way on additional second main track on the La Crosse division, from Camp Douglas, Wis., to West Salem, about 44 miles; on the River division, from Wabasha, Minn., to Richmond, 46 miles, and on the Prairie du Chien division, from Elm Grove, Wis., to Blue Mounds Junction, about seven miles. Some grade reduction work and improvement of alignment was also carried out. During the year 37 steel bridges, aggregating 4,411 ft. in length, were built, replacing 3,981 ft. of wooden bridges, 964 ft. of iron bridges and 366 ft. of embankment; 433 wooden culverts were replaced with iron; about 2.9 miles of pile bridges were filled with earth, 106 bridges having been completely filled and 53 reduced in length by filling. Construction work has been under way during eleven months on branch lines for the Chicago, Milwaukee & Puget Sound as follows:

Moreau Line.—From Moreau Junction, S. D., 3.8 miles west of Mobridge, southwesterly and westerly to Isabel, 58.4 miles. This line has been opened for operation.

Cheyenne Line.—From Cheyenne Junction, S. D., on the Moreau Line, 25.7 miles from Mobridge, southerly and westerly to Faith, 106.1 miles. It was expected to finish the work on this line in November.

Cannon Ball Line.—From McLaughlin, S. D., northwesterly to New England, 133.7 miles; the work is about finished.

St. Maries Line.—From St. Maires, Idaho, southeasterly through Bovill to Elk river, 71.7 miles. This line was finished about June 30.

Coeur d'Alene Line.—This line is being built by a subsidiary company, the Idaho & Western, from Dishman, a suburb of Spokane, Wash., easterly to Coeur d'Alene, Idaho, 25.6 miles. It is expected to have the work finished about December 15.

Warden Line.—From Warden, Wash., northeasterly to Hamlin, 47.5 miles. The construction work is finished.

Everett Line.—From Moncton, Wash., northwesterly to Everett, 57.8 miles. It is expected that work on this line will be finished about April 1, 1911.

Humulaw Line.—From Lanthier, Wash., southerly to Humulaw, 131 miles. Work on this line has been finished.

Grays Harbor Line.—From McKenna, Wash., on the Tacoma Eastern, westerly to Grays Harbor branch, 81.4 miles, from McKenna to Portola, 33.3 miles, was built by the C. M. & P. S. The section from Portola to Grays Harbor, 48.1 miles, is being built by the Oregon & Washington for the joint account of that company and the C. M. & P. S. Work has been finished to Cosmopolis, 72.3 miles. The construction of bridges across the Chehalis and Hoquiam rivers will delay the completion of the line between Cosmopolis and Grays Harbor for several months. (See report of this company elsewhere in these columns.)

Colorado & Southern.—The report of this company for the year ended June 30, 1910, shows that construction work on the new passenger terminal at Houston, Tex., for the Trinity & Brazos Valley has progressed, and it is expected to have the work finished within a few months. The Stamford & North-western began operating an extension from Stamford, Tex., to Jayton, in September, 1909, and in the following month the road was completed from Jayton to Spur, a total of 82.5 miles, all of which is now in operation. Heavier rail was laid at various places, replacing lighter sections. A viaduct to carry the tracks over 20th street, in the city of Denver, Colo., in being built jointly with other railway companies, and it is expected that the work will be finished next year. An agreement has been made with the city of Denver for the construction of a subway to be built jointly with other railway companies at West Alameda avenue; this work is to be finished next year. Property was bought in the city of Cheyenne, Wyo., to make a connection with the Chicago, Burlington & Quincy at Capital avenue, and the work has been finished. Property has been bought in Greeley, Colo., for the purpose of making a connection with the C., B. & Q., and extending the yard room and facilities at that place. Because of the congestion of business between Pueblo and Walsenburg, between which places the C. & S. has joint facilities with the Denver & Rio Grande, an agreement was entered into with that company whereby each company should build a line for itself and enter into joint use of the two tracks as a double-track line between Southern Junction and Walsenburg Junction. Contracts have been let and the work is now under way. It is expected to have this improvement finished before September, 1911. (See report of this company elsewhere in these columns.)

DENVER SIDE CONNECTING.—This company has applied for incorporation with \$10,000 capital and headquarters at East St. Louis, Ill. The plans call for a line from the southeastern limits of East St. Louis, between the right-of-way of the Southern Railway, State street, and the Illinois Central, to the Mississippi river. H. S. Kramer, R. P. Munger and A. W. Baltz are interested.

EL PASO & SOUTHWESTERN.—This company will begin work in January, it is said, on a line to Phoenix, Ariz., and Yuma. The line is eventually to be extended west via Imperial, Cal., to San Diego. (July 1, p. 54.)

GRAND TRUNK PACIFIC.—According to press reports, the first section of 90 miles from the Pacific coast at Prince Rupert, B. C., east, will be opened for passenger and freight traffic before December 1.

HAWKINSVILLE & EASTERN.—An officer writes that track laying is to be started in about two weeks from Hawkinsville, Ga., northwest via Grovania, and Perry to Fort Valley, about 40 miles. Grading has been finished on about 14 miles. T. B. Ragan, president, Hawkinsville, and C. J. Chenworth, engineer.

INDIANA ROADS.—The Commercial Club of Richmond, Ind., has taken action to encourage the building of traction lines north and south from that place, connecting important points now without railway communication. This includes the construction of lines reaching Connersville and Liberty and Hamilton, Ohio, on the south, and Winchester, Ind., Union City, Portland and Muncie on the north.

INDIANAPOLIS & CINCINNATI TRACTION.—John J. Appel, Indianapolis, Ind., as trustee for a committee, recently bought the property and franchises of this company. It is said that the new owners will build an extension from Connersville southeast to Cincinnati, Ohio.

IRON MOUNTAINS, St. Gabriel & Gravelly Caves.—According to press reports, surveys are being made from Beaver, Utah, south via Milford to Cedar City, and construction work is to be started as soon as the surveys are finished. The company was organized to build from Thermo, Beaver county, south to Cedar City and Kanarrville, thence southerly to St. George to San Santa Fe, to the Hualapai valley at or near Kingman, Ariz., about 240 miles, with a long branch below Kanarrville, southeast through an oil and timber section to the grand canyon of the Colorado river. Some short branches are also to be built from near Cedar City to coal fields and iron mines in Iron county, Utah. E. M. Burgess, Salt Lake City, is the engineer in charge. (April 1, p. 918.)

JANESVILLE TRACTION.—This company has been incorporated in Wisconsin with \$125,000 capital, to build railways. The incorporators include: T. Nolan, W. Murphy and J. L. Burke.

KINDER & NORTHWESTERN.—An officer writes that this company has completed 10 miles of line from Kinder, La., to timberlands. The line will carry farm products, naval stores and lumber products. A. J. Peavy, president, Shreveport, La.

LOS ANGELES PACIFIC.—An extension is to be built from Hollywood, Cal., to Van Nuys, at a cost of \$500,000.

MICHIGAN CENTRAL.—Work is said to be under way four-tracking the line from Calumet Park, Ill., south to Gibson, Ind. Large transfer yards are also to be added to the existing yards at Gibson.

NATIONAL RAILWAYS OF MEXICO.—A contract is said to have been given to the Compania Bancaria, Mexico City, Mex., for building the connecting line from Penjamo, Guanajuato, on the Guadalajara division, south to Ajuno, Michoacan, 75 miles, and work is to be started at once. E. R. de Steiguer is in charge of the work. Thomas Williams is general manager of the construction department of the Compania Bancaria. (Oct. 7, p. 674.)

The narrow gage Acambara-Uruapan line is now being shortened and widened, it is said. Bell & Semmes, Mexico City, are the contractors. It is expected to have the work finished by March, 1911.

NEW YORK ROADS.—Calvin Tompkins, commissioner of docks and ferries of the city of New York has applied to the New York Public Service Commission, First district, for a certificate of public convenience and necessity to build a line along the water front in the borough of Brooklyn, from Fulton street, southerly to 69th street. The plans provide for the operation of railways in connection with the water front and warehouses. The first work to be carried out will be the construction of the two 1,200-ft. piers.

NEW YORK, CHICAGO & ST. LOUIS.—This company has work under way, it is said, building culverts to carry double-tracks on the section from Chicago to Fort Wayne, Ind., preparatory to double-tracking the line between these places.

NORTHERN PACIFIC.—This company is said to have appropriated \$250,000 to complete the double-track from Spokane, Wash., southwest to Wins, five miles. Work on this improvement is expected to be finished during November.

OHIO, KENTUCKY & VIRGINIA.—Incorporated in Kentucky, with \$100,000 capital, to build about 300 miles of line. The projected route is from Manchester, Ohio, on the north side of the Ohio river, southeast through eastern Kentucky to Morgan county. The incorporators include: W. H. Howe and F. S. Clarke, Brooklyn, N. Y.; W. Browning, B. R. Hutchusft, W. F. Downing, Lexington, Ky., and Thomas Atkinson, Middlesborough.

PECOS VALLEY SOUTHERN.—According to press reports, track laying is now under way between Saragosa, Tex., and Balmorhea, and work is to be started at once on an extension from Balmorhea, south. The company was organized to build from Pecos, south via Saragosa and Balmorhea to the San Salmon. The first section of 30 miles was recently opened for traffic. L. W. Anderson, chief engineer, Pecos. (Aug. 19, p. 333.)

PRAIRIE FARM & SOUTHWESTERN.—An officer writes that contracts have been let for building from Prairie Farm, Wis., south-

west to Emerald, about 22 miles. G. E. Scott, president and J. H. Thomas, Prairie Farm. (Oct. 7, p. 672.)

QUEBEC RAILWAY, LIGHT, HEAT & POWER CO.—This company, which operates lines in the city of Quebec, also a line to Montmorency Falls and St. Ann de Beaupre, on the north side of the St. Lawrence river, it is understood, is planning to build an extension from St. Joachim, down the north shore of the St. Lawrence river, to Murray bay.

ROCKINGHAM RAILROAD.—An officer writes that a contract has been given to H. M. Allport & Son, Richmond, Va., and work is now under way from Roberdell, N. C., southwest to Rockingham, thence southeast to Gibson, 22 miles. J. P. Leak, president, Rockingham. (June 14, p. 1141.)

SAN JOAQUIN VALLEY ELECTRIC.—This company is pushing construction work, it is said, on a line from Stockton, Cal., southeast to Modesto, about 30 miles. Grading has been finished to Ripon and bids were recently opened for putting up a 200-ft. steel and concrete bridge over the Stanislaus river at Ripon. H. S. Renwick, president, New York, and M. L. Brackett, vice-president and general manager, Stockton, Cal.

SOUTHERN PACIFIC OF MEXICO.—The Mexican government has just granted this company a concession to construct a line between Guadalajara, Mexico, and Mexico City, about 325 miles. The line now under construction down the Pacific slope will connect with the Ameca line of the National Railways of Mexico at Orendain. A contract was entered into recently with the National Railways of Mexico by which the Southern Pacific will operate its trains into Guadalajara over the 25-mile stretch of road from Orendain. It is stated that the Southern Pacific's proposed line will be built considerably to the south of the National Railways of Mexico's line and will be about 50 miles shorter than that company's line from Guadalajara to Mexico City. It will give the Southern Pacific a through line between Mexico City and the Pacific coast region of the United States. It is announced that construction work on the Guadalajara-Mexico City line will be started within the next few months. Since the rainy season ended the force of laborers on the Pacific slope line has been increased. The line will soon be finished into Tepic. Work has been in progress for some time on the section running west from Orendain. The rugged Sierra Madre range must be crossed between Orendain and Tepic, that section of the work will be expensive. It will consist chiefly of tunnels through the mountains and bridges across the deep barrancas. When the work between the Santiago river and Tepic is finished, a large part of the construction forces from that section will be put to work on the line between Guadalajara and Mexico City.

ST. LOUIS, ST. CHARLES & NORTHERN TRACTION.—Incorporated in Missouri with \$900,000 capital, to build from St. Charles, Mo., northwest to Ladonia, 70 miles, through the counties of St. Charles, Lincoln, Montgomery, Pike and Audrain. The incorporators include: R. E. Race, D. S. Stokes, Mexico; R. M. Hendershot, C. Pearson, C. B. Duncan, H. A. Stone, C. F. Butler, all of Middletown; W. J. Dunn, Silex, and H. E. Tige, Ladonia.

TEXAS ROADS.—Edward Kennedy, Houston, Tex., is back of a project to build a line from Vidalia, La., southwest, across the Mississippi river to Houston, Tex.

TIDEWATER & SOUTHERN (Electric).—An officer writes that grading work was started November 1, on a line from Stockton, Cal., southeast via French Camp, Lathrop, Ripon and Modesto, to Turlock, with another line from French Camp, east via Atlanta to Escalon, and two connecting branches between the main lines. Track laying is to be started next month. It is expected to have the line finished to French Camp some time in December and to Escalon, 22 miles, by March 1, 1911. There will be one 200-ft. steel bridge and a 500-ft. trestle. J. H. Wallace, president, Stockton. (Nov. 4, p. 887.)

YREKA RAILROAD. An officer of this company, which operates an eight-mile line from Yreka, Cal., east to Montague, writes that plans are being made for building an extension from Yreka southwest via Fort Jones, Greenville and Etna Mills, 44 miles. There will be one short steel bridge, 10 trestles and one tunnel. The work will probably be started early in 1911.

Railway Financial News.

BALTIMORE & OHIO.—The circuit court of Franklin county, Ohio, has affirmed the decision of the lower court giving the state of Ohio title to a three-mile strip of land along the Ohio canal in Cleveland, now occupied by tracks of the B. & O., and claimed to be owned by the Cleveland Terminal & Valley, a subsidiary of the B. & O. The railways claimed that the land belonged to them, basing their claim on a grant by the Cleveland city council, approved by the state legislature more than 20 years ago. The case is to be appealed to the supreme court.

BOSTON & MAINE.—In its petition to the Massachusetts Railroad Commission for permission to issue \$11,720,700 additional stock, the company says that the stock is to be sold at 110.

CINCINNATI, HAMILTON & DAYTON.—Holders of the first mortgage 5 per cent. bonds of the Dayton & Michigan, due January 1, 1911, are to be offered the privilege of extending their bonds for 20 years on terms to be announced later. The bonds are guaranteed by the C. H. & D., and the present mortgage securing them is a first lien on the road from Dayton, Ohio, to Toledo, 142 miles. This lien is to remain unimpaired.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—This subsidiary of the Southern Railway has declared a dividend, for a period not specified, of 2½ per cent. on the common stock, payable December 17 to stock of record December 10. This payment is made out of accumulated surplus. The company also declared the regular 1¼ per cent. quarterly dividend on the preferred stock, payable December 1 to stock of record November 26. This is paid out of accumulated income.

EUREKA & PALISADE.—This road is to be sold at public auction on November 29. It is said that a new corporation has been organized to bid in the road and to operate it. The road runs from Palisade, Nev., to Eureka, 84 miles.

INTEROCEANIC OF MEXICO.—The directors have declared the full dividend of 4 per cent. on the outstanding £1,000,000 (\$5,000,000) second preferred 4 per cent. stock. The only previous dividends were 1 per cent. paid in December, 1909.

MISSOURI, OKLAHOMA & GULF.—This company has secured trackage rights over the Texas & Pacific from Denison, Tex., to Sherman, 10½ miles. Stockholders of the Missouri, Oklahoma & Gulf Railway & Terminal, formed to build the M. O. & G. lines in Texas, are to vote January 3 on the question of making a mortgage to secure \$1,000,000 first mortgage bonds. The mortgage will cover the line between Red river, Tex., and Denison, and the bridge over the Red river and any additional lines built in Texas.

NEW YORK, NEW HAVEN & HARTFORD.—This company is to buy the franchises and equipment of the Milford & Woonsocket and the Milford, Franklin & Providence, both trolley roads. Both roads have been operated by the New Haven under lease, but direct ownership is now sought.

SPARKS WESTERN.—The property of this company was sold on November 9 to representatives of the Georgia & Florida for a price said to be about \$100,000. The road runs from Sparks, Ga., to Pineboro, 15 miles.

ST. LOUIS, BROWNVILLE & MEXICO.—It is said that this company is to issue \$4,000,000 bonds, the proceeds to be used for improvements and for new equipment.

ST. LOUIS & SAN FRANCISCO.—There were offered for sale in Paris on November 8, \$5,000,000 New Orleans, Texas & Mexico division first mortgage 4½ per cent. bonds at 92½. The bonds are in denominations of \$100 (516 francs). The total authorized issue of these bonds is \$50,000,000, of which \$10,000,000 have been pledged to secure \$8,000,000 3 year 5 per cent. notes. The bonds now offered are part of the \$10,000,000 announced some time ago as placed abroad.

TOLEDO, ST. LOUIS & WESTERN.—James Stewart MacKie has been elected a director, succeeding James N. Wallace, resigned. E. J. Beirwal has been elected a member of the executive committee, succeeding Mr. Wallace.

Supply Trade Section.

The Brighton Car Company, Chicago, was declared bankrupt by Judge Kohlstedt in the United States Circuit Court on November 10, and John N. Earls was appointed receiver.

The Isthmian Canal Commission will receive bids until November 28 for one Scotch marine boiler for the tug *Bolton* and also for 100 20-in. cast iron car wheels. (Circular No. 611-B.)

The Safety Car Heating & Lighting Company's office for the southeastern district at Washington, D. C., will be removed from the Home Life building to 506 Munsey building on November 15.

W. J. Fauth, formerly treasurer of the W. K. Kenly Company, Chicago, has severed his connection with that company, and has opened an office at 310 Monachnock building, Chicago. Mr. Fauth will represent manufacturers of track and signal supplies.

The Pawling & Harnischfeger Company, Milwaukee, Wis., announces the opening of a branch office in the Washington building, Portland, Ore. The office is in charge of R. K. Morse, who has been a member of the engineering staff in the Milwaukee office.

Barton W. Mudge & Co., of Chicago, who make the Garland car ventilator, have appointed J. L. Phillips manager of their electric railway department. Recognizing the importance or ventilation on electric railways, Mudge & Co. have organized a department devoted to it.

The McKeen Motor Car Company, Omaha, Neb., has received orders for three additional gasoline motor cars. One of these, a 55-ft. car, is the second for the Woodstock & Sycamore Traction Company, and the other two, standard 70-ft. cars, are for the Denver, Laramie & Northwestern.

The W. F. Bossert Manufacturing Company, Utica, N. Y., has recently furnished the entire equipment of Bossert improved switch point adjusters for the electro-pneumatic interlocking plant of the Erie terminal at Jersey City, N. J. The order was placed through the Union Switch & Signal Company, who had the contract for the installation of the interlocking apparatus.

The Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, announces the appointment of Frank R. Goehler as its Chicago railway representative, with office at 1143 Marquette building. Mr. Goehler was connected with the purchasing department of the Atchison, Topeka & Santa Fe for four years and also with the Buda Company as factory business manager at its Harvey, Ill., works.

John I. Beggs, president of the Milwaukee Electric Railway & Light Company and interested in several other public service corporations, has been elected president and general manager of the St. Louis Car Company, of St. Louis, Mo., for the purpose of reorganizing the concern and placing it on a paying basis. The plan of reorganization provides that Mr. Beggs, David May, Moses Schoenberg and associates are to put \$850,000 into the corporation for which they are to receive seven per cent. cumulative preferred stock at par. The creditors are to take seven per cent. cumulative preferred stock in payment of their claims.

William G. Pearce, for some time vice-president and general manager of the Griffin Wheel Company of Chicago, having acquired an interest in the American Brake Shoe & Foundry Company, will on January 1, 1911, become associated with the latter concern as vice-president, with headquarters in New York. Mr. Pearce is well known in the railway supply world, having served for a number of years as auditor of disbursements, general purchasing agent, assistant to the president, and general manager of the Northern Pacific, until his resignation from the latter position in 1902, when he became vice-president of the Griffin Wheel Company. It is stated that Mr. Pearce will retain his considerable financial interest in the Griffin Wheel Company and continue as a member of its board of directors.

The American Rolling Mill Company of Middletown, Ohio, has completed a splendidly equipped research laboratory valued at approximately \$40,000. Every appliance that will aid them in chemical and electrical development work has been included in the equipment. The company has recently secured the co-operation of Dr. Allerton S. Cushman, late of the office of good roads, Department of Agriculture, Washington, D. C. Dr. Cushman is establishing an institute in Washington for scientific research work along several lines. The American Rolling Mill Company has been fortunate to secure the result of his future individual research work that applies to every branch of the iron and steel business in which it is interested. Under the arrangement that has been effected Dr. Cushman will also give the work of its research laboratory personal supervision and direction.

Samuel Addison Megeath, vice-president and general manager of the Galena-Signal Oil Company, Franklin, Pa., has been elected president and general manager, succeeding General Charles Miller, who becomes chairman of the board, succeeding J. C. Sibley, resigned on account of ill health. Mr. Megeath was born in Omaha, Neb., in 1869, soon after his parents had gone there from Virginia. After a college education he went into the stationery business. In 1895 he went to the Galena-Signal Oil Company and became vice-president, resigning from that office in March, 1907, to take charge of the foreign department of the company. On January 27, 1909, he was elected vice-president



S. A. Megeath.

and general manager, holding that office until his recent election as president. L. J. Drake, second vice-president, has been elected first vice-president, succeeding Mr. Megeath, and C. C. Steinbrenner, vice-president, has been elected second vice-president, succeeding Mr. Drake.

President William V. Kelley of the American Steel Foundries Company, in his annual report to the stockholders for the year ending July 31, 1910, says: "The gross sales for the year were \$17,173,740 and the gross earnings from operation of plants and other income after deducting manufacturing, selling, administration, head and district office expenses and management commissions, were \$1,896,072. The net income of \$1,030,220 applicable to surplus shown in the balance sheet is the remainder after deducting all interest and other charges, including \$1,199,983 for repairs and maintenance and \$355,693 for depreciation of fixed properties and also after appropriating \$162,570 for the sinking fund of the company's first mortgage bonds as required by the terms of the indenture securing them. The sinking fund appropriation, while properly charged against income, is in reality a setting aside of profits for liquidating the bonded debt, and the retirement of bonds from the fund benefits stockholders by increasing the value of the company's property. Since the close of the fiscal year shipments and earnings have been satisfactory, but orders on hand have shown a steady decrease from month to month for several months and there is as yet no definite betterment in sight, although there is a decided change in sentiment and the opinion seems to be that better business conditions will prevail within a short time."

The Western Electric Company's fiscal year ends with the current month, but the company's report will probably cover thirteen months in order to make the fiscal year hereafter correspond with the calendar year. October returns, gross, were 40 per cent. larger than last October, and the twelve months, ending with this November, will show gross sales of somewhat over \$61,000,000. In comparing this showing with the \$69,000,000 gross sales for 1906, which set the high record, it is of interest to note that this year a large business was done with customers outside the Bell system. This means that a much larger number of orders was handled, the average amount per order being less than one-half the average amount involved per order in 1906, resulting in an increase of operating expense per order. Taking into consideration the smaller margin of profit which has prevailed this year, with the increase mentioned in operating expenses, make it apparent that the ratio of net profits this year will be smaller than for 1906. Speaking of the improved showing which this year will show over last an officer of the company said: "The increase in the business is well distributed over the various classes of merchandise that the company handles and well distributed throughout the eighteen houses which represent the company in the United States. In telephone apparatus and cable business the increase has been gratifying and new uses to which the telephone is being put in connection with forest fire protection, railroad train despatching, in the household and in the factory are constantly adding to the demands upon the company for an increased output."

RAILWAY STRUCTURES.

BAY CITY, TEX.—According to press reports, the Railroad Commission of Texas will issue an order requiring the St. Louis, Brownsville & Mexico to repair at once the bridge across the Colorado river, between Bay City and Buckeye, Matagorda county.

BRISTOL, PA.—The Pennsylvania Railroad will build a station on Prospect street, near Beaver Dam road, on the change of line which has just been made through Bristol. The improvements to be carried out include the elimination of a number of grade crossings. It is expected to have the work finished by July, 1911.

GOSHEN JUNCTION, CAL.—The Southern Pacific is putting up a new roundhouse and making extensions to the yard at Goshen Junction.

HAMMOND, IND.—The Chicago, Indianapolis & Louisville is reported to have decided to build a passenger station to cost \$50,000.

MONTREAL, QUE.—An officer of the Grand Trunk writes regarding the new terminal at Montreal, that the question of constructing new terminals and elevated tracks has been under consideration for two or three years. Nothing definite has yet been decided in regard to carrying out the improvements.

PASADENA, CAL.—The San Pedro, Los Angeles & Salt Lake has finished a new station at Pasadena. The improvements cost \$15,000.

UTAH JUNCTION, COLO.—The Denver, Laramie & Northwestern is building a four-stall roundhouse and will also put up a repair shop.

FOREIGN RAILWAY NOTES.

Two great North American syndicates are in negotiation with the Government of Uruguay for constructing several long-distance railways of importance to the commercial relations of the republic with Argentina, through the city of Salto, linking up and with Brazil on the Rio Grande frontier. Senior O'Brien, the representative of these syndicates, recently visited Rio Grande do Sul to confer with Dr. Carlos Barbosa in reference to the projected junction of the Uruguayan and Brazilian railway systems.

French investments in Brazil are estimated to amount to \$200,000,000, more of which has gone into the building of railway, docks, and public works of various kinds.

Late News.

The items in this column were received after the classified departments were closed.

Contracts are to be let in January, 1911, by the Kansas & Missouri, to build from Fort Scott, Kan., south via Arcadia, Coalvale, Gross, Mulberry, Fuller, Nelson and Frontenac, to Pittsburgh, about 35 miles. Col. L. H. Phillips, president, 610 Broadway, Kansas City, Mo.

A. P. Prendergast, master mechanic of the Baltimore & Ohio at the Mount Clare shops, Baltimore, Md., has been appointed superintendent of motive power of the Baltimore & Ohio Southwestern, with office at Cincinnati, Ohio, succeeding John Hair, resigned.

The railway commission committee of the West Virginia board of trade has met and drafted a bill to be presented to the Legislature, providing for the creation of a state railway commission and containing other provisions relative to the regulation of railways.

The Southern Pacific and the Atchison, Topeka & Santa Fe, with twenty other companies have petitioned Judge Morrow of the United States Circuit Court for an injunction restraining the Interstate Commerce Commission from carrying out its order to cut commodities' rates. The rates are to go into effect on November 24. They were established after two years' investigation and were announced in the new class rate schedule on June 6.

An officer of the Stateline & Southern writes that the plans call for building from the Pennsylvania-West Virginia state line, following the west side of the Monongahela river, via Jimtown, W. Va., Granville, West Morgantown and Lowesville, to a point near Rivesville, in Marion county, 32 miles. The work is to be carried out under the name of the Buckhannon & Northern. It has not yet been decided when contracts will be let for the work. J. Wood, president, Pittsburgh, Pa., and S. D. Brady, chief engineer, Morgantown, W. Va.

The Kansas City, Mexico & Orient has contracted for 8,000 tons of rails with the United States Steel Corporation. The corporation will also roll 15,000 tons for the Norfolk & Western. The Louisville & Nashville has contracted for 29,000 tons with the Tennessee Coal & Iron Company. The Carnegie company will roll 5,700 tons for the A. De Mayo Co. It is understood that the Lehigh Valley will place an order soon for 20,000 tons, and that the Interborough has placed an order with the Lackawanna Steel Company for 5,000 tons of rails for third rail purposes.

Commissioner Harlan, representing the Interstate Commerce Commission, held a hearing Wednesday at New York relative to complaints filed by commuters between New Jersey and New York. James R. Wood, passenger traffic manager for the Pennsylvania Railroad, submitted a table showing that fifty-trip commutation tickets are sold on every division of the Pennsylvania lines, with the exception of the New Jersey division, on the basis of 2 cents per mile. In the New Jersey zone this basis is much lower. From New Brunswick it is 1.73 cents per mile. The advance made in the fare from New Brunswick amounted to only 0.8 mills per mile.

The Appellate Division of the New York Supreme Court has handed down a decision in the case of the Delaware & Hudson against the Public Service Commission upholding the commission. The commission in June, 1910, made an order on the complaint of the Business Men's Association of Ticonderoga reducing the fare between Ticonderoga station and Ticonderoga village from 25 cents to 15 cents. The Delaware & Hudson sued out a warrant. The position taken by the company was that the commission could not alter a rate fixed by statute. It is the first instance in which the commission has sought to exercise its jurisdiction to lower a rate originally fixed by an act of the Legislature. The rate in question was fixed by an act of the Legislature when it granted the charter to build the road.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The *Louisiana & Arkansas* has ordered two American type locomotives from the Baldwin Locomotive Works.

The *Kansas City Terminal* has ordered 10 six-wheel switching locomotives from the Baldwin Locomotive Works.

The *Yatsburg, Shawmut & Northern* has ordered four consolidation locomotives from the Baldwin Locomotive Works.

The *Central Railway of Brazil* has ordered four consolidation locomotives from the American Locomotive Company. They will have 17 x 20 in. cylinders, 37-in. driving wheels, and will weigh about 93,000 lbs.

The *Chicago & Western Indiana* has ordered ten 0-8-0 switching locomotives from the Lima Locomotive & Machine Company. The engines will have the following dimensions:

Weight on drivers	70,000 lbs.
Total weight	120,000 lbs.
Diameter of cylinders	24 in.
Stroke of pistons	28 in.
Diameter of drivers	37 in.
Type of boiler	Extended wagon top
Working steam pressure	180 lbs.
Firebox, length and width	108½ in. and 60½ in.
Tank capacity for water	7,600 gals.
Coal capacity	14 tons
Wheel base	15 ft. 6 in.

Special Equipment

Bell ringer	Golmar
Brakes	Westinghouse
Couplers	Sharon
Director	Ohio
Journal bearings	Hewitt
Piston and valve rod packings	L. & K. Metallic
Safety valve	Crosby
Sampling device	Leach
Sight-feed lubricators	Ohio
Stays	Simplex
Stays	Tate flexible staybolts
Tires	Inter Ocean
Tubing	Mahlo
Draft gear	Cardwell "G"

CAR BUILDING.

The *Kansas City Southern* is reported in the market for new freight equipment. This report is unconfirmed.

The *Pennsylvania Lines West* are reported to have ordered 120 steel underframe box cars, 20 gondolas and 10 flat cars from the Pressed Steel Car Company.

The *Alton, Jacksonville & Peoria* (electric) is taking prices on six motor cars. H. A. Strauss, vice-president Falkman Construction Company, Chicago, is receiving the bids.

The *New York Central & Hudson River* is reported to have ordered 1,000 cars for fast freight service from the Merchants' Despatch Company. A large percentage of these cars will be of the refrigerator type.

IRON AND STEEL.

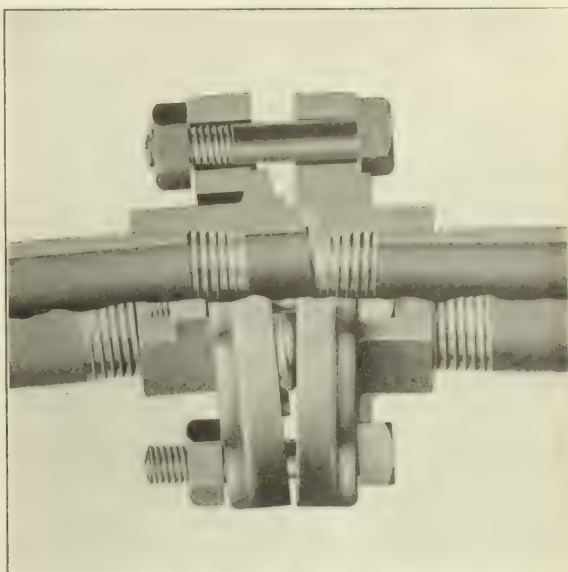
The *Delaware, Lackawanna & Western* is in the market for 10,000 tons of rails.

General Conditions in Steel.—The *Wall Street Journal*, in commenting on the rail output in this country for 1911, estimates that under normal conditions the renewals will amount to at least 2,250,000 tons, new construction 504,000 tons and export 370,000 tons, or a total of 3,124,000 tons. In 1908 the output was only 1,920,000, and in 1909 3,062,000 tons. In view of the fact that production in 1905, 1906 and 1907 averaged more than 3,650,000 tons a year, it is evident that the railways have been economizing for three years past, and if figures have any significance, are more in need of rails at the present time than at any previous period in years. John W. Gates, before leaving on a Western trip, is reported to have said: "There is every reason to believe that the steel industry will harden from now on. We do not expect any pronounced improvement in new business before February of next year. Conditions still strengthen generally, and in the meantime the steel companies will do a fair business. They are all making money on a basis of present operations, and if this can be kept up until the spring improvement sets in manufacturers will be satisfied. The conditions of the country do not warrant a gloomy view of the future. Our crops are the largest in history; money is getting easier, and the banks will be in a position to strengthen themselves from now on. The ex-

port movement is regulating itself, and the country is in less danger of speculation than has heretofore tended to disturb the business interests of the country. Next year should be one of the best business years the country has ever experienced."

Gasketless Flange Unions.

In making pipe connections much time may be saved when using a flange coupling if there is no gasket to be cut and fitted, and if no drifting is necessary to bring the bolt holes in line. These two features distinguish the Jefferson flange union shown in the illustration. A joint may also be made with the pipes out of alignment—another time saver—and such joints will be absolutely tight, as the seat is spherical and ground to a perfect fit. Another advantage of the spherically ground seat is that as the union is drawn up the pressure on the seat always acts in such a way that there is no tendency to warp or twist the parts of the union out of shape. The construction of the brass-to-iron seat is interesting. In the concave face of one member a channel is cut in which is embedded a ring of drawn brass tubing which projects slightly above the iron. The channel is so placed that there is a projecting lip of iron (patented) between the brass



Jefferson Gasketless Flange Union.

ring and the inside wall of the union. This lip serves two purposes—it diffuses the heat into the body of the fitting, thus preventing undue heating of the brass ring, and it prevents the fluid in the pipe from coming in direct contact with the brass seat. Furthermore, should the pipe be screwed in too far it will prevent any injury to the seat of the joint.

The brass ring fits tightly in the channel, being virtually one piece with the iron. The amount of brass, however, is so small that there is practically no difference in the expansion of the two metals. The brass-to-iron seat may be disconnected and connected a great number of times without injury. The absence of packing does away with the old blow-out trouble; the style of union shown successfully holds pressures up to 300 pounds. For pressures above this two heavier fittings, known as the heavy weight union and the extra heavy weight union are made. These are heavily bolted and guaranteed to stand a working pressure of 3,000 pounds per square inch. All styles are made of malleable iron. The loose collar has a machined wedge-shaped surface which comes in contact with a similar surface on one member of the union so that the tighter the union is drawn up the more closely the collar will fit. The advantage of this loose collar is the ease with which the bolt holes may be brought into line and the union be bolted up. The two end members are hexagonal in shape and are easily grasped with any kind of wrench. These unions are manufactured by the Jefferson Union Co., of Lexington, Mass.

ANNUAL REPORT

COLORADO & SOUTHERN RAILWAY COMPANY—ELEVENTH ANNUAL REPORT.

DENVER, COLO., July 1st, 1910.

MR. D. MILLER,
President,
Chicago, Ill.

DEAR SIR:—I herewith submit the report for the fiscal year ended June 30, 1910, which report combines the operations and affairs of the lines operated by the companies named, and which are herein designated as the "Colorado & Southern Lines":

REVENUES AND EXPENSES OF ALL ROADS COMPRISING THE COLORADO & SOUTHERN LINES FOR YEARS ENDING JUNE 30TH.

1910	OPERATING REVENUES.	1909
\$12,040,828.39	Freight	\$10,600,743.01
170,391.82	Passenger	3,756,694.84
8,457.66	Mail	169,460.84
324,009.88	Express	266,644.76
	Other Operating Revenues	286,869.02
\$16,777,980.73	Total	\$15,080,412.17
	OPERATING EXPENSES.	
\$2,188,644.76	Maintenance of Way and Structures	\$2,162,560.10
2,521,272.66	Maintenance of Equipment	2,447,906.42
274,271.16	Traffic Expenses	277,663.79
5,378,794.21	Transportation Expenses	4,811,851.02
500,472.19	General Expenses	525,706.28
\$10,863,454.98	Total	\$10,225,687.61
\$5,914,525.75	Net Operating Revenue	\$4,854,724.56

NET DEFICIT FROM OUTSIDE OPERATIONS.

Dr. \$ 4,083.05	Hotels	Dr. \$ 2,406.39
Dr. 2,477.26	Stock Yards	Dr. 21.80
Dr. 15,763.34	Dining Cars	Dr. 4,706.71
Dr. 22,323.59	Total	Dr. \$ 7,134.90
477,869.64	Taxes Accrued	393,906.76
\$ 5,414,332.52	Operating Income	\$ 4,453,682.90
237,367.75	Rents Balance, Income from Securities owned, Other Income and Interest	466,701.78
\$ 5,651,700.27	Gross Corporate Income	\$ 4,920,384.68

DEDUCTIONS FROM GROSS CORPORATE INCOME.

\$ 2,665,098.79	Interest on Bonds, Deferred Rentals and Equipment Leases	\$ 2,683,682.13
35,058.19	Sinking Funds	37,843.38
\$ 2,700,666.98	Total Deductions	\$ 2,721,525.51
\$ 2,951,633.29	Net Corporate Income	\$ 2,198,859.17
	DIVIDENDS.	
\$ 340,000.00	1% First Preferred Stock 4%	\$ 340,000.00
\$ 340,000.00	4% Second Preferred Stock 4%	\$ 340,000.00
\$ 620,000.00	2% Common Stock 2%	\$ 620,000.00
\$ 1,300,000.00	Total	\$ 1,300,000.00
\$ 1,651,633.29	Surplus	\$ 898,859.17

The Colorado & Southern Railway Company owns a beneficial interest in one-half of the total Capital Stock of The Colorado Midland Railway Company and also owns one-half of the Capital Stock of The Trinity & Brazos Valley Railway Company. The results of the operations of those properties for the years ended June 30th are:

1910	1909
\$ 132,293.19 (Deficit) The Colo. Midland Ry. Co. (Deficit)	\$ 47,086.74
933,436.01 (Deficit) Trinity & Brazos Valley Ry. Co. (Deficit)	902,023.85
\$ 1,065,729.20 (Deficit) Total (Deficit)	\$ 949,110.59

Deducting one-half of this deficit from the surplus of the Colorado & Southern Lines, the result is:

\$1,118,768.68 (Surplus) Colorado & Southern System (Surplus) \$424,303.88

The percentage of Operating Revenues required for Operating Expenses was 64.75% as compared with 67.81% in the previous year, and the proportion of Income required for Interest was 50.55% as compared with 54.54% in the previous year.

BOND ISSUES.

During the year Retaining and Extension Mortgage bonds of The Colorado & Southern Railway Company were issued to cover expenditures for: Retaining and Extension Mortgage Bonds of The Colorado Springs & Cripple Creek District Railway Company \$ 68,000.00

Retaining and Extension Mortgage Bonds of The Colorado Springs & Cripple Creek District Railway Company	194,000.00
Securities of Fort Worth & Denver City Railway Company	1,645,718.24
Securities of Fort Worth & Denver City Railway Company	8,059.41
Total	\$1,915,797.65

From proceeds of the sale of securities placed with the trustee, Retaining and Extension Mortgage bonds of the face value of \$83,000.00 were redeemed and cancelled.

On June 30, 1910, the sale of \$1,000,000 face amount of Retaining and Extension Mortgage Bonds from the Company's Treasury was authorized. These bonds were delivered and paid for \$1,000,000 on June 30 and September 1, 1910. The proceeds covered the treasury for expenses incurred in the making of improvements and new lines.

THE TRINITY & BRAZOS VALLEY RAILWAY

During the year the deficit from operations was made up equally by The Colorado & Southern Railway Company and The Colorado & Southern Railway Company.

Southern Railway Company. Advances were also made to take care of needed improvements and installations on leased equipment. Construction of the new passenger terminals at Houston has progressed and will be completed within a few months.

THE DENVER & INTERURBAN RAILROAD.

There was nothing done on The Denver & Interurban Railroad over and beyond the building of .95 mile of track in the City of Fort Collins to comply with the franchise given by that city.

THE STAMFORD & NORTHWESTERN RAILWAY.

Mention was made last year of the construction of the Stamford & Northwestern Railway, which was begun in January, 1909. On September 15th, 1909, operations from Stamford to Jayton were begun, and on October 25th, 1909, the road was completed from Jayton to Spur, making a total mileage operated, Stamford to Spur, of 82.5 miles.

IMPROVEMENT WORK.

Reference was made last year to the program adopted of substituting permanent bridges for wooden ones, and that same program has been carried out during the year. The excess cost of such new structures over the cost of replacing in kind the existing ones has been charged to "Additions and Betterments" and amounted to \$86,518.82 on the Colorado & Southern Railway and \$85,735.35 on the Fort Worth & Denver City Railway.

On the Fort Worth & Denver City Railway the work of ballasting was continued during the year. There were expended \$228,589.60, representing 605 miles of rock ballast and 1.31 mile of gravel ballast, or 61.36 miles. This makes up to June 30th, 1910, 362.67 miles ballasted with rock and gravel.

On the Colorado & Southern Railway, on the Platte Canon District, 13.74 miles and on the Gunnison District 6.36 miles of 56-pound steel were laid, replacing 40-pound steel, and there were 21 miles of new 85-pound steel laid, replacing 65-pound steel, on the Fort Collins District, namely, between mile-post 44 and mile-post 51 and between mile-post 60 and mile-post 72. On the Fort Worth & Denver City Railway there were 18.58 miles of 85-pound steel laid between mile-post 120.74 and mile-post 139.32. The difference between the value of the steel laid and the steel released was charged to "Additions and Betterments," and appears in statement on page 16.

By agreement with the City of Denver, by which certain streets were abandoned, it was arranged that the railway companies whose tracks crossed Twentieth Street, should contribute to a viaduct, the proportion to be paid by each road being based on the amount of abutting property owned. The Colorado & Southern Railway Company's proportion was estimated to be \$165,000.00. Last year The Colorado & Southern Railway Company paid \$23,447.54 and this year \$50,675.80. The viaduct will probably be completed during the ensuing year.

By agreement also with the City of Denver, a subway at West Alameda Avenue was arranged for. The Colorado & Southern Railway Company's proportion being \$25,000.00. In the past fiscal year The Colorado & Southern Railway Company paid \$2,811.24 toward the construction of this subway. The subway will be completed during the ensuing year.

In July, 1909, arrangements were made with the City of Cheyenne whereby a franchise was granted across certain streets in order that the Colorado & Southern Railway might make a connection with the Chicago, Burlington & Quincy Railroad at Capitol Avenue. Property was bought along the alley between Fifteenth and Sixteenth Streets from Capitol Avenue to a connection with The Colorado & Southern Railway Company's track, the cost of which amounted to \$196,421.33, and a track is now being laid on the property so purchased, and in August of this year connection was made with the Chicago, Burlington & Quincy Railroad. In Greeley The Colorado & Southern Railway Company purchased property to the amount of \$100,120.60 for the purpose of making connection with the Chicago, Burlington & Quincy Railroad and also for extending yard room and facilities at that point.

Because of the congestion of business between Pueblo and Walsenburg, between which points the Colorado & Southern Railway has joint facilities with the Denver & Rio Grande Railroad, The Colorado & Southern Railway Company, through The Colorado Railroad Company, entered into an agreement with The Denver & Rio Grande Railroad Company on May 14th, whereby each company should build a line and enter into joint use of the two tracks as a double line of railroad between Southern Junction and Walsenburg Junction. Contracts were let for the building of the lines and work is progressing as rapidly as possible. This double track will not be completed before September, 1911, but it is hoped that portions of such track may be so built that they may be used at a much earlier date.

NEW EQUIPMENT.

The increased amount of business on the Colorado & Southern Lines called for the following order of equipment:

The Colorado & Southern Railway:

- 5 S. G. Switching Locomotives for delivery October, 1910.
- 5 S. G. Mikado Type Freight Locomotives for delivery December, 1910.
- 5 S. G. Pacific Type Passenger Locomotives for delivery December, 1910.
- 1 Dining Car for delivery September, 1910.
- 500 Dump Gondola Cars (all steel) for delivery October, 1910.
- 300 Box Cars for delivery June, 1910.
- 250 Dumping Stock Cars for delivery September, 1910.

Fort Worth & Denver City Railway:

- 2 S. G. Switching Locomotives for delivery October, 1910.
- 5 Pacific Type Passenger Locomotives for delivery December, 1910.
- 4 Baggage Cars for delivery November, 1910.
- 200 Stock Cars for delivery June, 1910.

Deliveries of the above equipment commenced in June, 1910, and have continued since that date.

In addition there are being built at the shops of the Colorado & Southern Railway in Denver:

- 125 N. G. Box Cars.
- 50 N. G. Stock Cars.
- 15 S. G. Caboose Cars.
- 50 N. G. Coal Cars.

The construction of these cars is nearly completed at this time. All of this equipment is to be paid for in cash out of funds derived from the sale of Retaining and Extension Mortgage bonds.

Respectfully submitted,

A. D. PARKER,
Vice-President.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY EIGHT TIMES IN JUNE, BY
THE RAILROAD GAZETTE (INC.), 83 FULTON ST., NEW YORK.

CHICAGO: Pleasantly Bldg. CLEVELAND: Williamson Bldg.
LONDON: Queen Anne's Chambers, Westminster.

W. H. BRADSHAW, President.

T. A. SIMMONS, President of Trade.

HENRY LEE, Secretary.

The address of the company is the address of the officers.

EDITORS:

W. H. BRADSHAW, Editor	RAY V. WRIGHT	B. B. ADAMS
SAMUEL O. DENNIS	G. I. LOWERY	W. E. HOOPER
Washing. & Ind. Editor	WILLIAM FORSYTH	F. W. KROGER
BRADSHAW BRADSHAW	S. W. DENNING	H. H. SIMMONS
London Editor, Mgr.	CLARENCE DEMING	

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada	6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies.....	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49. FRIDAY, NOVEMBER 25, 1910. NUMBER 22.

CONTENTS

EDITORIAL:

Editorial Notes	991
Railway Business Association Dinner.....	992
Screw Spikes	993
The Survival of the Exhaust Bridge.....	993
National Railways of Mexico.....	994, 1028
New Books	996

ILLUSTRATED:

The Failures	1000
Multiple Track Railways in Illinois.....	1011

MISCELLANEOUS:

Transportation and Traffic in England.....	996
The New Long and Short Haul Law.....	1001
National Association of Railroad Commissioners.....	1006
Railway Business Association	1007
Train Accidents in October.....	1013
Foreign Railway Notes.....	999

GENERAL NEWS SECTION..... 1014

SUPPLY TRADE SECTION..... 1025

THE relation between foreign upsets and agitations and American railway investment should be noted. Within a few weeks there has been a revolution in Portugal; a cabinet crisis in France; acute Socialist disturbances in Germany; and now there approaches in England a new general election succeeding one only ten months ago and bearing on an issue that strikes

down to the very roots of the British constitution. To the mind of the foreign investor governmental stability holds big. Under conditions of governmental disturbance national securities—even English consols—fall, and the investor's eye turns over the sea looks abroad to such securities as those of the American railway for placing his funds. Must it not then be regarded as peculiarly unfortunate and untimely just at such a juncture when our best railway companies are ready with new loans bulwarked behind great equities in dividends that the foreign investor finds them shadowed by the frictions, not to say collisions, with federal and state authority? The foreign market which, under normal conditions, would be opening broadly for our securities with corresponding reduction of the price of the loan—that is to say, the rate of interest—either open narrowly or only in response to a high interest rate. All American securities suffer in such a case, but those of our railways suffer peculiarly, because long ago the judgment of the foreign investor, confirmed by experience, singled out the dividend paying American railway as a kind of emblem of financial conservatism—certainly so as to its bonds.

THE state railway commissioners, at their convention in Washington last week, again tackled the question of railway safety, but they did not treat it as they did last year. The notable feature of the discussion was the evidence it furnished of a more intelligent and earnest demand for the introduction of the block system. The more progressive of the members clearly see that this radical improvement is needed on the electric as well as on steam railways. The lessons of the horrible collisions on interurban lines during the past few months have not been entirely wasted. The discussion of the very poor management and discipline that is to be found on many interurban lines showed that the commissioners most interested are awake to the situation. The direct and vigorous language on this subject which is quoted in our report seems to have been fully warranted. The regrettable thing about this part of the discussion is that some of the speakers seem to have thought that if good trainmen were secured and suitable discipline enforced the collisions would be prevented; whereas the cold fact, as shown by all past experience, is that even with the best force of men that can be had there is still the necessity for the block system. Not only the men but the methods are faulty. The steam railways have learned this, and the electric and the commissioners will have to learn it—if they have not already done so. As to automatic stops, the action of the convention was ambiguous—so much so that, probably, it does not amount to anything. The committee said that "this association should pass resolutions at this meeting calling on Congress to take prompt action for the compulsory use of automatic control of trains." But no resolution was passed, and the action of the meeting on block signaling generally was in consonance with the views of the members who counseled a moderate course, quite different from the radical ideas of the committee; yet the report as a whole was "adopted," with this revolutionary paragraph still in it. The absurdity of passing a law to require the use of automatic stops, a comparatively new safeguard, when a law requiring the use of the block system, a well tested safeguard, is still waiting to be acted on, and has waited five years, will be apparent to anyone who considers the subject, even superficially.

FROM now on the gayety of the Interstate Commerce Commission's hearings on freight rate advances will never flag, for Mr. Brandeis, who has been retained by certain shippers, is going to show how the railways can save money so fast, by shop economies, that any increase of expenses due to heavier payrolls and the higher cost of raw materials will seem a mere bagatelle. In other words, such economies as have been introduced in shops by piece work, high speed tools and the like can be used with equal effect in all departments of railways; and Mr.

Brandeis is going to tell how to do it. He gave the press 2,500 words on the subject when the hearing opened, but he did not at that time get down to particulars; these will come later. Insofar as the slower railways ought to imitate the methods of the more progressive ones Mr. Brandeis is on solid ground; but he will find that he has coupled on to a pretty long string of "battleships" nevertheless. In the first place a governmental body like the commission, or a court, cannot hold the railways up to such high standards, howsoever desirable it may be to establish them. The courts, when they lay down "the state of the art" in any line of endeavor are decidedly conservative; far too conservative, Mr. Brandeis will find. Again manufacturers, whose skill in effecting economies he holds up for imitation, are free to pay 25 or 50 per cent. dividends—and often do pay them. That is an incentive; but the shippers would limit the railways to 6 per cent. If the lawyers simply want to "impress the jury" the railways can follow the same lines; for the railways' record as a whole is one of really brilliant economy; for the savings that have been made by the use of powerful locomotives, large cars and other improvements in that line will evoke the admiration even of Mr. Brandeis, if he examines the record. However, as we have said, there is a prospect of a lively discussion.

RAILWAY BUSINESS ASSOCIATION DINNER.

THE question of regulation of railways is a public question in the broadest sense. The only criterion of what ought or ought not be done is the probable effect on the public welfare. That recognition of this principle is emerging is illustrated by the annual report of the executive committee of the Railway Business Association, and by addresses delivered by John Claflin, Daniel Willard and Chairman Knapp, of the Interstate Commerce Commission, at the annual dinner of the Railway Business Association, abstracts of which are published elsewhere in this issue. Mr. Claflin is one of the largest shippers of dry goods in the United States, Mr. Willard is president of a great railway, and the Railway Business Association is an organization of makers of and dealers in railway supplies; yet they, while touching on the respective special interests of the large industries they represent, were not behind even Chairman Knapp in contending that in the settlement of the question of railway regulation all other interest ought to be subordinated to those of the public. Mr. Claflin frankly conceded that in the public interest there ought to be some advance in railway rates, and showed how, while the direct effect of this would be to make the shippers pay more for transportation, the indirect effect would be to cause an increase in the prosperity of the country by which the dry goods merchant would gain more than he would lose through higher rates. Mr. Willard just as candidly conceded the necessity for government regulation of railways and asked only that it should be conceived and carried out in a spirit of fairness and with an eye single to the general welfare. Mr. Knapp, in virtue not only of his official position, but also of the impartiality, ability and patriotism with which he has performed its duties, with good right spoke for the public and pointed out that the railways must be allowed to have adequate earnings to enable them to do three things: first, to earn such a return as will attract adequate new capital into them; second, to pay liberal wages to an adequate number of competent men; and, third, to make proper improvements out of earnings, which will have the effect of increasing the value and usefulness of railway service to the public and of preventing an undue increase of railway capitalization.

Unfortunately, it is easier to express high and correct ideals in post-prandial speeches than to get men to keep such ideals before them and try to live up to them when they come to dealing with practical questions, every-day affairs, for at the banquet table the thoughts of seemingly incompatible commercial interests cease from troubling, and the

spirit of unintelligent selfishness is at rest. But just the same, such dinners and such speeches do good. They raise ideals to aim at, and those who raise and aim at high ideals are pretty sure to be and do better, even though afterwards they sometimes temporarily forget them, than those who never conceive and aim at them at all. One of the main things that have got shippers, communities, railways and regulating authorities at loggerheads and brought some into disrepute has been that they have failed to formulate correct ideals and principles for their own guidance. The railway managers, for example, up to a few years ago, simply carried on their business as did other men in commercial pursuits. They made such rates and provided such service as they thought were needful to move the traffic. The shippers and communities strove to get such rates and service as they thought would further their own particular interests. Many of the regulating authorities have issued orders and passed laws with very little regard to anything but the political interests of the commissioners and lawmakers. Any far-sighted man ought to have anticipated that this pulling at cross-purposes on the theory of "every man for himself and the devil take the hindmost" must ultimately result in a condition which would be intolerable to the public. But there are not many far-sighted people. So when the prophets of trouble prognosticated no man listened. But things have changed, and now if the principles discussed are not too abstract and the ideals too exalted they fall on amenable ears.

"When the devil was sick the devil a monk would be. When the devil was well the devil a monk was he." The existing public sentiment and industrial conditions are bringing about the more harmonious views and relations of the shippers, the railways, the regulating authorities and the public. The tide has turned, and probably it is a matter of but a short time until pretty satisfactory conditions and a pretty fair and reasonable public sentiment will prevail. How long after that will the various interests represented at the dinner of the Railway Business Association continue to try to create and maintain a reasonable public sentiment and to prevent the revival of past and strive for the abolition of existing abuses? The railway business is being more conscientiously and public-spiritedly managed now than ever before. Its worst evils have been unscrupulous financial manipulation and unfair discriminations in rates. There has been very little of the former for some years. There has been much less of the latter than in previous years. But some grossly unfair discriminations still exist. Are or are not unscrupulous financial manipulations to be revived? Are or are not the big shippers, the big communities, the railways and the regulating authorities going to co-operate to eliminate existing unfair discriminations? Have the big shippers enough public spirit and foresight voluntarily to give up some of the unfair advantages they have now, and if not, have the railways and the regulating authorities the good sense and courage forcibly to abolish them? In brief, are reforms connected with the transportation business to go on, or after public sentiment is conciliated are the shippers, the railways and the regulating authorities going to begin at once to provide fuel for some future day of public wrath?

We are inclined to think that the entire railway business and its relation with all other interests have not only been raised to, but will be kept on, a higher level than in the past, but when the pressure of adversity is removed the work of keeping them on a high and raising them to a higher level will become more difficult, it is easier for most people to be virtuous in poverty than in riches. That work will be made much more effective if all the interests directly concerned will continue to keep in thought and act as well as words the points of view which were so well expressed by their spokesmen at the Railway Business Association dinner.

SCREW SPIKES

WE believe that screw spikes have not been adopted universally on any line in this country, the main disadvantages and extra cost still preventing their general use. Numerous experiments have been made with the ordinary laboring bench turning machine on the resistance of screw spikes with threads of various shapes and proportions, but the results of such tests give misleading values and do not take account of the changed condition of the tie caused by constant exposure to the weather. A portable tensile testing machine, invented by Albert Collet, of Paris, is now being used on one of our western roads to measure the resistance of screw spikes of various designs as found in actual track conditions and in different kinds of wood.

The size and shape of the threads on screw spikes have become so much a matter of personal preference with the chief engineers that they are the despair of the manufacturer, and as a commercial matter it becomes important that screw spikes of a few standard sizes be adopted. The resistance offered by the screw spike depends so much on the kind and condition of the wood surrounding it that in any general discussion of the subject a distinction should be made between its used in soft wood ties and in hard wood ties. Its successful use abroad has been almost entirely with hard wood, and where used with soft wood ties resort is usually had to plugs of hard wood, either square or screwed into the tie. Objection is made to the latter because each requires a hole some $1\frac{1}{4}$ in. in diameter bored nearly through the tie, and this materially weakens the tie. Various disadvantages of this kind connected with the use of screw spikes in soft wood have led some of the foreign roads which have used them extensively to discontinue their use in soft ties.

The ordinary screw spike cannot be regarded as a satisfactory rail fastening for soft ties when used alone. The vertical holding power depends largely on the shearing strength of the wood engaged by the threads, the extent to which there is direct frictional resistance against the shank varying with different methods of driving and kind of wood. Repeated efforts are made to help out the spike with some supplementary device to increase the vertical bearing against the wood fibres. A steel spiral has been used for this purpose, and more recently a threaded split bushing made of malleable iron. One part of this bushing is made so that the thread of the screw spike tends to spread it, making it conical with the large end down. Another form which has been suggested by American experience has a flanged bushing inserted from the bottom of the tie and the spike is screwed into it. This method has the advantage of the flange resistance as well as that afforded by the threads in the tie itself.

The wood surrounding the screw spike is sometimes injured by carelessness in driving the spike, by splits, shrinkage, knots or other irregular structure in the tie itself, and the spike is not then an efficient fastening. It is possible, that in the further development of a substantial fastening for rails, the screw thread in its contact with wood may be entirely abandoned, and an ordinary plain bolt, with a standard machine thread, used instead. To meet the ordinary requirements of securing rigidly the rail and tie plate to the tie a plain bolt passing clear through the tie would be sufficient. A washer 3 in. square on the under side would provide an area of 9 sq. in., and would be adequate for safe working crushing pressure of 7,200 lb., taking 800 lb. per sq. in. as the allowable pressure on soft wood, and in this way a rigid fastening would be secured. A small bolt $\frac{3}{8}$ in. in diameter would provide ample tensile strength, but on account of corrosion—and especially the small area for lateral thrust against the wood—it would be advisable to use a $\frac{7}{8}$ -in. bolt. The principal objection to such construction is the difficulty of removal for repairs, but the use of bolts for rail and tie fastenings is not entirely without precedent, as they are used on all forms of metal ties.

During the past 12 years a satisfactory fastening between rails and soft wood ties—especially in connection with tie plates—has

been the subject of continuous experiments by the American railroads, and the latest conclusions support the insertion of a rigid fastener to prevent wear. The usual fastener has been made a board of tie plate, which is nailed to the tie and the plate is then secured to the tie with four screw spikes. The Great Western Railway of England uses for a rail fastener bolts passing entirely through the tie in the manner we have indicated, but in this case the chairs are fitted and bolted to the ties before they are laid.

In thus commenting on the tendencies in the use of screw spikes we have not lost sight of their great superiority over the square spike and their great value in hard wood ties.

THE SURVIVAL OF THE EXHAUST BRIDGE

THE return to home and mother country is a great relief, or necessity is a natural tendency in mechanics as well as in medicine. There are numerous illustrations of this in locomotive practice, and one of the most recent is the return to the exhaust bridge as a means of making a locomotive steam freely when the ordinary standard appliances fail to produce the desired result. We have referred to standard draft appliances, but find that the Master Mechanics' Association has not adopted the designs and proportions for nozzles and stacks, as recommended in the reports of 1896 and 1906, either as standards or recommended practice. However, those proportions were presented with such a weight of authority, as the result of most elaborate experiments, that they have become generally recognized as standards and are in use on the majority of locomotives. The report of 1896 was concerned principally with the shape and size of exhaust nozzles, and the work included experiments made to ascertain the effect of bars or spreads placed across the nozzle opening; with a 14-in. choke stack, the top of the nozzle was 43 in. from the choke. The bars were made of $\frac{3}{8}$ -in. and $\frac{1}{2}$ -in. round iron; also of brass, triangular in cross section, the apex of the triangle being downward. After repeated tests with these cross bars or bridges on the exhaust nozzle at its outlet, the report concludes that it is not advantageous to increase the enfolding action of the jet at the expense of the induced action, or, in other words, that the more solid the jet of steam, within the limits of the experiments, the more efficient it is as a draft producer. In the general conclusions of the same report, one item states that the efficiency of the jet is reduced by spreading it by means of cross bars in the nozzle, and another item states that cross bars increase the back pressure in proportion to their width. This report was so positive in condemning the bridge in the exhaust nozzle that the subsequent experiments with stacks and nozzles made for the Master Mechanics' Association did not include any reference to it. The exhaust bridge has, for the reasons given, become regarded as bad practice and only to be used as a homely remedy in case of dire necessity.

Notwithstanding this bad reputation, it is interesting to observe the persistence of an effectual appliance and surprising to find that the exhaust bridge is now in general use on the large new locomotives of half a dozen of the principal lines in the West, and, doubtless, in the East, wherever the large diameter smokebox has compelled the use of a very short outside stack. In its present use it takes the form of a $\frac{3}{4}$ -in. round bolt which is placed in the nozzle near its top; in some instances the nozzle is given an outside flare at this point, with the apparent idea of giving the exhaust steam a chance to spread immediately on leaving the nozzle or else to provide an area of opening at the bolt equal to that of an unobstructed nozzle. The action of the bridge in spreading the exhaust is shown in the more rapid wear of the draft pipe and stack at points parallel with the sides of the bolt or bridge. It is this spreading that causes the exhaust jet to fill the stack lower down and thus produce a stronger draft on the fire.

The experiments in 1896 were made with an outside stack longer than the diameter of the smokebox, while at present the clearance limitations require the outside stack to be only about

one-fourth the diameter of the large smokeboxes; the result is that the inside stack is much longer than the outside one, and its relation to the tubes is very different. The stacks are now much larger in diameter. In fact, conditions generally have changed so much that it can hardly be claimed that the early work on exhaust nozzles properly applies to present practice. The difficulty that is now found in making large locomotives with short stacks steam freely would indicate that the ordinary form of nozzle is not sufficient, and the subject cannot be regarded as having reached a final settlement. The search for a satisfactory variable exhaust, which is in very general use on foreign railways, would indicate this, and, if we may so term it, the surreptitious use of the exhaust bridge is spreading so rapidly that it may presently be found an established standard. While it may be true that the proportions recommended in the 1906 Master Mechanics' report apply equally well to the very short stacks, there must be something wrong with their application and maintenance, or it would not be necessary to resort to methods which may not be best in their relation to fuel economy. It is possible that the inside stack is not as substantial as it should be, or its fastenings as secure, and it is not so easy to observe whether it is always in true alinement. It is well known that even a slightly cracked stack interferes materially with good draft, and it may be that the exhaust bridge has been introduced to help out the deficiencies of inside stack construction.

That an artificial spreader for the exhaust is not altogether a bad thing is seen in the design of the variable exhaust of French locomotives, where there is a supplementary bronze tip inside the exhaust proper, which can be raised or lowered. In its highest position it permits the steam to escape only through its center, which is arranged with three spiral-shaped vanes giving the escaping steam a whirling motion. When the tip is lowered, however, an outlet is given around its exterior surface and a cylindrical shaped jet of steam escapes around the inner whirling jet. The whirling motion given to the exhaust will permit it to fill a larger stack than if straight, and will also tend to extinguish sparks by throwing them against the sides as they escape through the stack. Such devices, acting as spreaders, are effectual in making large engines steam freely, and if they produce such an amount of back pressure as to effect economical operation the extent of the fuel loss should be demonstrated. If resort must now be had to draft appliances different from the well-established practice, the fact should be recognized and the best designs obtained for present practice by further experiment.

NATIONAL RAILWAYS OF MEXICO.

IT is possible to trace clearly in the operations of the National Railways of Mexico for the fiscal year ended June 30, 1910, the economies and benefits that have resulted from the merger of the Mexican Central and the National Railroad of Mexico, and the taking over of various other Mexican lines. For instance, under conducting transportation, the cost of superintendence was less in 1910 by \$50,000* than in 1909. Miscellaneous expenses were \$17,000 in 1910, as compared with \$106,000 in 1909. Gross earnings totaled \$26,300,000, 1910, as against \$24,400,000 in 1909, and total operating expenses amounted to \$13,000,000 last year and to \$14,600,000 this year. Under the cost of conducting transportation was \$7,500,000, an increase of about \$280,000 over 1909. In other words, while maintenance of way consumed 15.71 per cent. of gross earnings in 1910, as against 13.47 in 1909, and maintenance of equipment consumed 12.25 per cent., as against 14.72 per cent. conducting transportation consumed but 24.61 per cent., as against 29.65 per cent.

After the payment of depreciation fund and interest, and setting aside for the National Railroad of Mexico had a balance of \$1,000,000, and paid 2 per cent. dividends on the first preferred stock, setting aside also 2 per cent. of net profits

transferred to reserve fund. These transactions left a net surplus of \$480,000. In 1909 the balance available for dividends was \$650,000, and 2 per cent. dividends were paid on the first preferred stock, leaving as net surplus the nominal sum of \$25,000. The results in 1910, the second year of the new company, and, as a matter of fact, the first full year of operation of the combined roads under the new management, make a distinctly good showing.

In traffic statistics, as well as in the figures for earnings and expenses, the changes due to the operation under a single management of formerly separate roads, are traceable. The average haul of freight in 1910 was 356 miles, as against 346 miles in 1909. The average haul per passenger was 68.85 miles in 1910, as against 57.75 miles in 1909. In September, 1909—that is, in the first part of the last fiscal year—there were very severe floods in the Monterey district. It is estimated that in places as much as twelve inches of water fell in thirty-six hours. Debris formed a dam against the bridge across the Monterey river so that the water backed up behind it and eventually flooded a great part of the surrounding country. The results of this flood were to increase greatly expenses for maintenance of way and structures, and the closing of this line also hindered in many ways the economical operation of other lines not directly affected. Under maintenance of way and structures there is charged in 1910 \$390,000 for extraordinary repairs. Advantage has been taken of the necessity for building new lines in Monterey to make a considerable improvement over the condition of the old lines by changes of line, raising grades and putting in permanent steel and masonry. It is estimated that, of the final cost, \$650,000 of these expenses will be chargeable to additions and betterments (capital account), and the balance, \$950,000, represents the approximate cost of replacing previous structures. A reserve fund of \$500,000 has been taken out of this year's income to pay for the work under this head which is chargeable to operations.

In 1910 the total number of tons of revenue freight carried amounted to 5,711,951; in 1909, 5,707,972 tons were carried. But since the average haul of freight was much longer in 1910 than in 1909, the ton mileage was considerably greater last year than the year before. The National Railways earn a high ton mile rate, but a low passenger mile rate. Last year the average receipts per ton mile were 1.488 cents, which is greater by 4.31 per cent. than the average receipts in 1909. The average receipts per passenger per mile were 1.135 cents, which is greater by 1.28 per cent. than in 1909.

Of the total 5,711,931 tons of freight carried last year, 49 per cent. was mineral products, 23 per cent. agricultural products, 12 per cent. products of forests, 12 per cent. general merchandise, and about 3½ per cent. live stock and animal products. The tonnage of ores is a very important item in the traffic of Mexican roads. In 1909 there were 1,226,724 tons of ore carried; in 1909 there were 1,361,166 tons. This falling off in ore tonnage may be accounted for by the low price of metals during the past year. As the price rapidly declined, certain mines had to curtail their output greatly, and in some cases entirely close down; but, as is so often the case under such circumstances, the necessity for economies in cost of production resulted in a slowly increasing amount produced per unit of expenditure. The price of silver has recently gone up, and in the present year the prospects for the larger tonnage of ore are good. Under the heading general merchandise it is interesting to note that the tonnage of hardware, nails, etc., which amounted in 1909 to 73,782 tons, had increased in 1910 to 132,337 tons.

The decrease in the proportion of low grade tonnage possibly accounts in part for the smaller train load. The average train load in 1909 was 292 tons on the standard gage lines and 109 tons on the narrow gage lines; in 1910 the train load on the standard gage lines was 283 tons and on the narrow

* \$100,000. All figures in this column are approximate and are subject to revision when the complete figures become available.

gage lines 102 tons. Carloading also in 1910 was slightly under that of 1909.

The National Railways have a comparatively light freight density. There were 130,224 tons of freight carried one mile per mile of line in 1910.

In the review of the first annual report of this company, published in these columns last year, the financial changes that had taken place in the readjustment were commented on at some length. It will be recalled that holders of securities of the National Railroad of Mexico and the Mexican Central were asked to deposit their stock and bonds and receive in exchange securities in the new company, the National Railways of Mexico. One great advantage gained by the merger is that the company now has mortgages under which comprehensive and consistent financing of betterment and additions and of purchase of new lines can be carried on. Another

plan. In this connection there is a rather serious fact brought out by the annual report for 1910. While 92.74 per cent. of all the securities of the National Railroad of Mexico, and 97.44 per cent. of all the securities of the Mexican Central have been deposited under the plan originally providing for the organization of the National Railways of Mexico, over 71 per cent. of the priority 5 per cent. bonds of the Mexican Central have not as yet been deposited. As a matter of fact, less than \$20,000 of these priority bonds were deposited during the year. There does not seem to be any definite reason for this. There was no objection whatsoever on the part of the holders of these bonds to putting the plan of organization of the new company into operation; and under the plan they received not only a higher par value of securities by exchanging their priority bonds, but also a higher rate of interest; and what seems to be an equally good lien on the property. The bonds are, of course, not registered, and presumably in a great number of cases the company is unable to trace the holders of these bonds and is unable to learn their reason for not making the exchange.

The balance sheet of June 30, 1910, shows cash on hand of \$7,800,000, including \$3,750,000 deposited for payment of coupon interest. At the end of 1909 there was \$15,600,000 cash on hand, including \$3,000,000 for the payment of coupon interest. In 1910 total accounts payable amounted to \$5,550,000, which included \$1,850,000 notes payable. There were no notes payable in 1909; and total accounts payable amounted to \$1,800,000. During the year \$1,650,000 was spent on capital account, exclusive of additions and betterments; and since June 30, 1908, \$2,150,000 has been spent for additions and betterments. The benefits of these expenditures in 1909 and 1910 for betterment work are not shown in the 1910 report; the economies resulting from these betterments should be much more apparent in the current year.

When the Mexican Central and the National Railroad of Mexico were merged, the property of the National Railroad was in comparatively better shape than that of the Mexican Central, and the greater part of the expenditures for betterments by the new company have been to bring the Mexican Central lines up to the standard of the National Railroad. A large amount of work has been done relaying track with heavier rail. In general, 56-lb. and 70-lb. rail has replaced 40-lb. rail; and 85-lb. rail has replaced 70-lb. rail. The cost of the increased weight of rail laid in 1910 amounted to \$293,500, and the cost of ballasting track that has not had ballast before amounted to \$250,000.

The National Railways of Mexico now includes all of the important lines in Mexico, with the exception of the Southern Pacific lines in Mexico on the west coast. The Mexican International, control of which was formerly owned by the Southern Pacific, has been bought by the National Railways, which now own 203,023 out of a total of 207,082 shares; and the property of the Mexican International has been transferred by a deed dated June 30, 1910, to the National Railways. The property of the Mexican Pacific, heretofore controlled through stock ownership, has been transferred through a deed to the National Railways. Since the close of the fiscal year the company has also bought control of the Pan-American Railroad and of the Vera Cruz & Isthmus; and it is estimated by the company that these new acquisitions will, in the near future, earn sufficient to fully cover the expenses of operation, as well as fixed charges. Through the control of the Inter-oceanic, which in turn controls the Mexican Southern, the National Railways have an entrance into the State of Oaxaca. Another step in the expansion and development of the Mexican lines has been the formation of a company, half of the common stock of which is owned by the National Railways and half by the St. Louis, Brownsville & Mexico, to build a bridge across the Rio Grande at Brownsville.

There are many indications throughout the 1910 annual re-



National Railways of Mexico System.

advantage of the plan of merger is that under this plan securities issued under the new company's general mortgage are guaranteed by the Mexican government. The capitalization of the new company is high; but the issue of \$74,800,000 common stock (nearly all of this stock going to the Mexican government) on which there is no present prospect of earning any dividend is defensible, insofar as it offered a satisfactory way for the Mexican government to extend its credit to the National Railways, and in exchange to gain a controlling interest in the management of the principal railways of Mexico. The Mexican government owns \$10,000,000 first preferred and \$30,278,290 second preferred, which, together with its common stock, gives it \$115,023,590 stock out of the total \$230,000,000 authorized stock.

There were no securities sold during the year, and the only new securities put out during the year were those issued to retire securities of the old companies deposited under the

port that an effort is being made to make the Mexican railways a national undertaking, and as far as possible to have the management and operation largely in the hands of Mexicans.

In the formation of a local New York board of directors, it was generally understood that a majority of these New York directors represented the Mexican government. Last year the conductors and engineers of foreign nationality, mostly from the states, tried to obtain certain advantages in conditions of service, etc., over Mexicans occupying similar positions, and a general strike was threatened. The report says: "The board of directors worked energetically, and by exercising necessary prudence was able to handle the situation in such a way as not only to satisfy the conductors and engineers mentioned, but to uphold the principle of giving preference to the Mexican employees under equal circumstances. This was in accordance with the regulation in effect that foreign employees who properly performed their duties would be kept in the service, thus recognizing their personal merits; the understanding being that, under equal conditions, preference would be given to native employees, with a view to stimulating the native element, so that in course of time the company would be able to use native employees in its service as far as possible."

The express service on the National lines has been reorganized. At the time of the merger, Wells-Fargo & Co. operated over the Mexican Central, and the National Express Company over the National Railroad. A company under the name *Compania Mexicana de Express* has been organized to perform the express service over the entire system. The National Railways receive 50 per cent. of the gross earnings in payment for providing facilities for the service. The total capital stock of the express company was paid in in cash by Wells-Fargo & Co. and amounted to \$500,000. The stock was divided into two equal series, A and B, and all of the \$250,000 A series was given to the National Railways. Both series A and B stock bear 9 per cent. cumulative dividends; but the dividends on the A stock must be paid before payment is made on the B stock. After payment of 9 per cent. on both series, the balance is payable pro rata on the entire stock. This is a more advantageous arrangement from the railway's point of view than usually obtains between an express company and a railway company.

The following table shows the operations of the company in 1910, compared with 1909:

	1910.	1909.
Average mileage operated	5,463	5,327
Freight revenue	\$18,938,683	\$17,536,156
Passenger revenue	6,610,886	6,187,778
Total operating revenue	26,281,147	24,402,761
Maint. of way and equipment	4,138,009	3,282,416
Maintenance of equipment	3,219,112	3,095,885
*Transportation	7,518,762	7,234,607
Total operating expenses	15,796,779	14,583,440
Taxes	183,996	130,994
Operating income	10,301,372	9,680,027
Gross corporate income	10,895,640	10,373,074
Less corporate income	1,118,583	633,572
Net corporate income	864,987	576,658
Dividends	538,398	56,914

*Includes Traffic Agents.

After the deduction of \$1,014,056 in 1910 for reserves for third damage and for depreciation on equipment and for adjustments, and in 1909 \$620,200 for depreciation of equipment.

NEW BOOKS

The Polite Engineer. Published annually by the undergraduates of the Polytechnic Institute of Brooklyn, N. Y. Vol. X. 144 pages, 6 in. x 9 in. Price, \$1.50.

This publication, of annual interest and value to the graduates and undergraduates of the institution with which they are associated, contains the results of the best research work and the best papers delivered before the technical societies of the institute during the past collegiate year. Such publications usually contain articles of much value, being written by men whose interests have been centered on the particular subjects for some time, either in a business connection, or through undergraduate research work. The material in this publication shows current endeavor; it is both interesting and valuable.

TRANSPORTATION AND TRAFFIC IN ENGLAND.*

BY LOGAN G. M'PHERSON.

I.

The area of England and Wales is 58,324 miles, almost exactly that of the state of Georgia. This is over 20,000 miles less than the extent of the region tributary to the Rhine. Physically, England and Wales consist of seven basins separated one from another by watersheds that at places are pronounced and in others inconsiderable elevations. It is therefore evident that, as a rule, the 215 rivers that find their way to the coast on one side or another cannot come from very far in the interior, only the Thames, the Severn and the Trent extending from the Midlands. Although the rivers generally traverse level plains or broad valleys, only six of them are navigable for more than 50 miles of their lengths; others are navigable for greater or lesser distances, and a few in their lower reaches are estuaries of the sea. The first settlements of economic importance were naturally at or near the heads of navigation of such estuaries. Thus London owed its wealth and prosperity to the Thames, Bristol to the Severn and the Avon, while Norwich on the Yare had easy access to the sea. York, on the Ouse, had direct communication by water for many miles in nearly every direction with the surrounding country, and Exeter by way of the river Exe obtained connection with the English Channel.

The earliest landways were the Roman roads, leading in the main from a port on one side toward a port on another side of the country; that is, they extended from Dover through London to Chester, from London to Exeter, from Bath to Lincoln and from Manchester to Newcastle, taking substantially the same routes as those of the great railway lines subsequently constructed. After the Romans withdrew from the island, it would not seem that these highways were well maintained, for all accounts of communication during the medieval period dwell on the wretchedness of the roads. Much of the interior was forest, bog and fen. While the feudal lords accepted a certain responsibility for the condition of the roads, they did not bestow a great deal of effort on them. A statute of Henry VIII bound each county to repair the bridges of public utility within its limits, and an act of Philip and Mary provided for the election by the parishes of surveyors to see to the maintenance and repair of the highways leading to market towns. The local parishes as a rule, however, had no funds at their disposition for such repair, and throughout the middle ages goods were chiefly carried by packhorses, who traveled along the bridle paths which in many parts of the country were the only roads, while travelers mostly journeyed on horseback. Even in the middle of the seventeenth century, packhorses, strong enduring animals, the breed of which is now extinct, were employed to carry the products of the looms, the pottery of Staffordshire and even the coals of Newcastle.

In the Saxon era each of the separate counties was very much cut off from its neighbors, obtaining food and clothing from its own flocks and herds and from its own land. In addition to the towns that had grown up at the heads of navigation on the various rivers and estuaries, smaller settlements arose in fortified camps or in the shadow of a great abbey or monastery, as did Oxford, or around the country house of some king or earl.

The beginnings of that industry which ministers to the wants of those beyond the immediate neighborhood are rooted in the fact that the soil and the climate of England are especially adapted to the growing of sheep. At least as early as the thirteenth century wool was exported to Flanders and later to Holland and to Italy. During the reign of Edward III Flemish weavers came to England and established the looms from which the first woollen goods of this country were made. The growth of the industry was facilitated by the fact that England was incomparably more peaceful than the countries of Western

*From a preliminary report to the National Waterways Commission of the United States.

Europe. Between the thirteenth and the seventeenth centuries the body of the Continent was so continually devastated by war that the towns could scarcely have kept deep the most regular and continuous of domestic animal.

The development of the wool industry and progress in agriculture naturally tended to break down the barriers of local self-sufficiency and to the exchange of merchandise between one place and another, especially at fairs which were held annually in different parts of the kingdom, and were attended by all classes of the population. The largest fairs were at places not far from where wool could readily be received from the flocks of other lands. Here came Flemish merchants with their linen and cloth; Frenchmen and Spaniards with their wine; traders from Venice with silks, velvets and precious stones; Norwegian sailors with fur and parchment, the emissaries of the Hanseatic League with tins and amber, iron and copper, flax, tustian, buckram, wax and spices and ornaments from the East. In return the English farmers sold wool, barley, corn, horses, cattle, lead and tin. The principal mercantile event was the visit of the Venetian fleet to the southern shores. Small light boats plied back and forth, carrying wool between England and Flanders.

Throughout all this period, which extended well into the eighteenth century, the commerce of England with other countries was conducted mainly by the regions adjoining the coast or bordering the estuaries. Domestic commerce was also carried by coastwise vessels between one port and another. In the communication between place and place in the interior, peddlers and packhorses were still the principal factor.

There had, however, been a certain improvement in the land ways. The first real effort dated from the passing of the Turnpike Act in 1633. The first turnpike tollgates were not erected until during the reign of Charles II, and they did not come into general use until a hundred years later. Coaches had been introduced in 1553, but not until 1658 was a stagecoach line established between London and Edinburgh, the journey taking nearly a fortnight. In 1669 the stagecoach undertook to perform the journey from Oxford to London between the rising and the setting of the sun.

The landways, however, did not keep pace with the needs of the growing traffic. The wool industry founded by the Flemish weavers had become well established, a body of Italians skilled in handiwork came to England toward the end of the fifteenth century, and many Protestants, driven out of the Netherlands by the Duke of Alva, found refuge here during the reign of Elizabeth. The expulsion of the Huguenots from France likewise caused a great wave of emigration of silkworkers and linen workers to this country. The woods and forests which once covered much of England were being recklessly used up; there was progress in agriculture, and attention was being given to the utilization of ore from the veins of iron, tin and lead, as well as to the more extended use of coal. Although this fuel had been mined in Newcastle during the thirteenth century it hardly entered the markets until four hundred years later, it being difficult of conveyance except by water, and barges could not go up the rivers except for short distances. The same was true of iron and the other minerals, as well as with the products of the pottery industry which was gradually developing. At the beginning of the sixteenth century the eastern and southern counties were the most prosperous, their wealth being based largely on agriculture, which was here all the more successful because the level land offered fewer obstructions to making and maintaining roads than did the uneven interior. But in the reign of Elizabeth was completed the transition of England from a wool exporting to a wool manufacturing country, the manufacturing population spreading over the towns and the country. This led to the North becoming even more prosperous than the South. Merchants and artisans of Antwerp, which had suffered severely under the Spanish invasion, fled to England, where they were welcomed and encouraged to continue in their

vocations. London took the foremost position in the process, part of Europe, where the new treasures of the two Americas were found side by side with the products of the Continent and the East.

IMPROVEMENT OF RIVERS.

Improvement of the rivers was begun in the fifteenth century, when the Thames, the Lee and the Yorkshire Ouse received some attention. In the sixteenth century the Severn, the Stour in Essex, the Humber, the Exe, the Lee, and the Welland were improved; in the seventeenth century the Colne, the Itchen, the Warwick, the Avon, the Medway, the Wye, the Bure, the Yare, the Waveney, the Suffolk Ouse, the Witham, the Aire and the Calder, the Trent and the Fossdyke; in the eighteenth century the Avon, the Dee, the Derwent, the Nene, the Kennet, the Wirr, the Mersey, the Irwell, and the Weaver. The artificially improved channels of rivers are designated as "navigations."

In the seventeenth century, to extend the area available for industry, the fens of Cambridgeshire and Hatfield Chase, almost constantly flooded by the rivers, were drained by specially constructed channels. In imitation of the Dutch, the salt marshes of Essex and the lowlands of Norfolk were banked against the sea. In the next century the use of water increased as power for factories, cornmills and clothmills and in connection with the blast furnaces. This development tended to take the industries of eastern counties to the shores of the rivers and the streams. About the middle of the eighteenth century the Duke of Bridgewater conceived the idea that coal from his collieries at Worsley could be conveyed more speedily and more economically to Manchester by the aid of a canal. The authority for its construction was granted by act of Parliament; it was built and made a practical thoroughfare by James Brindley, who brought it to completion in 1761. Prior to the opening of the canal the charge for carriage along the existing waterway was twelve shillings per ton and along the landways, forty shillings. The charge by canal was made six shillings, and the price of coal in Manchester at once fell one-half. The canal was extended to the Mersey, affording connection between Manchester and Liverpool and laying the foundation of the prosperity of this district. Before this communication by canal the woollen and cotton products of Manchester intended for export had been carried on horses' backs to the Severn, down which they were floated to Bristol, then the chief seaport on the western coast. After the opening of the canal the packhorses were taken off, and the export trade was centered in Liverpool. Here new harbors and docks were built, and this city outdistanced Bristol. The next canal was the Grand Trunk, connecting Liverpool and Hull, opening up the salt district of Cheshire and the pottery district of Staffordshire. Heretofore, of the materials used in the manufacture of pottery, flints had been brought from the southeastern ports to Hull and then up the Trent in boats while the clay was brought from Devonshire and Cornwall by water up the Severn, being carried, from the points where water carriage ceased, on the backs of horses to the potteries; and the manufactured articles were returned for export by the same routes. The cost of carriage was enormous and consequently the expansion of the earthenware manufacture was checked. The same difficulties had hampered the carriage of salt, corn, coal, lime and ironstone. The Grand Trunk Canal was connected by the Trent with Nottingham, Newark, Gainsborough and Hull. Its effect was to reduce the cost of carriage of all articles by 75 per cent. The population of the districts served by it was trebled in 25 years, and the country was not more improved than the people. Other canals were built to connect the Severn and the towns of Wolverhampton and Kidderminster with Liverpool by way of the Grand Trunk Canal; to connect Oxford and London as well as with Birmingham, and to connect the mineral districts of Derbyshire with the Trent.

These canals were all built under the direction of James Brindley. Others were rapidly placed in the way of construction and completed, usually, with reasonable expedition. The Leeds

& Liverpool Canal connected the Irish sea at Liverpool with Leeds and the then populous district of Lancashire. Various coal fields and agricultural districts were connected by canal with adjacent rivers. The Rochdale Canal was built to connect Manchester with the Humber by way of the Aire and Calder Navigation. It has been said that \$150,000,000 was spent on these canals and navigations. Since 1852 the Manchester Ship Canal is the only canal that has been constructed, although various minor improvements and extensions have been made.

Expenditure on the rivers, principally along the channels of tidal navigation, continued during later years. The Tyne has been made of a uniform depth of nearly 30 ft. from Newcastle to the coast, permitting great vessels to move between the Tyne ports and the sea, and the Severn had been made navigable up to Stourport.

Although it was possible to trace continuous lines of water communication between the principal commercial centers of England, such continuous lines were rarely through routes over which the same boat could be taken from one end to the other. There were great differences in the depth and width of different canals and great differences in the sizes of the locks, the through boats being limited to the size that could be taken by the smallest lock. There was also great expense incurred in keeping the canals that crossed the watersheds supplied with water, it being necessary to lift the boats to heights, in many cases, of over 400 ft. through a series of locks up to which water had to be pumped. The barges employed to carry goods often got aground. For many days during the summer the canals were closed because of drought, and in severe winters they were at times frozen over. Notwithstanding all their disadvantages, however, the means of transportation afforded by the canals were so vastly superior to those of the packhorses and the stage-coaches, even though the landways toward the close of the eighteenth century had been greatly improved by macadamizing, that they led to a great advance in the industry and commerce of the country. Mills and factories were drawn to their banks, and they facilitated the development of the interior.

There was from 1791 to 1794 a canal building mania. Over 100 canal acts were passed by Parliament before 1800. The value of canal companies shares in some cases rose to 100 times their nominal or par value, and enormous dividends were often paid. In many cases, however, even at this time, the waterways yielded unsatisfactory results and were allowed to fall into decay.

The canal companies enjoyed a virtual monopoly, and with that singular want of foresight which so often accompanies unrivaled success, abused their power and outraged their customers. They shipped as much or as little as suited them and how and when they pleased. They limited the quantity, they appointed the time, until the difficulties of transit became a public talk and the abuse of power a public trouble. The canal proprietors were dilatory to the public until they became dangerous to themselves.

The truth is that as the packhorses and wagons of the previous era did not keep pace with the increase of traffic so also did the canals and other waterways rapidly fall behind the demand of the industry and commerce that in their day received an unparalleled impetus.

In 1769, Arkwright had originated the water-frame; in 1770. James Hargreaves the spinning-jenny; in 1779, Crompton the mule-jenny; and in 1785 Arkwright took out a patent for improved carding, drawing and rolling machines. The invention of the spinning-jenny and mule led to the provision of more yarn than all the weavers in the kingdom could consume. The invention of the power loom restored the balance and thenceforward there was no artificial limit to the use of yarn in weaving. But all the horses in the country, whether they were employed on the roads or in drawing canal boats, could not possibly distribute, with reasonable economy, all the cloth which the manufacturers could produce. That is, production was limited by the lack of adequate means of distribution. Just at this

time, in the closing years of the eighteenth century, production was further facilitated by the most momentous event in industrial history, the introduction of steam as a source of power. The stationary engine made possible large factories in the neighborhood of the coalfields, instead of small factories along the streams. Hence their migration to the vicinity of the coalbeds and a further tremendous advance in the productive capacity of interior and northern England. The application of steam to production was soon followed by the application of steam to locomotion. In the early years of the nineteenth century, those inventors who endeavored to utilize steam as a motive power on ordinary roads seemed much more likely to succeed than those who based their efforts on roads with rails. Steam engines and steam coaches were devised that actually ran upon the high-ways, but the roads were not sufficiently substantial to resist the weight of the heavy steam vehicles. It was soon found that adequate support could only be given by an especially constructed roadbed of exceptional solidity, and that frictional resistance was far less when the wheels ran on rails.

EARLY RAILWAYS.

A wooden railway existed in the neighborhood of Newcastle on Tyne prior to 1676, connecting a colliery with the river, and at the beginning of the nineteenth century several such coal railways were in existence, using horses as the motive power. The first line constructed especially for steam locomotion was that covering the 11 miles between Stockton and Darlington, in the county of Durham. Its opening on September 27, 1825, attracted slight attention beyond the immediate neighborhood. The London newspapers of the next week published short accounts, but these excited little comment. The greatest event in the history of the world since the battle of Waterloo was suffered to pass almost unnoticed.

At this time nearly 3,000 stage coaches were in operation in England, about one-half running in and out of London, and 100 mail-coaches. In the next dozen years this number was very largely diminished.

An article in the *Quarterly Review*, published soon after this event, said that the 75 canals constructed up to that time had cost on the average about \$45,000 a mile, whereas the railway cost was about \$25,000 a mile. The article went on to say that "the disadvantages of the canal are many. The frost at one season of the year entirely puts a stop to all conveyance of goods, and the drought at another renders it necessary to proceed with half cargo. The speed by which goods can be conveyed on a railway can be so regulated as to be certain and constant, while boats are frequently delayed for hours at the lockages of a canal. Railways may be made to branch out in every direction to accommodate the traffic in the country, whatever be the nature of the surface, while the possibility of carrying branches from a canal in any direction must depend entirely on the surface and the supply of water. Experiment has shown that at the speed of two miles an hour, under the same moving force on a turnpike road, on a canal and on a railway, the canal has the advantage of the turnpike as 15 to 1, and of the railway as 2 to 1; at the speed of 2.82 miles, the railway and the canal will be found to be equal, but at the rate of three miles an hour the railway has obtained the advantage over the canal in the ratio of 22.4 to 19.9, and at nine miles an hour the canal can take only $\frac{1}{8}$ of the weight conveyed on a railway with the same power."

The first considerable undertaking was that of a railway between Liverpool and Manchester, where the traffic had peculiarly suffered because of the inadequacy of canal transportation and the high-handed methods of the canal proprietors. After the first proposition the project was abandoned temporarily because of the engineering difficulties and partly because the opposition of the landowners was excited by the canal owners. These at last made a reduction in their charges, but it was too late. The merchants of Liverpool and Manchester came to a final deter-

mination to build a railway at an estimated expense of \$2,000,000. The coach-owners were fearful of the prospects which opened before them, and the canal interests were in great confusion.

"They brought every influence to bear to thwart the plans. Every report which could promote a prejudice, every rumor which could affect a principle was spread. The country gentleman was told that the smoke would kill the birds as they passed over the locomotive. The public was informed that the weight of the engine would prevent its moving, and the manufacturer was told that the sparks from its chimney would burn his goods. The passenger was frightened by the assertion that life and limb would be endangered. Elderly gentlemen were tortured with the notion that they would be run over. Ladies were alarmed at the thought that their horses would take fright. Foxes and pheasants were to cease in the neighborhood of a railway. The race of horses was to be extinguished. Farmers were possessed with the idea that oats and hay would no more be marketable produce, cattle would start and throw their riders; cows even, it was said, would cease to yield their milk in the neighborhood of one of these infernal machines."

The second attempt to obtain the Parliamentary act for the Liverpool & Manchester Railway was successful, and the directorate was composed of men of the first importance. While this railway was thus incipient, many other lines were surveyed and some of them attempted, covering nearly all the routes subsequently occupied by the great lines.

In 1830 the London & Brighton Railway was proposed for the second time, meeting with a reception whose warmth was in decided contrast with the hostility previously manifested towards the Liverpool & Manchester. It was not, however, without a certain measure of opposition, voiced by men who vociferated objections quite as exaggerated and preposterous as those which had been made against the Manchester line. Moreover, extortionate demands were made on the railways and advantage taken of every trifling want.

A first attempt to build a line from London to Reading was unsuccessful, but a second effort, including the extension to Bath and Bristol, resulted in a charter from Parliament, and in 1841 it was opened for traffic. In 1832 a line from London to Southampton was projected, the act of incorporation receiving royal assent in July, 1834. The project for a railway between London and Brighton brought on a fierce fight, during which five separate lines were proposed, the sums spent by the various companies in endeavoring to obtain an act of Parliament aggregating nearly \$1,000,000. The London & Essex Railway, proposed in 1831, was again brought forward in 1834, and at about the same time lines were projected to Edinburgh.

All the English railways were constructed by private enterprise, each under a particular act of Parliament. In the years 1836 and 1837 there was a railway mania, there being scarcely a practicable line between any two considerable places that was not embraced in the prospectus of one or another company. There were promoters who resorted to all kinds of tricks to get capital, and the parliamentary expenses were extraordinary. In one case \$500,000 was spent without any result; in another, six counsel and twenty solicitors were employed at an expense of \$335,000. The promoters of the London & Birmingham Railway spent \$360,000, and the promoters of the Great Western Railway, \$440,000, in forcing their schemes through Parliament. Of the whole capital of one railway, the London, Chatham & Dover, amounting to over \$80,000,000, not less than \$20,000,000 was dissipated in obtaining further subscriptions from the public and nearly \$10,000,000 was disbursed out of capital for the payment of interest and dividends.

In the four years ending with 1829 only a little more than \$4,000,000 a year was authorized by Parliament to be spent on railways. Authority was given for an average expenditure of more than \$10,000,000 in each of the four years ending with 1833. In 1836 schemes involving an outlay of \$225,000,000 were laid before Parliament, and it was suggested that they all be postponed

for a year so that an appeal might be made from the country drunk to the country sober. Three different companies promoted competing bills to Liverpool and although it was obvious that only one of the three bills could be passed, the shares of all the companies were quoted at a premium on the stock exchange. Parliament authorized an expenditure of nearly \$55,000,000 a year in each of the four years ending with 1837, and nearly \$105,000,000 in each of the four years ending with 1845. From 1830 to 1836 about 450 miles of railways were completed and 350 were in progress; the demand for engineers was difficult to supply. By 1838 the four great centers, London, Birmingham, Liverpool and Manchester, were all connected by rail. Less than 2,000 miles had been constructed in 1843, but more than 5,000 miles in 1848. The capital expended amounted to \$325,000,000 in 1843 and over \$1,000,000,000 in 1848. By 1861 the capital embarked in these enterprises amounted to \$1,800,000,000, over \$80,000,000 a year having been expended during the preceding eighteen years.

In 1845 most of the great lines had proved successful. The London & Birmingham was paying a dividend of 10 per cent.; the Grand Junction, 11 per cent.; the Stockton & Darlington, 15 per cent.; and railway shares were, on an average, at 100 per cent. premium.

The canal proprietors, panic-stricken from the inception of the new enterprises, in many cases blocked the railway projects by opposing the bills until the railways had taken over their canals. In some cases they made representation to Parliament that inasmuch as the building of a railway would destroy the usefulness of their property, the railway should be compelled to indemnify them by purchase or lease or otherwise. This feeling was generally shared by the entire public, and a decree of Parliament in many cases forced a railway to take over canal property as a step necessary to its obtaining the Parliamentary act authorizing construction. The terms on which the railways obtained the canals were not easy. The Fossdyke Navigation, in Lincolnshire, which had been leased by the Corporation of Lincoln to a Mr. Ellison at \$375 a year, was leased by his executors to the Great Northern Railway for \$47,875. The leases to the railways frequently provided that they were to maintain the canals in as good condition as when they received them, and to guarantee dividends. For example, the London & Northwestern made a guarantee to the Birmingham & Shropshire Union Canals that amounts to a dividend of about 4 per cent.

Claimants of all sorts against the railways asked what they chose and frequently succeeded in obtaining a good share of what they asked. The prosperity of the new lines of communication appealed to the government as a fertile source of taxation, and the perception was quickly acted on. In 1832 it imposed on railway travel a tax of 1/2d. a mile for four passengers and half a farthing for one. In 1842 this was modified to about 5 per cent. of the passenger fare, and this is substantially the levy now. The tax rates and government duty on English and Scotch railways in 1857 were equal to about 14 per cent. of their net receipts. In 1842 the traffic receipts amounted to less than \$20,000,000, and in 1861 to \$140,000,000, the working expenses in each year being about half the receipts. The return per mile during the former year was only a fraction less than in the latter, because of the extension of the railways through sparsely settled territory of scant traffic.

(To be continued.)

The government of Panama has contracted with the Panama Railway Company to build a line from the city of Panama to David, the capital of the Province of Chiriqui. The distance is about 274 miles, and it is expected that the route surveyed by the Intercontinental Railway Commission in 1893 will be followed. The road will traverse a rich district and will be an important factor in the development of a large and fertile section of the republic.

FLUE FAILURES.*

BY J. W. KELLY.

Foreman Boiler Maker, Chicago & North Western, Chicago.

Flue failures start, in a great many cases, in the designing room, by crowding in too many flues, placing them too close to the heel of the flange, or with too small a bridge. Even when properly designed the layout often uses his own judgment and places the flue wrong. After the flue sheet is laid out, the driller plays his part by drilling the holes too large. The cause, in some cases, is that the cutters are not ground right, or that there is too much lost motion in the spindle of the drill press. It is important to have the holes drilled the exact size and uniform, as it is impossible to keep flues tight in large holes. All holes should be chamfered on both sides. The copper ferrules should be expanded by a sectional expander, and never with a roller, as the roller reduces the gage. An Atlantic type engine came into the shop for a new firebox, and when removed, I found the flue sheet had moved upward in the center about $1\frac{1}{8}$ in., making the crown sheet look as if it was dropping down; when a straight edge was placed on it, we found that the crown sheet had started to raise about 18 in. from the back flue sheet. I put a straight edge on the new firebox and found it straight; then I got a tram and trammed it in the center of the flange on the top and the lower point between staybolts. The flues were set by expanding with sectional expanders and rolled very light, then beaded with a standard beading tool and inspected before the flue setter left the job, to insure proper work. I then trammed the sheet and found that it had moved upwards $3/16$ in. I sent the tram with the engine for future tests and had the men report the movement of the sheet every time the flues were expanded. It was as follows:

On February 4, 1910, flues expanded and trammed after work was completed; found a movement of $1/16$ in., or a total movement of $1/4$ in. upward.

March 11, 1910, expanded light, still 1-4 in.
 April 15, 1910, expanded light, still 1-4 in.
 May 29, 1910, expanded light, moved 1-32 in., total 9-32 in.
 July 10, 1910, expanded light, moved 1-32 in., total 5-16 in.
 July 20, 1910, expanded light, full set moved 3-64 in., total 23-64 in.
 Aug. 18, 1910, expanded light, full set moved 1-32 in., total 25-64 in.
 Sept. 20, 1910, expanded light, full set moved 3-64 in., total 7-16 in.
 Oct. 8, 1910, expanded light, no movement, total 7-16 in.

My object in making this statement is to show what this movement does later. The boiler is tested and if the material is all right, no flues have to be renewed, but on the other hand, if it is poor material, and the lap welds are not properly welded, we find the flue fails at this point in the expanding. I have, however, found cases in the center of the flues where they may fail at any time afterward in service.

The engine is ready for service and shortly afterward it fails on account of the flues leaking. What is the cause? We know the flue layout is not exactly correct, but the holes are drilled uniform and of correct size, and copper and flues were properly set and tested under 25 per cent. excess working pressure. We cannot say it is bad water, even if the engine is running in a bad water district, because it has not been out of the shop long enough to gather enough scale on the flues or flue sheet to do any harm; it has been washed out properly every three or four days. This failure is surely due to abuse—feed water not properly applied, or not fired right are two of the principal causes. The flues are and must be set back properly to the sheet again, and the engine will make successful trips, if the engine crew is taken to task by the right party.

We must keep the engine clean and free from scale by removing all washout plugs, especially those in the front flue sheet, and washing between the flues, back to the back flue sheet. Be sure that the long nozzle is used in every hole, because if you let it go until the space between the flues is filled up solid you all know what happens—flue failure after flue failure and cracked

bridges. These flue failures are all up to the roundhouses, but as we are going to keep the engine clean, I will try and show why it still fails on account of flues leaking.

The engine arrives at the terminal with only a fair fire, not very much steam, and a half glass of water, not leaking, and is therefore not reported. The hostler gets on the engine and finds these conditions, rushes it to the cinder pit, puts on the blower and gets the fire out quickly so as to get it into the house before the steam is gone—the water is also going fast. When he reaches the table, he starts the injector and fills the boiler until the injector breaks, and what has happened? Every flue has started to leak badly, which means the whole set must be expanded before the engine leaves the house. But possibly it is the only engine in and the roundhouse foreman has ordered it out, because he looked at it on arrival and knew it was not leaking. There is then a failure of flues, either by holding and doing a proper job, which should be done every time, or by taking a chance and telling the boiler maker to calk her up, or dry her up and let her go. The engine goes out on the main line and ties up everything, due to another flue failure. This kind of a failure can be stopped by compelling all engineers to leave their boilers full of water, a good fire, and plenty of steam. The engine is towed to the nearest roundhouse and the boiler maker is ordered to do the necessary work. He starts by using a mandrel, and pins out the flues and calks them with a beading tool, which is altogether too large and has no bearing on the bead, but cuts and grooves the flue sheet and spoils the bead. The engine is started out and fails again on account of flues leaking. This pinning of flues and the use of improper beading tools have caused a great many failures and every foreman boiler maker should watch this matter closely and stop it.

Everybody in charge is after the engine now, and the orders are to put it in first-class condition before leaving the roundhouse. The flues are again expanded, this time properly, and well beaded, and it does good work for a few days when a new hostler forgets the water and puts it in the house with 1 in. of water in the glass.

About two hours later the fill-up man finds no water in the glass and connects the hose to a blow-off cock located near the throat sheet. As the engine is ordered out, he fills it up quickly with cold water, fires up and pulls out of house with a heavy fire. The engineer cannot see the flues, and when the boiler maker makes an inspection they appear to be tight. At the depot the fireman calls the engineer's attention to the flues leaking, and there is another flue failure. I might say here: Do not allow fill-up men to connect up to blow-off cocks, if the fill-up water is cold. Better still, have a standard fill-up valve on top of the shell or dome and do all the filling through this valve, thus preventing flue failures. This also applies where the engines are waiting for orders or have been standing on the side track for some time. The crew gets careless, allowing the fire to burn down, resulting in no steam; they receive orders to go and on goes the injector, and what happens? Flues all leaking and engine soon gives out, thus causing another flue failure.

A great many flue failures are caused by careless firemen allowing the fire to get too heavy and having two or three feet of clinkers next to the back flue sheet, which stops circulation, causing the flues to contract and leak. Another cause is where engines are tied up and stand outside in cold weather. The fires are allowed to burn down and are only kept alive at the door hole. The injector must be put on, the cold water goes down to the bottom flues, and we get the same results as stated above, flues leaking.

There are several other causes, such as running with the fire door open, leaky steam pipes, poor firing, by having no fire for 10 to 20 in. from the back flue sheet, filling up hot boilers in roundhouses with cold water; in every case the flues must be worked over, and this continuous work in every case gives more or less trouble until the sheet is removed from the firebox.

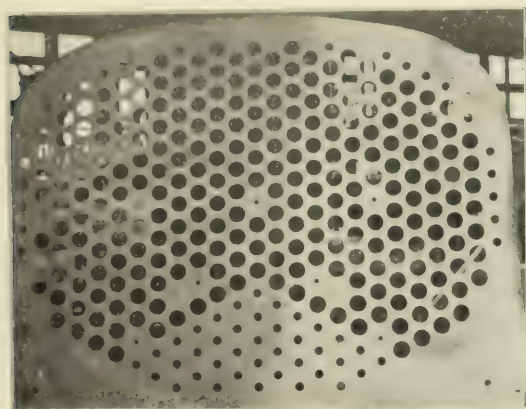
We all know what happens when beads drop off. Flues are

*Abstract of a paper presented before the Western Railway Club, November 15, 1910.

plugged, especially at the throat and in front and the flues are too low down. If it is possible to run an engine with the bottom flues plugged and it still does good work and is tight on coal, why not have them plugged out, so they will not be there to obstruct and leak? What this point in view, I got permission to experiment with an engine. I plugged up about 40 flues and put a stay rod in the center of the plugs. The engine went into service and did as well or a little better as to coal, and steamed fine. The flues were unplugged November 6, 1907, and the engine was put in heavy freight service for test purposes. Flues gave very little trouble, and were removed when the engine received general repairs to machinery, but they were still in fair condition on April 7, 1910.

The point I want to make is this. Do not crowd in too many flues because you must have the required heating surface. Keep the top flues down from 4 in. to 4½ in. from the flange to the center of the flue hole. The illustration shows the standard layout with stay rod holes where the flues are left out. These engines when received from the locomotive works had 342 flues and 5¼ in. bridge. They have, with the present layout, 280 flues, 13/16 in. bridge, and the flues are laid out with the taper of the sides of the flue sheet, which gives a wider bridge in the bottom, better circulation and a chance to let the sediment down. I recommend this wherever it can be applied.

We are applying this scheme to all engines of this class receiving new fireboxes or new back flue sheets, and are getting



New Spacing of Flues; Chicago & North Western.

good service. You all know there are a great many engineers who never have leaky flues or any kind of a flue failure, and the flues run for several months without being expanded. This is why some boilers and flues give such good service. Flue sheets do not move upward so fast and cause trouble, while on the other hand, engines of the same class with other engineers always leak and have all kinds of failures, doing practically the same work. While the flues and flue sheet must stand for these failures, nevertheless they are men failures.

We know from tests on the New York Central that the flues moved upward. I have proven that the back flue sheet moves upward when the flues are continually expanded. Now, with the power getting larger all the time, these large boilers must have more attention; we must depart from the old rut and try and grow larger with the boiler, because we cannot expect the same results with the same methods we had when the boilers had 150 flues and carried 135 to 150 lbs. steam pressure. It is my opinion that we must go even farther than above suggested and meet this situation by reinforcing the back flue sheet in some manner to help take care of these sudden contractions of flues and the upward movement of the back flue sheet and flues. But with present conditions, we must hold engines from service when the flues become thin and have poor beads and remove them be-

fore they make a serious failure. Do not try to get 100% efficiency trip and fail on a very important train.

EXPANSION OF FLUES

The method of taking care of flues at terminals is narrowed down to the sectional expander and heading tool. If flues are heading slowly, use a heading tool that fits the flue properly and calk well. If a set of flues are loose, and leaking badly, they should be properly expanded and calked. The roller expander should never be used, as it rapidly thins the flue and reduces its ultimate life. The mandrel or tapered pin should under no circumstances be used, as this tool shears off the bead in time and only dries up the flues temporarily and they soon become leaky and will fail. The heading tools should be watched very closely and kept up to the standard gage, as flat tools soon destroy flues.

BRICK ARCHES

Brick arches are playing their part in helping to keep flues tight, and should, in my opinion, be placed in all large locomotive boilers, tight against the back flue sheet, with an opening in the corner to allow sparks to go down. Among the advantages of the brick arch are fuel economy and better combustion. It reduces the cutting action of sparks on the beads by keeping a large percentage in the firebox and stops the small light fuel from passing through and stopping up flues.

In conclusion, we must educate everybody who handles engines to the importance of keeping an even temperature in these large boilers, of applying feed water correctly, and of properly opening blowers, and of the evils due to cooling the engine down too quickly and washing with cold water. The boiler must be washed out properly and must not be allowed to fill up with mud, which produces cracked bridges. All flues should be bored out; brick arches should be applied in every engine before leaving the round-house, and, at last, but not least, we must have good flues and flue work.

THE NEW LONG AND SHORT HAUL LAW.

The railways have until February 17, 1911, to decide what they are going to do about the new long and short haul section of the Interstate Commerce act. The power given to the Interstate Commission by this section of the Mann-Elkins act is second in importance among the powers given by it only to that conferring on the commission authority to restrain advances in rates. There is a widespread impression that under the new law the commission can and probably will rigorously prohibit railways from making higher rates for shorter than for longer hauls except in the most unusual circumstances. It is desirable that this impression be corrected. The order issued by the commission on October 19, regarding the steps to be taken by the roads toward complying with the amended long and short haul section, gives no definite indication as to the specific policy that the commission intends to pursue in administering it, but it does seem to make plain that the commission will not try to enforce this section rigidly. For the commission to try to do so would be to disregard the clear intention of Congress, for a bill to prohibit railways from in any case charging more for a shorter than for a longer haul was introduced at the last session and defeated. The main difference between the section finally adopted and that in the original Interstate Commerce act is the original act made it "unlawful for any common carrier * * * to charge or receive any greater compensation in the aggregate for the transportation of passengers or of like kind of property, under substantially similar circumstances and conditions, for a shorter than for a longer distance over the same line"; while the amended act strikes out the words *under substantially similar circumstances and conditions*, and makes clearer the intention of Congress that before a railway may charge a higher rate for a shorter haul it must get the express consent of the commission. Until February 17 the roads may continue to make rates as they have heretofore. After that they must not charge

a higher rate for a shorter haul unless they first get the explicit authorization of the commission, or invalidate the law by litigation.

While negatively it is clear that Congress did not intend the railways to be absolutely prohibited from charging a higher rate for a shorter haul, it is not clear when Congress meant that this might be permitted. There was a strong feeling that the existing method of making rates was wrong; but as to just what ought to be done to make it right the lawmakers did not have any clear idea, so they turned the whole job of making it right over to the commission. Under the old law some guidance was given to the commission by the words "under substantially similar circumstances and conditions." They plainly implied that where circumstances and conditions were substantially dissimilar a higher rate for a shorter haul might properly be charged. The fact that these words were deliberately stricken out by the Mann-Elkins bill shows that some substantially dissimilar circumstances and conditions which the courts have held to justify non-observance of the long and short haul principle do not justify it in the opinion of Congress. But under just what circumstances the long and short haul principle may be disregarded seems to be left by the act, if the fourth section be read alone, to be determined entirely by the commission.

Most railway lawyers do not believe, however, that if the question is ever litigated the courts will hold that the commission has such unlimited discretion. They contend that the railway has a property right in the beneficial use of its property. This includes the right to make any rate which is not unfairly discriminatory or unreasonable. They argue that there are certain conditions in which the fixing of a higher rate for a shorter haul is neither unreasonable nor unfairly discriminatory. It follows that the right of a railway under such conditions to charge a higher rate for a shorter haul is a property right which cannot be taken away. If it be answered that the law does not absolutely take its right away, but gives the commission discretion to determine when it may be exercised, it is replied that this does not cure the defect in the provision. The commission is an administrative body of delegated powers. Congress cannot confer on such a body authority without laying down the rule by which it is to be guided in exercising it; and the new long and short haul section gives no such guidance.

On this theory the law cannot be upheld as constitutional unless it be read as a whole and it shall be held that in some other part of it Congress has laid down the rule which is to guide the commission. It is contended that if the rule is laid down anywhere it is in the first section, which requires rates to be reasonable, and in the third section, which prohibits them from being unfairly discriminatory. Under this interpretation a railway which desires to disregard the long and short haul principle must first apply to the commission. If the commission denies its application the road may appeal to the courts on the ground that the adjustment of rates it proposes to make would not be unreasonable nor unduly discriminatory. And if the court finds that this contention is true, it will nullify the commission's ruling just as in previous years it nullified its orders when the courts differed from it as to whether certain circumstances were dissimilar within the intentment of the original Interstate Commerce act. On this theory the new long and short haul section differs from the corresponding part of the old law a great deal, as that part of the new law giving the commission jurisdiction of rates in general differs from the one in the Hepburn act. Under the Hepburn act the commission had no control over the initiation of rates. It could act with reference to a raise in rates only after the raise had been made. Under the new law it may restrain an advance until it has determined whether it is reasonable. Similarly, under the old law a railway might itself determine whether particular circumstances and conditions were sufficiently dissimilar to justify departure from the long and short haul principle and make rates accordingly, and the commission could not interfere with them until they were in effect. Under

the new law the railways are prohibited from disregarding the long and short haul principle without first having got the consent of the commission; the railway cannot make an unreasonable or discriminatory adjustment and keep it in effect until some shipper complains and gets it changed.

Some lawyers are inclined to think that the courts may hold that Congress did give the commission complete discretion to determine whether a higher rate may or may not be made for a shorter haul, and that its action in doing so is constitutional. The decisions of the Supreme Court of the United States construing the long and short haul clause of the original Interstate Commerce act do not throw much light on the question; for practically all, if not all, turned on the meaning of the words "substantially similar circumstances and conditions," which do not now appear in the law. But in 1901 the Supreme Court rendered a decision which is regarded as having more or less of a bearing on the matter. This was in the case of the Louisville & Nashville *vs.* Kentucky (183 U. S. 502).

The constitution of Kentucky contained a provision identical with the long and short haul clause of the original Interstate Commerce act, and the Kentucky legislature passed a law to give effect to it. The state railway commission, which also was created by the state constitution, prohibited the railways from in any case disregarding the long and short haul principle without its express consent. The Louisville & Nashville disregarded the commission's order and was prosecuted. It contended that the Kentucky law was unconstitutional on much the same grounds on which it is now contended that the new federal long and short haul law is unconstitutional. The Supreme Court of the United States decided against the railway.

There are several important points, however, in which this case differed from any that could arise under the Interstate Commerce act. The Kentucky commission was created by the state constitution, while the Interstate Commerce Commission exercises only powers delegated to it by Congress. The long and short haul clause was in the Kentucky constitution, while the federal long and short haul clause is merely an enactment of Congress. The Kentucky law and the action of the commission in administering it had been upheld by the Kentucky supreme court, and it is a familiar principle that the federal courts will uphold the interpretation put by a state court on a state law or constitution if this can be done without violating some provision of the federal constitution. The Kentucky constitution and the law passed to give effect to it laid down a rule for the commission to follow, by indicating that the long and short haul principle might be departed from where conditions were substantially dissimilar, while the present federal law does not lay down any such rule. It would seem that the only question on which the Kentucky case might be a precedent for a case arising under the existing federal law would be whether a law or an order of a commission which absolutely prohibits the charging of a higher rate for a shorter haul deprives a railway of its right of property to make reasonable rates. This question was directly raised in the Kentucky case, and the federal Supreme Court said:

"Though it be conceded that ownership in a railway is property, it is property of a kind that is subject to the control prescribed by the state. We do not wish to be understood as intimating that if hereafter the railway commission should fix and establish rates of a confiscatory character the company would be without the protection which courts of equity have heretofore given in cases of that description. What we now say is that a state corporation voluntarily formed cannot exempt itself from the control reserved to itself by the state by its constitution, and that the plaintiff in error if not protected by a valid contract cannot successfully invoke the interposition of the federal courts in respect to the long and short haul clause in the state constitution on the ground simply that the railroad is property."

In other parts of its decision the court repeatedly indicated that it based its decision "upon the proposition that the company takes and holds its franchise and property subject to the conditions and limitations imposed by the state in its constitution." Now, of course, the same thing could not be said of any railway which contested the constitutionality of the federal long and short haul law, because no road has taken and holds its franchise and property subject to any such federal constitutional conditions and limitations.

In view of all these circumstances it seems improbable that the Kentucky case can be considered a precedent indicating what the Supreme Court will decide regarding the constitutionality of the new Federal long and short haul clause. Of course, if it is a precedent, it indicates that the court will uphold the law. But A. P. Thom, general counsel of the Southern Railway, undoubtedly expressed the consensus of legal opinion when, at the hearing before the Interstate Commerce Commission on October 8, he contended that either the amended fourth section must be construed merely to give the commission the initiative to prevent the making of rates that are unreasonable or unfairly discriminatory, or it must be held unconstitutional.

Probably, sooner or later the question of the constitutionality of the new long and short haul law will be fought out in the courts. Meantime, the disposition of most railway legal and traffic officers is to try to work out and agree with the commission on some adjustment of rates which will make possible the avoidance of litigation. Heretofore there have been some violations of the long and short haul principle which cannot be defended on sound economic or ethical grounds, and there have been others which are defensible on these grounds but which seem so indefensible to the general public that in the long run the roads might gain by eliminating them from their tariffs. If, therefore, the commission does not lay down rules which seem to the railway officers altogether too drastic, there is ground to hope that some adjustment which will be reasonably satisfactory will be reached without litigation.

The cases where higher rates have been made for shorter than for longer hauls present the most infinite variety. Numerous examples of discriminations which seem against public policy may be cited. Suppose the case of a number of railways competing between large and important termini from which they get a big share of their total traffic. This competition pulls and keeps down the rates between the termini, while, there being no similarly intense competition to local points, the rates to the latter are kept up, violations of the long and short haul principle resulting. In such a case there is dissimilarity in the circumstances and conditions under which the traffic to the large terminal points and the traffic to the local points is handled, consisting in the large amount of traffic given by the terminal points and the fiercer competition between the carriers for it. But it is questionable if these are conditions of dissimilarity which justify disregard of the long and short haul principle. Do neither law nor fairness give to one community the right to have lower rates than another because it is able to give a larger amount of traffic, any more than they give to a large shipper the right to enjoy lower rates than a small shipper? The intense competition between the carriers is a condition created by themselves, and they cannot claim that conditions created by themselves, and which they can remedy, justify them in so discriminating as to give one community an advantage over another.

The Supreme Court, in its opinion in the case of East Tennessee, Virginia & Georgia et al. vs. Interstate Commerce Commission (U. S. 181), suggested a case where disregard of the long and short haul principle would be plainly unfair.

"Take the case," said the court, "where the carrier cannot meet the competitive rates to a given point without transporting the merchandise at less than the cost of transportation, and, therefore, without bringing about a deficiency which would have to be met by increased charges on other business. Clearly in such a case the engaging in such competitive traffic would both bring about an unjust discrimination and a disregard of the public interest, since a tendency toward unreasonable rates on other business would arise from the carriage of traffic at less than the cost of transportation to the particular places."

As there are some examples of disregard of the long and short haul principle that are plainly indefensible, so there are many which are conclusively defensible. The best, of course, are those where railways meet active and controlling water competition at more distant points which they do not meet at intermediate points. The commission, even in its early attempts to administer the original Interstate Commerce act, never held that where water competition was active and controlling a lower rate might not be charged for a longer haul, although it did differ from the roads

about whether they could then fix rates without its presence or consent. The best examples of lower rates for longer hauls made to meet the water competition are found in the southeast and on the Pacific coast. There has been nothing said or done to indicate that the commission will refuse to let the roads make lower rates from New York to San Francisco, for instance, or from New York to New Orleans, than to intermediate points. The law as it now stands not only gives the commission authority to say whether a lower rate may be made for a shorter haul, but also authorizes it "from time to time to prescribe the extent to which such designated common carrier may be released from the operation of this section." The theory on which the railways have acted in the past has been that where water competition was controlling they could make any difference between the water rates and the rates for the longer and the shorter hauls that they liked so long as the rate for the longer haul was not positively unremunerative and the rate for the shorter haul was not excessive. It is evident, however, that the commission now has—whether it had before or not—the authority to limit the amount of the discrimination which may be made between the intermediate and the more distant points.

Of course, the defense advanced for the distinction made between the more distant and the intermediate points in cases such as this is that the railways do not make the rates to the more distant points. The water lines make them. They must meet the rates fixed by the water lines or go out of business at the more distant points. But because competition forces them to accept a lower rate to the more distant point than they otherwise would is no reason why they should be prevented from charging a reasonable rate, even though a higher one, to the intermediate point. They could not afford to make rates as low in proportion on all of their lines as they make to meet water competition. If they were required to do this they would have in many cases to refrain from meeting water competition. The result would be that they would lose any profit that they make by hauling traffic to the more distant point, and, in order to earn a fair return, they might have to raise their rates to the intermediate points; in any event, the enforcement of a rigid long and short haul rule would be of no benefit to many intermediate points.

One fact very commonly overlooked is that the railways of the United States do not encounter water competition from river and coastwise water lines alone. Ocean steamships carry a large amount of grain from the Pacific coast around Cape Horn to Europe. There are times on the return trip when they can hardly get enough traffic for ballast. In consequence, they make very low rates from Europe to the Pacific coast on many bulky commodities. One of these is cement, which they carry in large quantities from Belgium. To meet this competition the railways make a very substantially lower rate on cement shipped from Hannibal, Mo., and Buffington, Ill., to the Pacific coast than to intermediate points. They could not make their present coast rates their maxima. If they were required to do so they would simply quit hauling cement to the coast and the Belgium producer would get all the business.

A good example of lower rates for longer hauls made to meet both rail and water competition that really covers the entire earth is afforded by the rates on grain and its products. Flour shipped from the United States to Liverpool meets there the competition of wheat and flour hauled there by rail and water from Canada, Russia and Argentine. It must be laid down there at a freight rate which will enable it to be sold at a profit. To enable the American producer to meet the competition in the markets of the world the rate on flour for export from Minneapolis to New York is made 21½ cents, while the rate to interior points is higher—to Paterson, N. J., for instance, it is 25 cents.

Still another example of the same kind is afforded by the rates made by the Chicago, Milwaukee & St. Paul on cotton piece goods moving to the Orient. The rates from different places vary, but, generally speaking, it may be said that the rate from points in the Southeast to Spokane is \$2.50; to the Pacific coast, \$1.32,

and that the proportion of the through rate received by the St. Paul and its connections on cotton piece goods moving from the Southeast to the Orient is 94 cents. The reason why the lower proportional rate is made on goods moving to the Orient is that these goods may move either westward through the United States and across the Pacific ocean, or eastward over the Atlantic ocean and through the Suez canal to the Orient. The other transcontinental railways formerly made lower proportional rates on goods moving to the Orient than to the coast, but when they were required to publish the inland proportions of these rates they raised them to the same basis as the Pacific coast rates, rather than disclose to the public what revenue they had been getting from oriental business. The St. Paul has been able to get a good deal of this business since it became a transcontinental line.

On economic grounds the justification for making lower rates for longer hauls when, as in these cases, it is absolutely necessary in order to meet competition not only with coastwise steamships but with ocean steamships moving over all the waters of the earth, seems complete. The German state railways and other railways of Europe also make lower rates on export than on domestic business. Nevertheless, the course of the railways of the United States in thus making rates has been the object of bitter criticism. It is an interesting question to what extent some of the roads will continue to make rates in this way, even if they get the consent of the commission—and if not its consent, that of the courts—to do so. The western transcontinental lines are confronted by the fact that in a few years the Panama canal will be done and that then the coastwise steamships can make much lower rates between the Atlantic and Pacific coasts than now. Furthermore, it is doubtful if the bitter sentiment the existing rate adjustment has excited against the roads can ever be changed except by a change in the method of making rates. The Interstate Commerce Commission in the various Pacific coast rate cases has held that the rates of the railways to intermediate points are unreasonable per se. Furthermore, as the Panama canal soon will be finished, it seems to some railway officers desirable that any discriminating done in future should be in favor of the interior country, since the railways will always get all of the traffic there, while they are apt to have to fight harder and make lower rates for the coast traffic. In these circumstances, it seems worthy of consideration whether the roads would not gain in the long run by raising their rates to the coast to a basis where they would be reasonable regardless of water competition. With rates made on this basis they would be able to get some traffic from the Eastern seaboard to the coast, for some traffic will seek the railway rather than the waterway even though the railway rate is much higher. On the other hand, there is no doubt that if the railways raised their coast rates they would lose a very large part of their traffic from the Eastern seaboard to the coast. But some railway officers are a little inclined to think that what they would lose in this way would be less than they will lose in the long run by continuing to make extremely low rates to the coast, which may be invidiously compared with their relatively high rates to the interior.

As is well known, the rates of the roads to the coast have been blanketed from the Eastern seaboard back to the Missouri river. In other words, lower rates have been made from Chicago, for example, to the coast than to intermediate points as well as from New York. This has been done to enable manufacturers and jobbers in the Middle West to compete with Eastern manufacturers and jobbers for business on the Pacific coast. In other words, it has been due to commercial competition. The Interstate Commerce Commission has pretty clearly indicated to the railway officers that the commission would not approve of the continuation of this method of rate making, and has intimated that Chicago should be used as a dividing line and that, while from points east of it rates must continue to be made lower to the coast than to intermediate points, from Chicago and points west of it the railways must desist from making lower rates to

the coast than to the interior. To draw the dividing line at Chicago would be rather arbitrary. Starch now moves in considerable quantities from Keokuk, Iowa, which is west of Chicago, to the Atlantic and thence by boat to the Pacific coast. South Bend, Ind., is only a short distance east of Chicago, and yet when the transcontinental lines a short time ago raised the rate on wagons from South Bend to the Pacific coast from \$1.25 to \$1.35 they found this change was sufficient to cause the traffic to begin to move to the Atlantic and thence by boat to the Pacific coast. In consequence, they restored the old rate. But, no doubt, the commission feels that if a line is to be drawn at all it must be drawn arbitrarily, and that Chicago is as good a place to draw it as anywhere. If this is done the rates from Chicago to the coast will have to be made the maxima to intermediate points. This would make it necessary for the roads to reduce all of their rates to intermediate points to the basis of their present coast rates, for the commission has held that any higher rates to Spokane from the East than those now made to the coast are unreasonable. On the other hand, it would not prevent the roads from raising their rates to the coast. If they reduced their rates to the interior and at the same time raised their rates to the coast they would suffer for some time a very heavy reduction in revenue from both their interior and their coast traffic, which would have to be made good—if it ever were made good—by an increase in the traffic to the interior.

The difficulties which the Southeastern lines would meet in complying with a rigid long and short haul rule are perhaps even greater than those which would be met by the transcontinental lines. Not only are the Southeastern states completely bounded on the east and south by the Atlantic ocean and the gulf of Mexico, but there are innumerable navigable rivers running from the ocean and the gulf into the interior. The roads have been able heretofore to hold their own against the waterways because they have been permitted to make lower rates where they have met water competition than where they have not. In its earlier decisions—for example, in the case of Board of Trade of Troy, Ala., vs. Alabama Midland—the commission held that water competition which was merely potential did not justify disregard of the long and short haul principle. If the commission should so rule now and the courts should uphold it, the Southeastern lines would have to choose whether they would reduce all their intermediate rates or raise the rates to the more distant points. If they adopted the former alternative, their revenues from their local business would be heavily reduced. If they adopted the latter alternative they would at once attract water competition. The water competition might then become active and controlling, in which event, under the old ruling of the commission, the roads would be justified in reducing their longer haul rates once more. If by this reduction they succeeded in destroying the water competition once more they would be placed in a peculiar predicament, for the Mann-Elkins act put into the Interstate Commerce act an entirely new provision regarding water competition. This appears in section four, and is as follows:

"Whenever a carrier by railroad shall be in competition with a water route, and such carrier reduces the rates on the carriage of any species of freight to an intermediate point, it shall not be permitted to thereafter increase such rates unless after hearing by the Interstate Commerce Commission it shall be found that such proposed increase rests upon changed conditions other than the elimination of water competition."

Now, the water competition having ceased to be active, it would seem that under the rule laid down by the commission in its earlier decisions the roads would have to quit making lower rates for the longer hauls. But they could not raise rates which had been made to meet water competition without proving that there had been some change in the conditions besides the elimination of water competition. It would seem that in that event if the commission stuck to its old rule, and the law were not modified, the southeastern railways would have no alternative but to reduce all of their intermediate rates. It will be recalled that the Supreme Court in its decisions construing the original Interstate Commerce act overruled the

communion, and held that where water competition actually had existed and would exist if railway rates were raised there existed a dissimilarity of circumstances and conditions which authorized the railway to make a lower rate for the longer haul. In view of these decisions of the courts and the changed personnel and greater experience on the commission, it seems not improbable that the commission may hold in continuing the *Mann* *Illinois* act that where potential water competition exists it justifies a lower rate for a longer haul, although it is easily conceivable that it may rule now as it did originally. In that event there would most certainly be litigation with the railways in the Southeast, as their traffic is still so light that they could not stand very heavy reductions in their earnings.

In addition to effective and controlling water competition, it has been generally recognized that where one of two railways running between competitive points has a substantially longer line than the other, it is justified in meeting the rates made by the shorter line between the competitive points, while charging higher rates to intermediate points. The defense of the practice is the same in this case as where a railway meets controlling water competition at one point which it does not meet at another point. The only place, it is believed, where the long and short haul rule has been consistently and rigidly enforced is in Iowa. The popular notion is that where this is done all of the intermediate rates will be reduced so that they will be no higher than the rate via the long line for the longest haul. This has not been the result in Iowa. In that state the longer line between any two points, in preference to decreasing its earnings by reducing its intermediate rates, has usually refrained from meeting the rate of the shorter line to the competitive point. The effect has been to keep the longer line from getting any profit that it might have derived from the competitive business and to deprive the people at the points where there are more than one road from getting any of the benefits of competition. Who benefits and who is hurt by this policy depends mainly on how much difference there is between the lengths of the competing roads. In many cases a road which is longer than a competing line between two points is shorter than the same line between two other points, and what it loses by not competing between the two former places it gains by its competitor refraining from competing between the two latter. But it seldom happens that the advantages and disadvantages of a road balance each other. There are some roads which are the short lines between most competing points and other roads which are the long lines between most competing points. Obviously, in these circumstances, rigid enforcement of the long and short haul rule will benefit the former and the shippers living on them and injure the latter and the shippers living on them, for the long line, being unable in many cases to make rates to the competitive points, must get its revenue mainly from its local traffic, which involves the necessity of making high rates on this traffic. Whether a long line will, where the long and short haul rule is rigidly enforced, meet the rates of the short line at competitive points and reduce its local rates, or will refrain from meeting competition and keep up its local rates, depends largely on the relative amounts of the local and the competitive traffic. If the terminal points are large cities, such as Kansas City and Chicago, or St. Paul and Chicago, it probably will prefer to stay in the competitive business and reduce its local rates. On the other hand, where, as in Iowa, there is no very great difference between the sizes of the various cities, the opposite policy is apt to be adopted.

While railways under the conditions existing in Iowa may submit without a determined contest in the courts to the enforcement of a rigid long and short haul rule, because the amount that they lose by it is relatively small, it seems inconceivable that they would do so where the amount involved was very large. For example, the Chicago & North Western and the Harriman lines between Chicago and Spokane are much longer than the Hill lines. For the former either to make their

rates to compete their rivals in attempting to pass on to their shippers the increasing rates in Spokane would involve loss at a large amount of revenue, and it is not conceivable that in such circumstances railways would submit to enforcement of the long and short haul rule without a serious legal contest. It is worth noting in this connection, also, that while, where the amount that a railway will lose by applying the long and short haul rule is small, the courts might not hold that enforcement of it was unconstitutional, enforcement of it, which would involve the loss of a large amount of revenue, might be held confiscatory of the property of the longer line.

While in most cases the lower rate is made for the longer haul because of controlling water or rail competition at the more distant point, this often is done for other reasons. For example, the rate on furniture from Chicago to the Pacific coast is lower than to intermediate points. This is not due to water competition, because furniture naturally does not move by water. It is due to the fact that there are factories on the Pacific coast which make furniture from lumber grown in that section, and it is considered necessary for the railways to make a low rate to the coast on furniture from the East if the Eastern manufacturer is to be enabled to compete with the coast manufacturer. As the coast manufacturer, in order to sell furniture in the interior, must pay a freight rate to get it there, the Eastern manufacturer can pay a higher rate to intermediate points and still sell it there at a profit. There is a number of other cases where lower rates are made to the coast than to interior points for similar reasons.

The justification for making a lower rate for a longer haul when rail or water competition is met at the more distant point which is not met at the intermediate points seems clear. But purely commercial competition is a different thing from transportation competition. The railways do not find a lower rate to the Pacific coast on furniture. They make the lower rate themselves in the first instance, and it is open to very serious question whether, as a matter of public policy, they are justified in doing so. Such rate-making, while it may be defensible on purely economic grounds, especially where a road has to adopt it to earn a fair return, excites so much public antagonism that it is doubtful if it does not cause more losses than profits. It is even questionable if it is a good thing from the economic standpoint for the railways. In the long run the best policy for a railway to follow is to protect and foster its own producers; and certainly a more effective way for the transcontinental roads to develop manufacturing on the coast would be to so adjust their rates as to favor the coast manufacturers instead of those in the East.

The main prerequisite to a satisfactory settlement of the long and short haul question—as well as of all other important railway questions—is that the public shall get the railway's point of view, and the railway the public's point of view. Persons without any special knowledge of railway affairs who discuss violations of the long and short haul principle usually talk as though they think the discriminations railway managers make between communities are willful and malicious. A little thinking would convince them this is not true. The railway manager is equally interested in the development of all the communities along his lines, and he naturally would rather get the same or a higher rate for a longer as for a shorter haul, simply because the longer haul costs more, and the practice of charging lower rates for longer hauls excites public discontent. It ought to be clear, therefore, that when a lower rate is made for a longer haul there must be conditions beyond the control of the traffic manager which prompt, or even compel, him to do so, and the public ought to study and understand these conditions before in any given case it condemns this method of rate-making.

On the other hand, it is daily becoming clearer that railways cannot be managed solely according to the principles which their managers believe to be right. Railway managers ought to do all that they can to educate public sentiment, so that the public

will be able to form a fair and intelligent opinion of the effect on the public interest of the policies followed by the roads. Where laws are passed which wantonly attack the constitutional rights of the railways they are, no doubt, justified in litigating them. But if satisfactory relations are ever established between the railways and the public, the railway managements must recognize the fact that some things which it would be right and desirable for them to do if the public could be made to see that they are right and desirable may become wrong from the railway standpoint when the public persistently and uncompromisingly condemns them. There are many discriminations in rates which railway men believe operate to the public good but which the public—often ignorantly—condemns. If the public cannot be convinced that such discriminations are right, it may be better to desist from making some of them, provided the railway can do so without reducing its profits below a fair return. The result of antagonizing public sentiment in regard to some matters of this kind is to provoke attacks on the railways which may in the long run cause them and the public more loss than the railways and the public would suffer from the railways complying with some of the public's unreasonable demands.

NATIONAL ASSOCIATION OF RAILROAD COMMISSIONERS.

The twenty-second annual convention of this association was held in Washington, November 15, 16 and 17. The addresses of Messrs. Knapp and Decker at the opening were noticed last week, page 975.

The convention declined to approve the report of its committee on railroad taxes. The report was opposed on the ground that market value suggested by the report as an element in railway valuation was impracticable as a basis of taxation of railways generally, and no action was taken on it. Reports on statistics, on simplification of tariffs, on shippers' claims, on rate-making, on powers, duties and work of state commissions, and on grade crossings and trespassing were discussed and with minor changes were adopted.

Officers for the coming year were elected as follows: President, R. Hudson Burr, of Florida; vice-presidents, Charles F. Staples, of Minnesota, and O. P. Gothlin of Ohio; secretary, William H. Connolly, chief clerk of the Interstate Commerce Commission; assistant-secretary, William Kilpatrick of Illinois.

The association decided to hold its next annual convention in Washington on October 10, 1911.

The report discussed at length the various methods of ascertaining the value of railway property, reciting that the most important facts on which to base a determination were actual cost of construction, cost of reproduction new, depreciated value, amount and market value of stock and bond issues with a full financial history of the road, density of population and traffic, nature and permanence of population and traffic, facilities for doing business, physical characteristics, and amount of earnings and operating expenses. An extended debate showed that the discussion of the report would never end, and it was finally ordered to be printed without having the approval of the committee.

The committee on railroad statistics, Henry C. Adams, chairman, reported that it had spent considerable time investigating a proposal submitted to it for a change of the time for ending the fiscal year from June 30 to December 31. Replies received by the committee from state railway commissioners and from carriers indicated that there was no strong desire for a change of the date for closing the fiscal year. In view of that condition the committee decided that it would be unwise to recommend such a change.

The committee on legislation recommended that the states not having railway commissions should pass laws establishing them and suggested that the laws of Wisconsin or of New York might be taken as a model.

The association adopted resolutions creating a committee on

telephone and telegraph rates and service, and authorizing its committee on statistics to take up the subject of statistical reports of telephone and telegraph companies.

The committee on car service and demurrage was instructed to consider what, if any, measures should be taken to guard against car famines.

As before noted, the report of the committee on taxes and plans for ascertaining the value of railway property was not satisfactory, and it proved to be a subject for contention. This report was presented by John C. Lawrence, chairman of the committee which had framed it. The report began by stating that in 29 states railways were taxed on a property valuation only. In five states the tax was levied on property value together with specific taxes, in four states on gross receipts, in three states on property value and gross receipts, in two states on capital stock and gross receipts.

The association voted that through a committee it would ask Congress to withdraw from the federal courts the right to review cases arising from decisions of state railway commissions, so that such cases should first go through the state courts. A resolution was passed asking the supreme court of the United States to take such action as might be found possible to expedite cases involving the validity of orders of either the Interstate Commerce Commission or any state commission. A resolution was passed recommending that all states should by law put track scales under the authority of the state railway commission. This action was taken on the report that in Minnesota track scales had been found to give incorrect weights.

The committee on safety appliances presented a report, but it was not considered until the last hour of the third day. The committee had labored under the disadvantage of the sickness of the chairman, Mr. Moseley, so that the report was not prepared until a day or two before the meeting. The committee briefly reviewed the results of the work of the Block Signal and Train Control Board, quoting some of the decisions of that board in its last annual report. The disastrous collisions which have occurred on interurban railways during the past few months came up for discussion and the practice of interurban lines generally was criticised in severe language. Their methods were spoken of as unsafe; their personnel is very much less efficient than that of steam railways. Their rules are crude and ill constructed. The committee called upon the convention to take action looking to the establishment of uniform rules on such railways and to recommend the compulsory use of the block system. This improvement is more necessary on electric lines than on steam, because the discipline is more lax and the companies generally do not require a sufficient period of apprenticeship for motormen. A standard code of train rules should be enforced on all railways. In the state of Washington three companies are using a single railway 150 miles long, and one of the three does not use the standard code. The whistle signal, calling attention to flags carried, is the same that the other companies use for the highway crossing signal. Congress should take action looking to the enforcement of the A. R. A. standard code or something equally good. The American Railway Association has no power to enforce its rules. The report closed with a recommendation that Congress should be asked to promptly make compulsory the use of automatic train stops, granting a period of years for preparatory work. The report is signed by William Kilpatrick of Illinois, W. G. Smith of South Dakota, John A. Webb of Mississippi, and S. L. Rogers of North Carolina.

In the discussion of the report Mr. Sullivan of Ohio, a member of the committee, said that he had refrained from signing it because of the criticism of the interurban lines. In Ohio the commissioners have been doing some missionary work, and the interurbans are now "getting along fairly well." Besides this, Mr. Sullivan looked upon the automatic stop as purely experimental, besides being costly. Mr. Lawrence of Washington referred to the inconsistent whistle signal mentioned in the report. His inspector had called attention to this situation, but the

state commission could do nothing, because of the conflict with interstate supervision which would have been entailed. He referred to the action of the Washington Water Power Company which had lately installed automatic block signals with an automatic stop on its electric line in the state of Washington.

Mr. Kilpatrick spoke of the conditions in Illinois. After a recent collision in that state it developed that the block signal man who was at fault, and who was a temporary man, had gone on duty with two quarts of whisky in his grip-sack. Moreover, he was working under a false name, having been in states prison for murder. After such happenings as this, Mr. Kilpatrick thought that the proper thing to do was to urge the general adoption of automatic block signals.

Mr. McClure of Indiana moved to amend the recommendation in the report so that it should call for the enactment of a law requiring "intermediate electric roads to be 'adequately blockaded'" and that a longer period of service on train should be required as a requisite to employment thereon in responsible positions; and also he would have power given to the Interstate Commerce Commission to require the use of a uniform code of signals throughout the United States. With this amendment the report was adopted. Mr. McClure said that in one of the investigations in his state it appeared that motormen were put in service after only about three weeks' training.

Mr. Dickinson of Michigan spoke in favor of compulsory use of the block system on both steam and electric lines. He said that a collision in his state last August [at Durand], where ten persons were killed, was caused by the absence of the block system. The Michigan commissioners found that the railways of that state pretty generally believe in the block system, but this particular road either did not believe or else did not act on its belief, so ten persons were killed. Mr. Dickinson had known of motormen being put in charge of cars on electric lines within fifteen days after they came from occupation in non-railway employment.

RAILWAY BUSINESS ASSOCIATION.

The annual dinner of the Railway Business Association was held at the Waldorf-Astoria Hotel, New York City, on the evening of November 22. President George A. Post presided at the dinner, and addresses were made by Martin A. Knapp, chairman of the Interstate Commerce Commission; Daniel Willard, president of the Baltimore & Ohio and of the American Railway Association; and John Clafin, president of the H. B. Clafin Company. Some original poems were read and a facetious talk made by Tom Daly, a Philadelphia newspaper man.

About 800 members and guests attended the dinner. The following sat at the speakers' table: Albert Allen, John N. Carlisle, John Clafin, E. A. S. Clarke, William E. Corey, Thomas A. Daly, Martin S. Decker, H. Fitzgerald, W. P. Hamilton, A. Barton Hepburn, James J. Hooker, Otto H. Kahn, John Kirby, Jr., Martin A. Knapp, J. V. Knight, Milo R. Maltbie, D. S. Marfield, Wm. McCarroll, P. H. Morrissey, Frank A. Munsey, John B. Olmsted, George W. Perkins, Ralph Pulitzer, Charles M. Schwab, George W. Simmons, John A. Sleicher, John C. Spooner, Frank W. Stevens, Isidor Straus, John Wanamaker, Daniel Willard.

The following composed the reception committee: E. A. Simmons, *Railway Age Gazette*, Chairman; W. B. Albright, Sherwin-Williams Company; J. C. Currie, Nathan Manufacturing Company; H. W. Davis, Hart Steel Company; R. L. Gordon, Standard Steel Car Company; O. C. Gayley, Pressed Steel Car Company; J. M. High, Pantasote Company; J. M. Hopkins, Camel Company; C. H. Howard, Commonwealth Steel Company; H. G. Hammett; Scott R. Hayes, Railway Steel-Spring Company; W. O. Jacquette, Manning, Maxwell & Moore, Inc.; H. G. Kittredge, Kay & Ess Company; J. A. Lamon, McCord & Company; G. E. Molleson, G. E. Molleson Company; George Moses, James B. Sipe & Company; Mark A. Ross, Pyle-National Electric Headlight Company; C. P. Storrs, Storrs Mica Company; F. K. Shults, Charles Shults, Worth Brothers Company; S. L.

Smith, National Malleable Castings Company; C. A. Shieren, Jr., C. A. Shieren Company; Alexander Turner, Bronze Metal Company; E. H. Walker, Standard Coupler Company.

Following are abstracts of the addresses of Messrs. Knapp, Willard and Clafin:

ADDRESS OF MR. MARTIN A. KNAPP.

The question of railway rates, that is to say, of business conditions, involves vastly more than the direct interest of shippers or shareholders. In a very real sense, in a sense which is fortunately coming to be better understood, it is a great question of national policy second to none in its economic importance. That the compulsion of competition among the carriers is an unwise and mistaken policy I am persuaded. It is out of the question to have the presence of competition and the absence of discrimination. Just so long as competition between carriers is unrestrained, just so long will it result in policies which are dangerous, for to compete is to discriminate. It is a fallacy to condemn discrimination and at the same time to insist upon the very policy which promotes it. For this reason I advocate the legal sanction of cooperative action between railways regarding rates.

Speaking only for myself, and without reference to the pending controversy over rate advances or any other concrete instance, I suggest three aspects of this question which are of immediate and intense public concern. If our country is to grow and prosper as it ought, if its untold resources are to be developed and its swelling numbers find profitable employment, we need and must have railway earnings sufficient for three things:

First, a return on railway investments of such amount and so well assured as to attract and secure the necessary capital—an enormous sum in the aggregate—to improve existing roads and to construct without delay thousands of miles of new lines in fruitful districts now destitute of any means of transportation. It is a matter of common knowledge that the output of traffic for the fiscal year 1907 exceeded our entire carrying capacity on land and water. With the rapid increase of population and of productive efficiency, that is, with a greater army of workers and better industrial organization, the volume of that year ought to be and will be nearly doubled in another decade if only we can provide for its prompt and proper distribution. And when we think of the rich regions yet unopened because unserved, when we recall, for example, that there is today in the old state of Maine a section larger than the whole of Massachusetts in which there is not a rod of railway, must we not be impressed with a realization of pressing need and of boundless opportunity. Since it is our national policy—and long will be, I trust—to rely upon private capital and private enterprise to provide these great highways of commerce, to improve and multiply them in pace with our requirements, must we not in the larger public interest, whatever may be thought by this or that shipper, make the business of furnishing railway transportation, which shall be up to the best standard of efficiency, convenience and safety, so desirable to the investor that the necessary funds for betterments and extensions will be forthcoming, and so attractive as a vocation that the highest ability will be employed in its management? Otherwise, if unhappily this is not done, must not our country come measurably to a standstill and face a future of comparative stagnation?

Second, the payment of liberal wages to an adequate number of competent men. This not only to insure increasing skill and reliability in a service which is all the while becoming more exacting, and on which the safety and comfort of the public constantly depend, but also because of the very great influence of railway wages upon the compensation of labor in every sphere and grade of private employment. To my mind the fundamental social problem is to provide, by the wise development of our institutions and without radical action or injustice, for a more equitable diffusion of the bountiful wealth which the earth produces. Now, as a large and increasing majority of the able

bodied live, and must live, by working for others in some capacity, a high and advancing standard of payment for service of every sort tends strongly to promote, and is the best practical means to bring about, the degree of equality in social welfare which makes for the satisfaction and happiness of all our people.

Third, the betterment of existing lines so as to greatly augment their serviceableness to the public, as can in varying degree be done everywhere, without unnecessary and undesirable increase in capitalization. Every dollar borrowed to improve a road now in operation involves a permanent addition to the interest charge which the public is required to pay; the improvement from current earnings puts no lien upon the property but rather augments its value and usefulness, and by adding to the security of the capital already invested tends to a lower rate of interest upon that capital. Broadly speaking, this means a national policy, so to speak, in respect of railway rates and revenues in harmony with our national policy in other matters of public concern, and in accordance with that enlarging spirit of altruism which manifests itself in public as well as in private life, and which impels the present assumption of burdens that might be escaped or deferred in order that another generation may have an easier task and a larger opportunity. Is it not in this particular field a wise and patriotic policy?

ABSTRACT OF MR. WILLARD'S ADDRESS.

The industries represented by your association constitute a powerful economic force, and your organization has for the first time brought that force to bear on public opinion. It was fortunate for the railways of this country, and I believe a fortunate thing for its commercial industries as well, when the Railway Business Association was formed. You have already performed a most valuable service in the way of bringing about a better understanding between the railway managers and the railway users, and your efforts in that direction deserve hearty recognition. I do not hesitate to say that the railways fully appreciate and gladly acknowledge what you have actually accomplished and will welcome a continuation of the same policy.

I am extremely anxious to see a better understanding reached between the railways and those who use them; but, I have never seen any substantial or lasting progress made towards such understanding by parties holding views greatly at variance, until they were both ready and willing to accept the truth, if it could be found, and then act accordingly.

The American railway, except in the extreme East, has almost universally gone ahead of the population or even the settler. The building of a railway under such circumstances was a hazardous undertaking. Men could not be found willing to assume the altogether too apparent risk of loss, unless in some manner there was thought to be something which promised large reward. In many instances large reward was realized. Had it not been so there would have been no railways. Similar risks were assumed in other enterprises in a new country and similar expectations of large reward were indulged in and just as frequently realized.

In the course of time complaints began to be made that the railways were showing special favors to some individuals and communities and withholding such favors from others. It was claimed that rebates were being granted the better to cover up the transaction. It was claimed also that the roads charged less in some instances for a long haul than for a shorter haul when the circumstances were substantially the same. It was claimed that the *commodore* exercised a controlling influence over some of the legislative bodies, such influence resting largely upon the issuance of free transportation and in some cases the actual payment of money. It was claimed that the railways were over-capitalized and that in some instances large fortunes were made by managers, not in an illegal, manner in that connection. Legislation was enacted and non-complaint. To hold otherwise would be to hold that men engaged in railway affairs were not subject to the same human limitations and weaknesses

that are known to be the common heritage of mankind. It was claimed that the pooling practice, at that time much in evidence, was inimical to the interest of the shipper and its abolishment was demanded, though so far as I am able to learn, no general complaint was ever made that rates, as a whole, were excessively high. Other minor complaints against the carriers were also registered.

The feeling aroused by these various practices finally found expression in laws, notably the Interstate Commerce act, with successive acts amendatory thereof.

Granting, for the sake of argument, that the builders, owners and managers of the railways were in common with the rest of mankind subject to all weaknesses and limitations that the human race is heir to, let us see how much foundation in fact there is, or ought to be, at the present time for such distrust as still seems to exist.

The rebate and unjust discrimination have disappeared, or, if not altogether, then the relief is to be found in the enforcement of the existing law. I submit no additional law is necessary in that direction. The long and short haul question seems to be fully covered by the recent amendment. Recognizing, however, the far reaching effect the so-called long haul practice has had upon the general commercial and industrial development of this country, Congress has seen fit—wisely, I think—to give the commission much latitude concerning it. A strict and literal enforcement of the law would mean commercial disaster to many communities.

The influence of the railways upon legislation has been, I believe, largely if not entirely eliminated. This has come about partly by the people requiring of their representatives a closer accountability and partly by the fact that the railways, recognizing the higher ethical standard concerning such matters today, have endeavored to adjust their practices in harmony therewith.

The claim that the American railways are over capitalized is still urged in some quarters. In that connection the following comparisons of capitalizations per mile are interesting:

England	\$275,040
Belgium	169,806
France	139,360
Austria	112,879
Germany	109,788
United States	59,000

In my opinion to duplicate the American railway system today would cost a sum very much in excess of the existing capitalization, and while I do not believe a physical valuation of the railways would serve any useful purpose, I am convinced that the railways have nothing to fear in that direction.

James J. Hill, whose knowledge of this subject rests upon the most careful thought and inquiry, has well said: "The American railway pays the highest wages in the world out of the lowest rates in the world, after having set down to capital account the lowest capitalization per mile of all the great countries of the world."

While the railways as they stand today, have cost nearly \$14,000,000,000, as shown by their outstanding capitalization, it is certain that the development of the country will make necessary further large expenditures for additions to and betterments of the existing lines. It has been well stated that one billion dollars a year, for a number of years at least, will be absolutely necessary for these purposes. How will the money be obtained? By offering something in the way of a security sufficiently attractive to make the money forthcoming; for, as one of the honorable members of the Interstate Commerce Commission has well said:

"We have provided for legislation the cost of cars which a railway shall own and the extent which it shall operate; we can not by legislation lower one single dollar of private capital into railway investment against its will."

The cost of railway operation has been increasing for some years, and there is no apparent reason for thinking that this upward tendency will cease. It has been due in part to higher prices for material, higher wages paid for labor, to the higher standard of service demanded by the public, and to various leg-

of business is the solution of his particular difficulties that every merchant would welcome. The railways now have reached a point where it seems difficult for them to continue to increase their gross revenue materially without very great expenditures for betterments and for extensions. Under ordinary conditions the money to pay for such extensions and betterments could readily be had by the sale of bonds bearing a moderate rate of interest. At the present time, however, investors are asking larger returns on their capital than in the near past, and foreign investors, especially those who seek only the choicest of American securities, are inclined to be indifferent to the offerings of American railways, because they are doubtful in view of the recent advance in wages by the railways, whether or not the railways now have a safe margin of profit which will enable them to pay interest on all their fixed obligations and to continue reasonable disbursements to their shareholders. It seems to me the solution of this doubt is of the utmost importance to the general prosperity of this country, and its solution may be facilitated or delayed by the attitude of the merchants of the United States in regard to the advances in freight rates which the railways have proposed.

As a wholesale merchant in New York the question to me is partly academic because as a wholesaler I pay but a small portion of the freight which is charged on merchandise shipped from New York, but as an investor in retail stores throughout the country, the question lies within the scope of my personal investigation and may affect my income largely. I ask then, will it be advantageous for the average merchant outside of New York to pay some increase in freight rates to help the general situation? I think it will. Let us take as a unit a retail business of medium size amounting in sales to perhaps a million dollars per annum. If this business is located pretty far West, say beyond the Mississippi river, it may now pay \$25,000 per annum for freight and express from the East. If freight rates should be raised 12 per cent. on the average it would pay \$3,000 additional per annum to the railways. What would such a business be likely to gain? Let any merchant look back carefully over his records and note the fat years and the lean years and then mark the years of general railway extension and improvement on the one hand, and the years of railway retrenchment on the other, and I am sure he will find that his prosperity on the average has increased with the progress of the railways and has waned with their lack of progress.

These facts may not necessarily demonstrate a relation of cause and effect, but they certainly point to such a relation and no one can doubt that to a considerable extent such a relation exists. If the railways should now be permitted to make some such moderate advance as I have indicated and our typical merchant should pay \$3,000 additional in freight and express charges, my own investigation leads me to believe that the general activity which renewed railway buying would induce would increase the merchant's business at least 5 per cent. and perhaps as much as 10 per cent. or 15 per cent. If such should be the case, at a minimum increase of 5 per cent. he would get additional sales amounting to \$50,000 at slight additional expense except for freight, and it is entirely safe to say that his net gain on these sales before deducting the increased payment to the railways would be at least \$6,000, or twice as much as he would pay by reason of increased rates for transportation.

If a typical business should be taken further east, say near the Ohio river, the haul being shorter the increase in the cost of freight would of course be less, while the increase of business would probably be equally great and the net gain to the merchant materially greater.

The solution of the problem for the merchant as well as for the railways seems to me the logical way out. Mercantile expenses cannot be reduced materially without reducing business proportionately, but under the impetus of a general growth of the country, mercantile business may increase in

the future as it has increased in the past with sufficient rapidity to keep expenses within reasonable ratio to the amount of sales.

How can the general growth and general prosperity be best promoted? I think the railway will answer this question satisfactory if by friendly coöperation we give them the power to go ahead.

The annual business meeting of the association was held at the Waldorf on the morning of November 22. The executive committee rendered its annual report, from which the following is extracted:

"The Railway Business Association has succeeded in disseminating very generally an appreciation that the frequent and serious periods of depression to which the railway equipment and supply industries are subject widely affect also every other line of business and that these periods of distress in our industries are largely due to uncertainty as to the legislative outcome of controversies between the railways and the public.

"Such a controversy is at this moment pending. The Interstate Commerce Commission is now holding hearings on proposed advances in freight rates. The railways will not know until the decision shall have been rendered what view the commission is to take as to the resources proper for railway operation, and have been constrained to postpone new projects and cut all outlays to the minimum.

"For the railway supply industries this may mean serious distress. While our establishments are now busy, the fact stares us in the face that few of us have booked any considerable orders in several months and this dearth of orders if continued a few weeks more would see factories shutting down and men thrown out of work. We have still fresh in our memories the disaster of 1908, when at one time 600,000 men usually employed making things for railways were walking the streets. A group of industries employing 1,500,000 operatives, with a capital invested of more than a billion dollars and paying freight bills of \$250,000,000 annually, cannot face a collapse of business without grave apprehension. Unless there is a change in a short time this immense aggregation, sustaining many great industrial communities, will be where it was two years ago, with all the consequent ramification of privation and suffering.

"We earnestly hope that the commission in giving its decision will indicate with all possible clearness a purpose of considering the needs of the railways in the broadest spirit. Such a decision would, we believe, enable our railways to finance the enormous improvements which must be made if the traffic of the country is to be carried efficiently and safely.

"The merchants want, of course, the best rate they can get for the transportation they use, but recently many of them seem to be thinking more about the quality of service and more about the prosperity of the railways and allied industries and less about the rate. We believe this is the broad, American view, and it should be the aim of our association to win converts to that attitude.

"It should be advertised to the world that there is in the United States an organized coöperation to the end that the railways may avoid giving offense and that the public may refrain from hasty measures. Let it be known that the American railways are safe investments because the railway men, the business men and the regulatory agencies of the state and nation have determined to make them safe.

"The function of the Railway Business Association is to create an amicable atmosphere in which the railways and their patrons may make mutual concessions and avoid litigation. We believe that nothing will tend more to make business conditions more stable than for railway questions to be discussed amicably and dispassionately."

The following officers were reelected: President, George A. Post; vice-presidents, H. H. Westinghouse, O. H. Cutler, W. H. Marshall, F. S. S. Keith, A. H. Mulhiken, O. P. Letchworth, A. M. Kittredge; treasurer, Charles A. Moore.

THE LIMIT OF ELASTICITY.

There is a tendency toward the adoption of the limit of elasticity as the basis for the calculation of the strength of the parts of a machine or structure, instead of the ultimate strength that has been the prevailing practice. The objection to adopting this has been the difficulty of determining the limit with any kind of accuracy, with the result that the ultimate strength and the guesswork of a high factor of safety has been used. The discovery of the phenomenon of the limit of elasticity, and the use of an extensometer slow, for determination of the limit of elasticity. An article in a recent issue of the *Revue Industrielle* calls attention to the well-known fact that when a test piece of metal is subjected to a prolonged tensile stress, that is less than its limit of elasticity, the temperature of the metal falls in accordance with a fixed law. When the stress is relieved the temperature of the piece soon returns to normal. If, on the other hand, the stress is carried to a point beyond the limit of elasticity of the metal, there is a sudden change of temperature, and instead of a cooling, there is a very perceptible heating.

These phenomena have been studied by such eminent physicists as Lord Kelvin and Joule, who have shown that this change of temperature takes place at the instant the metal has been stretched to its limit of elasticity. Dulong and Petit have also found that the product of the atomic weight by the specific heat is constant for all metals. This shows that there is a simple thermo-dynamic relationship existing between the limit of elas-

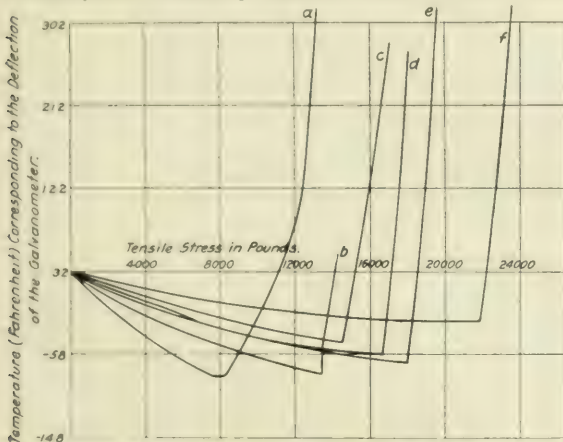
made apparent by the rise of temperature, thus showing that the limit of permanent deformation has been reached. The same point, when the curves shown were obtained, was at 16,000 lbs. The curves "a" were made with the metal in an annealed condition; the curves "b," "c," "d," "e" and "f" show the increasing limits of elasticity resulting from successive increases in the tensile stress.

The same metal when tested in the ordinary machines does not seem to show any definite limit of elasticity, while with this thermo-electric method the galvanometer always shows distinctly a point where the change takes place. With cast iron this point of permanent stretch does not appear until the instant of fracture.

This same method makes it possible also to determine accurately the distribution of stresses throughout the section of a bar, and especially the location of the neutral axis in transverse tests. To do this, several thermo-electric couples are arranged at different heights along the transverse section of the test piece, when it is possible, by observing the temperatures of the different points, to ascertain the location of the neutral axis.

MULTIPLE TRACK RAILWAYS IN ILLINOIS.

The railway map of Illinois, given herewith, is printed for the purpose of showing all sections of railway in the state on which there are two or more main tracks. Three-track and four-track lines are distinguished from two-track by the thickness of the lines on the diagram. The termini of the different sections are shown in the table below:



Temperature Curves Caused by Tensile Stress.

ticity, the molecular constitution and the calorific properties of a metal. Prof. Martens, of the Prussian Academy of Sciences, has recently made an interesting application of this principle for the accurate determination of the limit of elasticity of metals, a determination which is far too delicate to be made in the usual manner on certain metals, such as cast iron.

The great difficulty lies in the determination of the exact point in the curve of elongation where permanent set takes place. Up to the present, investigations to ascertain this limit of elasticity by means of temperature measurements were based on the calorimetric methods. Prof. Martens' method makes it possible by a simple thermometric reading to take instant cognizance of this change of temperature.

The apparatus used consists of a series of thermo-electric couples, placed inside of a hard rubber box and set in a narrow longitudinal slot, very close to the piece to be tested, but not in actual contact with it. The current produced by the rise in temperature of the piece affects a very sensitive galvanometer which gives an exceedingly accurate thermometric reading. The illustration is a reproduction of a series of curves showing the changes of temperature which are produced by a constantly increasing tensile stress. The turning point indicative of the limit of elasticity is clearly shown. At this point the internal friction resulting from the slipping of the molecules over each other is

ILLINOIS. Chicago, Havana & Santa Fe.

	N. tracks.	A. miles.
Chicago to Plaines	2	40
Plaines to Pequot (with C. & A.)	2	20
Pequot to Holton	2	65
Chillicothe to Edelstein	2	8
Knox to E. Port Madison	2	60

Baltimore & Ohio.

Chicago to Indiana line	2	20
Baltimore & Ohio Southwestern.		
St. Louis, Mo., to Hanover	2	7

Chicago & Alton.

Chicago to Plaines	2	36
Plaines to Pequot (with Santa Fe)	2	20
Pequot to Nilwood	2	156
Wann to E. St. Louis (with C., C. & St. L.)	2	18

Chicago, Burlington & Quincy.

Chicago to Belmont	4	20
Belmont to Burlington, Ia.	2	186

Chicago & Eastern Illinois.

Chicago to Dalton	2	16
Dalton to Thornton	3	5
Thornton to Crete	2	9
Crete to Mokena	3	20
Mokena to Gessie, Ind.	2	81
Villa Grove to Tuscola	2	8
Pana to St. Louis (with C., C. & St. L.)	2	85

Chicago & Western Indiana.

Chicago State line	2	18
Cleveland, Cincinnati, Chicago & St. Louis.		
Pana to St. Louis (with C. & E. I.)	2	85

Grand Trunk.

Chicago to Griffith, Ind.	2	36
---------------------------	---	----

Illinois Central.

Chicago to Blue Island Jct.	4	15
Blue Island Jct. to Cairo	2	348
67th St. to South Chicago	2	6
At Springfield	2	1
At Decatur	2	2
E. St. Louis to St. L., B. & S. R. R. Jct.	2	4
Kings to Pinckneyville	2	4
Portage to E. Dubuque	2	12

Lake Shore & Mich. Southern.

Indiana Harbor to East Side	4	6
East Side to Chicago	2	13
S. Chicago to Root St.	2	7
Root St. to 22d St.	3	3
22d St. to Chicago	2	2

Louisville & Nashville.

E. St. Louis to Rankin	2	3
------------------------	---	---

Michigan Central.

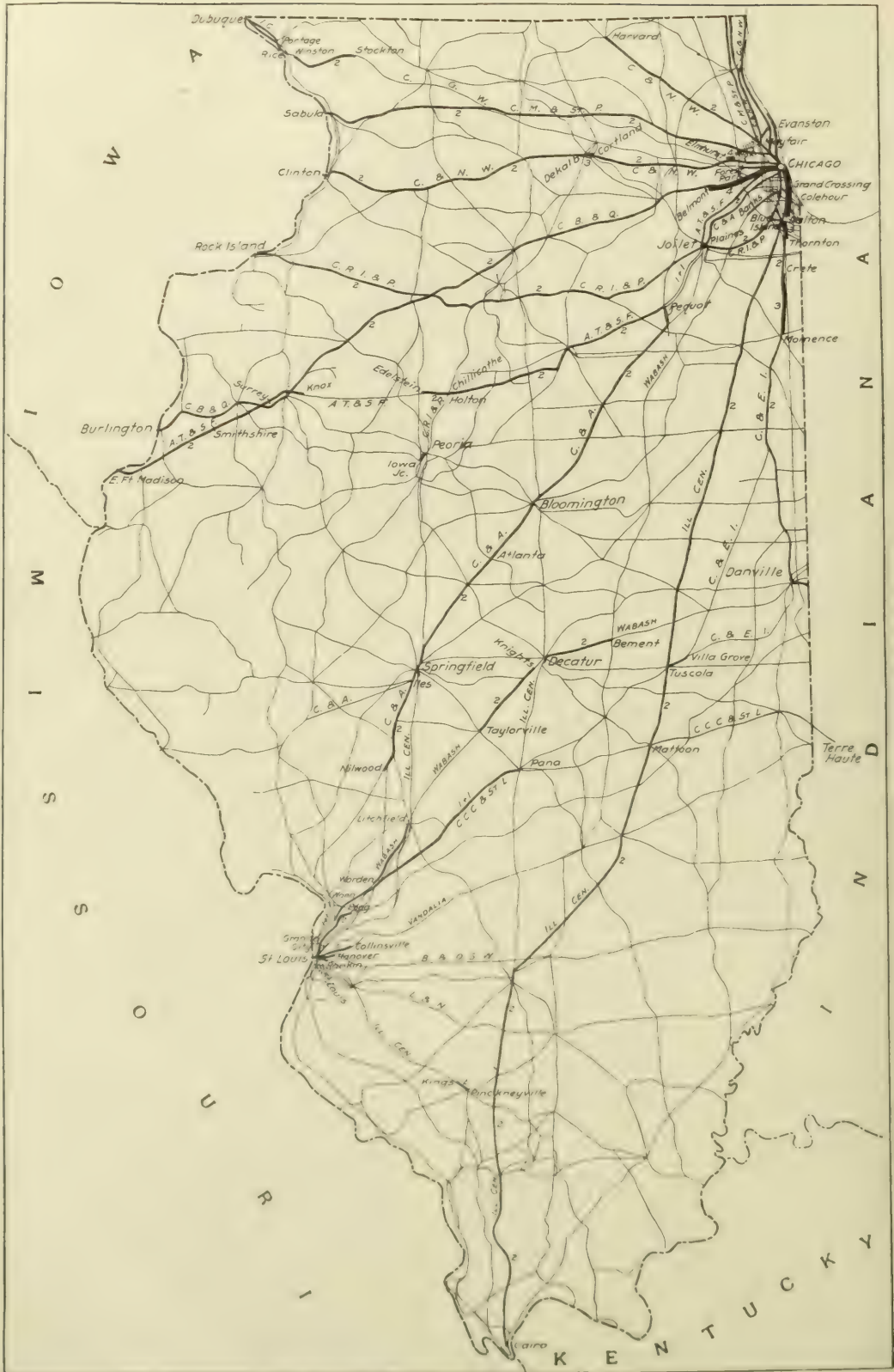
Michigan City to Kensington	2	42
-----------------------------	---	----

New York, Chicago & St. Louis.

Hessville, Ind., to Grand Crossing	2	14
------------------------------------	---	----

Pennsylvania Lines.

Whiting, Ind., to Colehour	3	4
Colehour to Constance	2	..
Constance to Park Manor	3	..
Park Manor to S. Branch River	4	..
S. Branch River to Chicago	2	..



Multiple Track Railways in Illinois.

[illegible]

TRAIN ACCIDENTS IN OCTOBER.

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of October, 1910. This record is intended to include usually only those accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. It is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation:

Date.	Road.	Place.	Kind of Accident.	Train.	Killed.	Inj'd.
1.	Del. & Levee & W.	Scranton, Pa.	nc.	P. & F.	0	18
2.	Del. & Levee & W.	Laporte, Ind.	rc.	P. & F.	0	20
3.	N. Y. & N. H.	Bolton, Conn.	nc.	P. & F.	3	4
4.	N. Y. & N. H. & H.	Sharon, Conn.	nc.	P. & F.	0	2
5.	Phil. & R.	White Hill, Pa.	bc.	F. & F.	1	0
6.	L. S. & Mich. So.	Youngstown, Ohio	rc.	F. & F.	1	3
7.	Balt. & O. S.	Cresskill, N. J.	bc.	P. & F.	5	17
8.	Grand Rapids & I.	Ridgeville, Mich.	F. c.	F. & F.	1	18
9.	Chic. & A. & N. W.	Madison, Wis.	bc.	P. & P.	5	17
10.	Chic. & A. & N. W.	Nashua, N. H.	bc.	P. & F.	0	8
11.	C. M. & St. P.	Marquette, Minn.	rc.	P. & F.	4	4

Derailments.

		CROSSING KILLED			
No.	Road.	Place.	Derailment.	Train	Kill'd. Inj'd.
6	N. Y. & N. H. & H.	Naugatuck Jct.	derail.	1	1
8	Chic. & Alton	Jerseyville.	d. track.	1	0 18
9	St. Louis & S. F.	Compton, Ok.	unx.	1	0 42
10	Chic. & H. & N.	Rockford, Ill.	unx.	1	0 2
11	Aetehson, T. & S. F.	Greenfield, N. M.	acc. obst.	1	0 1
12	Balt. & O.	Winchester.	unx.	1	0 8
13	Mo. & Kan. & Tex.	Gainesville.	unx.	1	0 4
14	Southern Pac.	Chocoma.	unx.	1	0 2
15	Hocking V.	Harpster.	unx.	1	0 29
16	Atlantic C. L.	Jacksonville.	open draw	1	0 9
17	San Ant. & A. P.	Hallettsville.	unx.	1	0 3

In the collision at Bolton, Conn., on the 6th, two light engines, coupled together, ran into the rear of a passenger train standing at the station. The men killed were the engineman of the passenger train and a bystander who was trying to assist the engineman in repairing a defective coupling. The two engines completely wrecked the rear car of the passenger train, but it was an empty car. The collision was due to a false clear signal given by a block signal operator at a tower about one-third of a mile west of the point of collision. This operator

and lives in this place only three days. (Group 3 1990's interview with the West. This is twenty-three years old.)

The collision at White Hill, Pa., on Dec. 30, was caused by an engine on being backing to get up. This engine to have been admitted by the trainman himself to back. It was caused by the death of a brakeman named Charles, who was in the standing caboose that was too far forward to see the train. papers the engineman said that he had had little chance for sleep during the few days preceding. The collision occurred Sunday morning, about six o'clock. The coroner's jury exonerated the engineman from blame for killing the brakeman, holding that as the flagman had got out of the standing caboose and had run back 150 ft. to flag the on-coming train, and as the flagman had warned Charles, he (Charles) must have had ample time to escape.

The butting collision near Ridgeville, Ind., on the 14th, was between a freight train and a work train and the victims were laborers riding on the work train. Five of these men were killed and 18 injured. The collision was due to the failure of the freight to protect itself. There was a dense fog and the freight entered the working limits of the work train without flagging. The men killed were sitting on the end of a platform-car with their legs hanging between the car and the tender of the locomotive.

The butting collision of passenger trains near McCormick, S. C., on the 16th, was between northbound and southbound passenger trains, both running at full speed. Two engineers, two firemen, a mail clerk and a porter were killed and 13 passengers and 3 trainmen were injured. The collision was due to the failure of the operator at McCormick to deliver an order to the southbound train. He neglected to display a stop signal, but the conductor of the train was expecting orders and went to the office and asked for them. He did this not only once, when he went to register his train, but he asked a second time, as he was leaving the office. An officer of the road writes that the conduct of this operator is unaccountable. He is a man 30 years old, with nine years' experience as a telegrapher. In sending the order to him the despatcher directed him to display red and he replied that he had done so, but entirely forgot to carry out what was apparently his intention.

In the collision at Montevideo, Minn., on the 30th, four drovers were killed. They were in the caboose of a freight train which was run into at the rear by a passenger train, the fourth section of eastbound train No. 6. The caboose was wrecked and took fire and the bodies of the men killed were burned to a crisp. Two cars of cattle were also burned up, as well as a number of box cars standing on a side track.

The train derailed near Winchester, Va., on the 15th was southbound passenger train No. 1. The first vehicle to jump the track was the tender. Two passenger cars were overturned and fell down a bank, and twenty-seven passengers were slightly injured. The engineer had applied the brakes a few seconds before the accident, in order to reduce speed over a bridge; and the derailment occurred just as he again put on steam to resume speed. The engineer thought the brakes were sticking and used full steam pressure in order to move the train, and this, it is said, was the cause of the derailment. The tender was the first vehicle to leave the track in three other derailments in this list: Compton, Okla.; Harpster, Ohio, and Hallettsville, Tex.

Of the ten accidents to electric cars reported in the newspapers as occurring in the United States in October, four were attended with fatal results. One of these, the butting collision at Staunton, Ill., October 4, killing 37 persons and injuring 20, was reported in the *Railway Age Gazette* of October 7, page 662. In a collision on an interurban line near Pittsburgh, on the 20th, during a fog, two persons were killed and 10 injured; and in a derailment at Boston on the 15th, due apparently to a defective switch, three persons were killed and six were injured.

re. Rear collision—bc Butting collision—xc. Other collisions—b.
 12. Derailment, Derailment—ca Derailment obstruction—mx, Unex-
 plained—derail, Open derailing switch—ms, Misplaced switch—acc.
 obst, Accidental obstruction—malice, Malicious obstruction of track, etc.—
 boiler, Explosion of locomotive or road—fire, Cars burned while run-
 ning—fire, Freight cars, including empty engines, work trains, etc.)—asterisk, Wreck wholly or partly de-
 stroyed by fire—dagger, One or more passengers killed.

General News Section.

The Erie road has been making experimental runs near New York City with a passenger car propelled by power from an Edison storage battery; and the Pennsylvania with a McKen gasoline motor car.

The constitutional convention in New Mexico, which has nearly finished its work, has adopted a clause providing for a corporation commission of three members. The commission is to be elective and there is a provision for the immediate review by the State Supreme Court of all of the commission's orders, whether anybody asks for review or not.

On Saturday last President McCrea and other officers of the Pennsylvania Railroad entertained a party of about 200 officers and agents of the Pennsylvania Lines West of Pittsburg, by showing them around the new passenger station in New York City, to which the through trains of the road will begin running next Sunday. During the past few months the Pennsylvania has run a number of New York excursions of this kind for its station agents and others; a fine example of one of the best methods of increasing the men's efficiency as servants of the public; while at the same time their spirit is improved by promoting their acquaintance with each other and with the officers.

The supreme court of Oklahoma on November 16 reversed the order of the Oklahoma corporation commission requiring Interstate carriers to establish depots at the Oklahoma state line, the court holding that the state commission is without authority to arbitrarily require a railway to build stations and switching facilities at places not required by public convenience or necessity. The appeal from this order was made by the Atchison, Topeka & Santa Fe. Another order of the commission requiring the St. Louis & San Francisco to build switches to the property of elevator owners at its own expense has been reversed, and many other orders of the commission requiring railways to build switches under these conditions have been set aside by this decision.

The extent to which physical valuation of railways as a basis for rate-making is in the political atmosphere is reflected in the present popularity of the subject for college debates. For example, last week teams representing the Iowa State College, at Ames, Iowa, and the Iowa State Teachers' College, at Cedar Falls, Iowa, discussed this question in two debates, one at Ames and the other at Cedar Falls. The subject of the debates was "Resolved, that railway freight rates should be based on the physical value of railway property used in transportation service," and in both debates the team taking the negative of the question won. At Ames, two of the judges voted in the negative and one in the affirmative, one of the judges being Professor Jesse Macey, a well-known authority on political science. At Cedar Falls all three of the judges voted in the negative.

The American Association of Railway Surgeons, at its meeting held in Chicago recently, went through the usual list of unhealthy conditions in cars and railway stations which the surgeons are going to improve; and in addition they introduced one new idea: They are going to do what they can to stop the use of abandoned freight cars as lodging houses for track workmen. For this move, looking to the improvement of the hygiene of track laborers' lodgings, the laborers should be duly thankful, and we congratulate them. At the same time we congratulate the traveling public, (in anticipation) on the abolition of a frequent eyesore. What is more depressing than a box-car minus trucks, minus paint and with a few ragged holes for windows (like igloo windows)? Moreover, such cars usually bear the initials of the name of the unashamed owner, still sufficiently visible to be read from every parlor car that passes by.

On November 20 the Rock Island Lines put on a new 72 hour train, "The Californian," which will operate daily between Chicago and Los Angeles via Kansas City and El Paso. The train, which leaves Chicago at 8:35 a. m., arrives at Kansas

City the same evening and reaches Los Angeles the morning of the third day, is equipped with electric lighted drawing-room and tourist sleeping cars, free reclining chair cars and coaches, and provides dining car service. A compartment sleeper has been placed in service on the "Golden State Limited," between Chicago and Santa Barbara, Cal., and entirely new Pullman equipment has been provided for this train. A new train has been put on for points between Chicago and Davenport, Cedar Rapids and the Twin Cities, leaving Chicago at 3:10 p. m. The new train makes all stops which have previously been made by the "Chicago-Twin Cities Express," and the latter train will be operated on a fast schedule, making stops at Joliet, Bureau, Moline and Rock Island only. Dining car service has also been provided on the Chicago Twin-Cities Express. The Illinois division train, which formerly left Chicago at 1:25 p. m., has been discontinued.

Practical demonstrations are being given at the exhibit of the Rock Island Lines at the Land Show in Chicago of the modern agricultural methods which are being advocated by the agricultural department of those lines. Experts from many of the western agricultural colleges are co-operating in the demonstrations so that they are of interest and practical value to the farmer and consumer. The Land Show opened in the Coliseum in Chicago on November 19 and will continue until December 4. Twelve free lectures will be given in the lecture room as follows: "Practical Equipment for Growing Poultry," and "Doubling the Egg Yield," by Prof. W. E. Vaplon, of the Colorado Agricultural College; "Methods for Increasing the Yield of Wheat," by Prof. L. A. Fitz, of the Kansas Agricultural College; "Practical Systems of Farm Management," by Prof. Thomas Cooper, of the Minnesota Agricultural College; "Increasing the Amount of Meat Per Acre," by Prof. C. M. Evans, of the Texas Agricultural College; "How to Grow Rice," by Prof. C. V. Ruzck, of the Arkansas Agricultural College; "How Our Cotton is Grown," by Prof. T. M. Jeffords, of the Oklahoma Agricultural College; "Growing Alfalfa in Different Climates and on Different Soils" and "Methods of Dry Land Farming," by Prof. H. M. Cottrell, agricultural commissioner of the Rock Island Lines; "Increasing Farm Profits," by Prof. Andrew Boss, of the Minnesota Agricultural College; "Doubling the Yield of Corn," and "Demonstrations of Selecting, Caring for and Testing Seed Corn," by Prof. M. L. Mosher, of the Iowa State College.

The New Pennsylvania Time-Table.

The Pennsylvania, announcing the completion of the time-tables for the train service to and from its new station in New York City, which is to begin next Sunday, gives the number of trains as follows: Westbound, week days, 61 trains; eastbound 55; Sundays, westbound 46; eastbound 43. The old station at Jersey City will have on week days 118 trains westward and 131 eastward. All of the local and suburban trains will continue running to and from Jersey City, as well the trains of the Lehigh Valley and the New York, Susquehanna & Western. The length of the new line from the New York station to Manhattan Transfer, the junction of the old line, is 8.7 miles and the running time of trains will be 15 minutes. With the new time-table there will be a train from New York to Broad Street Station, Philadelphia, every hour from 7 a. m. to 9 p. m., and all will be on the even hour except two (4:04 p. m. and 8:04 p. m.) and nearly all of these trains will run through in two hours. In addition to these there are others at other hours, making in all 25 express trains each week day from Seventh avenue, New York, to Broad street, Philadelphia; and there is a corresponding service from Broad Street to New York. All of the trains to and from the new station will be through express trains, except that for certain Long Branch expresses running from Jersey City connecting trains will be run from Seventh avenue. There will be expresses to Washington at 8:08, 10:08, 11:08, 1:08 and 2:08 and at less regular intervals thereafter; besides the through trains for the South. With the

abandonment of the ferry to and from Twenty-third street, New York, passengers in upper New York desiring to use Battery ferry, suburban or local trains will have to go downtown to Eastland or Church or Duane street, unless, indeed, they take express trains at Thirty-third street and change cars at Manhattan Transfer. Whether the road will allow this does not appear. All of the express trains will stop at Manhattan Transfer eastbound to let off passengers for Jersey City and the lower New York terminal and westbound to take on.

Water Level in the Great Salt Lake.

The present behavior and past history of Great Salt Lake are now the object of a special investigation by the United States Geological Survey. The United States Weather Bureau precipitation records, beginning in 1861, present a comparatively accurate record of the levels of Great Salt Lake dating back to the year 1850. In 1850 the lake stood at 3 ft. In 1868 the water rose to 14 ft., dropped to 7.5 ft. in 1873, and rose again to 14 ft. in 1877. The lake then gradually lowered until the water stood at -2.4 ft. in 1902 and -2.2 ft. in 1905. Since 1905 the water has gradually risen, reaching the 6-ft. mark in May, 1910. The lake is now falling.

Many millions of dollars have been spent in the construction of railways and resorts over or near the shores of the Great Salt Lake. If any data can be secured which will enable one to make a reliable prediction as to the behavior of the lake ten years in advance the information would be of inestimable value. It will be necessary to determine whether or not there are regular periods of wet and dry years; also to determine the time intervening between two wet and two dry periods. To determine this point one should have precipitation records dating back one hundred years or more.

Taking, for example, a forest tree which is some distance from a flowing stream, and one which receives no moisture from artificial sources, it is believed that the annual growth of this tree would bear a direct relation to the amount of precipitation which fell during the winter just prior to the growing season. The amount of growth made during each year may be determined by measuring the thickness of the tree's annular rings. The temperature during the growing season would have its effect upon the growth of the tree, and it is therefore not expected that the data obtained from measuring the thickness of annular rings would give reliable records for successive years where

Fire Protection for Wooden Bridges in Canada.

The Canadian board of railway commissioners has issued an order requiring and regulating the protection of wooden bridges from fire. It applies to all trestles the whole of which cannot be seen from an approaching train for a distance of at least 1,000 ft. During the months of May to October, inclusive, one of the following methods of protection must be enforced: Keeping watchmen at the structures; the track-patroling system; fire-alarm signals; ballast flooring; zinc covering of caps, stringers and batter posts; and the use of fireproof paint, equal in efficiency to a certain standard and applied at least once every five years. In addition water barrels must be kept at one end of trestles of less than 30 ft. in length, at both ends of trestles longer than 30 ft., with intermediate barrels at intervals of not more than 150 ft., except in the case of pile trestles over streams or other bodies of water. These barrels are to be kept filled with water, within ten inches of the top. The water barrels must be maintained in good repair, pails must be provided, and where watchmen or track-walkers are employed, pails must be carried by them during their inspections.

Where protection is provided by watchmen or by track-walkers, all trestles on the main line must be inspected at least twice every 24 hours, and on branch lines once every 24 hours. Brush and dead grass must not be allowed to accumulate around trestles. Railway companies failing to comply with these regulations will be subject to a fine of \$30 for each offense, and watchmen or track-walkers who fail to make inspection in accordance with the regulations are liable to a fine of \$15 for each offense. Where ballast flooring is the means of protection the ties must be completely covered with gravel level with the under side of the rail head. It is required that the fire-alarm signals must be equal in efficiency to the Montauk thermostat.

Seven Cars, \$1,500,000; Thirty-Seven, 1,500,000 Lbs.

A short time ago the Chicago, Milwaukee & Puget Sound hauled from Seattle a train of Oriental silk which is believed to have been the largest of the kind ever shipped from Puget Sound. It filled seven cars, was valued at \$1,500,000, and was destined to New York.

The accompanying illustration shows a train load of lumber hauled from Puget Sound by the same road recently, which is believed to have been the largest train load of lumber ever sent by a single shipper in a single train from the Pacific coast terri-



Chicago, Milwaukee & Puget Sound Lumber Train.

there is little variation in the annual precipitation. It seems reasonable to believe that the high, normal and low years can be determined. The Forest Service has cut a big tree from the Big Cottonwood drainage area, which lies about 10 miles southeast of Salt Lake City, Utah. This tree is between four and five hundred years old. A section will be cut and polished in order that the thickness of the annular rings may be easily measured. A thorough study will be made of the first sixty annular rings, and a comparison made with the 60-year record of the levels of Great Salt Lake. If a definite relation can be determined showing that a certain amount of precipitation produces a ring of certain thickness, this relation can then be applied back to the center of the tree and an estimate thereby secured for the annual precipitation for a period of four hundred to five hundred years. An effort will be made to complete this study during the next three months.

Any information concerning the progress of this work can be secured by writing or calling upon E. C. LaRue, district engineer, Water Resources branch, U. S. Geological Survey, Salt Lake City, Utah.

tory. The train consisted of thirty-seven box cars 42 ft. long, having a capacity 80,000 lbs. each, and the total weight of the contents of the cars was 1,500,000 lbs. The lumber was shipped by the Lumber Manufacturing Agency to dealers in various Eastern cities.

A Canadian Pacific Track-Walker.

A Galician, employed in the maintenance of way department at Telford, east of Winnipeg, while walking the track recently, making the usual Sunday inspection, discovered a piece of flange 18 in. long, which appeared to have been freshly broken off a wheel. He was some distance from a telegraph office; but a freight train was approaching, and quickly grasping the situation, he held the piece of flange up to the engineer's view. The engineman comprehended and he stopped his train at the first telegraph office; he notified the despatcher, who in turn called up the various stations, and stopped all freight trains then on the road, with a view to finding the car with the broken wheel. It was found on a train 50 miles from where the piece was picked

up, and was safely side-tracked. This intelligence of the section man and the prompt action of the engineman and the despatcher no doubt prevented a serious wreck, as the train was about to proceed over a crooked line. The Canadian Pacific gives credit to employees for meritorious acts, and it is found that a considerable number of such acts come to light every year. In this instance, the track-walker was given a money reward.

Hudson & Manhattan Proposal to Operate Tri-Borough Subway.

W. G. McAdoo, president of the Hudson & Manhattan, has sent to the New York State Public Service Commission a proposition for the operation of the proposed new subways in New York by his company and he offers to give a bond of a million dollars as an evidence of good faith; but as a condition he would require the city to provide two sections of underground railway which have not before been considered, and he would omit the northernmost extensions of the Lexington avenue line, presumably because they would not be profitable. At the same time he would recommend the omission of the Canal street line across the lower end of Manhattan. He estimates that on the whole the scheme as modified by his proposals would cost the city about one hundred millions. His company would provide the additional funds necessary for the equipment and operation, which he estimates at fifty millions. He would ask the city to make a subway from Thirty-third street and Sixth avenue southward through Broadway to Tenth street so that, in connection with the subway which is to be built to the Grand Central Terminal by his company, he could run trains of the Lexington avenue line around through this part of Broadway; and he would ask that an extension be built from the southern part of the Lexington avenue line, beginning at Church street, across the river to the Flatbush avenue station in Brooklyn and thence, by the line already proposed by the commission, through Lafayette avenue to Broadway, Brooklyn. Under this scheme there would be a line from the Bronx to Brooklyn parallel to and competing with the Interborough System, while at the same time the new system would closely connect with the present lines of the Hudson & Manhattan and thus tend to increase the business over the H. & M. to and from New Jersey. The work could be finished in about four years. The Hudson & Manhattan would operate under a fair contract, dividing the profits with the city after the payment of interest, taxes and a suitable sum for amortization.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
- AMERICAN ASSOCIATION OF FIREBRIDGE OFFICERS.—A. G. Thomson, Scranton, Pa.; next meeting, June 22, 1911; Niagara Falls, N. Y.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Boyd, Boston, Mass.; next meeting, St. Paul, Minn., 1911.
- AMERICAN ASSOCIATION OF LOCAL FREIGHT AGENTS' ASSOCIATION.—G. W. Dennison, Pennsylvania Co., Toledo, Ohio.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew building, Cincinnati, Ohio.
- AMERICAN RAILROAD RAILWAY ASSOCIATION.—H. C. Doherty, 39 W. 39th St., New York.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Sept. 17-19, 1911; St. Louis, Mo.
- AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION.—E. H. Fritch, Monadnock building, Chicago; March 21-23, 1911, Chicago.
- AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; May 6, 1911; Detroit, Mich.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; June 14-16, 1911, Atlantic City, N. J.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Hairoun, Bloomington, Ill.
- AMERICAN ROAD BUILDERS' ASSOCIATION.—Dec. 6-9, Indianapolis, Ind.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wednesdays, except July and August, annual, Jan. 18-19, New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Haner, 13 Park Row, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., New York; annual, Dec. 6-9; New York.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 113 Dearborn St., Chicago; April 26, 1911, New Orleans, La.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. L. Chicago; May, 1911, Montreal, Can.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Colegrove, I. C. R.R., Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston, Mass.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Place, New York; Dec. 13-14, 1910, Chicago; June 20-21, 1911, Cape May City, N. J.
- CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tuesday in month, except June, July and Aug.; Montreal.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays; Montreal, annual, last week January.
- CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.
- CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo, N. Y.
- CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul; 2d Monday, except June, July and Aug.; St. Paul.
- ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday; annual, Jan. 17, 1911; Pittsburgh.
- FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot R.R., Richmond, Va.; 20th annual, June 21, 1911; St. Paul, Minn.
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—H. D. Judson, 209 East Adams St., Chicago; Wednesday preceding 3d Thursday; Chicago.
- INDIANAPOLIS RAILWAY AND MECHANICAL CLUB.—B. S. Downey, C., H. & I., Indianapolis, Ind.
- INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; next convention, Omaha, Neb.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; May 15-18, 1911; Chattanooga, Tenn.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. Ry., Two Harbors, Minn.
- INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio.
- INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.
- IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
- MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; June 19-21, 1911, Atlantic City, N. J.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF UNITED STATES AND CANADA.—A. P. Dane, R. & M., Reading, Mass.
- NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept.; Boston.
- NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
- NORTH-WEST RAILWAY CLUB.—T. W. Flannagan, Soo Line, Minn.; 1st Tues. after 4d Mon., except June, July, August, alternately at St. Paul and Minneapolis, Minn.
- NORTHERN RAILWAY CLUB.—C. L. Kennedy, C., M. & St. P.; 4th Saturday; Duluth, Minn.
- OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Bldg., second Wed.
- RAILWAY CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City; 3d Friday in month; Kansas City.
- RAILWAY CLUB OF PITTSBURGH.—C. W. Allemen, P. & L. E., Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
- RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.
- RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio; annual, May, 1911.
- RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. J. Ry., Peoria, Ill.; Oct. 1911; St. Louis.
- ST. LOUIS RAILWAY CLUB.—E. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.
- SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Prudential bldg., Atlanta, Ga.; 3d Thurs.; Jan., April, August and Nov.; Atlanta.
- TOLEDO TRANSPORTATION CLUB.—L. G. Macomber, Woolson Spice Co., Toledo; 1st Sat.; annual, May 6, 1911; Toledo.
- TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; 1st Sat. after 1st Nov.; annual, Dec. 13, 1910; Buffalo, N. Y.
- TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; 1st Tuesday in month, except June, July and August; New York.
- TRAINING CLUB OF PITTSBURGH.—J. J. Walters, Oliver building, Pittsburgh, Pa.; meetings monthly; Pittsburgh.
- TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 20, 1911; Baltimore, Md.
- TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.
- WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August; Winnipeg.
- WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.
- WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, First National Bank Bldg., Chicago; annual, Jan. 17-19, 1911, Chicago.

The only railway in Nicaragua is the National Railroad of Nicaragua, owned by the government but leased to a German. The terms of the lease provide that 25 per cent. of the gross earnings of the road shall be paid to the government, 10 per cent. shall be used to pay for repairs, and the remainder goes to the holder of the lease, who must pay from his share the operating and administrative expenses of the road.

Traffic News.

The Pennsylvania Railroad, beginning this week, will run an agricultural special instruction train over the Bedford division, carrying lecturers from the School of Agriculture at the State College.

Western and southern railroads have informed the manufacturing and jobbing interests of Chicago, through the Chicago Association of Commerce, that they will no longer allow the usual reductions in passenger rates for conventions and expositions.

The Traffic Club at New York will hold its annual meeting for the election of officers at the Waldorf on Tuesday evening.

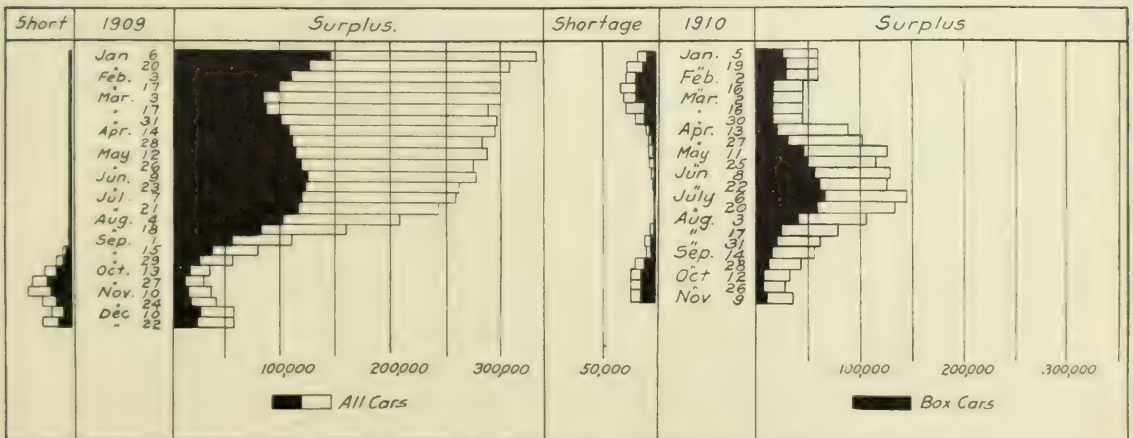
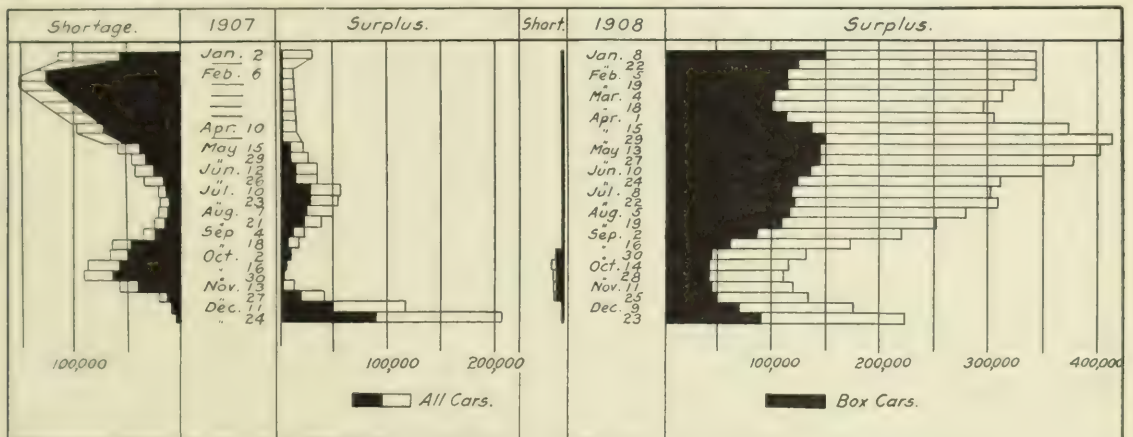
November 29. After the conclusion of the business there will be an entertainment and a luncheon. The ticket reported by the nominating committee proposes the following candidates for the ensuing year: For president, F. E. Herriman, the vice-presidents, E. G. Warfield, Colin Studds, W. J. Harahan, W. G. Sickel, Chas. F. Tuttle; for treasurer, F. C. Earle; for secretary, C. A. Swope; for assistant secretary, H. L. Derby; for members of board of governors to serve three years, C. F. Seegar, F. E. Stoddard, L. F. Vailnigh, for member at large of governors to fill unexpired term of E. C. Warfield, resigned, one year, E. C. Weekes.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of The American Railway Association, in presenting

Date	No. of roads.	CAR SURPLUS.					SHORTAGES.				
		Box.	Flat.	gondola.	and hopper.	Total.	Box.	Flat.	gondola.	and hopper.	Total.
1. Nov. 1, 1910	8	21	170	60	20	777	0	0	0	138	267
2. " " 9, 1910	3	751	99	469	5,970	7,289	0	0	1,139	125	1,557
3. " " 9, 1910	24	88	244	377	1,817	3,126	1,685	0	670	662	3,017
4. " " 9, 1910	9	183	81	326	310	870	359	1,030	1,030	0	2,509
5. " " 9, 1910	17	0	0	30	10	40	2,606	702	1,124	46	4,478
6. " " 9, 1910	30	6,502	634	1,487	4,040	12,663	134	60	914	328	1,436
7. " " 9, 1910	4	68	34	146	124	372	113	0	0	117	230
8. " " 9, 1910	14	124	14	528	1,752	2,418	1,975	120	354	64	2,513
9. " " 9, 1910	12	522	95	57	444	1,118	679	85	123	50	937
10. " " 9, 1910	21	743	711	1,173	2,774	5,401	1,972	65	11	465	2,513
11. " " 9, 1910	4	45	99	22	144	310	1,142	0	0	81	1,223
Total	156	9,814	2,181	4,981	17,605	34,581	11,959	1,450	5,515	2,076	21,000

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia, and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages in 1907, 1908, 1909 and 1910.

statistical bulletin No. 83, giving a summary of car shortages and surpluses by groups from July 7, 1909, to November 9, 1910, says:

"There is an increase of 5,450 in the surplus, making the total 34,581 cars. The largest increase is 4,533 in the miscellaneous column, which is made up chiefly of coke cars in group 2 (Eastern), and stock in groups 6 (Northwestern), 8 (Middle Western), and 10 (Pacific). There was also some increase in box surplus in the West and Northwest, partially offset by decreases in the Eastern and central groups. The coal car surplus decreased 797 cars, the largest item being in group 2 (Eastern).

"There was a decrease in the shortage of 896 cars, the items of change in general reflecting the changes on the surplus side.

"It will be noted that the increase in surplus is setting in at exactly the same period as last year, and that the amount of the increase for this report is almost identical with that for the corresponding period in 1909. The total surplus this year, however, is slightly lower than last year, having been 36,616 on November 10, 1909, as against 34,581 for this report."

The accompanying table gives surpluses and shortages by groups for the last period covered by the report and the diagrams show total surpluses and shortages in 1907, 1908, 1909 and 1910.

INTERSTATE COMMERCE COMMISSION.

The Interstate Commerce Commission has granted the railways additional time to reply to the inquiry recently submitted regarding value and financial administration of the properties. On questions 1 to 4 the time for reply has been extended to December 5, and on questions 5 to 7 until January 5. Questions 5 to 7 of the commission's inquiry circular require the railways concerned in the applications for higher rates to furnish the commission with full details respecting stock and bond issues since the creation of the respondent companies, including all expenses of preparation and sale, the terms of all contracts with bankers or syndicates, amount of all fees, commissions, etc., proceeds in cash, property, securities or services of all security issues; the interest and dividend payments and all other disbursements to holders of the company's bonds and stocks; rights of subscription and their market quotations; application of earnings or profits in each year to purchase of equipment, other additions and betterments, sinking funds and other purposes, specifying each.

Reparation Awarded.

Webster Grocer Company v. Chicago & North Western et al. Opinion by Commissioner Cockrell:

Joint rate in excess of sums of separately established rates. (19 I. C. C., 493.)

Hanley Milling Co. v. Pennsylvania Company et al. Opinion by Commissioner Clark:

On the facts complainant is entitled to reparation because defendants negligently failed to comply with complainant's request for reconsignment of one carload of hay. (19 I. C. C., 475.)

Complaint Dismissed.

Paragon Plaster Co. v. New York Central & Hudson River et al. Opinion by Commissioner Clements:

Rates collected on carload shipments of wall plaster from Syracuse, N. Y., to Boston, Mass., and New York, N. Y., not found unreasonably high.

S. Shoecraft & Son v. Illinois Central et al. Opinion by Commissioner Prouty:

Following *Blinn Lumber Company v. Southern Pacific Company*, 18 I. C. C. Rep., 430, consideration of this claim is barred by the statute of limitations. (19 I. C. C., 492.)

Griffen H. Deeves Lumber Co. v. Chicago & North Western et al. Opinion by Commissioner Cockrell:

1. The fact that over nine months after shipment moved defendant provided for absorption of switching charge, held not sufficient in itself to justify a finding that the charge was unreasonable.

2. Complaint of unreasonable charges on shipment from Greenville, Mo., to Foodhouse, Ill., and on shipment from Dothan, Ala., to Chicago, Ill., not sustained. (19 I. C. C., 482.)

Wells-Higman Company v. Grand Rapids & Indiana Railway Company et al. Opinion by Commissioner Cockrell:

Joint rebate in excess of combination. Reparation awarded. Shipment Metropolis, Ill., to Chicago, Ill., reconsigned to Lawton, Mich. Reconsigning instructions given to carrier not participating in original movement; held, that two separate movements resulted, the first intrastate and the second interstate. Carriers participating in interstate movement not made parties defendant. Complaint dismissed. No overcharge shown for transportation within the jurisdiction of commission. (19 I. C. C., 487.)

Time Limit on Redemption of Unused Coupons.

T. A. Rickel v. Atchison, Topeka & Santa Fe. Opinion by Commissioner Harlan:

Without considering the question of the legality of the use by interstate carriers of so-called exchange scrip books, the commission holds that because of the defects of the tariff under which such books were sold by the defendant the provision therein limiting the right of the purchaser to demand redemption of unused coupons to a period of eighteen months was not valid. Reparation awarded the complainant for his unused coupons, although presented for redemption after the said period had expired. (19 I. C. C., 499.)

Progress of Hearings and Suspensions of Tariffs.

The Interstate Commerce Commission resumed its hearings on the proposed trunk line freight rate increases at Washington on Monday of this week. The first testimony was that of William A. Glasgow, H. K. Hathaway and James M. Dodge, all of Philadelphia, who told how by the introduction of scientific methods in their factories they had been able to produce greatly improved results with fewer men and at a reduction in cost. This testimony was prefaced by a long statement from Mr. Brandeis, attorney for the shippers, who said that he was going to show how the railways could provide for all of their increased expenses, on account of labor or because of the higher cost of materials, by the introduction of economies in management and operation.

Joseph Ramsey, president of the Ann Arbor Railroad, made a general statement concerning the necessity of increased income, of the same nature as the statement heretofore made by Messrs. McCrea, Willard and others.

Many prominent roads appeared at the hearing to ask relief from some of the requirements of the commission in its recent order asking for a great mass of information relative to the capitalization and financial history of the companies.

The Interstate Commerce Commission has suspended until April 10, 1911, tariffs filed by the Rock Island and other lines west of the Mississippi river showing increased rates on live stock. These tariffs will be considered with other live stock tariffs which have been issued in the same territory and which were suspended sometime since.

The commission has suspended until January 5 tariffs filed by the Kansas City Southern and other railways showing increased rates on second-hand locomotives.

The commission will begin its hearing on the long and short haul clause at Washington next Monday.

Decision on Long and Short Haul Question Postponed.

Colorado Coal Traffic Association v. Colorado & Southern et al. Opinion by Commissioner Clements:

Apart from the charge of deviation from the long-and-short section, no question is herein involved that was not disposed of in *Cedar Hill Coal & Coke Company v. C. & S. Ry. Co.*, 16 I. C. C. Rep. 387. Whatever may be the merit of complainant's contention regarding the long-and-short-haul feature of the controversy, no order at this time will be made by the commission in respect thereto for the reason that following the language in the first part of the amended fourth section of the act, approved June 18, 1910, prohibiting a greater charge for a shorter than for a longer haul when over the same line in the same direction, it is provided—that no rates or charges lawfully existing at the time of the passage of this amendatory act shall be required to be changed by reason of the provisions of this section prior to the expiration of six months after the passage of this

and, not in any case where application shall have been filed before the commission, in accordance with the provisions of this section, until a determination of such application by the commission. This complaint will therefore be dismissed. (19 I. C. C., 478.)

Exception to Demurrage Rules in New England.

In the matter of the investigation and suspension of certain demurrage schedules. Opinion by Commissioner Lane.

In November, 1909, the National Convention of Railway Commissioners adopted a code of uniform demurrage rules. This action was based on extensive investigation and thorough discussion, participated in by railway commissions, commercial organizations, representatives of railways, and individual shippers from all parts of the country. The deliberations of the committee having the matter in charge were presided over by a member of the Interstate Commerce Commission, who submitted the report recommending the adoption of the code.

This commission, believing it to be of first importance that uniform demurrage rules should be observed throughout the United States, except in so far as local conditions might interfere, recommended carriers to apply this uniform code to interstate business, and following this recommendation the railways of New England filed schedules with this commission making these rules effective October 1, 1910. As soon as these tariffs were filed the commission began to receive numerous vigorous protests against the putting into effect of these schedules, claiming that conditions in New England differed from those elsewhere, and that the establishment of these rules would work much hardship. Desiring to proceed with great caution, we suspended the effective date of these tariffs for thirty days and assigned the matter for hearing at Boston on October 17, last.

Two members of the commission attended that hearing, which extended over two days. We found an earnest and aggressive sentiment against these new demurrage regulations, begotten, without doubt, of an honest belief that their operation would entail much hardship. In the past New England has enjoyed a demurrage free time of ninety-six hours, which is reduced by these rules to forty-eight hours. The testimony before us indicated that the average shipper had not looked beyond this fact, and believed that the only effect of these new rules was to divide in half his free time.

In point of fact, this is not true. The new rules contain many provisions of advantage to the shipper not found in the schedule at present in force. They contain, for example, a bunching provision, relieving against hardship from the irregular delivery of cars; an average provision by which shippers may gain, through the prompt unloading of cars, credits which are applied against overtime in the unloading of other cars; a weather provision which is of much importance in New England. It is our belief that the new rules, applied in a proper spirit, will result in less inconvenience to and in the payment of less demurrage charges by the shippers of New England than under the old regulations.

We also found certain local conditions in New England which differed to some extent from other sections of the country, but it is uncertain, from the testimony given, just how far, if at all, these conditions require a departure from the rules elsewhere in effect. We feel that, in the main, New England should be able to operate under the same demurrage code which prevails in other parts of the United States and in the Dominion of Canada; but we desire to be certain of our ground before taking final action.

From a consideration of the entire situation we think that the first necessity is the establishment of a demurrage officer in this territory who will give construction to these rules and enforce them impartially and fairly as between the shippers and the carriers. We have to this end suggested to the carriers the name of a man in whom we have confidence, to whom doubtful questions will be referred by both carriers and shippers. This officer will have access to the carriers' records, and will report the working of the rules to the commission.

The effective date of these schedules has been a second time suspended until December 1, 1910. We recommend that for six months following that date the free time upon lumber and forest products, coal, grain and grain products be extended from forty-eight hours to seventy-two hours, provided, however, that the

application of the average rule shall only be allowed upon a forty-eight-hour basis. Before the expiration of that period the commission will be able to intelligently determine what modifications, if any, should be given a longer free time than the standard forty-eight hours.

The shippers of New England should understand that this uniform demurrage code was only adopted after the most careful consideration. The business of a railway is transportation, not storage. The service of a railroad cannot be efficient unless its cars are promptly released. If a car is detained by a particular shipper for a longer period than is necessary for loading or unloading, the efficiency of the railway is to that extent diminished, and every other shipper is to the same extent prejudiced. We urge that shippers cooperate in giving a fair and intelligent trial to these regulations. If it turns out that under the peculiar conditions of New England their application results in undue hardship, the rules themselves will be modified; the present recommendations are understood, however, to be purely tentative, awaiting fuller and more precise information upon the New England situation. (19 I. C. C., 496.)

COURT NEWS.

Important Decision in Louisiana Regarding Sugar Cane Rates.

The supreme court of Louisiana has rendered a decision holding unjust and unreasonable and annulling rates on sugar cane fixed by the Louisiana railway commission on August 6, 1906. The rates on sugar cane were originally placed at a low figure by the railways in order to develop the industry. The commission still further reduced these rates, and the Southern Pacific (Morgan's Louisiana & Texas Railroad and Steamship Co. and the Louisiana Western) contested its action.

The original rates of the railways were made some ten or fifteen years ago. Some of the sugar people in Louisiana had conceived the idea of building large central factories and then consolidating the large tonnage of sugar cane manufactured into sugar instead of following the method followed since the settlement of the country of having an independent sugar factory on each plantation. It was to enable manufacturers to carry out these plans that the railways made the original reductions in rates, and the central refinery plan was in consequence carried out, and the result has been that under the rates made the sugar manufacturers constantly have prospered. It was in spite of this fact, and of the fact that the cost of operating railways had increased since the rates had been fixed, that the commission reduced them. In rendering its decision the supreme court laid down a number of important principles. The following is a summary of them:

The freight rates charged in one state have no bearing on those charged elsewhere, unless the conditions are shown to be the same, and it was not shown that the conditions were the same in Louisiana and in Texas and Wisconsin, with whose rates those in Louisiana were compared.

No rate could be held to be reasonable or just only on the basis of the total earnings of the carriers. Furthermore, where the railway derives its revenue from both interstate and state business, a state cannot predicate the rates it fixes on earnings derived from interstate business.

A reduced rate on a particular commodity cannot be said to be reasonable or just when made without regard to rates on other commodities or to whether it will pay the cost of the service or yield a fair return, even though it be held by state and federal courts that requiring of a road to haul a commodity for less than cost is not a taking of property without due process so long as the company gets a fair revenue from the whole of its intrastate business. The courts of Louisiana need hold that a rate to be unreasonable or unjust within the meaning of the Louisiana constitution must also violate the fourteenth amendment of the federal constitution.

Where rates are fixed on a particular commodity, the only question is whether they produce a revenue—first, sufficient to pay the actual cost of the service, and second, to yield a fair return over operating expenses. For certain companies the carrier hauls both the raw and manufactured material, and in such cases the loss on transporting the one may be made good by the gain from hauling the other.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

W. L. Goodnow, claim adjuster of the Rock Island Lines at Toledo, Kan., has been appointed claim agent of the Kansas City Terminal Railway, with office at Kansas City, Mo.

S. W. Patton has been appointed claims agent of the Minneapolis & St. Louis and the Iowa Central, with office at Minneapolis, Minn. He will have charge of fire, freight and personal injury claims.

The officers of the Sparks Western are now as follows: Col. J. M. Wilkinson, president, Valdosta, Ga.; E. L. Bemiss, vice-president, and R. Fleet, secretary and treasurer, both of Augusta. Mr. Wilkinson is third vice-president; Mr. Bemiss, second vice-president, and Mr. Fleet, treasurer, of the Georgia & Florida.

C. C. Wright, assistant attorney of the Chicago & North Western lines west of the Missouri river at Omaha, Neb., has been appointed general solicitor, with office at Chicago. He will act as immediate assistant to the general counsel, and will have active charge of cases before the Interstate Commerce Commission.

Operating Officers.

W. C. Bussett has been appointed assistant superintendent of telegraph of the Atchison, Topeka & Santa Fe Coast Lines, with office at Los Angeles, Cal., succeeding G. A. Lawrence.

The office of special agent of the Louisiana division of the Rock Island Lines has been abolished, and the jurisdiction of R. M. Clary, special agent of the Arkansas division has been extended over the Louisiana division. H. Fairmon has been appointed a trainmaster on the Louisiana division, succeeding F. O. Whiteman, transferred.

John A. McGrew, whose appointment as superintendent of the Saratoga and Champlain divisions of the Delaware & Hudson, with office at Albany, N. Y., has been announced in these columns, was born June

8, 1873, at Bridgewater, Ohio. Mr. McGrew graduated from the Ohio State University with the degree of civil engineer, in June, 1895, and completed a post-graduate course at the same university in November, 1896. He began railway work in June, 1894, with the Columbus & Westerville Electric Railway, at Columbus, remaining with that company until October of the same year. In 1895 he again entered the service of this company, and for about six months he was assistant superintendent of construction. From November, 1896, to August, 1899,

he was an assistant on the engineering corps of the C. & P. division of the Pennsylvania Lines at Wellsville, Ohio, and Columbus. In August, 1899, he was appointed assistant engineer maintenance of way of the Logansport division of the Pittsburgh, Cincinnati, Chicago & St. Louis, at Logansport, Ind., and in January, 1901, was promoted to engineer maintenance of way. In April, 1903, he was appointed engineer maintenance of way of the Eastern division of the Pittsburgh, Fort Wayne & Chicago, now a part of the Pennsylvania company, remaining in that position until May of the following year, when he went to the Rock Island as a special agent in the general manager's office at Chicago. He was out of railway work from November, 1904, to September, 1909, and since that time was inspector maintenance

of way of the D. & H., the Quebec, Montreal & Southern, the Hudson Valley Railway and the United Traffic Company.

C. F. Merrill, assistant superintendent of the Central Railroad of New Jersey, at Much Ocean, Pa., has been appointed superintendent of the Lehigh & Hudson River, succeeding L. W. Berry, resigned to go to another company. Mr. Merrill received his education at Phillipsburg Academy, at Andover, N. J., and at Amherst College. He is a son of W. F. Merrill, former first vice-president of the New York, New Haven & Hartford. He began railway work in the engineering department of the Indiana, Illinois & Iowa, and then went to the Philadelphia & Reading, with office at Harrisburg, Pa. Mr. Merrill has been with the Central Railroad of New Jersey for the past eight years on the Lehigh & Susquehanna division, holding various positions in the operating department, which he now leaves to become superintendent of the Lehigh & Hudson River.

L. W. Berry, whose appointment as superintendent of the New York & Long Branch, with office at Long Branch, N. J., has been announced in these columns, began railway work in 1878, as operator and agent of the Chicago & Alton. From 1880 to the spring of 1881 he was operator of the Chicago, Burlington & Quincy, and was then despatcher until July, 1899. He was appointed superintendent of the St. Louis division of the same road in 1899, remaining in that position for six years, and he was then for one year inspector of transportation of the Toledo, St. Louis & Western. In 1906, he went to the Lehigh & Hudson River, and at the time of his recent appointment was superintendent of that company, which position he now leaves to become superintendent of the New York & Long Branch, succeeding former Senator Rufus Blodgett, deceased.

Traffic Officers.

W. S. Williams, commercial agent of the Rock Island Lines at Cedar Rapids, Iowa, has been appointed a general agent, with office at Spokane, Wash.

G. M. Jackson, ticket passenger agent of the Canadian Pacific at San Francisco, Cal., has been appointed general agent, passenger department, with office at San Francisco.

M. M. Hogan has been appointed Florida freight agent of the St. Louis & San Francisco, the Chicago & Eastern Illinois and the Evansville & Terre Haute, with office at Jacksonville, Fla.

R. C. McKelley, traveling freight agent of the American Refrigerator Transit Company at Milwaukee, Wis., has been appointed general agent, with office at Kansas City, Mo., succeeding Fred Wemhoener, resigned.

Russell Houston, soliciting agent of the Louisville & Nashville, at Louisville, Ky., has been appointed general freight and passenger agent of the Alabama, Tennessee & Northern and the Tombigbee Valley, with office at Mobile, Ala.

George L. Williams has been appointed a general agent of the Chicago Great Western, with office at Fargo, N. D., succeeding H. S. Jones, resigned to go into other business, and E. D. Forde has been appointed general agent, freight department, with office at Pittsburgh, Pa.

H. B. Holbert, division freight agent of the Chicago Great Western at St. Paul, Minn., having been transferred to Des Moines, Iowa, the territory under his jurisdiction at St. Paul (from Oelwein, Iowa, to Invergrove, Minn.; and from Osage, Iowa, to Judge, Minn., and Tripoli and Bremer, Iowa), has been assigned to B. J. DeGroot, division freight agent at Red Wing, Minn.

T. M. Schumacher, assistant director of traffic of the Southern Pacific, the Union Pacific, the Oregon Railroad & Navigation Company, the Oregon Short Line and the Oregon & Washington, with office at Chicago, has resigned to take charge of the traffic interests of the American Smelting & Refining Company, with office at New York. He will succeed William Sproule, who was recently elected president of the Wells-Fargo Express Company.

J. P. Gehrey, city passenger agent of the Minneapolis, St. Paul & Sault Ste. Marie at Minneapolis, Minn., has been appointed district passenger agent, with office at Duluth, Minn. J. E. Collins succeeds Mr. Gehrey. F. D. Grant has been appointed district passenger agent, with office at Chicago, succeeding C. C. Hill, promoted. P. J. Asselin, traveling agent at Minneapolis, Minn., has been transferred to New York City, and W. B. Lutz succeeds Mr. Asselin.



John A. McGrew.

Engineering and Rolling Stock Officers.

C. J. Stewart, master mechanic of the Central New England, at Hartford, Conn., has been appointed master mechanic of the New York, New Haven & Hartford, with office at Waterbury.

George H. Bussing has been appointed superintendent of motive power of the New Orleans Great Northern, with office at Bogalusa, La., succeeding to the duties of H. W. Burkheimer, master mechanic, resigned.

Curtis Dougherty, engineer maintenance of way of the Alabama Great Southern and the Cincinnati, New Orleans & Texas Pacific, at Cincinnati, Ohio, has been appointed chief engineer of both companies, with office at Cincinnati, and his former position has been abolished.

A. Dinan, division master mechanic of the Atchison, Topeka & Santa Fe at Ft. Madison, Iowa, has been appointed mechanical superintendent of the southern district of the western lines, with office at Amarillo, Tex. He will have jurisdiction over the Pan Handle division and territory from Clovis, Tex., to Belen, but not including shops or roundhouse at Belen. The Albuquerque shops and roundhouse have been transferred from the Coast lines to the northern district of the western lines, and will be under the jurisdiction of M. J. Drury, mechanical superintendent of the northern district at La Junta, Colo., the northern district including the Western, Arkansas River, Colorado, New Mexico and Rio Grande divisions. W. H. Hamilton, division master mechanic at Argentine, Kan., has been transferred to Chanute, Kan., succeeding A. Mitchell, retired. E. E. Machovec, division master mechanic at Newton, Kan., succeeds Mr. Hamilton, and James McDonough, general foreman at Emporia, Kan., succeeds Mr. Machovec.

R. G. Kenly, whose appointment as chief engineer of the Minneapolis & St. Louis and the Iowa Central, with office at Minneapolis, Minn., has been announced in these columns, was born March 13, 1866, at Ritchie Mines, W. Va. He finished his education at Baltimore City College, and began railway work in September, 1885, as a rodman and levelman on surveys and location, with the Annapolis & Baltimore Short Line. He was promoted through the various grades of the engineering department with different roads, and in 1891 became a supervisor of the Norfolk & Western; he was later assistant engineer and then assistant trainmaster of that road, and 1898 was appointed assistant to the chief engineer of the West Virginia Central & Pittsburgh. The next



R. G. Kenly.

year he went to the Pennsylvania Railroad as draftsman and engineer in charge of construction, and in 1900 became a supervisor, and then a division engineer on the Lehigh Valley. Four years later he was appointed a trainmaster, and in March, 1907, was appointed general superintendent of the Lehigh & New England, with jurisdiction over the operating, mechanical and engineering departments, and for six months from June, 1908, he was engineer of maintenance of way of the Lehigh Valley. He was then made chief engineer of the Minneapolis & St. Louis and the Iowa Central, and when those roads were consolidated with the Chicago & Alton and the Toledo, St. Louis & Western in November, 1909, he became engineer of maintenance of way; now that the managements are separated again, he has been re-appointed chief engineer.

OBITUARY.

E. B. Childs, master mechanic of the Northern Pacific, with office at Spokane, Wash., died at Spokane last week.

Railway Construction.

New Incorporations, Surveys, Etc.

ATCHISON, TOPEKA & SANTA FE COAST LINES.—See Atchison, Topeka & Santa Fe.

ATCHISON, TOPEKA & SANTA FE.—On the Pecos & Northern Texas track has been laid from Lubbock, Tex., southeast to Coleman, 122.66 miles, and it is expected that an additional 37.54 miles will be finished during 1910. Track has also been laid from Plainview, southeast to Floydada, 14.36 miles, as well as from Slaton, southwest to Lamesa, 54.36 miles. The Gulf, Colorado & Santa Fe expects to finish about 13.80 miles from Lometa to the Colorado river during 1910, track has been laid on a branch from Brady to Melvin, 12.24 miles. The Coast Lines completed work on 5.10 miles from Fullerton, Cal., to Richfield, and the Fresno County Railway, on the Kings river extension, has built 10.28 miles, during 1910.

BALTIMORE & OHIO.—An officer writes regarding double-tracking work on the Wheeling division that the company is extending the second-track from Valley Falls, W. Va., to Powells, three miles, and from Gaston Junction to Benton Ferry, three miles. The improvements are being made to facilitate the movement of coal to the seaboard from the West Virginia fields. The grading is all light and very little masonry is necessary. The single-track through bridge over the Monongahela river, near Fairmont, will be replaced with a double-track structure. J. F. Brogan, Philadelphia, Pa., has been given the contract for the grading and masonry, and the track work will be carried out by the company's men.

BANGOR & ARROSTOOK.—Surveys are now being made for the extension from West Seboois, Me., to St. Francis, 160 miles.

BANGOR RAILWAY & ELECTRIC COMPANY.—An officer writes that this company has projected an extension from Bangor, Me., to Northern Maine Junction, three miles.

BINGHAM & GARFIELD.—Work is now under way by the Utah Construction Company, Ogden, Utah, from Bingham, north to Garfield, 18 miles. H. C. Goodrich, Salt Lake City, may be addressed. (June 3, p. 1390.)

BUCKHANNON & NORTHERN.—An officer writes that the plans call for a line from the Pennsylvania-West Virginia state line, southwest to Rivesville, W. Va., 32 miles. S. D. Brady, chief engineer, Morgantown. (Feb. 4, p. 230.)

CLARION & EAST BRADY ELECTRIC.—A contract has been given to the Ridge Brothers Company, Pittsburgh, Pa., to build from Clarion, Pa., to Reidsburg, six miles. The plans call for a line to connect Clarion, Reidsburg, Curllsville, Sligo, Reinersburg and East Brady. Maximum grades will be 2 per cent., maximum curvature eight degrees. The company will let contracts soon for putting up a power house. F. M. Arnold, president; G. E. Arnold, assistant to president, and F. W. Patterson, chief engineer, Clarion.

CINCINNATI, FINDLAY & FORT WAYNE.—An officer writes that this company carried out improvements during 1910 including grade revision work and laying 10.5 miles of second-track between Kirkwood, Ohio and Swanders. The Carter Construction Company were the contractors.

CRITTENDEN RAILROAD.—This company, which operates 15 miles of railway from Earle, Ark., south to Heth, with a branch from Crittenden to Felco, has projected an extension of five miles.

DULUTH, MISSABE & NORTHERN.—Work is now under way on a double-track line from Hull Junction, Minn., to Hull Rust mine, 18.11 miles. First track has been laid on 14.40 miles, and second-track on 12 miles. It is expected that all the work will be finished by March, 1911.

EL PASO & SOUTHWESTERN.—This company is making some surveys between Benson, Ariz., and Tucson, but the question of whether the line will be built has not yet been decided. An

officer writes regarding the report that a line is to be built to Yuma, Ariz., or San Diego, Cal., that the company does not contemplate building such a line. (Nov. 19, p. 98.)

FRESNO COUNTY RAILWAY.—See Atchison, Topeka & Santa Fe.

GRAND CANYON, IRON MOUNTAINS & SOUTHERN.—SHERMAN and Co. have been offered at Merrill, Colo., for this line. The projected route is from Nephin or Payson, through the east side of the Sevier valley, to Fillmore, thence to Kanosh, Beaver City, Cedar City and St. George, and through a pass in the Pine Valley mountains to a point in Arizona, about 275 miles. A branch is to be built to the Kanab forest, along the Utah-Arizona state line. M. H. Walker, Salt Lake City and Grand River Road School are back of the project.

GEORGIA & FLORIDA.—This company has secured control of the Sparks Western, building a 20-mile line from Sparks, Ga., west to Moultrie. About three miles of track remain to be laid to complete the line.

GRAND VALLEY, COLORADO RIVER & SOUTH PACIFIC.—An officer writes that this company has projected a line from Grand Junction, Colo., down the south side of the Colorado river. Henry Barna, president, Brooklyn, N. Y.

GULF, COLORADO & SANTA FE.—See Atchison, Topeka & Santa Fe.

HECLA JUNCTION & BOX CANON.—An officer writes that contracts will be let about April, 1911, to build from Hecla Junction, Colo., on the Denver & Rio Grande, to Granite City, 13 miles. There will be nine trestles or tunnels and some station buildings on the line, which is being built to carry granite from the quarries at Granite City. David Heaton, president and chief engineer, Salida.

HILLSBORO & NORTHEASTERN.—An officer writes that this company has projected a line from Hillsboro, Iowa, to Dubuque, with a number of branches to Lancaster, Wis., and Shullsburg. W. H. H. Cash, president and general manager, New Lisbon, Wis.

HOCKING-SUNDAY CREEK TRACTION.—This company proposes to build an electric line from Nelsonville, Ohio south via Floodwood to Doanville, thence north to Chauncey. The company is securing the right-of-way. About 3.3 miles of track has been laid. The company will put up power houses and a car barn.

KENTUCKY & TENNESSEE RAILWAY.—An officer writes that this company now operates 11 miles of line in Kentucky, and that plans have been made to build an extension for 20 or 30 miles under the name of the Kentucky & Tennessee Railroad, to reach the coal and timber lands owned by the company. The existing line extends from Stearns, Ky., on the Queen & Crescent, southwest through Wayne county, Ky., and is to be extended through Scott and Fentress counties, Tenn. The line will open up a large coal section in the Cumberland mountains heretofore undeveloped, as well as large tracts of timberlands. The company expects to build about five miles during the coming winter and to have all the improvements finished during 1912. Contracts will not be let for the work, as the company's men will carry out the improvements.

KENTUCKY & TENNESSEE RAILROAD.—See Kentucky & Tennessee Railway.

KNOXVILLE, SEVIERVILLE & EASTERN.—This company, which operates 30 miles of line from Knoxville, Tenn., southeast to Sevierville, has made surveys for an extension from Sevierville to Cosby, 30 miles. W. A. Seymour, chief engineer, Knoxville. (July 29, p. 205.)

LOUISIANA SOUTHERN.—An officer writes that this company has projected an extension from Belair, La., southeast to Bohemia, 20 miles.

METHOW VALLEY & WASHINGTON NORTHERN.—An officer writes that this line will extend from Pateros, Wash., at the mouth of Methow river, northwesterly along that river via Methow and Twisp to Winthrop, about 45 miles. Surveys have not yet been made and it is undecided when bids will be

asked for the work. W. A. Bollinger, president, Methow, and J. C. Burton, engineer, Twisp. (Oct. 11, p. 941.)

MEXICO, SANTA FE & PUEBLO TRACTION.—An improvement of one year has been granted this company by the city of Puebla, Mex., to build an electric line through that place. The plans call for building electric lines to connect Perry, Mexico, Santa Fe, Hereford, Columbia, Fulton and Mokane. The Fruin-Bambrick Construction Company, St. Louis, has charge of the work. M. Crum, president, Mexico. (June 24, p. 1812.)

NATIONAL RAILWAYS OF MEXICO.—The report of this company for the year ended June 30, 1910, shows that the work has been finished by the Brownsville-Matamoros Bridge Company, which was organized in Arizona to build a bridge over the Rio Grande, connecting Matamoros, Mex., with Brownsville, Tex. The St. Louis, Brownsville & Mexico paid for one-half of this improvement, and the National Railways of Mexico paid the other half. Under a contract entered into between the National Railways of Mexico, the state of Durango and the Campana Maderera de la Sierra de Durango, which is covered by a concession from the federal government, a line is being built from Durango, westerly to Llano Grande, about 65 miles. Contracts were let for the work in January. A large amount of bridge improvement work was carried out during the year, as well as improvements made in the districts affected by washouts, necessitating a change of line, raising the grades and putting in permanent steel and masonry. (See report of this company elsewhere in these columns.)

NIAGARA, ST. CATHERINES & TORONTO.—Surveys are being made for an extension from Port Colborne, Ont., to Fort Erie, 18 miles.

PECOS & NORTHERN TEXAS.—See Atchison, Topeka & Santa Fe.

PEORIA & PEKIN UNION.—Improvements are to be made, extending the yards at East Peoria, Ill. The work will be carried out by the company's men.

RANDOLPH & CUMBERLAND.—Work is now under way on an extension from Hallison, N. C., to High Falls, four miles.

ROME & OSCEOLA.—An officer writes that this company is building from Rome, N. Y., north to Osceola, 25 miles. Grading work was finished during 1910 on about five miles. W. P. White, president, Utica.

SAN DIEGO, EL PASO & ST. LOUIS.—This company was organized to build from El Paso, Tex., east via Artesia, N. M., to the Red river, in Texas, about 525 miles. The McCarthy Engineering Corporation, Houston, Tex., has the general contract, and it is expected that the contracts for the work will be let during 1911. There will be some heavy earth and bridge work and six tunnels, aggregating 2.75 miles. A. Courchesne, president, El Paso, Tex., and P. A. McCarthy, chief engineer, Houston.

SEABOARD AIR LINE.—A contract has been given to E. L. Anderson & Co., Dunnellon, Fla., and work is under way on an extension from Fruitville, northwest to Venice, 18 miles. A contract has been given to Kibler, Boswell & Co., Dunnellon, for work from Hernando to Inverness, five miles.

SOUTHERN PACIFIC.—This company's line, between Los Angeles, Cal., and Palms, will be electrified and used as a connecting link between the Los Angeles-Pacific and the Pacific Electric systems, both of which are Southern Pacific properties. The branch will be used mainly for freight traffic.

SPARKS WESTERN.—See Georgia & Florida.

SPRINGFIELD & WESTERN.—An officer writes that preliminary surveys are being made for this line. The projected route is from Springfield, Mo., to Carthage, about 100 miles, with a branch from Paris Springs to Pierce City. H. D. Mackey, president, and M. M. Hollenback, chief engineer, Springfield.

SPRINGFIELD & CENTRAL ILLINOIS TRACTION.—An officer writes that it has not been determined when contracts are to be let for building this line. The projected route is from Springfield, Ill., south via Pawnee, Morrisville, Hillboro, Coffeen, Greenville, Carlisle and Centralia; another line is to be built from Greenville, west via Alhambra, Edwardsville and Grant City to St.

Louis, Mo., and a third line from Coffeen, Ill., southeast via Vandalia, Kinmundy, Louisville and Olney to Mount Carmel. Isaac A. Smith, president and general manager, Security building, St. Louis, Mo.

STAMFORD & EASTERN.—An officer writes that it has not been decided when bids will be asked for building from Stamford, Tex., via Throckmorton, east to Fort Worth or Dallas. (July 1, p. 54).

STATESVILLE AIR LINE.—This line is being built from Statesville, N. C., north via Yadkinville, Boonville and Dobson to Mount Airy, about 64 miles. The grading work is being done by state convicts. Maximum grades will be 1.5 per cent., maximum curvature eight degrees. There will be three short steel bridges and five trestles. The line is being built to carry lumber, farm products, manufactured goods and merchandise. W. D. Turner, president, and N. R. Greenlee, chief engineer, Statesville. (April 1, p. 919.)

ST. JOSEPH VALLEY.—An officer writes that this company is carrying out with its own men work on an extension from Angola, Ind., east for 15 miles.

SYDNEY & LOUISBURG.—This company, which operates a line from Sydney, N. S., east to Glace bay, thence south to Louisburg, 39 miles, has work under way from McKiegan's Point to Dixon's Platform, one mile, also on an additional mile from Mile 30 to Mile 31. The latter work is being carried out to replace a section of one mile on the existing line, which will be abandoned. The company proposes to build from Balls creek to Limestone quarries, 2.4 miles, and from Morinin station to Birch Grove coal mines, 2.25 miles. Surveys for this work have been made.

TUSCARORA VALLEY.—An officer writes that this company has projected an extension from Blairs Mills, Pa., to Cherry Run, W. Va., 58 miles.

VERMONT VALLEY.—An officer writes that surveys are being made for a line from Brattleboro, Vt., south to South Vernon, about 10 miles.

WATERLOO, CEDAR FALLS & NORTHERN.—An officer writes that in addition to the line to be built from Cedar Falls, Iowa, southwest to Dike, about 10 miles, that the line from Waterloo west to Cedar Falls, is to be improved to make it a low grade line. It is probable that the contracts will be let and work carried out next spring.

WICHITA FALLS ROUTE.—Track laying is to be started soon by the Wichita Falls & Northwestern on the extension from Elk City, Okla., north to Hammon, in Roger Mills county, 16 miles.

FOREIGN RAILWAY NOTES.

The amount of produce secured from the new section of the Cape to Cairo Railway recently opened has been a surprise. The freight returns for the first month's working were \$50,000. From most parts of the Sudan hitherto served by the railway one or two train loads a week would be considered good. On this new section a train every day has hardly been sufficient to carry down all the stuff, chiefly dhurra (native corn), gum, and cotton. The fourth-class native passenger traffic has produced almost enough to pay the working expenses of the section. This is the first portion of the railway to leave the desert part of the Sudan and break into the edge of the land naturally fertile without artificial irrigation.

A concession has been secured, a preliminary survey made and seven miles of road graded for a railway running from San Pedro de Sula into the hardwood forests of Honduras. The road is an extension of the government railway terminating at San Pedro de Sula, and is being built by Americans, who plan to build saw and planing mills for mahogany timber.

One of the most fertile parts of Hayti is the plain of Leoganes, about 20 miles southwest from Port au Prince. The total area is about 90 square miles. A railway has been planned into this district, with the expectation of providing an outlet for the agriculture products through Port au Prince. About five miles of this road has been built, costing, it is estimated, about \$1,000 a mile.

Railway Financial News.

ATLANTIC COAST LINE.—J. R. Kenly, third vice-president, has been elected also a director. This increases the number of members of the board to 12.

CHICAGO & NORTH WESTERN.—This company has sold to Kuhn, Loeb & Co., New York \$15,000,000 4 per cent. general mortgage bonds due 1987. Of the total \$165,000,000 authorized general mortgage bonds there were outstanding on June 30 \$30,271,000 3½ per cent. bonds, and there were owned by the company and due from the trustee \$19,792,000 bonds. The mortgage provides that the interest rate shall not be higher than 5 per cent. Marvin Hughitt, chairman of the board of directors, said to the *Wall Street Journal*: "The bonds were sold to take care of obligations maturing before the first of June for corporate purposes. There are \$6,000,000 bonds which must be paid between now and the close of the current fiscal year, and they will be paid off in this manner. None of the proceeds of the sale will be used for construction of new railways, as they are amply provided for."

CINCINNATI, BLUFFTON & CHICAGO.—The date for the final decision regarding the sale of this property has been set for December 5. A press despatch says that when the sale is ordered, it is understood that \$800,000 will be the upset price. The road runs from Buffington to Huntington, Ind., 52 miles.

DETROIT, TOLEDO & IRONTON.—A report from Detroit, Mich., says that the receivership will be terminated December 1. What the plans are for a reorganization has not been announced.

INTERBOROUGH RAPID TRANSIT.—On November 1 the privilege of converting 3-year 6 per cent. notes of 1908-May 1, 1911, into 5 per cent. bonds of 1907 at the rate of 99 in notes for 100 in bonds expired. Of the \$21,973,000 notes outstanding, \$17,389,000 were exchanged for bonds. This leaves \$4,580,000 notes outstanding, and there are now \$30,552,000 of the bonds.

KANSAS CITY TERMINAL.—J. P. Morgan & Co., New York; Lee, Higginson & Co., Boston, and the Illinois Trust & Savings Bank, Chicago, are offering \$7,500,000 Kansas City Terminal first mortgage 4 per cent. bonds of 1909-1960 at 97. Of the authorized \$50,000,000 bonds there are outstanding, including the bonds now offered, \$20,094,000; and reserved to retire 6 per cent. bonds of the Kansas City Belt, due 1916, \$2,500,000; and reserved for improvements, \$27,406,000. The bonds are guaranteed principal and interest unconditionally by the following roads: A. T. & S. F., C. & A., C. B. & Q., C. G. W., C. M. & St. Paul, C. R. I. & P., Kan. C. S., M. K. & T., Mo. Pac., St. L. & S. F., Union Pac. and Wabash.

PARRAL & DURANGO.—A press despatch says that this road has been sold by the Hidalgo Mining Company to a syndicate of Americans, represented by A. J. McQuatters. (See this company in Railway Construction.)

SEABOARD AIR LINE.—Ernst Thalmann and W. K. Wingham have been elected directors, succeeding Y. van den Berg and C. Sidney Shepard.

WASHINGTON, BALTIMORE & ANNAPOLIS.—It is understood that the reorganization plan has been drawn up providing for a new company to take over the property after foreclosure sale. The new company, it is said, is to have \$7,500,000 first mortgage bonds, \$2,500,000 6 per cent. non-cumulative preferred stock and \$3,000,000 common stock. Of these authorized securities, \$5,000,000 bonds, \$1,460,000 preferred stock and the entire amount of common stock are to be issued at once.

WICHITA FALLS & NORTHWESTERN.—Alfred Mestre & Co., New York, are offering a block of first mortgage 5 per cent. bonds of 1909-1939 at 98 to yield 5.15 per cent. on the investment. There are authorized and outstanding \$2,300,000 of these bonds, which are secured by a first lien at about \$15,000 per mile on the 153 miles of line running from Henrietta, Tex., where it connects with the Missouri, Kansas & Texas, to Elk City, Okla., connecting with the Choctaw, Oklahoma & Gulf.

Supply Trade Section.

The McKen Motor Car Company, Omaha, Neb., has completed a 70 ft. motor car and a 31 ft. trailer car for the Chicago Great Western. These cars left the company's plant November 14 en route to McIntire, Iowa.

The Edgar Allen American Manganese Steel Company, Chicago, announces the appointment of Walter Benton as consulting engineer, with headquarters at New Castle, Del. Mr. Benton was formerly superintendent of the manganese steel department of the Taylor Iron & Steel Company, High Bridge, N. J., a position which he had held since 1895. The Edgar Allen American Manganese Steel Company is now manufacturing manganese steel at Chicago Heights, Ill., and New Castle, Del.

The W. F. Goltra Tie Company, Cleveland, Ohio, has recently been organized to manufacture and sell railway cross ties. The officers are as follows: President and general manager, W. F. Goltra; vice-president, L. C. Mambourg; secretary and treasurer, P. F. Gallagher. Mr. Goltra has been connected with the New York Central lines for 27 years, having held the position of general tie agent during the last three years, from which position he has recently resigned. The company's offices are located in rooms 804 and 806 Rockefeller building, Cleveland.

TRADE PUBLICATIONS

Denver & Rio Grande. The passenger department of the Denver & Rio Grande has issued a booklet advertising "The Land of Irrigation." It contains 14 photographs of agricultural scenes along the Denver & Rio Grande, a small scale map, and terse, axiomatic sentences regarding the natural resources and possibilities of the Rocky mountain region.

Graphite Products for the Railways.—A booklet has been issued by the Joseph Dixon Crucible Company of Jersey City, N. J., with this title. The object of the book is to bring under one cover all the various products in the Dixon line that are of interest to the various mechanical departments of railways. These include various graphite lubricants, protective paint, crucibles, facings, etc., all of which have been found by actual service to give satisfactory results.

London & Northwestern.—The publications of the London & Northwestern deserve study by the passenger departments of railways in this country. One of its recent tourist books, "Scotland for the Holidays," is an example. This combines several excellencies, each of which may be found separately in various publications in this country, but which are rarely united in a single one. As to form, it is made to slip into a pocket, being 4½ in. by 7 in., and it is printed on heavily coated paper. This latter is partly responsible for the appearance of text and illustrations; but the press work on the half-tones is of a grade rarely found outside of art magazines. There are 130 pages of running comment, concisely written and forming a readable and valuable guide book. Travelers really use such a book—and keep it after they get home.

RAILWAY STRUCTURES.

BENTON, WASH.—The North Coast has let contracts to Harry Boyer, North Yakima, Wash., for building passenger stations at Benton, Wash., and Grand View. The Benton station will be two stories high and the Grand View building one story. Both will be modern in every respect.

CALLAN, TEX.—See Henderson, Tex.

CLARION, PA.—See Clarion & East Brady Electric under Railway Construction.

DALLAS, TEX.—The Houston & Texas Central has let a contract to the Texas Building Company, Fort Worth, Tex., for building a modern fireproof freight depot. The structure will be of reinforced concrete of the most modern type with an ex-

terior finish of brick and stucco. It will be located on Wood street, between Jefferson and Market, on property now owned by the company. The freight warehouse portion of the building will be of one-story construction, approximately 70 ft. x 145 ft., equipped with nine steel rolling doors on each side of the building. The remaining portion of the building will be two stories high, approximately 70 x 55 ft., the first floor containing a parcel freight room, record room, lobby, etc., and the second floor containing the freight offices of the company. Work will be begun at once and pushed to completion as rapidly as possible.

FAIRMONT, W. VA.—See Baltimore & Ohio under Railway Construction.

GERBER, CAL.—The Southern Pacific will build a new round house and yards, and will move the equipment now at Red Bluff to the new plant.

GRAND VIEW, WASH.—See Benton, Wash.

HENDERSON, TEX.—The St. Louis & San Francisco has let contracts for building brick and stone passenger stations at Henderson, Whitehead, Callan and Menard.

MENARD, TEX.—See Henderson, Tex.

MIDLAND, ORE.—The Railroad Commission of Oregon, it is said, has ordered the Southern Pacific to build a combined freight and passenger station at Midland.

WHITEHEAD, TEX.—See Henderson, Tex.

FOREIGN RAILWAY NOTES.

The first -class passenger fare on the Costa Rica railway lines averages three cents per mile, and the maximum freight rate is said to be approximately 13 cents per ton per mile.

Japanese newspapers, in commenting on the \$50,000,000 loan to China, made by an American syndicate, both commend and criticize. One paper says: "The loan will no doubt tend to strengthen the position of China greatly, and it is a matter of congratulation that such a loan was placed with Americans. China will be able to build railways throughout the country, which would tend to introduce modern civilization in China." Another says: "News of the loan has stirred the Japanese press to a high pitch, and all kinds of complications are pointed out as the result. They are worrying over the fact that China may appoint an American financier to oversee the monetary affairs of the government."

The Panama Railway is to build for the government of Panama a standard-gage railway, connecting with the Empire in the Canal Zone, and Chorrera, Penonome, Nata, Agua Dulce, and Santiago in the republic of Panama, with a branch line from or near Santa Maria to the town of Pedasi in the Province of Los Santos, and a branch from the foot of the Divide or Cordillera to Anton in the Province of Coclé. The government of Panama will advance the money to the Panama Railroad with which to begin, carry on, and complete the work of construction. The railway company will render monthly statements to the government showing how the money advanced is expended, and the books of the railroad company are subject to investigation at any time by the authorized representatives of the government of Panama.

In the employment of labor the railway company agrees to give preference to natives of Panama when practicable and consistent with efficient service. The contract, which was submitted to the president of the republic for approval, was signed on March 30, 1910, by the secretary of foreign affairs, and the superintendent of the Panama Railroad.

The Panama Railroad has appointed George H. Ruggles to take charge of the surveying forces, and five locating parties have been put in the field. The first installment of \$25,000 has been paid to the railway company by the Panama government.

Late News.

The items in this column were received after the classified departments were closed.

The Randolph & Cumberland has ordered a ten-wheel locomotive from the Baldwin Locomotive Works.

The Seaboard Air Line has ordered ten consolidation locomotives from the Baldwin Locomotive Works.

Surveys are being made by the Pittsburg, Shawmut & Northern, from Elk County House, Pa., to Detsch, 4.5 miles. The improvements include building new shops and a gravity yard.

General manager H. Baker of the Cincinnati, New Orleans & Texas Pacific has asked for bids on five 110-ton Pacific type passenger locomotives and ten 100-ton consolidation locomotives.

The Pacific & Idaho Northern is laying track on an extension from Lamotah, Idaho, to New Meadows, eight miles. Maney Brothers Company, Ogden, Utah, are the contractors. Surveys are being made for a further extension from New Meadows to Long Valley, 35 miles.

The Interstate Commerce Commission has suspended proposed advances in coal rates on the Baltimore & Ohio and allied roads which were to have taken effect December 16. The suspension is to March 15, 1911, pending an investigation for reasonableness. Eight other roads are named as party defendants to the suspension.

The following railway companies are in the market for rails: The Pennsylvania, the New York Central & Hudson River, the New York, New Haven & Hartford, the Delaware, Lackawanna & Western, the Chicago, Burlington & Quincy, the Chicago, Milwaukee & St. Paul and the Lehigh Valley. It is said that the Pennsylvania Railroad will order for 1911 delivery about 135,000 tons, and the New York Central Lines over 100,000 tons.

The Illinois Railroad and Warehouse Commission, which has held a hearing on the reasonableness of coal rates in the state of Illinois, has ruled that some advance in the rates should be allowed. The auditors of the railways presented complete figures showing their records of the cost of hauling coal. A final ruling is to be made next Monday, after submitting the railways' figures to all the roads interested and to the Illinois Manufacturers' Association.

The Illinois Traction system has placed a contract for automatic block signals, style B, made by the Union Switch & Signal Company, Swissvale, Pa., for complete signaling on its lines from Mackinaw Junction east to Peoria, and from Mackinaw Junction south; also between Carlinville and Staunton, six miles west to Danville. The new St. Louis bridge of the company will be completely equipped with automatic block signals. In all, 75 miles of road will be equipped with automatic block signals, to be installed immediately. The company proposes to continue installing signals until it completes signaling the entire system of 500 miles.

Bids were received recently for work on three additional barge canal contracts. The contracts and lowest bidders are: Contract 27—A, for the completion of certain work on contract 27 at Fort Edward, Holler and Shepard, Rochester, for \$449,498, as against the state engineer's estimate of \$409,455. Contract 37, largely dredging work in the Oswego river, between Fulton and Oswego, American Pipe & Construction Company, Philadelphia, \$2,323,998, as against the state engineer's estimate of \$1,992,220. Contract 82, construction of a new highway bridge superstructure over the canal west of the Genesee river in Rochester, Groton Bridge Company, Groton, \$28,841, as against the state engineer's estimate of \$27,235.

Officials of the St. Louis & San Francisco confirm the fact that B. F. Yoakum, chairman of the board, and B. L. Winchell, president of the St. Louis & San Francisco, arrived in St. Louis Monday over the Chicago & Eastern Illinois, and were accompanied on the inspection trip by A. J. Earling, president of the St. Paul, and Percy A. Rockefeller, a director. The party is continuing the inspection of the 'Frisco lines throughout the Southwest. Officers, however, are non-committal as to the sig-

nificance of the trip. A New York director of the St. Louis & San Francisco says he has not heard anything regarding an alliance of any sort between the St. Paul and 'Frisco. According to a rumor Mr. Yoakum is desirous of having the St. Louis & San Francisco enter into a traffic agreement with the Chicago, Milwaukee & St. Paul Railway Company, whereby the last mentioned company will divert all its traffic from the West bound for Southern ports to the 'Frisco. Naturally in turn the 'Frisco would give all its business destined to Northwestern to the St. Paul.

At the hearing in Washington last Tuesday in the freight rate increase case before the Interstate Commerce Commission several men representing the big furniture industries at Grand Rapids testified concerning the probable effect on their business of the proposed increases. Being cross-questioned they said that their appearance was at the suggestion of George W. Perkins, of the firm of J. P. Morgan & Co. The witnesses said that while they opposed pending advances, they would not object to a general increase of rates throughout the country. W. H. Gay testified that \$8,000,000 was invested in the 45 furniture factories at Grand Rapids, whose annual sales aggregated \$12,000,000. Stewart Foote, of Grand Rapids, also testified that Mr. Perkins had suggested his appearance. Mr. Foote said that the consumers and not the shippers would pay the increase. Mr. Gay said that the suggestion from Mr. Perkins had been made at an accidental meeting in Washington a month ago. Mr. Perkins had explained that the witnesses for the railways had been one-sided, and that he did not like it, as he was just as much interested in manufacturing and producing as in the railways.

The sum total of the testimony of the furniture people was that they were opposed to the present advance because it discriminated against them, leaving lower and more favorable rates to furniture people at other points where the rates have not been advanced.

C. J. Bertschy, of Milwaukee, traffic manager of the Schlitz Brewing Company, testified that the advances would result in \$172,510 of additional expense to them. Asked as to how closely his company was affiliated with the Union Transit Company, Mr. Bertschy said the Schlitz concern had no financial interest in the refrigerating company, but that it "simply had a call on their cars."

The Appellate Court of Indiana has rendered a decision upholding the right of an electric railway to parallel a steam railway and operate its high voltage alternating current system even though it interferes with and renders useless the telegraph and telephone lines of the steam road. The suit was brought in the Elkhart Circuit Court by the Lake Shore & Michigan Southern against the Lake Shore and South Bend Electric to enjoin the latter from operating its high voltage system. The trial court denied injunctive relief, and the plaintiff appealed.

The appellant based its right of relief upon a line of early decisions that "one who for his own purpose brings upon his land and conducts and keeps thereon things likely to do mischief, if it escapes, is *prima facie* answerable for all the damage which is the natural consequence of its escape." The complaint also alleges that the appellate operated its high voltage system without installing necessary devices for minimizing the induction of the electric current, to the damage of the appellee, and was to that extent a nuisance.

The Appellate Court held that the electric company was making lawful use of the franchise conferred upon it by the state in a manner contemplated by the statute, and that such act cannot be considered a nuisance in itself; that in the exercise of such franchise no negligence has been shown nor any wanton or unnecessary disregard of the rights of the complaining company, and that the damages occasioned are not the direct consequence of the construction of the electric road, but are incidental result of its operation and not recoverable. The Court further said, "that no suggestion is offered as to the character or success of these devices and appliances calculated to prevent induction or whether they are in general successful use, nor is anything said in the way of approximating the cost to the appellee of their adoption; nor does it appear but that the appellant (steam road) might, by some inexpensive method, have prevented the annoyance to which it is now subjected. For these reasons the judgment of the trial court in denying injunctive relief is affirmed.

Equipment and Supplies.

CAR BUILDING.

The *Camden and Philadelphia* has ordered 1,000 30-ton steel hopper cars.

The *New York Central & Hudson River* is in the market for 1,000 box cars and 110 refrigerator cars.

The *Boston Elevated* has ordered 50 semi-combustible cars from the Laramie Car Company. This item is not confirmed.

The *New York Dispatch Refrigeration Line* has ordered 300 thirty-ton refrigerator cars from the Whipple Car Company.

MACHINERY AND TOOLS.

The *Chicago & North Western* is taking bids on a few machine tools, but it is not definitely known how many will be ordered.

The *San Diego Electric Railway*, of San Diego, Cal., has placed an order with the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., for two 1,000-k.w., 600-volt, 514-r.p.m. generators, to be driven by Westinghouse-Parsons low pressure steam turbines running at 3,600 r.p.m. The generators and turbines will be connected through Melville-McAlpine reduction gears. In addition to this equipment the Westinghouse company will shortly ship one 1,200-k.w., 600-volt, 80-r.p.m. engine type direct current generator to the same company.

IRON AND STEEL.

The *Erie* has ordered 400 tons of structural steel from the American Bridge Company.

The *New York, New Haven & Hartford* is in the market for about 200 tons of bridge steel.

The *St. Louis & Southwestern* is said to be in the market for 4,800 tons of heavy section rails.

The *Boston Elevated* is in the market for 4,500 to 5,000 tons of structural steel for extensions.

The *Boston & Maine* has ordered 150 tons of bridge steel from the Phoenix Bridge Company.

The *Bessemer & Lake Erie* has ordered 350 tons of structural steel from the American Bridge Company.

The *Philadelphia & Reading* is in the market for car floats, which will require about 900 tons of steel plates.

The *Kansas City, Mexico & Orient* has ordered 8,000 tons of rails from the United States Steel Corporation.

The *Chicago, Milwaukee & St. Paul* has ordered 240 tons of structural steel from the American Bridge Company.

The *Louisville & Nashville* has ordered 29,000 tons of O. H. rails from the Tennessee Coal, Iron & Railroad Company.

The *Grand Trunk* has ordered 100 tons of steel for a bridge over the Erie Canal, at Buffalo, from the American Bridge Company.

The *Norfolk & Western* has ordered 30,000 tons of rails, the order being equally divided between the Carnegie Steel Company and Pennsylvania Steel Company.

The *Pennsylvania Railroad* is in the market for two small bridges, requiring about 150 tons of steel, and is said to be in the market for 300 tons of steel for a bridge in Baltimore and one in Delaware.

General Conditions in Steel.—There have been no important developments in the steel market this week. The large roads have as yet made no announcement as to their rail requirements for 1911.

Acme Culverts in South America.

The Canton Culvert Company, of Canton, Ohio, recently sold a large order of its corrugated metal culverts to Brazil. Although the shipment containing several carloads of 4, 5 and 6-ft. diameter culverts left New York by boat October 15, it is not expected that it will reach its destination until some time next spring. A representative of the railway in connection with which these culverts are to be used said: "We are buying your large size nestable culverts for use along our railway in place

of other style small bridges or culverts. The section proposed for the transport bridge is not anything that could be adapted in small and light sections, and the country is so flat that no large bridges are required. By using Acme's culverts we can get them to their destination, and in the event of emergency, such culverts are better than anything else that could be put in place with equal assurance of permanent service. These culverts must be transported inland by river, on land, and by sea, a great distance. If they reach their destination by next April we shall be satisfied. We calculate that our laborers, who, as you may imagine, are not any too intelligent, can easily set them up. We import most of our men and have some trouble in keeping them." The Canton Culvert Company states that its "Acme" nestable culverts are being used abroad in large quantities in Brazil, Peru, Argentina, Colombia, Philippines, Santo Domingo, Cuba, Japan, Sudan, India and other parts of the world.

The Randall Graphite Sheet Lubricator.

The lubricating value of graphite has long been recognized, but it has not been extensively used for journal bearings of railway rolling stock on account of the difficulties in applying it. This relates to the trouble found in getting the graphite to the right place and keeping it there by the usual method of mixing graphite and oil. Oil lubrication is based on the theory of a separation of the journal and the bearing surfaces by a thin oil film, and its success depends on a continuous flow of oil. When this ceases the metals are in contact, and there are undue friction, rapid wear and hot bearings. The large brass melting furnaces used by railways, and the great number of car bearings made per day by every large railway, is striking evidence of the extent to which car bearings are worn out, and all this wear means the consumption of power and fuel to overcome its resistance. Soft bearings have less tendency to heat and cut under deficient oil supply, and the combination of soft metal and graphite in a stable form would appear to be the ideal arrangement for car and locomotive bearings.

In the Randall graphite sheet lubricator this desirable combination has been effected. It is made of small cones of solid graphite about $\frac{1}{4}$ in. in diameter and $\frac{3}{4}$ in. long, molded on thin copper netting. This is placed in the bearing shell and the babbit or soft metal is cast around it so that the ends of the cones are flush with the bearing surface of the filled bearing.

Besides the large saving in wear of journals and bearings, and in the power consumed in overcoming the friction due to wear, there is also a considerable saving in oil, amounting to about 90 per cent., due to the use of the graphite sheet lubricator. It is only necessary to use the original application of oil in sponging the box; a further use of oil is unnecessary, as the graphite supplies a constant and effective lubricant. It is believed that the use of oil at any time is unnecessary when the graphite sheet lubricator is applied, and further experience may demonstrate this to be true.

These statements may be surprising to many mechanical officers, but they have been sustained by actual service on a number of prominent roads during the past year. The Southern Pacific began using the sheet graphite lubricator in October, 1907, on the trailers of heavy passenger locomotives on the line between Portland and San Francisco—a portion of the line where it is difficult to avoid hot bearings. They have been so successful that all heavy passenger engines on that line are now fitted with the Randall bearings in the front engine trucks, as well as on the trailing trucks. The Burlington has also used this material in trailing trucks of heavy passenger engines with success and satisfaction. They are, however, making a larger use of it for car bearings, and have placed in service 1,000 car bearings with the Randall graphite sheet lubricator in them. One hundred of these bearings are in service under the special observation of the test department, which is making a careful investigation of their economy. Another of the important Western railways has been experimenting with the graphite sheet lubricator, and has found it especially useful in trying service in the bearings of trailing trucks of Pacific type locomotives. Where these have given trouble from hot boxes nearly every day, when lubricated in the ordinary way, the Randall graphite lubricator has been running three months without any trouble from hot bearings. This lubricator is made by the Strong, Carlisle & Hammond Company, Cleveland, Ohio.

ANNUAL REPORT

FERROCARRILES NACIONALES DE MEXICO—SECOND ANNUAL REPORT.

NATIONAL RAILWAYS OF MEXICO.)

MEXICO OFFICE:

PRIMERIA CALLE DE VERDUN, 209

NEW YORK OFFICE:

No. 25 BROAD STREET.

To the Stockholders:

In compliance with the provisions of Article 8 of the By-Laws of the Company, the Board of Directors has the honor to present to the stockholders the report of operations for the fiscal year ended June 30, 1910.

EXECUTION OF AND COMPLIANCE WITH THE BANKERS' AGREEMENT OF FEBRUARY 29, 1908.

The Bankers' Agreement of February 29, 1908, has been complied with in all respects, both in regard to the receipt of the certificates of stock of the former Mexican Central Railway Company Limited and the former National Railroad Company of Mexico, called for conversion, and in relation to the distribution of the stocks and bonds of the Ferrocarriles Nacionales de Mexico (National Railways of Mexico).

The shares and bonds of the former Mexican Central Railway Company Limited and the former National Railroad Company of Mexico have continued to be presented for conversion, and at June 30th of this year the number and proportion of these certificates exchanged for those of this Company is shown in the following statement:

Statement of Securities Deposited up to the 30th of June, 1910.
in accordance with the plan of the 6th of April, 1908.

SECURITIES OF THE MEXICAN CENTRAL RAILWAY COMPANY LIMITED.

	Total Issue.	Deposited.	Per Cent.	Out-standing.	Per Cent.
Ten Per Cent. Notes.....	\$500	.....	0.00	\$500	100.00
Five Per Cent. Priority Bds.	6,597,000	\$5,192,000	78.70	1,405,000	21.30
First Mortgage Bonds.....	264,062	225,715	85.48	38,347	14.52
Consolidated Mtg. Bonds.	109,020,000	105,359,000	96.64	3,661,000	3.36
First Income Bonds.....	32,706,000	32,329,100	98.84	376,900	1.16
Registered Income Bonds.....	325,200	314,000	96.55	11,200	3.45
Second Income Bonds.....	11,284,000	11,254,000	99.74	30,000	.26
Shares	59,127,100	59,038,900	99.85	88,200	.15
Total	\$119,333,862	\$113,712,715	95.34	\$5,621,147	4.66

SECURITIES OF THE NATIONAL RAILROAD COMPANY OF MEXICO.

	Total Issue.	Deposited.	Per Cent.	Out-standing.	Per Cent.
Preferred Stock	\$32,000,000	\$31,997,300	99.99	\$2,700	0.01
Second Preferred Stock.....	2,000,000	2,000,000	99.81	41,000	2.09
Common Stock	81,000	147,500	81.83	137,100	48.17
Deferred Stock	11,021,800	11,021,800	100.00	.....	0.00
Total	\$65,330,800	\$65,169,200	99.73	\$160,800	0.27

TOTAL NUMBER OF SECURITIES OF BOTH COMPANIES.

	Issued.	Deposited.	Per Cent.	Out-standing.	Per Cent.
Bonds and Shares.....	\$284,673,862	\$278,881,915	97.97	\$5,791,947	2.03

All the above securities are United States Securities.

The remaining Five Per Cent. Gold Notes of the former Mexican Central Railway Company Limited, to which reference was made in the annual report last year, and which were assumed by your Company together with other obligations of that Company, have been paid in full, and the Equipment, Tools and Notes of the said former Mexican Central Railway Company Limited are being paid in full.

There remains pending payment, therefore, of the obligations referred to only the amount shown in the attached General Balance Sheet, or \$4,708,000, recommended July 21, 1910, at June 30, 1910.

In order to give greater scope to the activities of this Company on the lines of the First and Second Preferred Stocks have been listed on Exchange in Paris, Geneva and Zurich, Switzerland, and the First Loan Bonds have been listed on the Exchanges in Berlin and Frankfurt, Germany. In connection with this the Company has only assumed the obligation to communicate and publish in due time advertisements relating to the payment of dividends and interest, redemption of bonds, etc. The listing of the Second Preferred Shares on the Paris Bourse has also been accomplished.

ACQUISITION OF RAILWAY LINES.

Subsidiary Companies.

By the purchase from the Southern Pacific Railroad Company, the transfer of all the Mexican Intercontinental Railroad Company, the Ferrocarriles Nacionales de Mexico (National Railways of Mexico) become the owner of all the lines of the said company, comprising the Capital stock owned by that Company, and the permitted the execution of the deed transferring all of the properties of the Mexican Intercontinental Railroad Company to the Ferrocarriles Nacionales de Mexico (National Railways of Mexico), which transfer took effect on the 1st of June, 1910.

Your Company being the only holder of the stock of the Mexican Pacific Railroad Company, it was deemed convenient in order to simplify the administration of said Railway, to transfer all of the properties of that Company to the Ferrocarriles Nacionales de Mexico (National Railways of Mexico), this was done, the transfer being effected on or June 30th, last.

The two deeds of transfer mentioned above were executed in New York City in due legal form, and as the transfers had previously been authorized by the Department of Communications and Public Works the documents were protocolized in the City of Mexico, on the register books of Notary Juan M. Villeta.

The Board of Directors entered into negotiations for the acquisition of all or at least a large majority of the shares of stock of the Pan American Railroad Company and the Veracruz & Isthmus Railroad, considering that these lines had great significance in connection with the future development of this Company, and although the contracts covering these acquisitions were executed after June 30th of this year and do not, therefore, properly pertain to the period covered by this report, the Board of Directors deem it expedient to inform the Stockholders of this fact, though only in general terms, on account of the corresponding deeds not having as yet been executed.

It would be deemed proper to observe, with respect to these contracts, that, in all probability, according to careful studies which have been made of the physical and financial conditions of the lines referred to, the earnings of these railroads will in the near future be sufficient to fully cover the expenses of operation as well as the fixed charges.

The Intercontinental Railway Company of Mexico (Acapulco to Veracruz) Limited, which as the Stockholders understand, is operated by this Company, has entered into a contract with the Mexican Southern Railway Company, covering the rental of the latter Company's properties for the balance of the time covered by its concession, and inasmuch as the concessions of the Intercontinental Railway will expire before those of the Mexican Southern Railway, it is stipulated in said contract that, after the expiration of the former Company's concessions, the rental contract will continue in favor of the Ferrocarriles Nacionales de Mexico (National Railways of Mexico). The rental stipulated is the equivalent of the amount necessary to cover the payment of the principal and interest of the bonds issued by the Mexican Southern Railway Company, and to reimburse the Capital Stock, paying thereon progressive dividends not to exceed at any time 5 per cent. per annum. The receipts to date from the Mexican Southern Railway will assure the payment of these amounts in the near future, and will soon yield considerable profit directly to the Intercontinental Railway, and indirectly to the Ferrocarriles Nacionales de Mexico (National Railways of Mexico).

It does not appear necessary to say more concerning the great advantages offered by the acquisition of the only railroad that connects the State of Oaxaca with our System.

This Company is the owner of the concession issued by the Federal Government to the National Railroad Company of Mexico for the construction of a bridge over that part of the Rio Grande belonging to this country, to connect the towns of Matamoros, State of Tamaulipas, and Brownsville, State of Texas, and the St. Louis, Brownsville & Mexico Railway is the owner of the concession issued by the Government of the United States of America for the construction of that part of the bridge located in the State of Texas, and these Companies agreed to the organization of a subsidiary company to which they will transfer the concession and facilities on both sides of the river and which subsidiary company shall take charge of the construction and operation of said bridge. The result of this agreement was the organization of the Brownsville-Matamoros Bridge Company, under the laws of the Territory of Arizona, and the concessions referred to will be transferred to that Company in due course, with the authority granted by the Governments of Mexico and the United States of America. The Capital Stock of the Bridge Company was subscribed in equal parts by both Railway Companies.

It was considered advantageous to reorganize the Express Service over the Company's lines, which had previously been performed by Wells Fargo & Company on the former Mexican Central Railway, and by the National Express Company on the lines of the former National Railroad Company of Mexico. The result of the negotiations entered into with this end in view was that this Company and Wells Fargo & Company organized a limited company in accordance with the laws of the Republic of Mexico, under the name of the "Compania Mexicana de Express, S. A.", the object of which was to perform express service in the Republic of Mexico. The organization having been perfected, the said company executed with the Ferrocarriles Nacionales de Mexico (National Railways of Mexico) a contract covering the operation of express service on its system, and by virtue of this contract your Company and the lines which it operates, in their capacity of transportation companies, receive as compensation for providing the facilities necessary for the performance of the service, 50 per cent. of the gross earnings that may be received on the entire system, the balance going to the Compania Mexicana de Express, S. A. Furthermore, the Capital Stock of the Express Company, totaling paid in cash by Wells Fargo & Company, was fixed at one million pesos, or the sum of \$1,000,000, and the balance of the said Company was divided into one hundred pesos each, which were divided into two series, A and B, of five hundred shares each, Series A shares being assigned to this Company, free from all expense, as compensation for our having agreed to the organization of the Express Company. It was also agreed that out of the gross earnings of the Express Company, the Compania Mexicana de Express, S. A., should receive 50 per cent. of the gross earnings of the Express Company, and the balance of the gross earnings of the Express Company should be divided into two series, A and B, of five hundred shares each, Series A shares being assigned to this Company, free from all expense, as compensation for our having agreed to the organization of the Express Company. It was also agreed that out of the gross earnings of the Express Company, the Compania Mexicana de Express, S. A., should receive 50 per cent. of the gross earnings of the Express Company, and the balance of the gross earnings of the Express Company should be divided into two series, A and B, of five hundred shares each, Series A shares being assigned to this Company, free from all expense, as compensation for our having agreed to the organization of the Express Company. It was also agreed that out of the gross earnings of the Express Company, the Compania Mexicana de Express, S. A., should receive 50 per cent. of the gross earnings of the Express Company, and the balance of the gross earnings of the Express Company should be divided into two series, A and B, of five hundred shares each, Series A shares being assigned to this Company, free from all expense, as compensation for our having agreed to the organization of the Express Company.

As a matter of information and in view of its importance the Board desires to advise the stockholders that the gross Express receipts of the Compania Mexicana de Express, S. A., on the lines of your Company for the last ten months of its operation (September 1, 1909, to June 30, 1910), amounted to \$2,422,982.10 Mexican Currency, out of which the Company, as a transportation company, is entitled to 50 per cent., or \$1,211,491.05 Mexican Currency, and on account of dividends declared on the Capital Stock of the Compania Mexicana de Express, S. A., Series A, Series, \$78,868.37 Mexican Currency, making a total of \$1,290,359.42 Mexican Currency.

As the Stockholders are aware, the Mexican Central Railway Company Limited was the only stockholder in several subsidiary companies which

	Kilometers.	Miles.
San Juan Tlaxiaco to Jural del Valle	80.607	49.752
Connection with the "Y" at Salamanca	0.936	0.581
Matamorla Branch, including Potrero Branch	65.212	40.521
San Luis de la Paz Branch	59.995	37.280
Matamoros Branch	331.078	205.723
Cintura Extension—San Lazaro to Nicos and Branch to Factorles	5.183	3.221
Jarita Branch	30.800	19.139
Mexico (Buena Vista) to Ciudad Juárez	1,970.340	1,224.320
Tampico to Monterey and Gómez Palacio	882.100	548.115
Chicalote to Tampico	652.678	405.558
Irapuato to Guadalajara	259.100	160.998
Guadalajara to Ameca	89.000	55.861
Guadalajara to Manzanillo	356.052	221.242
Torreón to Saltillo	307.694	191.193
Mexico (Buena Vista) to Balsas	292.480	181.740
Jiménez to Rosario	153.895	95.626
Lechería to Aulco	141.200	87.738
Yurécuaro to Los Reyes	138.248	85.904
Paredón to Saltillo	73.763	45.834
Tula to Pachuca	70.200	43.621
La Vega to San Marcos	47.000	29.205
San Bartolo to Rio Verde	42.356	26.319
Tepencasco to Honey	35.162	21.849
Ocotlán to Atotonilco	34.922	21.700
Salto to Guadalupe	23.600	14.664
Mexican Union Ry.—Rincón de Ramos to Cobre (Leased Line)	17.070	10.607
Tellico to Pánuco	16.753	10.410
Brittingham to Dinamita	10.240	6.363
Tampico to La Barra	10.810	6.717
Cintura Ry. of the City of Mexico	9.572	5.948
Adrian to Santa Barbara	8.363	5.197
San Luis Potosi to Hacienda de Beneficio	8.350	5.189
Kilo. 1228 to Sulphur Mine	5.245	3.259
Santiago Branch—Mexico to the Customs House	1.930	1.199
Total, Standard Gauge	7,619.118	4,734.329
NARROW GAUGE.		
Tacuba Junction (Kilo. 6) to Uruapan and Extension to Packing House "Popo"	511.899	318.081
Michoacán & Pacific Railway (Leased Line)	91.917	57.115
Peralvillo to Beristáin	164.200	102.030
San Agustín to Irolo	28.200	17.523
Ventouplia to Tortugas	26.500	16.466
Tepa to Pachuca	25.900	16.094
Total, Narrow Gauge	848.616	527.309
Total, Main Line and Branches	8,467.734	5,261.638

Sidings and Yards:

On Main Lines (between México and New Laredo and México and Ciudad Juárez), including México City Terminals	512.067	318.186
On Branch Lines	479.408	297.892
Hidalgo Division	30.657	19.049
Total, Sidings and Yards	1,022.132	635.127
GRAND TOTAL	9,489.866	5,896.765

The decreased mileage of sidings and yards, as compared with last year, is accounted for by a re-measurement of the ex-Mexican Central property during the fiscal year under review, and which developed this difference.

	Kilometers.	Miles.
Texas Mexican Railway	260.475	161.853
	Kilometers.	Miles.
Tulancingo Division	3.781	2.340
Del Rio Division		
To Los Reyes	9.670	
To Saltillo	6.034	
Average Length of Line Operated	15.704	9.758

The average length of line operated during the year was 8,467.734 kilometers, or 5,261.638 miles.

WEIGHT OF RAILS.

The following table shows the weight of rails in the main line and branches, including sidings and yards, at June 30, 1910.

Main Line and Branches	Kilometers.	Miles.
85 lb. rail	416.741	259.171
81 lb. "	70.182	43.619
75 lb. "	1,629.273	1,012.452
70 lb. "	1,499.105	931.699
66 lb. "	998.778	621.599
60 lb. "	12.530	7.780

	Kilometers.	Miles.
60 lb. rail	419.187	260.472
56 lb. "	2,787.010	1,731.778
45 lb. "	669.360	415.923
40 lb. "	490.608	310.444
Various "	25.670	15.951
Total, Main Line and Branches	8,467.734	5,261.638
Sidings and Yards:		
85 lb. rail	8.595	5.341
83 lb. "	1.922	1.194
75 lb. "	11.855	7.366
70 lb. "	66.372	41.242
66 lb. "	8.493	5.277
60 lb. "	2.830	1.759
56 lb. "	629.057	390.880
54 lb. "	3.169	1.969
45 lb. "	122.251	75.964
40 lb. "	163.780	101.769
30 lb. "	3.808	2.366
Total, Sidings and Yards	1,022.132	635.127
GRAND TOTAL	9,489.866	5,896.765

GROSS EARNINGS.

The total Gross Earnings from all sources amounted to \$52,562,293.39, Mexican Currency, for details of which, as well as comparison with last year, your attention is called to the following table:

1908-1909.		1909-1910.	
Earnings.	Percentage.	Earnings.	Percentage.
\$34,968,578.03	71.65	\$37,668,711.38	71.66
103,733.74	.21	202,652.70	.39
10,365,724.23	21.24	11,245,560.16	21.39
130,214.95	.27	207,160.68	.39
1,879,617.15	3.85	1,769,049.99	3.37
38,472.82	.08	46,014.50	.09
134,793.31	.28	101,365.25	.19
8,678.89	.02	8,186.34	.02
1,175,709.14	2.40	1,313,592.39	2.50
\$48,805,522.26	100.00	\$52,562,293.39	100.00

The percentage of each class of commercial freight to the total handled during the year, and comparison with the previous year, is shown in the following table:

1908-1909.	Percentage.	1909-1910.	Percentage.
10.04	12.34	.....
23.43	23.24	.....
3.41	3.48	.....
52.41	48.87	.....
10.71	12.07	.....
100.00	100.00	.....

The foregoing table shows a very satisfactory increase in Gross Earnings for the year, and the increases in earnings from commercial freight and passenger traffic are most gratifying, when it is taken into consideration that the country has been recovering from the effects of a financial crisis. Also, the fact should not be lost sight of that on account of the floods in the Monterey district in August, 1909, the lines in this district were not only closed for quite a time, which prevented us from moving freight and passengers, but the farmers suffered to a great extent in the loss of crops, cattle, etc.

OPERATING EXPENSES.

Diligence and care have been exercised in the maintenance of the property, and at the close of the fiscal year the physical condition might be considered as good, and somewhat improved during the year.

On account of the heavy floods in the Monterey district, and consequent extensive washouts, Operating Expenses were charged during the year with approximately \$870,000.00 Mexican Currency, being the cost of repairing the line temporarily to open it for traffic, together with such permanent repairs as were made during the period under review. There is also included in Operating Expenses the extra cost of detouring freight and passenger trains to and from points affected by these interruptions and which, in some instances, meant a haul of considerable additional mileage.

The comparative percentages of the sub-accounts for the years 1908-1909 and 1909-1910 are as follows:

1908-1909.	Percentage.	1909-1910.	Percentage.
22.54	26.14	.....
21.23	20.38	.....
49.61	47.80	.....
6.62	5.89	.....
100.00	100.00	.....

The comparative percentages to Gross Earnings for the years 1908-1909 and 1909-1910 being:

1908-1909.	Percentage.	1909-1910.	Percentage.
13.47	15.71	.....
12.69	12.25	.....
29.68	28.61	.....
4.95	3.54	.....
59.79	60.11	.....

STATEMENTS OF OPERATION.

The various statements of accounts as prepared by the General Auditor, and which accompany this report, give in detail the results for the year, and show the financial condition of the property.

The books and accounts have been audited by Messrs. Price, Waterhouse & Co., of London, New York and Mexico, and a copy of their certificate as to the correctness thereof accompanies this report.

The results of operations for the year ended June 30, 1910:

1909-1910 Mexican Currency	1908-1909 Mexican Currency	Percentage of Increase or Decre.
\$48,801,372.76	\$48,801,372.76	
Operating Expenses	17,164,988	3.49
Net Earnings	\$31,636,384.76	6.13
Wages and salaries of Mill and other persons of the Mexican de- partment for the year ended June 30, 1910	\$10,454,307.80	1.00
Operating expenses per kilometer of road operated	17,164,988	3.49
Operating expenses per ton of freight transported	\$1,000.1	6.13
Operating expenses per passenger transported	1,840.5	6.13
Net Earnings per kilometer of road operated	1,716.3	6.07
Average amount received for each ton of freight	6,207.36	7.65
Average receipts per ton per kilo- meter	7,311.05	7.65
Average amount received from each passenger	2,476.31	6.07
Average receipts per passenger per kilometer	6,594.74	7.65
Average amount received from each passenger	.01851	4.99
Average receipts per passenger per kilometer	1,851.95	11.99
Average receipts per passenger per kilometer	.01813	1.28

Expressed in terms the figures show as follows:

1908-1909 Mexican Currency	1909-1910 Mexican Currency	Percentage of Increase or Decre.
\$4,110.8	\$4,110.8	
Operating Expenses per revenue train mile	10,665,809	1.38
Operating Expenses per revenue train mile	\$4,928.1	6.13
Net Earnings per revenue train mile	2,962.1	6.74
Gross Earnings per mile of road operated	1,966.0	5.23
Operating Expenses per mile of road operated	9,989.80	6.99
Net Earnings per mile of road operated	6,004.55	7.61
Average amount received for each ton of freight	3,985.25	6.07
Average receipts per ton per mile	6,594.74	7.65
Average amount received from each passenger	.02978	4.81
Average receipts per passenger per mile	1,851.95	11.99
Average receipts per passenger per mile	.02918	1.28

ADDITIONS AND BETTERMENTS.

By referring to the Balance Sheet it will be noted that there is a total amount of \$4,290,918.94, Mexican Currency, standing to the debit of Additions and Betterments as June 30, 1910, of which amount the sum of \$1,779,501.52, Mexican Currency, pertains to expenditures made up to June 30, 1909; the balance, or \$2,511,417.42, covers amounts expended during the year ended June 30, 1910. From the appended statement it will be seen that of the latter amount \$99,756.22 were expended on freight and passenger equipment and on converting locomotives from coal to oil burning; the balance, or \$2,411,661.20, on extraordinary work of a capital nature.

The following statement gives details of amounts expended on this account during the year ended June 30, 1910:

	Expended July 1, 1909 to June 30, 1910.
Right of Way and Station Grounds.....	\$46,277.99
Real Estate.....	1,474.76
Protection to Banks, and Drainage	4,777.25
Grade Reductions and Changes of Line.....	261,190.96
Tunnel Improvements	24,398.20
Bridges, Trestles and Culverts.....	392,328.17
Increased Weight of Rail.....	587,028.79
Ballast	500,636.25
Sidings and Spur Tracks	84,801.76
Terminal Yards	56,477.51
Improvements or Crossings Over and Under Grade...	15,639.87
Interlocking Apparatus	2,190.45
Telegraph and Telephone Lines.....	23,546.32
Station Buildings and Fixtures.....	46,203.61
Roadway Buildings	4,774.86
Shops, Engine-houses and Turntables	60,278.19
Shop Machinery and Tools.....	86,528.83
Water and Fuel Stations.....	53,095.23
Dock and Wharf Property	13,167.67
Electric and Power Plants	2,949.06
Additional Equipment:	
Locomotives	\$53,304.96
Passenger Coaches	25,000.00
Freight Cars	2,378.00
Work Equipment	19,073.26
	99,756.22
Colombia Branch	40.62
Sundry Betterment Expenditures pending Formal Au- thorization	143,854.85
Total	\$2,511,417.42

Ballast

The following quantities of ballast have been placed on the track during the year 1910:

Division	Quantity
Mexican Currency	12,000
Monterrey	18,000
Matamoros	4,000
Torreon	1,622
Guadalupe	1,400
Agua Prieta	1,400
Chihuahua	1,400
San Luis	1,400
Total	38,220

BRIDGES, TRISTLES AND CULVERTS

The following statement of bridges, trestles and culverts during the year:

Northern Division:	
Two 401 meters steel, I beams, span on masonry. Bridge 708-A near Monterrey.	
Acamascentos Division:	
At Camascentos an 8 meter masonry, steel, covered span, 2 meter wide walls has been constructed to replace the viaduct; this work embraced a 130,000 cubic meter fill, changing line to one curve of 2 m. 30' in place of three curves of seven, fifteen and ten.	
Guadalupe Division:	
Trinapito to Guadalupe. Two 624 meters through steel truss bridges, Nos. 908-A and 908-B, at La Piedad and La Brea, respectively.	
Gomez Palacio Division:	
Two pairs of 4.87 meters steel, I beams on masonry abutments; Bridges 908-A and 908-B, Main Line.	
Two 457 meters steel, double span on masonry abutments and pier; Bridge 1,093-B; Main Line (Picardias Bridge).	
Chihuahua Division:	
Three spans of 7.01 meters, and two spans of 3.9 meter steel, I beams; Bridge 1,610-A; Main Line, over street car subway.	
Linarez District:	
Ten spans of 7.01 meters steel, I beams on masonry; comprising three bridges, Nos. 456-A, 457- and 465-B; located at kilometers 455.93, 456.30 and 465.55, respectively.	
Zamora Branch:	
One pair of 7.01 meters steel, I beam spans on masonry abutments; Bridge 38-B.	
Pacific Division—Narrow Gauge:	
Two spans of 5.18 meters steel, I beams on masonry; bridge 357-K; Morelia district, near Charo.	

RELAYING WITH HEAVIER RAIL.

The following sections of track were laid with heavier rail during the year, viz:

Mexico Terminals:

Buena Vista yard: 1,097 kilometers of 27.779 kilograms (per lineal meter)—56 lbs. per yard) rail laid in place of 19.842 kilograms (40 lb.). Santa Julia: 411 meters of 19.842 kilograms (40 lb.) replaced with 313 meters of 34.723 kilograms (70 lb.) rail, and 98 meters of 27.779 kilograms (56 lb.) rail.

Mexico—Queretaro Division.

From kilometers 123.389 to 312.438, difference of 189.049 kilometers, and from kilometers 5.377 to 95.000 difference 89.623 kilometers, a total of 278.672 kilometers of 34.723 kilograms (70 lb.) rail replaced with 42,390 kilograms (85 lb.) rail.

San Luis Division:

Matehuala Branch: from kilometers 34.700 to 47.000, or 12.300 kilometers of 22.322 kilograms (45 lb.) rail were replaced with 34.723 kilograms (70 lb.) rail.

In Matehuala yard, 1,859 kilometers of 19.842 kilograms (40 lb.) rail were replaced with 780 meters of 34.723 kilograms (70 lb.) rail and 1,079 kilograms of 22.322 kilograms (45 lb.) rail. Morales Smelter Branch; San Luis Potosi; 7 kilometers of 19.842 kilograms (40 lb.) rail replaced with 27.779 kilograms (56 lb.) rail.

Northern Division:

Matamoros Branch: There were 38,220 kilometers of 22.322 kilograms (45 lb.) rail and 19,842 kilograms (40 lb.) rail taken up and relaid with 27.779 kilograms (56 lb.) rail, as follows:

Kilometers.	Rail Taken Up	Rail Laid.
From To	22,322 kgs.	19,842 kgs.
79.440 86.440	7,000	7,000
88.500 92.500	4,000	4,000
107.300 107.900	.600	.600
112.000 112.600	.600	.600
128.900 129.350	.450	.450
131.700 132.020	.320	.320
203.950 205.050	1,100	1,100
275.700 279.600	3,900	3,900
307.150 328.000	20,850	20,850
Totals	12,200	26,620
		38,220

Monterrey Division:

From kilometers 16.400 to 21.000, or 4.600 kilometers, and from kilometers 26.273 to 60.100, or 33.827 kilometers, total, 38.427 kilometers of 27.779 kilograms (56 lb.) rail replaced with 34.723 kilograms (70 lb.) rail. From kilometers 581.000 to 593.520 or 12.520 kilometers of 27.779 kilograms (56 lb.) rail replaced with 30.507 kilograms (61½ lbs.) rail. From kilometers 593.520 to 594.500, or 980 meters of 27.779 kilograms (56 lb.) rail replaced with 37.204 kilograms (75 lb.) rail.

Guadalajara Division:

Irapuato to La Junta: Between kilometers 0.861 and 251.168 there were 205.535 kilometers of 34.723 kilograms (70 lb.) rail laid in place of 27.779 kilograms (56 lb.) rail, leaving some small gaps at switches still to be changed.

Aguascalientes Division:

From kilometers 735.034 to 735.838, or 804 meters of 32.739 kilograms (66 lb.) rail replaced with 37.204 kilograms (75 lb.) rail.

Cardenas Division:

From kilometers 438.462 to 457.069, or 18.607 kilometers of 37.204 kilograms (75 lb.) rail replaced with 42.390 kilograms (85 lb.) rail.

Chihuahua Division:

From kilometers 1734.422 to 1778.600, or 44.178 kilometers of 27.779 kilograms (56 lb.) rail replaced with 37.204 kilograms (75 lb.) rail.

NEW SIDE AND PASSING TRACKS.

During the year new side tracks, passing tracks, cross-overs and extensions to existing side tracks were built to the extent of 19.820 kilometers. Of these new tracks, 19.428 kilometers are of standard gauge, and the balance, or 392 meters, of narrow gauge. The following statement gives details of weight of rail used in these new tracks, viz:

	Kilometers.
Forty pound rail (19.842 kilograms).....	.097
Forty-five pound rail (22.322 kilograms).....	3.233
Fifty-six pound rail (27.779 kilograms).....	16.005
Seventy pound rail (34.723 kilograms).....	2.361
Seventy-five pound rail (37.204 kilograms).....	.201
Eighty-five pound rail (42.390 kilograms).....	.172
Total	22.069
From which deduct:—	
Tracks taken up:	
Forty pound rail (19.842 kilograms).....	1.365
Fifty-six pound rail (27.779 kilograms).....	.884
	2.249
Net increase	19.820

FLOODS IN MONTEREY DISTRICT.

With reference to remarks under head of "Damages Suffered by the Lines" in your report of last year, an approximate estimate of the total damage places the amount at \$3,282,300.00, Mexican Currency, as necessary to repair the damage, improve the districts affected by the washout by changes of line, raising grades and putting in permanent steel and masonry. Of this amount it is estimated that a sum of \$1,332,900.00, Mexican Currency, will be chargeable to Additions and Betterments, and the balance, or \$1,949,400.00, represents the approximate cost of replacing previous structures. It is thought that the charge of \$870,000.00 Mexican Currency, to Operating Expenses, and the reserve of \$1,000,000.00, Mexican Currency, which has been set up in the accounts for the year under review, will take care of all the work to be done under this head and which is chargeable to operation.

IN GENERAL.**Employees:**

The number of employees in the service of the company at the close of the fiscal year was 26,106. Of the total number, 1,075, or 4.12 per cent, were foreigners.

Statements of Equipment:

Your attention is invited to statements showing various classes of locomotives and cars on hand at June 30, 1910, and which accompany this report.

New Equipment:

The increase in the traffic over the system made necessary the purchase of additional rolling stock, and, with the approval of the Board of Directors, orders were placed in the months of January, March, April and July, 1910, for the following:

13 Mallet Compound Locomotives.
46 Passenger Coaches.
2,550 Freight Cars.

The first deliveries of this new equipment will begin during the last quarter of the present calendar year.

Matamoros—Brownsville Bridge:

This bridge, to which reference was made in the last Annual Report, was completed and opened for traffic on July 21, 1910.

Operation of Express Department:

Under a contract executed between this Company and the Compañía Mexicana de Expres, S. A., the latter assumed control and operation of the express service on all of our lines as of September 1, 1909, and for a period of twenty-five years from that date. The results from operation for the ten months to June 30, 1910, have been satisfactory.

New Line from Durango to Llano Grande:

Under contract executed January 4, 1909, between this Company, the State of Durango and the Compañía Maderera de la Sierra de Durango, and covered by a concession from the Federal Government, we are to build a line from Durango in a westerly direction for a distance of approximately 105 kilometers to a point called Llano Grande. The State of Durango and the Compañía Maderera guarantees for a period of twenty years any deficit from operations sufficient to pay the interest on cost of the line. Contracts for construction of the line were let in the month of January, 1910, and the work is progressing satisfactorily.

Transfer of The Mexican International Railroad Company.

The physical transfer of all the lines, property, etc., of The Mexican International Railroad Company to Ferrocarriles Nacionales de México having become effective on June 30, 1910, all of the assets and liabilities of that company have been included in the General Balance Sheet of this company, and which forms a part of and accompanies this report.

As in former years, a separate report of the operations, etc., of The Mexican International Railroad Company will be rendered for the fiscal year ended June 30, 1910.

Tree Planting:

The work of planting trees on the various divisions of the system has received considerable attention during the last year; at most points the experiment has been a success, and in a few cases it has been ascertained that in certain districts the soil, climate, etc., are unsuitable for certain kinds of trees. To further this work a nursery has been established at La Barra, a short distance out from Tampico, on company's land, and many young trees are being shipped to suitable points on the system for planting.

Stocking Streams, etc., with Fish:

The Industrial Department has been endeavoring to stock the principal lakes, running streams and larger presas along the lines with game fish of various kinds, and at some places the fish have been supplied.

Artesian Wells:

At various points on the system new artesian wells have been sunk, and at some places existing wells have been deepened, with a view to improving the water service.

Statements of Accounts:

Attached hereto you will please find letter from the General Auditor, dated September 13, 1910, together with the ten statements of accounts as listed therein.

Accompanying this report will be found a list of directors and officers of your company as at June 30, 1910.

Respectfully submitted,

E. N. BROWN,
President.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

Published Every Friday, and Daily Except Times in Issue by
THE RAILROAD GAZETTE (TRC), 15 LEXINGTON ST., NEW YORK

CHICAGO: Plymouth Bldg.

CLEVELAND: Williamson Bldg.

LONDON: Queen Anne's Chambers, Westminster

W. H. RAGGAMAN, President

F. A. SIMMONS, Treasurer & Editor

HENRY LEE, Secretary

The names of the company is the names of the officers.

EDITORS:

W. H. RAGGAMAN, Editor

RAY V. WRIGHT

B. B. ADAMS

SAMUEL O. DUNN

G. I. FOWLER

W. E. HODGER

WILLIAM FOREWORTH

T. W. KRAIGER

BRADY BRYAN

S. W. DUNNING

H. H. SIMMONS

CLARENCE DEXING

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada.....	6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies.....	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49. FRIDAY, DECEMBER 2, 1910. NUMBER 23.

CONTENTS

EDITORIAL:

Editorial Notes.....	1033
The Train Staff.....	1034
Railway Rates and Railway Efficiency.....	1035
Great Northern.....	1037
LETTERS TO THE EDITOR.....	1038

ILLUSTRATED:

Rates and Cost of Commutation.....	1042
Tests of Rail Joints.....	1043
Recording Movements of Switch Joints.....	1048

MISCELLANEOUS:

John M. Forbes and the Michigan Central.....	1039
The Freight Car Situation.....	1041
Foreign Railway Notes.....	1043, 1048
Transportation and Traffic in England.....	1045

SHOP SECTION

EDITORIALS:

Editorial Notes.....	1049
Sharp Flanges on Steel Freight Car Wheels.....	1050
The Belpaire Boiler at Home and Abroad.....	1050
Chemistry in the Foundry.....	1051
Apprenticeship.....	1051
Mechanical Articles During November.....	1051
LETTERS TO THE EDITOR.....	1052

ILLUSTRATED:

Friction of Freight Car Trucks on Curves.....	1058
Shop Kinks from the Lehigh Valley Shops at Sayre, Pa.....	1059
Locomotive Bell Ringer.....	1081
Drop Pit for Engine House.....	1082
Apprenticeship System of the Lehigh Valley at the Sayre Shops.....	1083
Rearrangement of Machine Tools, Union Pacific Locomotive Shop, Omaha, Neb.....	1084

MISCELLANEOUS:

CARE AND SELECTION OF SHOP EQUIPMENT:	
Selection and Maintenance of Machine Tools and Shop Equipment.....	1053
Care and Maintenance of Machine Tools.....	1054
Selection and Maintenance of Tools.....	1055
Selection and Care of Railway Shop Machinery.....	1056
Selection and Care of Machine Tools.....	1056
Maintenance of Tools.....	1057
The Care and Selection of Machine Tools and Shop Equipment.....	1057
Foreign Railway Notes.....	1080, 1084
Corporation Schools.....	1080
Exposition of Safety Devices.....	1084
GENERAL NEWS SECTION.....	1085
SUPPLY TRADE NEWS.....	1098

W took the figures for securities owned by the Hocking Valley in our summary in the annual report in the Hocking Valley in the December 18 issue of the *Railway Age Gazette*, page 927. The figures for securities owned under "assets capitalized" should also have been included, making the total for securities owned by the Hocking Valley on June 30, 1910, \$13,271,561.

OCTAVE CHANUTE, who died last week, as noted in another column, did three great things. He showed it to be commercially possible to preserve ties; he was in charge of the double-tracking of the Erie; and he formulated principles on which the construction and operation of our present aeroplanes are based. In his "Progress in Flying Machines," published 16 years ago, he gave a summary of conclusions embodying his beliefs as to the character of the successful aeroplane, and it is surprising in what detail his prophecies have been fulfilled. In 1896 and 1897 he, associated with Herring, made some 2,000 flights in gliders, publishing the results of these experiments in 1897. The Wright brothers called on him for help during their experiments from 1901 to 1905, and he supplied them with both information and advice. He had a great taste for bridge building. He is particularly remembered for the Missouri bridge at Sibley, Mo., and the Mississippi river bridge at Fort Madison, Iowa. Mr. Chanute had the imagination and ability which the big French engineers have, combined with an even temperament rare in one of his nationality. He was always judicial and inquiring, and seemed naturally qualified to make investigations of unknown or little known questions.

THE mystery that surrounded the ownership of the North Coast road, now under construction in Washington, has been cleared up by the announcement by Union Pacific officers that this road is a Harriman line. The road is to parallel the Great Northern and also compete with the recently built Spokane, Portland & Seattle, owned jointly by the Great Northern and the Northern Pacific. The two main lines of the North Coast will run from Spokane, Wash., and from Walla Walla, joining at Kiona and running from there west to Portland Junction, with one line running north from Portland Junction through Tacoma to Seattle, and the other south to Portland. There are numerous branches in Washington, and the projected and completed lines, which will total about 800 miles, are direct competitors of the Hill lines in a territory in which heretofore Hill interests had been dominant. The announcement from the Union Pacific offices said that a new company, the Oregon-Washington Railroad & Navigation Co., had been organized to take over the Oregon Railroad & Navigation Co., the Oregon & Washington, the Columbia River & Central Oregon, the Ilwaco Railroad, the Des Chutes Railroad, the Lake Creek & Coeur d'Alene, the Oregon Eastern, the Oregon, Washington & Idaho, the Spokane Union Depot, the Umatilla Central and the Malheur Valley, in addition to the North Coast. The new company is to take over the operations of these lines and will probably bear much the same relation to the Union Pacific that the Oregon Railroad & Navigation Co. has borne in the past; that is, its operations will be included, as are the Oregon Short Line's, in the Union Pacific annual report under the heading, "Union Pacific Railroad and auxiliary companies." None of the lines that are to be taken over by the new company, with the exception of the Oregon Railroad & Navigation, are mortgaged, except that in some cases, where the sums advanced by the Union Pacific or the Oregon Short Line have been large, a mortgage has been given to the parent company. The Union Pacific's balance sheet of June 30, 1910, showed \$46,620,520 total advances for construction and acquisition of new lines made by the Union Pacific and auxiliary companies. This, of course, would show advances to any of the construction companies made by any of the Union Pacific auxiliary lines, but would not show intercompany loans between auxiliary companies. The keen competition in railway building

that is being carried on between the Hill and Harriman lines in Oregon and Washington has previously been described at some length in these columns. The formation of an operating company to take over the Harriman lines, with the possibility of a comprehensive plan of financing the projected lines through mortgaging lines already partly built, is an important step in the struggle in the Northwest which has amounted at times to open warfare.

THE TRAIN STAFF.

THE electric train staff system and the train tablet (which works on the same general principle as the train staff), are generally recognized as the simplest and safest machines known for maintaining the space interval between trains on a busy single-track line. This has been shown by many installations of both systems. No block signaling device has shown a higher record for safety. One railway officer, declaring that the electric train staff was the best block signal apparatus in use, gave as his reason the fact that the "emergency key" is always out of the reach of the operator. The emergency key is what gives access to the electric switch or other instrumentality by which the signalmen in charge of a "lock-and-block" or "controlled manual" apparatus, may, when necessary to prevent delays to trains, throw the lock-and-block out of service. The electric locking apparatus being thereby disconnected, the two signalmen in control of a block section are free to arrange matters between themselves over the telegraph or telephone line. They may clear or agree to the clearing of the signal to admit a train, free from any restriction except their own cautiousness.

Freedom from mechanical checks has many times been followed, however, by a mistake. A signalman who is regularly kept from error day after day by the mechanical checks in his machine seems determined, as soon as the check is removed or suspended, to commit the very error against which he ought to have learned to guard. This being so, an apparatus and system which should be perfect, and therefore require no emergency unlocking feature, have been the great desiderata. No one has discovered such a system, however. But the theory of the electric train staff comes as near to accomplishing this object as is possible. The staff itself is the only emergency key, and that is in possession of the engineman, where the signalman cannot get it. In point of fact, the number of times in a year when the use of this apparatus has to be suspended because of any trouble in or with the mechanism is exceedingly small. It is so small that no special unlocking arrangements have been provided. When all the staffs are in the machine, either one of the two signalmen may secure the right to the road unconditionally; and, on the other hand, when one staff is absent from either machine, both signalmen are absolutely prevented from getting the right to the road.

The principle of the electric train staff being thus so completely adequate, and practice with it having justified our confidence in it, it is not to be wondered at that where the apparatus is appreciated, it should be used extensively; and an instance of a new use is reported on the Atchison, Topeka & Santa Fe. On the steep grades of this company's line between Raton, N. Mex., and Jansen, the staff apparatus is used for blocking trains on double track; that is to say, on a track where trains run in one direction only. It is on the descending track. There are four block sections. This part of the line is on a grade of 3.5 per cent., and an incidental advantage of using the staff is to compel each engineman to test his air-brakes by reducing his speed to a low rate at each staff station to take on the staff. Staffs are taken out of the machine at the lower end of each block section each day by the signalman, who locks them in a box and sends them to the main station at the upper station of that section. Each part of machine is designed to hold 40 staffs at either end of the section. On the ascending track of the line all trains must at once run at very low speed, and the space interval is not enforced.

Another modification which ought to enlarge the useful field of this apparatus is the use of the staff without attendants. On the Bangor & Portland line of the Delaware, Lackawanna & Western, in Pennsylvania, this has proved highly satisfactory. On this line there are not many trains and no serious inconvenience is caused by the delay necessary for each conductor to get off, go into the station and communicate by telephone with the despatcher before taking out the staff. The conductor who wishes to take out a staff effects the necessary manipulation of the circuit closer at the distant station (which ordinarily would be done by the distant operator) by means of a separate line wire and relay. Here, as in all cases where the train staff is used, the officers and trainmen are enthusiastic in their praise of its simplicity and safety. The rule requiring every conductor at the outgoing end of a block section to put the staff into the instrument is strictly maintained; but the officers say that except for the requirement that conductors communicate as frequently as practicable with the despatcher it would be entirely feasible and safe for a conductor arriving at the end of a section to hand the staff directly to another conductor ready to move in the opposite direction into the section. With competent men and strict discipline there should be no difficulty in employing this means of saving time.

Another thing which ought to make the staff popular is its adaptability to temporary uses. Where a single track line is suddenly burdened with a large addition to its traffic, or where on short notice, or without notice, a piece of double-track has to be worked single-track, the setting up of a pair of staff instruments need take but a few hours. A few roads, notably the Great Northern, have made considerable use of the staff in this way.

The merits of the staff and the tablet should be kept in mind by railway officers at all times; but our attention has been turned to the subject just now by the statement of the Indiana State railway commission, in its report of accidents for the quarter ending September 30, last, that "the small revenues of the interurban lines make most difficult" the problem of securing the safety of passengers. The commission is discussing the butting collisions which occurred at Bluffton and other places, killing, altogether, 50 passengers. What better can an interurban line do than install one of these systems? Why should the legislature of Indiana require the block system, as it does, on the steam roads of the State and not require it on the "interurban" lines? Neither the staff nor the tablet can be installed for the very small sums to which electric railways usually seem to think they ought to limit themselves, but what is the alternative? Are people and legislatures to continue to allow these roads to kill passengers by the car-load because fares of one cent a mile do not afford a reasonable income? This old argument, that we are justified in constantly risking our lives on the cars because it is such a good thing for the community to have cheap railway transportation, has been used industriously for the last 30 years in connection with steam railway transportation in our "new" country, and it would seem to be high time to lay it aside. These safety appliances are not "cheap" in the sense in which that term is usually employed by railway managers whose first thought is the percentage of net to gross receipts, but they are the cheapest to be had without sacrificing important elements of safety.

Economy in railway operation is too large a subject to be taken up in this place; but there is one simple alternative that must always be kept in mind if one is to give due weight to the element of safety as compared with cheapness and convenience: if safety is not assured the speed of trains must be reduced. Judging from past experience this is so severe a test that many railway officers lack the courage to meet it. But can the public reasonably require anything less? To put the matter in concrete form, many interurban roads ought either to have an adequate block system or else lengthen the time of cars between termini probably 50 per cent.

RAILWAY RATES AND RAILWAY EFFICIENCY

LOUIS T. BRANDEIS, attorney for the eastern shippers in the rate advance case, has relieved the monotony of the hearings, and added little to the fund of useful knowledge, but much to the gravity of notions, by asserting, and undertaking to show how, the railways of the United States, can reduce their operating expenses \$365,000,000 a year. Mr. Brandeis' statement and the evidence he has introduced to support it merit serious consideration, only because they have been printed broadcast over the country, and, therefore, no doubt, have tended to give to the uninformed the impression that American railways are very inefficiently operated.

The first comment that suggests itself regarding the position taken by Mr. Brandeis is that it involves the abandonment of the theory on which the shippers heretofore have opposed advances in freight rates. Their contention has been that the railways have so greatly increased the efficiency of their plants and operating methods during the past ten years that, in spite of the advances that have taken place in the costs of labor and materials, they do not need higher rates. Obviously, the contention that the railways have greatly increased the efficiency of their plants and operations and do not need an increase in earnings, and the contention that they are inefficiently operated and should get the additional revenue they need by abandoning their inefficient methods, are not quite compatible. The railways of the United States, with the smallest capital expenditure per mile of any railways in the world, have carried freight and passengers at the lowest rates in the world, while paying the highest wages for labor and the highest prices for materials in the world. This does not indicate inefficient management. The manufacturers of the United States, while paying the highest wages of any manufacturers in the world, have, in the main, charged the highest prices of any manufacturers in the world for their goods. Mr. Brandeis cites the great improvements in methods in manufacturing plants as examples to be imitated by the railways. One of two things is true: either the factories of the United States, whose owners Mr. Brandeis represents, are not as efficiently operated as American railways are operated, or there has been no justification for the manufacturers raising their prices as much as they have in the last ten years, while railway rates have remained practically stationary.

There are about 236,000 miles of railway in the United States. Their operating expenses per mile in the fiscal year 1910 were \$7,779, of which \$1,574 was charged to maintenance of way and structures, \$1,758 to maintenance of equipment, \$3,920 to transportation and the rest to general expenses. The average reduction per mile in operating expenses which would have to be effected to obtain the aggregate economy suggested by Mr. Brandeis would be \$1,546, which could be secured by a reduction of 14 per cent. in the cost of transportation, 30 per cent. in expenditures for maintenance of way and structures, and 30 per cent in expenditures for maintenance of equipment. The average operating ratios of the railways of the United States would have to be reduced from about 67 per cent. to 53 per cent. Everyone familiar with railway affairs knows that many great economies have been made within the past decade, and that many more can be effected. But everyone who is aware how fast operating expenses have increased in spite of the great improvements in plants and operating methods which have been made knows that talk of effecting any such reductions in operating expenses as Mr. Brandeis and his witnesses outlined is the merest moonshine. The larger economies have been carried out. Only the smaller remain to be made. If, in spite of the larger ones, operating expenses have increased so fast, how can it be expected that they will not continue to increase in spite of the smaller ones?

The greatest obstacle in the way of effecting even the economies that are possible is that the railways cannot secure from the shippers, the public and their employees the coöperation which

is necessary to render them *practicable*. One of the criticisms made by Mr. Brandeis of railway operation is that cars and engines are not loaded as heavily as they might be and that the average movement of a freight car is only 25 miles a day. The railway managers have been struggling for years to remedy these conditions, and Mr. Brandeis' clients and other shippers have prevented their correction. The two main things necessary to get cars loaded more heavily is to raise the minimum carload weights and to hold at terminals cars carrying less-than-carload freight until they are fully loaded. The railways in recent years have made many advances in carload minimums; but the opposition of the shippers has been so strong that carload minimums are lower now, compared with the average capacity of cars, than they were ten years ago. The shippers at Pittsburgh, Chicago, St. Louis and numerous other cities have within recent years successfully solicited the railways to put in operation numerous package cars running to all parts of the United States on regular schedules for the handling of less-than-carload freight. A car which runs on a regular schedule must be started on its journey when the time comes for it to leave whether it has a full load or not. The abolition of package cars would enable the roads to get heavier loading per car. But do the shippers want them to effect economy in this way, or would they rather pay a somewhat higher rate for the better service?

The only way that engines could in all cases be loaded to their maximum capacity would be to hold cars at terminals until the maximum trainload each engine could pull had been accumulated. That would result in increased economy in railway operation. But would the shippers submit to economy being secured in that way? There is constant complaint from shippers that traffic does not move expeditiously enough now. Mr. Brandeis himself bemoans the fact that the average movement of a freight car is but 25 miles a day. How does he think that the railways can detain cars until they get the maximum tonnage rating of each engine, and at the same time increase the average movement per car per day?

The statement that freight cars move an average of only 25 miles a day is true, but, as made by Mr. Brandeis, utterly misleading. The average speed of freight cars *when in motion* is not 25 miles a day, but about 10 miles an hour. The only way to form a correct opinion as to how efficiently freight cars are handled on the average by the railways is to consider in detail the average movement from the time the car is started to be loaded until it has completed its trip and been unloaded. The average time required for the loaded and empty car movement involved in the average haul of freight in the United States is about 12 days, and the average distance the car moves about 330 miles. Two days' free time is usually allowed for loading and also for unloading (not including Sundays and holidays, for which additional free time is allowed), and the statistics of the demurrage bureaus show that the delays of the car at terminals by the shippers' consignees for loading and unloading average about $4\frac{1}{2}$ days for each movement. This leaves an average of $7\frac{1}{2}$ days during which the car actually is in the possession of the railway and gives an average movement of about 44 miles per day. This time during which the car is in the possession of the railway includes all legitimate detention of it, such as for switching in and out at both terminals, for switching for classification in yards en route, for rigid inspection and frequent shoppings, and for transfer of lading by reason of enforcement of the stringent safety appliance regulations now in effect. It includes the period during which cars are held for reconsignment to accommodate shippers and also the periods during which cars are in shops; and, on the average, about 5 per cent. of the total number of cars are in the shops at any given time. It also includes the movement not merely of loaded cars but also of empty cars; and, of course, the average movement of empty cars is much less than of loaded cars, because the empty car stands idle on the sidings for much longer periods,

which periods of idleness are included in the average movement. The effect of a heavy reduction in traffic and a consequent proportionate increase in the number of empty cars on the average movement of all freight cars was strikingly shown just after the panic in 1907. In October, 1907, when traffic was very heavy, the average movement of all the cars in the United States was 24.8 miles per day. In April, 1908, there were substantially 700,000 idle cars, including those in shops; and in that month the average movement per day was but 19.6 miles, or 20 per cent. less than it was in October, 1907. Now, there are four months in every year when practically all the freight cars in the country are busy, and eight months when a large part of them are not in service, and, of course, the great number of cars idle during these eight months pulls down the figure showing the average movement.

When all these conditions are taken into consideration it does not seem at all surprising that the average movement of a freight car is but 25 miles a day. It also appears perfectly evident that those who are best situated to increase this average movement are the shippers, who have actual possession of the car for loading and unloading more than one-third of the time, who have practical possession of it for a considerable time for reconsignment, and whose failure to provide a more uniform traffic throughout the year makes it necessary for eight months of the year to have thousands of cars standing idle on side tracks.

The question of car efficiency is more than a matter of mere movement. Probably the best combination unit of car performance is that of ton-miles per car per day, which was invented by the committee on car efficiency of the American Railway Association. The statistics of the association show that this item is steadily increasing. The average number of tons hauled one mile per car per day in April, 1907, was 348, and in November, 1909, the record figure of 413 ton-miles per car per day was made, an increase of over 18 per cent. This increase was secured by better car loading and a reduction of empty mileage. The increase in efficiency would have been much greater if the efforts to secure it had met less opposition from the shippers.

One of the main obstacles to increasing car and locomotive efficiency is the congested condition of yards and terminals. And this condition, it would seem, can be remedied only by the expenditure of large sums of money which must either be derived from earnings or obtained by the sale of securities to the payment of the interest and dividends on which earnings must be applied.

Experience in the shops of many private concerns and of not a few railways has proved that very substantial economies might be effected in railway shops as a whole in the United States. But the difficulties in the way of introducing efficiency methods in railway shops are much greater than in other shops. If a manufacturer wishes to adopt efficiency methods and his employees object, he can lock them out or shut down his plant until they come to terms. But the railway, being a public service corporation, cannot close its shops whenever it pleases and keep them closed as long as it likes. That would mean that its transportation service would rapidly become impaired, and in course of time would cease altogether; and this the law and public opinion will not permit. Labor unions usually oppose efficiency methods, because such methods are based on the theory that each man should be paid in proportion to the quality and quantity of work he does and tend to stimulate each employee to do a greater amount of work than he otherwise would do, which results in the employment of fewer men than otherwise would be employed. Nowhere has the introduction of efficiency methods been, or is it now, more stubbornly opposed by labor unions than it is in railway shops; and it is the deliberate judgment of practically all persons competent to form an opinion that before betterment methods could be introduced in all railway shops it would be necessary to go through the worst railway strike that ever took place in this country. The railways

are willing to pay the price if the public is. The only reason why they do not try forcibly to adopt betterment methods and provoke the inevitable strike is that they fear that a misguided public sentiment would side with the labor unions instead of with the roads.

It is not only in shops that railway employees are comparatively inefficient, and demand, and often get, two days' pay for one day's work. One of the reasons why the locomotive engineers employed on the railways west of Chicago are threatening to strike is that the railway managers have refused to pay substantially twice as high wages to engineers running Mallet engines as to those running other freight engines. The Mallets have been introduced to effect economies and increase efficiency. Their purpose would be nullified if the wages paid to employees on trains where they are used were based on what the engines do instead of on what the men do. Making speeches or introducing evidence before the Interstate Commerce Commission will never make it practicable for railways to get a dollar's work for every dollar that they pay in wages. That will be rendered practicable—if it ever is—either by appeals to the good sense of employees or by the stern abatement of strikes and lock-outs; and the latter seems the more probable alternative.

Government regulation, by forcing railway executives to apply their time, thought and energies to protecting rather than to improving their properties, is tending strongly to make railway operation inefficient. Railway managers, being human, cannot do two things at once. The more thought and energy they must give to defending the roads, the less they have left for devising methods for reducing operating expenses. As the *Railway Age Gazette* has said before, "not only does government regulation as now carried on hinder the higher officers from initiating plans for improving operation, but it also interferes with their giving adequate consideration to plans worked out by their subordinates; and, of course, the important schemes of subordinates cannot be carried out until they have been digested and approved by their superiors. The public needs to be reminded that for whatever reduces the efficiency or increases the cost of railway operation it must, in the long run, foot the bill in the passenger and freight rates that it pays, or in the impaired service that it will receive, or in both. The public will be much more apt to get improved service at reasonable rates if it gives the railway managers a chance to devote more time to the administration of their properties than if it continues to compel them to give so much of their time to the defense of them."

But, after all, why, on the shippers' theory, should the railway managers be interested in the question of railway efficiency? The shippers take the ground that the railway is entitled to a fair return and no more, and that the railways of the United States as a whole are earning a fair return now. If this be true, what objection can railway managers have in trying to increase efficiency of operation? The only effect would be to increase the earnings of the roads above a fair return and to invite reductions in rates and earnings. That would benefit the shippers, but it would not benefit the stockholders of the railways; and the railway managers' employment, their salaries and their promotions come from the stockholders. The application of the "fair return" theory to the railway business would be the surest way to deaden railway enterprise and prevent the economies which Mr. Brandeis claims could be made. The only public policy which will tend to promote railway efficiency will be for the government to say in effect to the railways that they must not charge higher than reasonable rates and that they must give good service, and that so long as they meet these requirements they will be allowed to earn whatever profits they can. The only incentive that has ever been effective in promoting efficiency in the management of concerns owned by private capital has been the hope and prospect of gain to the owners; and until human nature is revolutionized it will continue to be the only effective incentive.

GREAT NORTHERN

THE Great Northern Railway Company has often been cited as an example of a very conservatively capitalized railway corporation, and the effect of the rate question was quite forcibly brought to public notice by the findings of the master in chancery in a recent Minnesota case. This case was brought to restrain the railway company from putting in effect rates ordered by the Minnesota railway commission on the ground among other things that they did not yield a fair return on the capital invested. At the close of the fiscal year ended June 30, 1910, the company had outstanding total bonds and stocks amounting to \$319,367,409, or about \$14,494 per mile of road. The master in chancery in the Minnesota case, while taking the position that the valuation of the Great Northern and the Northern Pacific properties was not necessary to a determination of a reasonable freight rate, nevertheless made a general valuation of both properties. He placed the valuation of the Great Northern, after the deduction of its interest in the Spokane, Portland & Seattle, and charging off 12 per cent. for depreciation, at \$457,131,469, or at the rate of \$65,117 per mile of line.

The main points in the Minnesota case were discussed in these columns at the time the master in chancery made his report. It will be recalled that the report found the rates prescribed by Minnesota unremunerative and, therefore, unconstitutional. The chief interest in a discussion of this case in connection with the annual report of the Great Northern lies in the light thrown on the relation between the nominal capitalization of the property and its actual value as given by a disinterested outsider. Assuming that the profit and loss surplus—shown on the 1910 balance sheet as \$34,997,560—is all invested in the property and capitalizable, this surplus would figure out at \$4,985 per mile, which, added to the capitalization represented by stocks and bonds, makes \$50,479 per mile for a property worth \$65,117 per mile.

The fiscal year ended June 30, 1910, brought to the Great Northern both the largest business measured in ton miles and passenger miles, and the largest earnings in the history of the company; and, unlike so many other companies whose gross was much larger in 1910 than in 1909, the Great Northern was able to show larger net last year than the year before. It was not possible, however, to make a saving in net proportionate to the increase in gross. Total operating revenues last year were \$64,500,000, an increase of \$10,800,000, or 20 per cent., over the year before. Net operating revenues amounted to \$25,200,000 in 1910, an increase of \$4,100,000 over 1909, or slightly over 19 per cent. The revenue ton mileage of freight amounted to 5,678,800,000 in 1910, and to 4,842,000,000 in 1909. This is an increase of 17.28 per cent. in freight business handled. Passenger business on the Great Northern furnishes under ordinary conditions only about 20 per cent. of total operating revenues. In 1910, however, passenger revenue amounted to \$14,300,000, or 22 per cent. of the total operating revenue. This is greater by 30.37 per cent. than the 1909 passenger revenue. The passenger mileage was 649,300,000, an increase of 32.41 per cent. over 1909. The very large increase in passenger business was due to the Alaska-Yukon-Pacific Exposition held at Seattle, and to the heavy travel also produced by the opening for settlement of the Flathead, the Coeur d'Alene and the Spokane Indian reservations and the Rocky Boy Indian land. The company also ascribes part of this increase in passenger business to its educational and advertising campaign designed to help the early settlement of lands along its lines.

The increase of 17.28 per cent. in ton mileage was handled with an increase of 15.13 per cent. in freight train miles, loaded freight car miles amounting to 280,200,000 in 1910, an increase of 14.71 per cent., and empty freight car miles amounting to 100,200,000, an increase of 19.89 per cent. The increase of 32.41 per cent. in passengers carried one mile was handled with an increase of 29.03 per cent. in passenger train miles. The average haul of revenue freight was 245 miles in 1910, as against 268 miles in 1909. The average length of passenger journey was 77.82 miles last year and 68.15 the year before.

The average freight per ton per mile last year was 3.49 cents, as compared with 3.51 cents in 1909. The slight increase in rate is due to a greater proportion of high grade trains, and also to the greater proportion of short haul business. The freight rate received by the Great Northern is very much the same as that received by the Northern Pacific. The average revenue per passenger per mile was 2.204 cents in 1910, a decrease of 0.35 mills.

The Great Northern is able to hold down operating expenses in better shape than was the case with its competitors to the south of it. Total expenses last year amounted to \$39,300,000, an increase of \$6,700,000, or 20.66 per cent. As will be seen from the table accompanying this review, the increase in expenses was quite evenly divided between maintenance and cost of conducting transportation. The operating ratio last year was 60.92 per cent., and in 1909, 60.64 per cent. It is impossible to give the unit costs of maintenance of equipment, since the company's report does not show the details of operating expenses.

The 1910 balance sheet shows cash on hand amounting to \$6,650,000 and total current assets of \$14,900,000. Current liabilities amounted to \$10,200,000, of which \$851,000 are accounts payable, exclusive of vouchers, payrolls, etc. In 1909 the company had cash on hand totaling \$9,140,000 and total current assets amounting to \$16,000,000, with total current liabilities amounting to \$7,500,000. During the year the company sold \$9,700,000 Pacific extension 4 per cent. bonds and \$3,500,000 consolidated mortgage 4 per cent. bonds. Consolidated mortgage bonds were issued in exchange for Dakota extension bonds surrendered and cancelled, and for second mortgage bonds redeemed. The net increase in amount of bonds outstanding in the hands of the public was \$9,400,000.

The total spent for additions during the year was \$2,350,000, and for betterments, \$2,500,000; the largest items for additions being for additional main tracks and additional sidings and spur tracks; and the largest items for betterment being for bridges, trestles and culverts, and for ballast.

On June 30, 1910, of the total mileage, there was 4,927 miles of road which the company had owned for 10 years on which during that period steel bridging was increased 32,786 lineal feet, and timber bridging was reduced 87,073 feet. In 1900, of the mileage now owned, 69 track miles was laid with 80-lb. rail, there being nothing heavier than this in track. At the end of 1910 there was 1,717 track miles of 80, 85 or 90-lb. rail. The company has a considerable mileage of branch lines on which the comparatively light traffic does not require heavy rails. During the past year embankments were widened or restored to original width and grade line on 800 miles of road, and 1,378 miles of track was ballasted with gravel, of which 334 miles was not previously ballasted and 532 miles on which ballast was restored and an additional lift given.

In the last 10 years the number of locomotives in service on the Great Northern has been more than doubled, there being 1,123 locomotives in service at the end of 1910; and during these 10 years the combined tractive power of all locomotives was increased three times. The average tractive power of each locomotive is 47.72 per cent. greater in 1910 than was the average in 1900. During the 10 years, also, the number of freight train cars has more than doubled; the number in service at the end of 1910 totaling 44,283; the average capacity per car was 35.44 tons in 1910, as compared with 25.52 tons in 1900. In this connection it is interesting to note that notwithstanding the well known large increases in average train load on the Hill roads in past years, the company was able to show an average train load of 518 tons, an increase of over 16 tons from the 1909 figure. This train loading was accomplished despite an extraordinarily severe winter.

In an interview quoted in our General News Section, James J. Hill discusses the prospects of railways and of general business and specifically cites the immediate plans of the Great Northern as an example of curtailment.

The following table shows the operations of the Great Northern

in the fiscal year ended June 30, compared with 1909:

	1910.	1909.
Average mileage operated.....	7,620	6,288
Passenger revenue.....	\$46,757,734	\$3,464,811
Total operating revenue.....	14,311,800	10,977,948
Maint. of way and structures.....	64,465,370	53,687,444
Maint. of equipment.....	11,773,314	9,797,370
Traffic.....	7,520,634	6,173,847
Transportation.....	922,104	745,847
Total operating expenses.....	18,068,666	14,822,546
Taxes.....	39,278,096	32,553,487
Operating income.....	3,570,302	2,570,372
Gross corporate income.....	21,856,981	18,812,783
Net corporate income.....	23,113,800	22,566,583
Dividends.....	17,791,824	17,487,434
Transferred to fund for permanent improvement and betterment.....	14,698,663	14,697,473
Profit and loss surplus.....	2,319,158	2,789,961
	774,003	.....

Letters to the Editor.

TURBO-ELECTRIC LOCOMOTIVE.

JACKSONVILLE, FLORIDA, Nov. 15, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I notice in some of the recent magazines a brief account of the completion and successful trial of a turbo-electric locomotive in Glasgow, Scotland. I am disposed to claim a little of the credit for the suggestion, at least, of this application of steam and electricity to locomotive power. In your March 25, 1904, issue you will find a letter of mine suggesting with some detail this very use of the turbine in locomotive construction, together with some reasons why it ought to be an economic success. The editor also made some suggestions by way of comment on the letter, so, perhaps, he is entitled to part of the credit for the great idea. A few weeks or months later I saw somewhere the statement that a distinguished Scotch engineer was working on this problem with great hopes of success. I immediately determined to keep my eye on him and note his progress. It has taken six years, but he has done it at last. The turbo-electric locomotive bids fair to be a success. This claim of mine for any credit in the matter is, perhaps, a trivial affair, but there is at least some satisfaction in being able to say "I told you so!"

J. LOGAN IRVIN.

TICKET OFFICE ACCOMMODATIONS IN BOSTON.

New Haven, Conn., November 18, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The *Railway Age Gazette* of November 11 contains a letter entitled, "A Friendly Criticism of Poor Passenger Service," and one part of the letter refers specifically to an alleged defect in the method of caring for sleeping-car passengers at the Back Bay station in Boston. The writer of the criticism misunderstands the situation, and this part of his criticism is not warranted. The ticket agent at the Back Bay station can and will receive an order for space in sleeping car, unaccompanied by money, and this space will be reserved up to 15 minutes before the leaving time of train. If the party making the reservation does not call for it by 15 minutes before leaving time of the train, then the space may be sold to any other passenger who requires it. S. HIGGINS,

General Manager, New York, New Haven and Hartford Railroad.

[Presumably the grievance of our correspondent was in that 15-minute limitation. He wanted to be able to come back 15 seconds before leaving time, protecting the company by leaving money with the agent, Editor.]

SAFETY APPLIANCE STANDARDS.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I was very much interested in the editorial on safety appliance standards in the November 11 issue of the *Railway Age Gazette*, and believe that it covers the ground carefully. My opinion is that the government has shown a disposition to be fair all the way through. It is to be regretted that the members of an association like the Master Car Builders' have not held up to their own recommended standards better than they have, and no one is to blame more than they are as a body, if in any way the new standards are not satisfactory.

We were informed time and time again in the past in our conventions by Mr. Moseley, secretary of the Interstate Commerce Commission, that it was his ambition some day to see the M. C. B. standards adopted by the government. Knowing this, what have we done? We have adopted some features as standards, and others as recommended practice. It is no wonder that the government, with the very competent set of inspectors that were selected to draw up these rules, were compelled to insert some standards into the new rules concerning which the Master Car Builders in the past had allowed its members to do as they pleased. The government was looking for uniformity, and where matters were left as standards and the word "preferable" used, which allowed some railways to have ladders on the ends, and others on the sides and at the center of cars, also brake shafts to the right or to the left of the center of the car at the ends, no one should be surprised that it took the action that it did. The committee of railway men that appeared at the hearings, say that the very best of feeling existed at all times between the railway men and the government inspectors, and the disposition was to be fair towards the railways.

The Master Car Builders' Association and other railway associations have learned a good lesson in this; that is, when standards are adopted, stick to them. It is a well known fact that when the M. C. B. 3¼ in. x 7 in. journal was adopted as standard, some of the roads disregarded it and manufactured an axle that was one inch longer than the M. C. B. recommended practice. Also, when the M. C. B. standard bearings, for 3¼ in. x 7 in. and 4¼ in. x 8 in. journals were adopted, some roads manufactured journal bearings entirely different from the M. C. B. standards, and which did not even interchange with them.

I might go on and mention many other cases where our association has adopted standard sizes and locations of safety appliances to which some roads have paid no attention. I might also refer to the M. C. B. standard freight coupler; the committee has made recommendations as to the size of the coupler and the formulae and tests to be given them, so that we might get the very best material and couplers on the market. How many roads to-day are buying their couplers strictly to the M. C. B. recommended practices?

I am a firm believer in standards, but when we, as an association, adopt standards, we should see to it that they are followed. However, we are now compelled by the law to follow certain standards. The railways that have ignored the recommended practices of the M. C. B. Association can now see the folly of their ways.

MASTER CAR BUILDER.

GOOD PASSENGER SERVICE.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The recent articles on politeness and on making railway service convenient and valuable to the user have stirred me to make a little addition to the lists.

Recently my wife and our little child went to C, a big city, for an extended visit. I accompanied them to the little country station at A, and went with them on the train to the next town B, where there was an easy chance for me to return. The train was late, but the station agent courteously volunteered to let us know when to look out for it, and at the time for its approach he advised as to where to stand on the platform to be the most conveniently situated for the passenger coaches (other than Pullman, second-class and smoking) on a ten-car train. This was without suggestion of any reward. He wanted nothing but the knowledge that the road's patrons were comfortable. In the train the conductor took our tickets and asked: "Are you going direct to C, Madam?" The answer being "Yes," he glanced at me and kindly informed me how many minutes I could have to wait in the car with my family at B before the train would leave (there was ticket reading to B) and then went about his work. My wife tells me that on arrival in C she found herself courteously assisted by the brakeman and by a uniformed station

employee in the handling of a considerable amount of hand baggage, while she looked after the child.

A few days later I followed her, and was also heartily taken with hand baggage. I took the train at A at a different hour, and another man was on duty, but I was given the same advice in regard to where to take the night car in the intermediary stop at a second express train. Also, the man who threw the baggage pushed up some of my baggage and carried it to the right location. At the next stop, a look-alike directed me to the car at the right where there would be more room for my luggage. I left the train at a good sized city before reaching C, and waited for the local train that would take me to the desired suburban station. Knowing that the time table had been recently changed, I asked a station porter—the nearest railway employee—when my train would leave, and he said he would look it up. In less than two minutes he returned with the information. As I neared my destination the conductor came along to tell me that the train was running on a new track and I must get out at the side opposite that usually taken, and further suggested that it might be well to be ready, when the train stopped, so as not to be swamped by the crowd which usually boards the train there.

These were pleasant experiences, but the finest of them was when the conductor showed the good breeding and fine intelligence to address my wife as "Madam" instead of as "Lady."

There is another side to the picture. The man at the baggage transfer office at the station in the big city (C) charged my wife \$1.50 instead of the rightful 95 cents for company's work in taking two trunks and an extension case to a house in the suburb.

Let me mention some instances of carelessness recently observed at different places, for I am a man who knocks about considerably on the cars. I saw a passenger train taken across a drawbridge without any railway man looking at the bridge, when the rules distinctly require the conductor and engineman to make a personal examination and be sure that the draw is closed before the train goes on the bridge. I saw a freight train enter the main line from a branch while the signals were set for safety for trains on the main line. I saw a passenger train stalled between stations and the man carrying a flag to the rear went less than 60 rods from the train, while just beyond him a sharp curve shut him from the view of any other train that might approach in case the block signal had not worked properly. All three of these were seen in as many weeks. C.

[Train men and station men who use the term "lady" in the place of "madam" ought to be fined a day's wages. We have thought of proposing this to the superintendents, but as they themselves are mostly responsible for the prevalence of this bad habit we have restrained ourselves. This little item alone would betray our correspondent's letter as coming from New England, although we have omitted the date line. New England origin is also indicated by other things; for that region (it is believed by some) is notable for the use of poor signaling as well as good English. Where else do they do without drawbridge signals on lines traversed by ten-car express trains? However, not to be too severe, we must note that the incident of the flagman is of a kind observable everywhere in America. But it is the good things in this letter—not the bad—that we want to emphasize. Most readers will say that the peculiarity about those courteous station employees was that they *desired* to make passengers comfortable. Where there is a will there is a way. Quite possibly, too, the passenger was of that temperament which evokes good treatment. But desire or no desire, every station man should be trained to aid passengers in finding their proper place on the station platform *before* the train arrives. In cold weather, especially, the station agent who wants to make himself popular can do nothing more conducive to that end than so to inform passengers that they will not have to search wildly along a row of a half dozen closed vestibule doors before finding an opening where they can break into the train. Sending passengers out of the waiting room to freeze on the platform several minutes before the train arrives is another good thing to avoid.—EDITOR.]

JOHN M. FORBES AND THE MICHIGAN CENTRAL.*

BY HENRY C. PEARSON.

I.

THE MICHIGAN CENTRAL.

In the spring of the year 1847 Charles Deane, being one of the owners of the American Fur and Trade Company, came coach to carry him from Columbus, Ohio, north to Tiffin, where he expected to place a contract for freight. The discomfort of the journey epitomizes the difficulties of travel by land in the Middle West of those days. "At one time we were all flung together in a heap at the bottom of the coach, and at another we were crushing our heads against the roof. Now, one side was down deep in the mire, and we were holding on to the other. Now, the coach was lying on the tails of the two wheelers; and now it was rearing up in the air, in a frantic state, with all four horses standing on the top of an insurmountable eminence, looking coolly back at it, as though they could say, 'Unharness us. It can't be done.' The drivers on these roads, who certainly get over the ground in a manner which is quite miraculous, so twist and turn the team about in forcing a passage, corkscrew fashion, through the bogs and swamps, that it was quite a common circumstance on looking out of the window to see the coachman, with the ends of a pair of reins in his hands, apparently driving nothing, or playing at horses, and the leaders staring at one unexpectedly from the back of the coach as if they had some idea of getting up behind. A great portion of the way was over what is called a corduroy road, which is made by throwing trunks of trees into a marsh, and leaving them to settle there. The very slightest of the jolts with which the ponderous carriage fell from log to log was enough, it seemed, to have dislocated all the bones in the human body. It would be impossible to experience a similar set of sensations, in any other circumstances, unless perhaps in attempting to go up to the top of St. Paul's in an omnibus. Never, never once, that day, was the coach in any position, attitude, or kind of motion to which we are accustomed in coaches. Never did it make the smallest approach to one's experience of the proceedings of any sort of vehicles that go on wheels."¹

In this passage, though it wear the guise of fiction, is found the reason why the development of the Middle West waited for the day of railway transportation. Where the region touched the Great Lakes on the north, the Ohio on the south, and the Mississippi on the west, commerce crept along its borders, but the interior was impenetrable. The richness and stickiness of the soil which could produce such wonderful crops made the business of raising them hopelessly unprofitable, for the cost and the difficulties of getting them to market were almost prohibitive.

What happened in Michigan was typical of the whole western situation. In the early days of its statehood it had planned and partly built two lines of railway running across its lower peninsula from east to west. So severely was the State shaken by the panic [of 1837], however, that in spite of its heroic efforts to meet its obligations, the word Michigan became a scarecrow to Eastern capital. As the years went on and it proved impossible not only to complete the two roads but even to procure the money necessary to keep them in repair, it grew plain that the State must get rid of them. One, the Michigan Central, 145 miles long, ran from Detroit to Kalamazoo. The other, the Michigan Southern, also ran nowhere, but achieved the same result with less effort, being only 75 miles long. The roads together had cost \$3,500,000. Accordingly, placing its dilapidated property on the bargain counter, the State waited for customers.

*From a forthcoming biography of John M. Forbes, by Henry C. Pearson. Mr. Forbes died October 14, 1898, at his home in Milton, Mass., at the age of 86. At the time of his death he was chairman of the board of directors of the Chicago, Burlington & Quincy and he had been a director of that road since 1857. His service with that company and with the Michigan Central made him a prominent railway man for fifty years, but his activities were those of a financier and capitalist rather than as an active administrative officer. He was a millionaire before he became interested in railways. He is chiefly remembered for his high personal character, his public spirit, and the wise use that he made of his great wealth.

¹American Notes, Ch. xiv.

At last, in 1845, the roads attracted the attention of two young men, both Easterners, who had gone West, and both persuaded not only that the day of prosperity for the West was about to dawn, but that, if the right means could be taken, Eastern capital could be brought to look upon a Western road as a profitable investment. One of the men was James F. Joy, a graduate of Dartmouth College and the Harvard Law School, who had come to Detroit and was waiting for his practice to grow. The other was John W. Brooks, superintendent of the Auburn & Rochester Railroad in New York. They believed that if the Michigan Central could be rehabilitated and completed for the remaining third of the distance to Lake Michigan, it would prove a profitable investment. * * * Brooks went East to interest capitalists. Good luck led him to the counting room of John M. Forbes, in Boston. Forbes, who came of a good Boston family, his uncles, James and Thomas H. Perkins, being prosperous merchants engaged in the China trade, had been sent by them, when he was only seventeen, to be a clerk in the house in Canton which did their business for them. Beginning as the youngest of all the clerks, and having no money of his own, he was able in seven years to win what in those days was a comfortable fortune. At the age of twenty-four he came back to Boston and established himself in the business of building and loading fast ships for the China trade. Successful as his ventures were, his true wealth was his intelligent and inflexible honesty, his power of inspiring others with confidence in himself—a striking proof of which was his being intrusted with the investment of half a million dollars belonging to Houqua, a mandarin of Canton—his love of exciting and intense work, and above all, an impulse to turn his powers into some channel where they should serve not only his own interests but also some work of public utility.

Forbes went so far as to employ Daniel Webster to draft a charter embodying the wisdom that had been gleaned from Eastern railway experience, and to send Brooks back to Michigan to secure the passage of the charter by the legislature.

The discussion of this act, with its momentous consequences to the exhausted treasury of Michigan, was naturally the chief event of the legislative session of 1846. But so ignorant were both the public at large and the legislators themselves concerning railway charters that the point on which local interest centered was the danger that the pagan capitalists of the East should attempt to run trains "on the Sabbath"; and every day petitions bearing on this point were presented. When, however, the time came for voting on this section, amendments were offered requiring that the corporation should observe the other nine commandments also, and that the directors should attend church at least twice every Sunday, and the section was laughed to defeat. The true guardian of the State's interests proved to be the governor, Alpheus Felch, an able and honest executive, who more than once during this session had to restrain the legislature from giving away to corporations the property of the people. Thus the charter as passed retained for the State a measure of legislative supervision and control. Yet even so Brooks and Joy knew that, with the price of the road fixed at \$2,000,000, they had not the worst of the bargain.

By the act of incorporation, the Michigan Central Railroad Company was granted the property of the road forever, but the state might repurchase it after a lapse of twenty years, and after thirty years the legislature might alter, amend, or repeal the charter. For the first four years the road was to pay a tax of one-half of one per cent, after that, of three-fourths of one per cent on the capital stock and loans for construction purposes. Its annual report to the secretary of the state was to contain tables showing its financial condition, its physical condition, and the amount and character of its business. The amount of the capital stock was set at five million dollars, with permission to increase it to eight million.

The rates existing under state management were to continue in force until July 1, 1848, from which time a reduction of twenty-

five per cent was to be made on flour and grain; the tariff for no article was to be higher than the average of the tariffs charged for that article on the Boston & Lowell, the Boston & Providence, and the Boston & Worcester Railroads, during September and October of 1845. An exception might be made if the secretary of state of Michigan, the auditor, and the attorney-general gave their consent. There was provision for a commission to determine what was the average rate on the New England railroads, and in case of disagreement a final decision was to be rendered by the court of chancery. Furthermore, not oftener than once in ten years the legislature might require such a commission to review all the rates of the road. The road was required to "transport merchandise and property . . . without showing partiality or favor, and with all practical despatch" The maximum passenger tariff was fixed at three cents a mile. No publication of rates was required; nevertheless, for eight years, from 1850 to 1857 inclusive, these tariffs were given in the annual report of the railroad.

As one person after another looked into the facts about this worn-out railroad in the wilderness, it became plain that it was indeed a bargain. Brooks' report showed that there had been an increase of one hundred per cent. in the receipts within the past year, and there was every prospect of even more satisfactory returns when the road should be built across the state and properly equipped. Finally, there was the assurance that it was to be controlled by eastern capitalists of proved honesty and ability. Advantages such as these were made the most of by a man like Forbes, who had vision, will, and above all, the faculty of "pitching in." As the six months allowed for the formation of the company drew to an end, his tense and tireless efforts brought success. "I shall, I hope," he wrote when it was all over, "have cause to look back upon this September as one of the best spent months of my life." He had, indeed, opened the door upon his true career.

On September 23, 1846, the Michigan Central Railroad took possession of its property. Forbes was president, having consented to take the office only because he found that otherwise the necessary capital could not be secured; but he arranged to put the burden of his work on the treasurer, George B. Upton, to whom he made over his salary. John W. Brooks, at Detroit, was to have charge of the running of the road.

Promising as were the prospects of the Michigan Central, the road itself, as Brooks' report made clear, was a shabby piece of property. The one hundred and forty-five miles of track from Detroit to Kalamazoo were in bad condition, and fifty-six miles more were needed to complete the line to the nearest point on Lake Michigan. There were only four passenger "depots" along the line, and at Detroit nothing but a small freight depot and an engine house, both inconveniently situated at some distance from the water front. The value of the rolling stock was \$68,000, the largest single item being \$4,000 for a locomotive of twelve tons. The track, like that of all the early railways, consisted of beams of wood six inches square, to which were fastened strips of iron half an inch thick by two and a quarter inches wide. The beams were fastened to cross ties laid three feet apart, which in turn were laid upon undersills, "the whole being supported upon short blocks of different lengths, varying according to the distance between the bottom of the undersills and a firm foundation."¹ On the first thirty miles out of Detroit, the wooden part of the track, which had been in use for eight years, had never been renewed, and was naturally much decayed.

* * * *

It was at the time of this meeting that Forbes and some of his associates received their first lesson in practical railroading. They traveled on the road, explored so called harbors on Lake Michigan in the search for a western terminus, went on to Chicago, and returned by steamer through the Straits of Mackinac. Forbes, a born traveler, with a keen eye and a zest for

¹ Brooks' Report upon the Merits of the Michigan Central Railroad as an Investment for Eastern Capitalists.

every experience, described the trip in a cordial letter to his wife. It describes a place where the pleasure of going to the owners of the country, which the railroad was to dispossess, had developed.

By the summer of 1891 it was clear that an enterprise of the kind would be profitable, and Forbes and his associates explored the country. In a letter to his wife he wrote:

Detroit, October, Michigan, 1891 (11/13/91)

We reached Detroit 1.30 in the night and landed in the mud, slept an hour or two, and had to get up and go to find T. Howe; Brooks, our mainstay, having gone West. We decided to follow and started at eight or so on our railroad . . .

"For the first few miles out of Detroit the country was dreary; flat, with a great deal of surface water, through forests mostly, but dense and melancholy ones; water under foot and huge decaying trees lying about; the trees generally tall and with no foliage until near the top.

"We found the road in a most deplorable condition, the iron broken up often into pieces not a foot long, and sometimes we could not see any iron for some feet, only wood; in other places short pieces of iron, almost athwart ships, but our protection was in its being so short that no snake heads could reach the cars. This bad road lasted about eighty miles, the bad country about thirty, when we came to a little drier soil and passed through several flourishing villages."

The letter goes on to describe the country through to the lake. From Kalamazoo it was necessary to go in a barouche drawn by four horses. The travelers sat up half the night talking with the engineers about the routes. Not daring to drink the water found in the wilderness, their tongues were parched as with fever. St. Joseph, which is spoken of as a "celebrated city," was reached after a drive of twelve hours. It was now a group of unoccupied houses, its fame having died out very soon after it was built. From Michigan City they took a steamer to Chicago, where, on their arrival at five o'clock in the afternoon, they found it "hotter than Tophet." Mr. Forbes continues:

"Established ourselves at an immense Hotel, and, the pangs of thirst being unbearable, we here broke into lake water astonishingly, and happily without bad effect. Mr. Odgen came for us at 6 or 7 in his carryall, and took us to drive about the town. Some of the houses are on a bluff (like that at Brooklyn) looking out on the blue lake, and it was lovely at sunset beyond imagination; few trees however, and the ground under foot dampish, being called wet Prairie."

In the early days of the road the locomotives had proceeded with such obliging caution that livestock could browse between the rails in entire safety. Naturally, when under the new management the speed was accelerated, with the consequent destruction of cattle, the outcry was at first great. But the balm of damages easily obtained opened the eyes of the settlers to new tactics; and soon they took their pigs to the railroad track to market. As a counter move, Brooks, when the line of track had been properly fenced in, issued notice to the effect that hereafter the road would pay only one-half the value of any animal killed. The contest was then joined. Trains found their progress blocked by logs on the tracks, and on grades the rails often greased, so that the passengers had to get out and work their passage. In his *Reminiscences* Forbes tells the story of the struggle. * * *

"In the county next west of Detroit the law-breakers were so strong that it was said no judge nor jury dared to convict any of the prominent men among them; and it was soon evident that here was the battle-ground between order and disorder. Mr. Brooks at once took his measures with his characteristic foresight and decision. When almost powerless, he maintained the best truce possible, protecting his property and trade by special police raised from his own men, and usually running a hand-car ahead of every train, as I remember was still done the first time my wife and I went over the railroad. But Brooks laid his plans for more

thorough work. His shrewd lawyer sent on colonists to settle on the road, to find in three months as farmers and at the same time to get evidence against the dispossessors who had determined either to destroy or control our road. He also quietly took measures to get the legislature to change the general law, so that anyone could, when circumstances justified it, be tried in counties other than those in which their offences were committed. While thus accumulating evidence and getting ready for enforcing his rights, he went on extending and rebuilding the road with vigor. The conspirators were led by a man named Fitch, supposed to be quite rich for the country, who boasted that no court would give a verdict against him or his men. Misled perhaps by Brooks' quiet methods, he extended his operations from putting obstructions on the track and firing upon trains to burning wood piles and depots, destroying at one fire \$75,000 worth of property. . . . When in due time Mr. Brooks' plan was ripe, he one night sent a train-load of special officers, chiefly enlisted among his own men, and captured thirty-five of the conspirators without a blow being struck or any resistance attempted. They expected to be carried only to their county town, there to be bailed out; but, when they approached Detroit, they found for the first time that the law had been changed, and that they could be tried in a place where justice was possible. They hired William H. Seward to come from New York and defend them, which he did in a speech worse than any made by himself or any other demagogue in this country. The trial lasted all summer, Fitch and one or two others dying in jail, it was said in consequence of medicine taken to produce illness and prolong the trial in hopes of a disagreement of the jury. Mr. Brooks' measures for getting evidence and working up his case were so good that in spite of Seward's help and of all the disadvantages of a great corporation prosecuting individuals and farmers, all the worst members of the gang were . . . convicted . . . It was the great railroad trial of this century, and settled many practical questions for all Mr. Brooks' successors in railroad building and management. . . ."

THE FREIGHT CAR SITUATION.*

In considering the freight car situation this Fall, two facts stand out prominently: First, the railways own many more freight cars than they did last year; second, the railways are making their cars go farther than they did last year. The surpluses are about the same as they were last year, while the shortages are considerably smaller. It is fair to presume from this that the reason the shortages are so small this year is that cars are moved better and shortages are filled with surplus cars which have been moved for quite a distance. These two facts are about all we absolutely know today as to the situation, but they are sufficient to warrant a statement that the railways did more in the month of October, 1910, than in the month of October, 1909; which is the same thing as saying that the commerce of this country is greater this fall than it has ever been.

The railway business of October, 1909, did not greatly exceed the business of October, 1907, but there had been no net increase in the number of freight cars in the two years. The only reason why the railways did more in the fall of 1909 than in the fall of 1907 was that they had better cars, they loaded them heavier and moved them faster. Now we have more cars, and the increase in the number of cars alone should account for quite an increase in business. If we have improved over our record last year in the movement of cars and in the loading of cars, the increase in business will be still greater.

The above is based on the figures of the American Railway Association, which show for July 1, 1909, a total of 2,100,000 freight cars in service and 40,000 under contract. On the 1st of July,

*From an article by Arthur Hale, in *American Industry*.

1910, there were 2,270,000 freight cars in service, with 120,000 under contract. We do not know just how many freight cars there are now, but there are certainly many more than last fall.

The statements as to surpluses and shortages, published semi-monthly, show very clearly that we are doing business this year on a less margin of surplus cars than we did last year. It also shows that our worst situation this year from the car supply standpoint is about the same as the best we had in the summer of 1907. * * * After the panic of 1907 we had two years of unusual car surpluses, and it is probable that the figures shown in the published statements have been normal only since the summer of 1909. It seems quite evident that if the railways had not made these large purchases of new cars in the last year there would have been a very serious car shortage this fall.

I was called upon to write an article on this subject a year ago. At that time I said that a comparison with the two prior years as shown would seem to indicate that the shortages would not increase much longer, and the surpluses would increase very soon. The prediction was a very fortunate one. The shortages did decrease and the surpluses increased until a number of the railways were seriously affected by the extreme severity of last winter. The weather of the coming winter will doubtless have much to do with the record made. An increase of one degree in temperature on the larger railways in the North is equivalent to an addition of many engines to its available supply.

In my paper of last year I estimated that the shortage of October 13, 1909, which was somewhat more severe than the worst shortage this year, meant that 13 per cent. of the freight offered was delayed one day or more before it could be shipped. I said that this was all that the shortage meant. It did not necessarily mean any restriction of production except in the trades where absolutely no storage is provided before shipment. The same statement appears to be true for this year, except that the per cent. of freight delayed is smaller. There is a car shortage felt in various parts of the country, just as there was last year, and just as there has been in every recent year excepting 1908 (even then there was a shortage of 13,000 cars reported on one date, although the surplus on the same date was over 100,000). Such shortages simply mean that empty cars cannot be moved from remote points to promptly fill orders.

Even in the regions where the coal strike has suspended production of coal for so many months, the efforts of the railways have been very successful in the way of filling orders, and supplies from other and unusual sources appear to have postponed all danger of a coal famine.

The supply of freight cars is not affected by the usually accepted law of supply and demand. If it were practicable for the railways to raise or lower their rates in accordance with the demand for the commodity which they are furnishing, namely, "transportation," or, in case of freight transportation, freight cars, they could, by proper advance in rates, readily keep the freight car supply well within the demand. Such a course is not practicable, for many reasons, which need not be detailed.

It is a pity that this fact is not more generally appreciated. Its full appreciation might go far to mitigate the annoyances felt by shippers when a sudden demand for freight cars is not met with an impossible increase in the car supply. As matters stand, whenever there is a car shortage the railways are obliged to deal with shippers who, not fully understanding the situation, feel that they have a grievance, and this makes even more difficult the task which is before the railways of dividing an insufficient car supply without discrimination. In this task the railways have been very successful. So far as I can learn, all serious complaints of discrimination in freight car distribution date back to the extreme shortages of 1906 and 1907. In a few months we shall have detailed figures giving us an exact record of what has been done this fall. I feel quite certain that these figures will prove that in their large increase in freight equipment and in their improved handling of that equipment the railways will have done all that could have been expected to meet the present emergency.

RATES AND COST OF COMMUTATION.

The accompanying chart was made for use by the New York, New Haven & Hartford at the hearings on commutation rates before the Interstate Commerce Commission and the New York Public Service Commission, First District. One or two of its most vivid features will at once attract attention, notably in showing that not until a distance of 23 miles from the Grand Central station is reached does the commutation rate equal even the terminal charge and tollage of the New Haven company. At the other end of the service, New Haven, the commuter's rate of about 23 cents per trip compares with a total cost of about 73 cents.

The chart shows the relations between the average receipt per passenger per trip in the commutation service of the company and the cost of the service. The line of the average rate paid represents the receipts from all classes of commutation tickets sold, divided by the number of trips sold on such tickets. The elements composing the total cost are the fixed charges and operating expenses, given in detail and in total amounts. This cost has been ascertained by dividing the various elements of the total cost of the service by the average number of commuters per car and per train. It will be noted that the cost of the service, unlike the average rate paid, does not vary directly with distance, but rises in progressive steps—each step representing a group of commuters residing within the limits of suburban runs. It will be clear, also, that the cost of the service within each group is determined by the maximum length of the train run provided for each group; cost must be computed to the end of the run and is not affected by the actual distance traveled by each commuter. The fixed charges and operating expense forming the total cost are thus classified into suburban zones, the limit of each zone representing the terminus of the suburban train run. Each extension of the zone adds to the cost, and the cost per commuting passenger is practically unaffected by the actual distance traveled by him.

A factor, however, that would affect the chart is the proportion of tickets unused by commuters. This would raise the rate somewhat. The proportion unused at the lower end of the line, where the volume of commutation is largest, is comparatively small; the proportion is larger at the New Haven end, where the volume of commutation is small. This factor would raise the average paid probably about 25 per cent., but still leave that average far below the total cost.

The argument of the commuter based on original "moral contract" and on the theory that commuters fill a gap of empty seats has been met by the New Haven by allegations of a great increase of terminal charges; of the greatly increased volume of passenger traffic now filling cars that carried empty seats when the old commutation rates were fixed and of the greatly increased costs of general operation. Slight depressions in the line of average rate—at Noroton and between Milford and New Haven—are accounted for by variations in the type of commutation ticket sold.

The accompanying tables represent the chart in figures and give out tabulated information bearing on the subject. The first totals are based on cost of terminal to date; revised totals, on additional fixed charges and operating expenses of completed Grand Central Terminal.

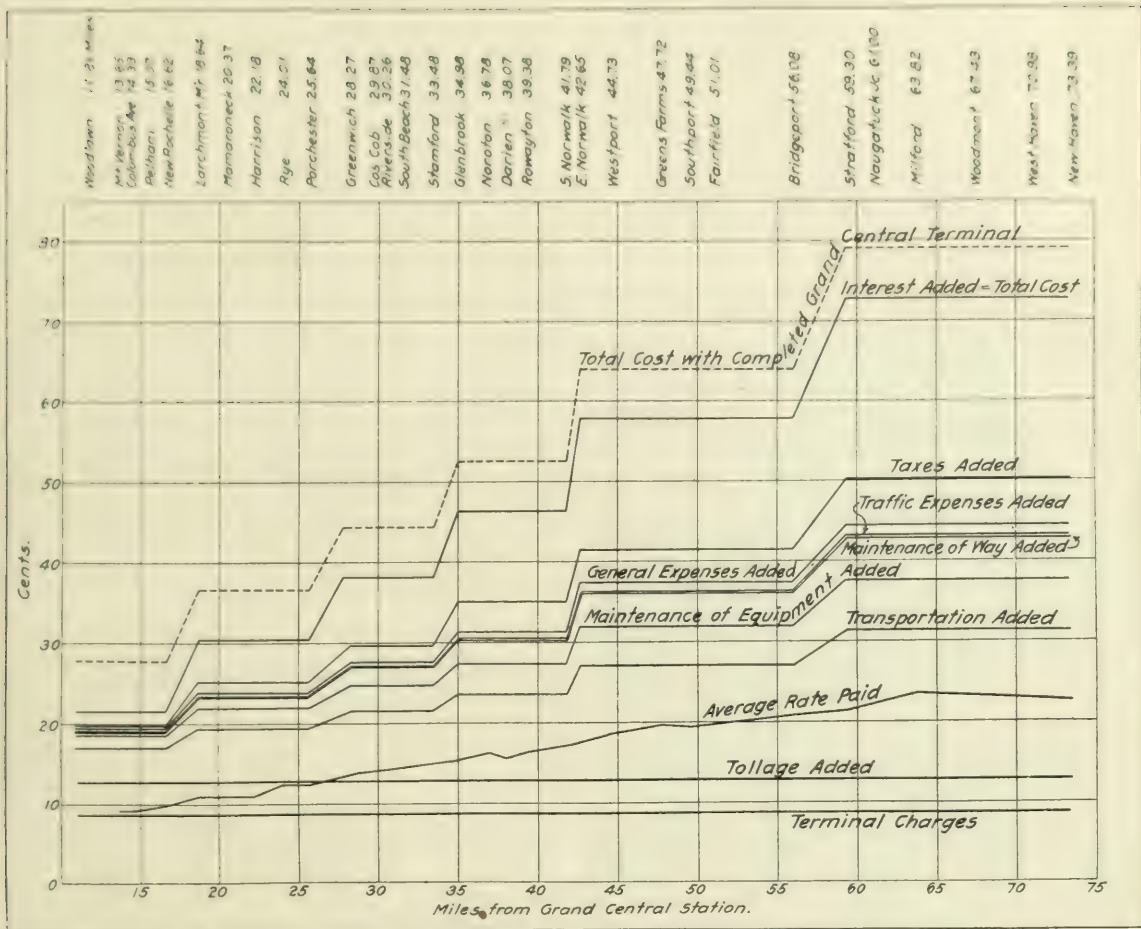
COST OF SUBURBAN SERVICE (COMMUTERS) PER RIDE.

	For year ending April 30, 1910							
	New Rochelle	Pt. Chester	Stam. Ford	So. Norwalk	Bridge port	New Haven		
Terminal charges	\$0.087	\$0.087	\$0.087	\$0.087	\$0.087	\$0.087	\$0.087	\$0.087
Tollage	0.091	0.091	0.091	0.091	0.091	0.091	0.091	0.091
Transportation	04.46	067.3	087.9	107.8	143.3	186.1		
Maintenance of equipment	01.89	0346	0432	0382	0491	061.9		
Maintenance of way	00.48	0147	0133	0097	0111	053.2		
Tractive expenses	0004	0007	0010	0017	0022	0038		
General expenses	00.32	0047	0080	0078	0104	0134		
Taken at 1 per cent	00.13	0112	0209	0180	0210	0266		
Interest at 6 per cent	01.74	0257	0336	0312	0434	0568		
Totals	\$0.2152	\$0.3035	\$0.3805	\$0.4620	\$0.5766	\$0.7271		
Add for completed terminal	06.34	06.34	06.34	06.34	06.34	06.34		
Revised Totals	\$0.2786	\$0.3669	\$0.4439	\$0.5254	\$0.6400	\$0.7905		

TESTS OF RAIL JOINTS.

Material	Yield	Ultimate	Elongation	Reduction of Area	Impact
Steel	30,000	45,000	25%	50%	10 ft.
Cast Iron	15,000	25,000	10%	20%	5 ft.
Brass	10,000	20,000	15%	30%	3 ft.
Aluminum	8,000	15,000	20%	40%	2 ft.
Copper	12,000	22,000	18%	35%	4 ft.
Lead	5,000	10,000	5%	10%	1 ft.
Concrete	3,000	6,000	2%	5%	0.5 ft.
Timber	2,000	4,000	1%	2%	0.2 ft.
Asphalt	1,000	2,000	0.5%	1%	0.1 ft.
Gravel	500	1,000	0.2%	0.5%	0.05 ft.

Laboratory tests of rail joints have been made in great numbers, and various methods have been followed in the attempt to make a test on a steel rail joint on the elastic roadbed.



Rates Paid and Cost of Commutation Service, per Trip.

APPORTIONMENT OF TERMINAL AND TOLLAGE CHARGES.

	Regular Passengers	Commuters
Terminal	\$0.1861	\$0.0872
Tollage	.1182	.0394
Add for completed terminal	\$0.2543	\$0.1266
	.0972	.0624
Number per car	\$0.3515	\$0.1890
Number per train	29.42	47.63
Number cars per train	206	263
Number cars per train	6.99	5.74
Average number cars, all trains, 6.52.		
	Regular Passengers—	Commuters—
	Cost per trip.	Cost per trip.
New Rochelle	\$0.3631	\$0.4603
Port Chester	.2710	.3682
Stamford	.5661	.6633
South Norwalk	.6662	.7634
Bridgeport	.8069	.9041
New Haven	.9917	1.0889

The Department of Public Works, Chili, recently received bids for the electrification of a railway between Valparaiso and Santiago. The first bid received was from the Westinghouse Electric & Manufacturing Company.

found in actual service. It therefore seems most important for all who are making tests, or who are using the results of tests, to look carefully into the actual track conditions under a rolling load, in order that the rig test on the machine may be made to conform as nearly as possible to the elastic road conditions.

Figures 1 and 2 are exaggerated for better illustration, and show the action of the flexible track structure, composed of rails, joints, ties, relative to a line representing the normal position of the bottom of the ties. The long waves in the track structure between the wheel loads bend upward between the loads as far, if not farther, from its normal position, than it deflects downward immediately under the loads. The reason for this is that there is nothing between the load points to resist the upward bending caused by the lever action of the rail bending over the ballast, while in the downward bend of the rail directly under the load the ties under and to each side of the load afford a somewhat elastic resistance which is distributed from one wheel bearing to the next. The amount of the upward and downward wave depends principally on the stiffness of the rail and splice bars, also on the solidity of the roadbed, the magnitude of the wheel loads

and their distance apart. The spacing of the ties relative to the joint is a very small factor, since, with the usual tie spacing, the stiffness of the rail is much too great to bend between the ties. It bends over a series of ties in a long wave. Wheel loads may be distributed on the roadbed by a very stiff rail with few ties, or by a light rail with a larger number of ties. If there were a space of four or five feet between ties, without intermediate support, the rail would then bend perceptibly between the ties; but this condition is not approached in practice, and we must consider, in testing the rail joint, the long wave between the wheel

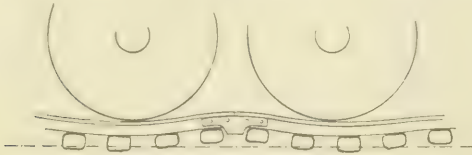


Fig. 1.

loads, rather than the short spacing between the bearings of the rails or splice bars on the ties. On account of these reverse wave actions of the rails, splices and ties in the ballast, it is apparent that it does not make any difference whether the joint is suspended or supported, so far as the stiffness of this rail and tie structure is concerned. The upward bend is as important as the downward deflection, and the splice bars can extend over one, two or three ties without perceptibly affecting the stiffness of the superstructure one way or the other. Neither does it make any difference whether the joint is in the form of a chair resting on the ties or an angle bar clearing the ties. The function of the entire fabrication of the joint, whatever its construction, is to furnish stiffness at the two rail ends regardless of the ties. The joint follows the long wave of the rail and carries the ties up and down with it in the same manner as does the rail. The ties are not solid bridge abutments, but are yielding bearings which are driven into the roadbed and rise above it in proportion to the stiffness of the rails and joints, the general character and rigidity of the roadbed and the spacing and magnitude of the wheel loads.

The principal point, then, to consider is the bending of the spliced rail in a long wave extending over a number of ties, rather than the bending between ties, or between load centers approaching anywhere near to the tie spacing. The damage to a rail joint is caused by these long lever actions of the rail ends bending in one direction and then in another, causing fatigue of the metal to a point where it is finally fractured by a blow. It is this long leverage of the rails, when the joint is between the loads, that breaks the top chord of the ordinary angle bar, which has only 30 per cent. of the stiffness of the rail. It is also a fact that the further up the splice moves between the loads, on account of its weakness, the further down it will allow the un-



Fig. 2.

broken rail to go under the loads. A rail or splice of sufficient stiffness to prevent any bending between the loads would also prevent any deflection under the loads. On the other hand, the beam depth of the T-rail used on steam railways is very small for the loads which it carries, when we consider that it does not have any rigid support. The elastic roadbed throws a great strain on the rail and splice, and allows a long up and down wave movement between adjacent wheels, the length of this wave ranging from 1 to 6 ft. on a locomotive, or on a car truck, to 20 to 40 ft. between the trucks of a car. In the latter case it

has often been noted, when the rail and splices are tightly spiked to the ties, that the ties are lifted from $\frac{1}{8}$ in. to $\frac{1}{4}$ in. out of their normal seat in the ballast. The stiffness of the rail and splices is not great enough to bind the ties down to their place between the loads, and the tendency is for them to bow up, and either to carry the ties with them or draw the spikes. If ties are firmly frozen into the roadbed, the track becomes very rigid, some of the ties then furnishing stiffness to the rail structure, while adjacent ties, which may not be frozen solid, do not. This, in turn, permits a lack of uniformity and abrupt deflections and kinks in the rail. The result is, that the rails are broken, especially at the joints, where deflections are much greater, if the joint is not as stiff as the rail; in which case the holes in the roadbed under the joint ties are deeper and the amount of deflection depends on the drainage of the sub-grade and the variable frozen condition of the water accumulated in the holes.

If the stiffness of the rail and splice largely govern the extent of the up and down wave deflection, it is not hard to imagine what the conditions would be at the point where the superstructure had no stiffness. Figure 3 represents this condition by showing the rail ends as they would act without splice bars, or as they would be if the splice bars were broken, or the bolts loose. This same condition would exist as a downward deflection, if the rail ends were directly under the load, and would cause damaged rails and excessive tamping. The remedy, of course, is obvious: make the splice bars as stiff as the rail, disregarding entirely their relation to the ties, so as to approximate the conditions which would be found if we could have continuous rails.

It will thus be seen that the rail joint should be tested for stiffness without regarding its bearing on the ties. The rail ends should act as long levers and should rest on widely spaced bear-

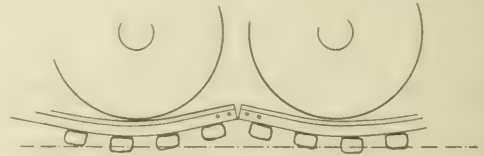


Fig. 3.

ings, in order to represent the long wave and yielding bearings of the track. The yielding tie bearings on the roadbed distribute the load over a long wave, while on the testing machine the bearings are rigid and the load concentrated at the middle. The test of a rail joint then involves the vital question: What distance between rigid centers should be used to represent these yielding conditions of the track? The most severe strains in the rail and splices of the track are caused by two adjacent driving wheels of a locomotive. Taking the average distance between these drivers as 72 in., we find, by formula, that the same maximum load could be distributed along a 100-lb. rail mounted on 72-in. centers as could be concentrated on the rail midway between 36-in. centers. It would seem, then, that we can approximate the resilient track conditions in making tests on a rigid table by choosing 36 ins. as the distance between centers, and it is suggested that this distance of 36 in. be adopted as a standard, with 40 in. and 30 in. as the absolute maximum and minimum which should be used to give approximately the same action on the testing machine as is found in the track. This distance between centers is, of course, the vital feature in tests of any kind, but there are other details which should be included, and which would vary somewhat according to the type of joint under test.

The following details have proved valuable in many tests which have been made, and especially in the tests which have been used in the development of our own joint.

POINTS TO GOVERN TEST.

1. Rail ends, bolt fastenings and splice bars should be selected promiscuously from stock and not prepared especially for test by manufacturers.

2. Rail ends must be spaced not less than 4 in. apart.
3. The rails, including assembled joints, should not be heated or fastened in any way to the testing machine during the test.
4. Preliminary to the test the nuts should be drawn up tight by repeated application and release of a 15,000-lb. load. The method of tightening should be followed until all looseness is taken up and until its location on the testing machine bars assumed their maximum indication for a 15,000-lb. load. The number of releases of load for tightening purposes should be the same for all joints tested. This process of tightening and settling will assure a deflection in the test which will accurately represent the stiffness of the joint, and which will not include deflection due to indentation of the bearings and taking up of loose parts.
5. Each joint should be tested to destruction without release of the load, and the deflection should be noted at 5,000-lb. intervals.
6. Each joint should be fitted up with its own rail ends so that it may be carefully examined and measured at any time after the tests have been completed.
7. Two tests should be made of each type of joint; in one test the rail should be in its normal position with the load on its head, and in the other test the rail should be inverted and the load applied on the bottom of the rail base.

POINTS FOR OBSERVATION DURING TEST.

1. Careful observation should be made to determine the parts of the bar from which the outer scale spalls off, and the loads at which spalling off occurs should be recorded.
2. Borings should be taken from each bar for chemical analysis.
3. Observe any indications of lifting of the bars away from the top of the rail base at the outer edge, due to buckling of the bar at the point where the outwardly extending member joins the vertical member.
4. Bars having depending flanges should be calipered between the middle and also between the ends of the lower edges of the depending flanges at 10,000-lb. intervals, in order to determine the extent of spreading or clamping action of these flanges. Deflections of the lower edge of the depending flange should be measured at 10,000-lb. intervals in order to record the vertical movement of this member.

TRANSPORTATION AND TRAFFIC IN ENGLAND.*

BY LOGAN G. McPHERSON.

II.

Until the opening of the Liverpool & Manchester not one railway had been constructed for the conveyance of passengers, the first intention being to provide for the carriage of goods at a cheaper rate than by canals and to accommodate the traffic of the great coalfields and mineral districts. The first carrying of passengers was on aristocratic basis. The railway directors did not conceive that it would pay to carry a large number of passengers at high speed and low fares. Their best trains were therefore reserved for the rich, while the poor were carried at low speed, at inconvenient times and in uncomfortable carriages.

The introduction of machinery and the application of steam to almost every industry dislocated the labor market. There was more or less change in the processes of nearly all manufacturing. Certain labor was thrown out of employment, but wide demand was created for labor adjusted to the new methods. The great industries of the country were in many instances moved to other locations which they would benefit by the changed conditions: factories of the kind that had previously sought the banks of canals and rivers were now built along the railways. The steam engine, whether working by water or by land, enabled the manufacturer to distribute his goods more efficiently and therefore

more widely. The demand for labor in building the railways and then in their operation was a large factor in the readjustment of supply to demand, which gradually regained a condition approaching equilibrium. Both directly and indirectly steam locomotion effected a great improvement in the condition of the laboring classes. It came at a time when capital was abundant and the labor market overstocked. It provided a new and almost illimitable field for the investment of the one and the employment of the other.

Steam locomotion, both on water and land, leading to a wider distribution of products, also necessitated and made practicable the bringing of raw material and supplies of various sorts from greater distances. In the earlier period of England's development the value of the exports probably exceeded that of the imports. In the earlier part of the nineteenth century they were practically at the same amount, which rapidly increased year by year, especially after the introduction of the railways. About the middle of the nineteenth century the natural resources of the island became inadequate to supply raw material for the manufactures that were in increasing demand, England at that time being the one firmly established manufacturing country of the world. The farms of England were also inadequate to supply the food for the continually increasing portion of the population that engaged in manufacture. The necessity for the import of raw materials and of foodstuffs caused the imports to overbalance the exports of manufactures and of coal. Of the imports the foodstuffs began to exceed the raw materials of manufacture in the early seventies and the increase has continued.

RATE REGULATION.

As the maximum tolls that could be charged for the use of the canals were from the first specified in the original canal acts, so also were the maximum tolls that could be charged for the use of the railways specified in the original railway acts, it being supposed at the beginning that carriers would provide transportation on the railways as they did on the canals. It was soon found, however, that a railway company would have to be the transporter as well as the provider of the track and structures of the railway, and therefore in later charters there was a maximum charge for the use of the railway and for the transportation combined. The conditions attendant upon the development of commerce after the introduction of railways quickly led to the lowering of nearly all rates below the permitted maximum. To secure traffic between one port and another in competition with coastwise vessels rates were made lower than those between stations not having water communication. For example, to keep traffic from going between Liverpool and London by vessel the railways put into effect rates that would bring such traffic or a goodly portion of it to their rails, but such reductions were not applied to the intermediate traffic. Because of the long, broken coast-line of England and the great number of ports, it has been estimated that about three-fifths of the rail rates have been determined by water competition. Then, again, as railways were extended, a longer line competed with a shorter line, meeting the short-line rates between competitive stations while not making the same concession to intermediate stations. The desire of a railway company to develop the district served by it led to the making of reduced rates to markets reached by other railways from competing districts.

Classifications of freight were early adopted by the railways, later given a certain uniformity through the railway clearing-house, and further unified under parliamentary direction. At present there are eight classes. Three lettered classes, designated as A, B and C, include heavy commodities, such as coal, stone and pig iron in station to station service. Five numbered classes, designated as 1, 2, 3, 4 and 5, include merchandise of higher value likely to go in smaller quantities and needing to be loaded and unloaded under cover. Merchandise of lower value, such as raw cotton, is included in class 1, and the merchandise is graded up class by class to class 5, which includes the most expensive, such as dress velvets and cigars. With exceptions, the

*From a preliminary report to the National Waterways Commission of the United States.

rates on traffic of the numbered classes cover transportation from the warehouse or other place of business of the sender to the storeroom or other place designated by the receiver; i.e., the railway company performs the cartage to the railway station at the place of consignment and from the railway station at the place of destination, the compensation for this as well as for the station service being included in the transportation rate. On the lower grades of traffic reductions from the ordinary rates per hundredweight are made for shipments of two, four and six tons. Especially reduced rates are now and then made for trainloads.

The seeming anomalies in the long and short haul charges and other preferences in the developing rate structure of the English railways early attracted public attention, giving rise to the same outcry as to unjust discrimination that persisted for so long in the United States. These and other matters entered into parliamentary discussion. The course of legal enactment and other governmental procedure in connection with the regulation of the railways has been so admirably summarized by W. M. Acworth, a distinguished writer on railway economics, in a statement before the committee on interstate commerce of the senate of the United States, in its hearing on May 9, 1905, that there can be nothing better than to quote that summary here:

"The first important act, I think, that affects English railways is what is known as the 'cheap-trains act,' which was introduced by Mr. Gladstone as long ago as 1844. One consequence of that act was that it regulated what was probably the most important existing rate in the world. I suppose a yearly traffic of \$100,000,000 is carried on that rate to-day. That act provided that one train per day should carry third-class passengers at two cents per mile, and the fact is that to-day in England every train carries third-class passengers at that rate.

"This same act of Parliament provided that the state was to be entitled to take over any railways, constructed after the passage of the act, at twenty-five years' purchase, on the supposition that the annual profit would be not less than 10 per cent. Practically that act has not been put into force yet.

"With respect to rate regulation proper, the first act that we need to notice was in 1845, called the Railway Clauses Consolidation Act, and it applies to every new railway that is constructed. One clause of that act is known as the Equality Clause, which requires that every railway company shall charge the same rate for traffic carried the same distance under the same conditions. Practically no two kinds of traffic are carried the same distance and under exactly the same conditions. Therefore a clause that merely insisted on equality when all the circumstances were exactly the same had very little effect.

"Nine years afterwards, in 1854, Parliament enacted what is known as the Railway and Canal Traffic Act of 1854. Under that act the railway companies were put under obligations, if the circumstances were different, to make such a difference in the rates as was proportional to the difference of circumstances.

"The early act said that, circumstances being equal, charges should be equal. The later act said circumstances being different, the difference is to be proportional to the difference of circumstances.

"That act was left to be applied by an ordinary law court, the court of common pleas. That court, being an ordinary law court, showed, I think you may say, a considerable distaste for dealing with what were not strictly law questions.

"It is, of course, familiar to this honorable committee that the question always raised was, What are similar conditions? What are differences of conditions that justify a difference of rates? At the bottom that is not a legal question, but an economic or business question. From its point of view the court showed considerable distaste, and I think one may say did not encourage complaints of that kind to be brought before it.

"Then, after nearly twenty years, in 1872, there was an inquiry into this matter. There was considerable depression of trade following an early great prosperity at the time of the Franco-German war, and the traders grew restive, raised many

difficulties, and there was an inquiry by a very strong parliamentary committee, consisting of ten members, nine of whom were at that time, had been, or afterwards became, cabinet ministers. That committee recommended, and it was carried into effect by the act of 1873, the institution of a railway commission. That commission was not a legal court except in the sense that it could make orders, and of its three members two were laymen; there was one legal member, not of the standing of a judge, but the chairman was a layman.

"One effect of that was that the railway companies particularly protested against being subjected to the jurisdiction of what they claimed to be an inferior court. Whenever they were defeated, as they frequently were, they took the case on appeal, or by writ of prohibition, or by various legal methods, before one of the ordinary law courts, and I think one might say that as a rule, certainly in many cases, they succeeded in upsetting the judgment of the commission.

"Another point of very great importance, I think, in the act of 1873, was that it put the obligation upon the railways to publish every rate, perhaps not in the most effective way, but each railway was compelled to keep at every station from which it sent traffic books showing the rates at which all traffic was carried and the conditions attaching to the rate. So that in England, if a rate is complained of as giving undue preference, and it is found that somebody is getting a rate which is not published in that rate book, it is taken by the commission as almost conclusive evidence that there is something unfair about the business, and no railway company would venture to be found charging a rate not in its rate book.

"There may be cases where a special rate is justified for a certain period. For example, if an aqueduct is being constructed in a thinly inhabited part of the country where cement and iron pipes are not easily found and at hand in large quantities, the railway might give a specially low rate upon cement and iron pipes in large quantities, and then, after that demand for those articles had ceased, wipe out the rate entirely and go back to the prior rate. But, in general, all rates are published and available alike to everybody.

"Then, there being a great many complaints, not only of the railway situation in general, but of the jurisdiction of the railway commission in particular, there was another inquiry by a committee of the House of Commons, which lasted for many months, extending over two sessions, and going into the whole question of railway rates. The upshot of that was a great deal of difficulty; many bills were introduced in Parliament year after year which did not get through.

"Finally, in 1888, there was passed what is known as the Railway and Canal Traffic Act of 1888. That act did, I think, four important things:

"In the first place, it reconstituted the commission, and to get over the former difficulty that the legal member of the commission was not of sufficient status, he was made the president of the commission and judge of the high court. There is one judge appointed in England, a second in Scotland and a third in Ireland. The other two members of the commission are lay members. If the commission sits in England, the English judge presides; if it sits in Scotland, the Scottish judge presides, and if in Ireland, the Irish judge, and the other two members go to make up the court in whichever country the session is held. It was specially provided that upon questions of law the opinion of the judge should prevail. The judge sits for five years, and then may be either reappointed or his successor may be appointed. When he is not engaged in the commission court—and he is probably not so engaged more than a few weeks in the year—he is doing the ordinary legal work of the country.

"The jurisdiction of that court is, in the first place, interpreting the law as contained in private acts of Parliament, or in what are very frequently termed with us 'agreements,' that are scheduled to private acts of Parliament and of course have the same force as if they were in the body of the acts.

They also had jurisdiction to sit as arbitrators under certain circumstances.

I suppose the important matter, from the point of view of this country, are questions of undue preference and interfering reasonable facilities. In England we do not have many of these questions to deal with, because, you may say, the railway law has practically become known to the railway companies. Within pretty narrow limits the railway companies know how much power they have, what the court has held to be an undue preference, or what it would regard as a refusal of reasonable facilities, and they accommodate themselves to what they believe the court would regard if they were taken into court, and therefore cases do not often come before the court.

"They also have a further power, which I shall mention later.

"A second point which I think of special interest to the honorable committee, because it rests on American legislation, is section 31 of the act, which is known as the Conciliation Clause. The then president of the Board of Trade, our minister concerned with the executive control over railways, had heard of the great success of the Massachusetts railway commission, and he endeavored to introduce something on the lines of the Massachusetts commission, but instead of appointing a special body he gave the jurisdiction to the Board of Trade itself. Section 31 provides that the Board of Trade, if anybody complains to them that the railway companies are treating them in an unfair or unreasonable way, may bring together the parties, the railway company and the complainant, and endeavor to settle the differences, and then they shall report at intervals to Parliament the results obtained under that section. They have now reported to Parliament for more than ten years. They have always said that that section has been of great value, and it certainly has been of great value in all matters. If I might be allowed to say so, I do not think it has been of as much value as the Massachusetts legislation has been, for two reasons:

"In Massachusetts the sitting of the commission is public and people who are interested (not necessarily parties, but who are concerned in some question) attend the hearings, which are of themselves an education.

"In the second place, the commission gives its reasons at great length, and naturally has to give reasons to justify its action. With us, the official of the Board of Trade who hears the case sits privately. If a big question were to arise, it would probably go forward to the railway commission, who have the power to compel. Naturally, the railway companies say: 'If this is going to be taken into court you cannot expect us to show our hand to our opponents in advance, and therefore we will ask you to permit us to waive making our case before you, and reserve it until we get to the law court.' So that it is only the small cases that are dealt with under that section of the act, and, for the reasons I have given, it certainly has not the same advantage in educating the public and bringing the railway and public nearer together that has been obtained by the procedure in Massachusetts.

"Another point was an enactment that no increase of rates could be made without fourteen days' notice. I dare say that would be regarded as a very long period in America, where your circumstances are more fluid than ours, but when any railway proposes to make an increase it is bound to give fourteen days' notice before it can advance the rate.

"The act of 1888 provided that the old maximum rates should be entirely repealed and recast. Elaborate machinery was provided, with which I need not trouble the committee. To get at that matter there was held a very long inquiry by two special commissioners appointed by the Board of Trade, who sat, I think, for one hundred and eighty days, and subsequently by a joint committee of the two houses of Parliament, which sat, I think, for about seventy days. As the result of that, the whole of the maxima that had been contained in the different railway acts passed in the preceding fifty years were abolished. There were said to be 3,000 different acts, each fixing different maxima of rates. They were all abolished, and there was a compendious

schedule of maximum rates, and of the same company separately. The large companies had a schedule all to themselves, with a separate set of Parliament sanctioning it; the smaller companies were grouped, each group supposed to be rather similar to the others, and they had a rate applying to them.

"That even rate in England is controlled by the fact that it has to be subject to the maximum contained in the act of Parliament affecting the particular railway.

"The last of these acts was passed in the autumn of 1892, and the new maxima were to come into force in the beginning of the year 1893.

"That only left the railway companies four or five months in which to recast the whole of the rate schedules from every point to every point in the country. But I believe our schedules are perhaps more complicated than are yours, because I understand that in America the custom is not to make rates between practically every point and every other point, but to make rates only to basing points, and then to leave the local points to be added to that. With us, the country being smaller, and conditions being more stable, it is common to put into the rate books through rates from the same place upon the same articles to every other place upon the same articles. So that to recast this was exceedingly complicated and difficult.

"When the 1st of January, 1893, came and new maxima came into force, the railway companies had not finished the job, and the result was that in many cases the only instructions given to station agents were to charge the maximum rates. The maximum rates in some cases were nearly double the rates that had been previously charged for what you would call carload lots, and there was a tremendous uproar in the country. Parliament was appealed to, and the president of the Board of Trade stated publicly that he would bring the railway companies to their senses. A new committee of the House of Commons was appointed and heard evidence, and they were not apparently satisfied with the statements of the railway companies that they had not intended harm, but had only done what they had for lack of time, and they made a new limitation of railway powers, that, with regard to any rate that had been increased under this procedure that I have described or that should be increased at any future time, if any member of the public complained he could come before the railway commission, and the railway commission was not to allow the increase to take effect unless the company could satisfy them that there was good reason for allowing it.

"So that you have the railway company subject in these charges to three checks:

"First, the statutory maximum, which, of course, is not really much of a check; the statutory maximum is not likely to be charged except where there is no competition making a lower rate necessary, or where the traffic is coming in quite small quantities. So that the statutory maximum check is of no value except to local traffic for short distances and small amounts.

"The second check is that the rates must not be such as to constitute an undue preference to one trader or to one district over another. Of course, that can only apply as to an individual railway. It cannot apply beyond what the particular railway does.

"Third, the railway company must make no increase except for good cause, if anybody objects. Of course, objection is not likely to come, in practice, except where a considerable number of interests are involved.

"Subject to these restrictions, the railways remain free to make or to vary rates as they please.

"I may perhaps say, sir, that the secret rebate question is non-existent with us. Of course, nobody can prove a negative. I do not think I have ever come across an individual who believed that there were in England any secret rebates that were of any practical importance. They may exist. If they do, probably the officials of the railway companies do not know of them. But, for practical purposes, the secret rebate question is of no importance

in England. I think there would be a universal agreement as to that.

"We have had in England, as they have had in every other country, heroic proposals. At the time of the uprising of public opinion in 1893 there were proposals to hand over to a county court judge (who is our judge of first instance in civil matters) the power to say what was a reasonable rate. But these questions have been argued pretty fully more than once before parliamentary committees, and they have never stood the test of argument. The rate-practice history is really the history of what Parliament has enacted in the past with reference to the railway questions from time to time for just such cure or alleviation of specific ills as were brought to their attention."

It will be perceived from Mr. Acworth's statement that the conclusion reached in England in regard to the charge of a lower rate for a longer than for a shorter distance over the same line is practically the same as that arrived at by the Supreme Court of the United States, i. e., that dissimilar conditions, which include competition by rail as well as by water, must justify the lower charge for the longer distance without entailing reduction in the intermediate higher rates.

The English railways are also free to agree as to rates and to enter into pooling arrangements. Indeed, for many years much of the competitive traffic has been carried under pooling contracts and the scope of the old pools has been widened within the last two years to embrace a larger part of such traffic.

[The next installment of Mr. McPherson's paper takes up the handling of freight traffic.]

FOREIGN RAILWAY NOTES.

Press despatches from Peking say that there is some doubt that the projected loan of \$50,000,000 to China by an American financial syndicate will be finally concluded. Numerous difficulties have arisen, among them being the unwillingness of the Chinese to accept a foreign financial adviser. Without such control, it is said that the promoters are unwilling to proceed.

The opening of a direct steamship service between Dairen and Shanghai has had marked effect upon trade, and the railway authorities are anxious to improve the shipping facilities of the port to the utmost possible extent. Beans and bean cake are the staple products of Manchuria. Last year more than three million piculs (400,000,000 lbs.) were exported from Dairen, which figures are double those for the previous year.

It will be recalled that at that time the South Manchuria Railway loan was concluded Japan incurred much harsh criticism from the English press on the ground that the funds obtained from English financiers were largely expended on the purchase of equipment in the United States. From what I could learn on the spot, the South Manchuria Railway authorities do not intend to lay themselves open to similar criticism again, and although part of the rolling stock is to be bought in America, I understand that nearly all the locomotives are to be purchased in England. Orders for rails are to be distributed in a very eclectic manner, English, American, Japanese and even Russian makers being on the Japanese lists.—Special correspondent of *New York Herald*.

Bids are asked for building a railway from Ambato, Ecuador, to the Aranjuno river, 73 miles, and for the supply of locomotives and rolling stock.

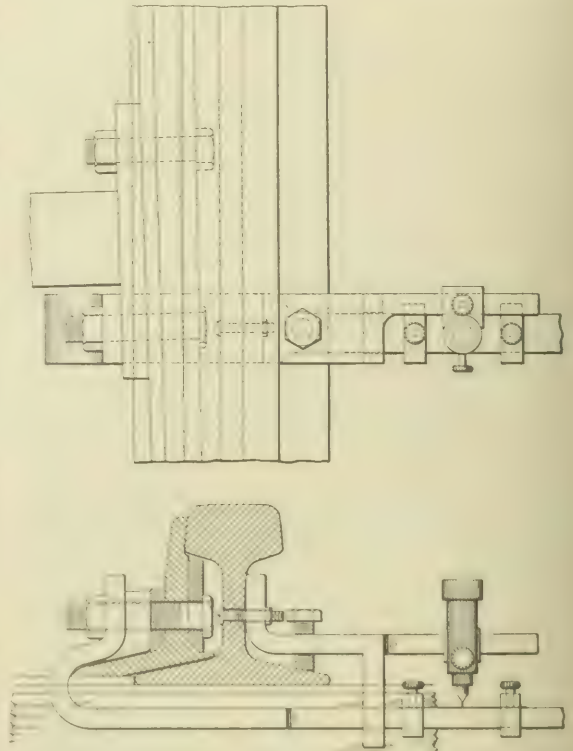
RECORDING MOVEMENTS OF SWITCH POINTS.

C. E. Lamberbacher, engineer of maintenance of way of the New York, Ontario & Western, and W. H. Harland, signal engineer of that road, have patented a deflection recorder for recording the lateral deflection of switch points under moving trains with respect to the fixed rail or track.

The object is to provide a device of few parts which may be quickly attached to any switch point and a printed record obtained of the actual lateral deflection of the switch point under

a moving train. The failure of a switch point to remain in contact with the stock or fixed rail, resulting perhaps in a derailment due to the flanges of the wheels passing between the fixed rail and the switch point, may be brought about by wear of certain parts of the switch, such as clips, rods, pins, etc., or the point itself may be too weak from wear to stand the lateral pressure of a heavy train or one running at high speed.

By means of the recording device the division superintendent or other persons in charge may make tests at suitable times which will give a record of the conditions of the various switch points located on that section of the road which is under their supervision. The printed slip from the recording device will not only indicate the condition of the switches but will also give a check on the work of the sectionmen, whose duty it is to see that switches are in first-class condition and make necessary repairs or renewals. After the completion of the test the



Deflection Recorder for Switch Points.

device is removed and the permanent record of the actual working condition is filed in the office for future reference.

The arm carrying the strip on which the record is to be made is attached to one of the switch lug bolts, while the other arm is bolted to the web of the rail. The recording point is held down by a spring; after the record is taken, the set screw in the side of the barrel is tightened so that the point will not drop out when the device is removed. A separate strip of paper, or other impression receiving material, is inserted to record the movement produced by each train that passes over the switch.

Some interesting tests have been made with this device, and as a rule it was found that section foremen, in order to obtain good recording slips from the switch points on their respective sections, kept their switches in first-class condition. This is where the inventors claim that the recording device soon pays for itself—for good maintenance is obtained by the use of same, which not only increases the factor of safety, but also increases the life of the switch points and their attachments.

Shop Section.

IF you have not yet prepared your paper on Increasing Shop Output for the competition, which closes December 15, you still have time to do so. A complete announcement of the competition and suggestions as to the subject which might properly be considered, appeared in the issue of November 4. Briefly, any paper containing from five to fifteen hundred words and devoted to any subject which has to do with the increasing of the output of a railway shop, or any department in it, is eligible for entry in the competition. Prizes of \$35 and \$20 will be awarded to the authors of the best two papers. Other papers which are used for publication will be paid for at our regular space rates.

THE shop kink competition, to close January 15, will include kinks of all kinds used in connection with the repair and maintenance of cars and locomotives. In other words, there is an opportunity for every department or shop of a locomotive or car repair plant, an engine house, or car repair yard, to be represented. Three kinks are required for entry in the competition, although more may be submitted, allowing the judges to base their decision on what they consider to be the best three in each collection. The best collection will be awarded a prize of \$50, the second best a prize of \$25; others that are accepted for publication will be paid for at our regular rates.

A CAR department competition, of which this is the first announcement, will close February 15, 1911. In order that all of our car department readers may be in position to participate the only requirement concerning the papers submitted is that they cover some subject of interest or importance to the men in that department. Here are a few suggestions from a foreman: "The car department field has hardly been touched as yet and I feel sure that every foreman has subjects which are of vital importance to him and from which we all may give and take if the opportunity were only given us to express ourselves. Following are a few suggestions: The Call of the Car Department—How can we attract bright young men to the car department? Most young men think that the locomotive department is the only field open to them for advancement. If this is so, why? Distribution of Supervision—How is the distribution of shop supervision carried on in the car department? Do we lack organization? Side Sills—What method is being followed to prevent the side sills rotting at the side doors on baggage, mail and combination cars? This refers particularly to where the sill is morticed to receive the tenon of the door post. Wooden vs. Iron Steps—Life and cost of the wooden step as compared to the iron step. Drawbar Knuckles—When is a knuckle worn out? Is it safe to use an old knuckle by reaming out the coupler and knuckle and using a larger pin? Deck Ventilators—Life and cost of the ordinary deck sash, together with ratchets, weather stripping and deck screens for them, compared to the stationary sash with no weather stripping, no screens and a patented ventilator for ventilation. Roofs on Passenger Cars—What covering is the best, or have we experimented enough to find a substitute for canvas? Leaks on Roofs of Passenger Cars—Every foreman of passenger car shops has sweat blood over this proposition. What is done to prevent flashings breaking at deck posts? Is the flashing now commonly used on passenger cars as good or better than the old style wooden strip formerly used at the story sill? Supplies—Methods of handling supplies for repairs and construction. Machinery—The value of the com-

bination saw, band saw and planer in the coach shop. Facts and statements showing saving of labor. Increased Output—This is a very broad subject and one whereby the management could get in closer touch with the cutting edge of their tools. How can the supervision share in the general increased output of the shops financially? It is only human to expect that any plan whereby a foreman and his assistants can add to their monthly wages by increased output will appeal to them. The plan of increasing the salaries of foremen has only accomplished this partially, but a per cent. or bonus whereby they could add to their wages would be a constant incentive to increase the shop output and thereby its efficiency, as the foreman would naturally get after the man who did not push his work and instruct him properly in the best way and manner. In this way the shop organization would stand out before the management in a very different light, as the shop's output from the day such a plan was put into effect, as compared to the old method of driving the departments, could be very easily kept track of." There are hundreds of other subjects of equal or greater importance. A first prize of \$35 will be given for the best paper and a prize of \$20 for the second best. Other papers which are accepted for publication will be paid for at our regular space rates.

FIVE contributions were received in the car repair kink competition, which closed November 15. The judges were not able to examine these in time to announce the winners in this issue. The competitors are: A. G. Pancost, draftsman, Elkhart, Ind.; F. Rattek, Brighton, Mass.; Theo. Rowe, general foreman, Great Northern, Jackson street shops, St. Paul, Minn.; S. S. See, planing mill foreman, Norfolk & Western, Roanoke, Va., and W. H. Snyder, assistant general foreman, New York, Susquehanna & Western, Stroudsburg, Pa.

WHILE the collection of shop kinks from the Lehigh Valley shops at Sayre, Pa., takes up a much larger amount of space in this number than is usually given to that subject, it covers such a wide range of shop work—including the smith shop, car department, machine shop, erecting shop and boiler shop—that it will appeal to practically all of our shop readers. Moreover, it illustrates to a striking degree the great number of labor saving devices which must be developed in a large modern railway repair plant in order to meet the demands for greater output and higher efficiency. As a matter of fact, modern, up-to-date machinery cannot be used to the best advantage unless it is surrounded and equipped with special facilities for handling the work. The forging machine, for instance, which is today an absolute necessity in a railway smith shop of any size—but which was practically unknown in such shops ten or twelve years ago—cannot be used without special dies, and it requires far more ingenuity to devise and construct these than was formerly the case when the work was done by hand or even on bulldozers. The car wheel lathes, which give such wonderful results in turning steel tired wheels, were not nearly as efficient before special arrangements were made to handle the wheels and axle in and out of the lathe. Turret lathes, which have revolutionized shop practice on certain classes of work, require far more ingenious tools than formerly required when the work was done on simpler machines. A few years ago a large shop plant was built and equipped with new and modern tools and equipment, with the expectation that it would immediately show a great improvement in output and efficiency as compared to older shops. It really made a much

poorer showing and it took several years to bring about the desired results. Two things were found to be necessary in order to accomplish this. A better and different type of organization was required than in the older shops and also the development of special devices and equipment for use with the new tools. A most important factor in this development was a bright and ingenious assistant machine shop foreman who gave practically all of his time to this work. It is, therefore, not surprising that the Sayre shops have been able to make such a generous contribution of kinks, for it is several years since they were enlarged, and the new tools which have been added to the equipment have apparently been carefully studied with a view of getting the best possible results from them.

SHARP FLANGES ON STEEL FREIGHT-CAR WHEELS

IN turning steel tired wheels or rolled steel wheels a large part of the steel removed from the tread is due not to flat spots or other irregular shape in the tread itself, but to the necessity of restoring a full flange. This requires a turning of the tread far below that required for a full circle, and the apparent waste of steel in heavy turnings is large. When a steel flange is worn to the limit of 15/16 in. thickness, or to the point of having a flat vertical surface extending 1 in. from the tread, it requires about 3/4 in. in radial thickness to be removed from the tread in order to obtain a full flange, and the value of this material at 75 cents per 1/16 in. is \$9.00.

The comparative hardness and wear of chilled cast iron flanges and of rolled steel flanges has not been carefully investigated, but it is our impression that steel flanges wear more rapidly than those made of chilled iron, and the most frequent cause for condemning cast iron wheels is sharp flanges. On some railways 50 per cent. of the wheels removed are taken off because of worn flanges and on other lines this percentage is as high as 85. Under such conditions the more general introduction of steel wheels will materially increase the cost of freight car maintenance and some method of reducing flange wear should be devised. It does not seem like a correct mechanical process continually to turn off large masses of steel from the tread of a wheel after it is truly circular in order to obtain a full flange, and some method should be devised to avoid this waste.

A considerable saving in flange wear on locomotive driving tires has been obtained by the use of flange lubricators, and they are coming into more general use on railways where there are numerous sharp curves and on switching engines whose principal service is in yards where they are continually running on cross-over tracks. But the use of a lubricator for freight car wheels would grease the track so much as to reduce adhesion and interfere with the efficiency of the brakes.

With the improved methods of welding by which broken locomotive frames are repaired and the tubes and tube sheet made a solid structure, it might be possible to weld enough material for a new flange on a sharp steel flange and thus avoid unduly turning down the tread. The wearing qualities of cast iron wheels have been improved by special treatment which increases the hardness of the tread and flange, and in a similar manner the tread and flanges of steel wheels could be made harder than the body of the wheel so as to prolong the life of the wearing portions.

An attractive field for invention might be found in the design of a composite steel wheel with a separate flange bolted or riveted on. The reduction in the amount turned from the tread would prolong its life three or four times, and the saving thus obtained would be much larger than the cost of the new flanges required. The first impression of such a suggestion may be that it would not be safe, but it would be easily possible to test such construction and ascertain its resistance under static loads, or by the drop test for live loads, and in this way a safe composite wheel tread and flange might be designed. The steel tired wheel, which is almost used on passenger equipment on account of its safety, is a composite structure in which the whole tire is fastened to

the wheel center by bolts, rivets or rings, and a bolted or riveted flange might be made equally secure.

The powerful wheel lathes that have been recently developed remove steel from worn wheels with marvelous rapidity, and the restoration of flanges by this method has become a comparatively cheap operation so far as labor cost is concerned, but the expense for the steel thus wasted is large. This rapidity and low cost in turning steel wheels tends to cause the cost of steel to be disregarded by the lathe operator, and a larger amount is wasted than there was under the old conditions with the slower and less powerful wheel lathe.

We have called attention to this part of the cost of wheel maintenance, in the belief that if it is recognized and measured by correct records the necessity for a more economical method than the usual practice will be apparent and some improvements in steel wheel construction will be made.

THE BELPAIRE BOILER AT HOME AND ABROAD

THE economies that have resulted from the adoption of super heating in locomotive practice excited so much interest at the International Railway Congress at Berne, Switzerland (*Railway Age Gazette*, August 5, 1910, page 222), that in the discussion of the reports on "Improvements in Locomotive Boilers" other important matters relating to firebox construction and safety were not made prominent, and no definite conclusions as to the best type of firebox were reached.

American locomotive designers have been influenced only to a slight extent by foreign practice, but they should regard with favor certain details of boiler construction which receive general commendation by prominent railway men of most other nations. Any doubt as to the superiority of a certain type of boiler construction should be greatly reduced, if not removed, when it is generally adopted by the large railways of other countries. Henry Fowler, chief mechanical engineer of the Midland Railway of England, reporting for Great Britain and the Colonies, said, "the greatest change in boiler construction that has taken place in recent years was in the largely increased use of the Belpaire firebox, the majority of newly designed locomotives having been of this type." One chief advantage derived from the change was the removal of crown bars, which left the space over the firebox comparatively clear. The Belpaire system of direct staying with flat top crown sheet provides full threads on the crown bolts. It secures more steam and water space and a larger area of evaporating surface for a given width of box than is obtainable with the round top firebox. The stresses in crown stays and plates can also be more accurately calculated. Its cost is slightly more for the same capacity than the round top boiler and its weight is somewhat greater.

Mr. Nadal, chief engineer of the French State railways, reported that the principal French railways had adopted Belpaire boilers for all their recent locomotives. The Belpaire boiler was first used in Belgium, having been designed by the former chief mechanical engineer of the Belgian State railways, and it is the prevailing type in that country. It is also generally used on the Prussian, Saxon and Bavarian State railways, and in Russia, Norway, Sweden, Denmark and Switzerland. The railways of India have about 8,000 locomotives. The secretary of state of India referred to the British engineering standards committee the question of the standardization of the locomotives of India, and in its recent report that committee recommended the Belpaire type of firebox for adoption as a standard for all future construction.

El H. Vaughan, who reported for America at the Berne congress, stated that the type of boiler generally used in the United States and Canada is that with the round top firebox, usually called a radial stayed boiler. He said that a few of the large roads, such as the Pennsylvania and the Great Northern, are using the Belpaire as an adopted standard, while others, including the Canadian Pacific, use that type more or less extensively. From the showing thus presented, it must be con-

cluded that while the Belpaire boiler may not now be used on the majority of the locomotives of the world, yet the majority of newly designed engines have that type of boiler. This is the most prominent point in regard to boiler design that was brought out in the reports on boiler improvements at the Berne Congress.

CHEMISTRY IN THE FOUNDRY

A RATHER remarkable paper was read before the Canadian Railway Club at its September meeting. Not that the data presented was really new, but because it indicated a tendency that has become quite marked within the past few years. The subject was "Iron Castings, Their Defects and Remedies." Instead of handling the matter in the old-time method and looking to the practicalities of foundry work, coupled with a "careful selection of pig and scrap," without giving any clear idea as to how this careful selection was to be exercised, the author, Robert Job, struck at the real core of the matter and put the main part of the burden of the responsibility for the work and successes on the chemical composition of the charges and the output, which, of course, included that of the coke used in the melting.

That such a paper should be presented before this club is not at all surprising, when it is remembered that the Canadian Pacific employees are a large factor in the club's membership and that the study of the chemical composition of the cast irons used has reached a high state of development at the Angus shops. The author is not, however, a Canadian Pacific man. Again, it must not be inferred from the above that chemical composition was set down as the sole cause of success or failure. Cupola manipulation, the tempering of the sand, the ramming of the molds, and the quality of the facings were all given due credit for the influences that they might exert. These we have heard before, but too little attention has been paid to the other points emphasized by Mr. Job, probably because the average foundryman is not in a position to grapple with them. He has no chemist at his elbow to point out and detect faulty compositions and so has been obliged to depend solely on the general character of certain brands of iron that give good results, and when hardness or blowholes appeared he had to depend largely upon guess to locate the cause. He might even be a most skilful practical foundryman, and yet fail to realize that the cause of the hardness of his castings is due to an excess of sulphur or manganese, or because of a low percentage of silicon. Or, worse still, his hard iron may not be the "result of any one cause, but may be due to many widely different conditions."

Sulphur appears, according to Mr. Job, to be one of the worst of the evils to be contended with, and he urges that "proper care in the selection of the materials" should be exercised, and that this should be of such a nature as to fix the proportions of silicon, phosphorus, sulphur and carbon, so that they should combine to produce the quality of casting desired. And above all the foundryman should look well to the quality of the coke that he is using, and see to it that the quantities of sulphur and ash are kept at a minimum, "for obviously it is sheer waste of time and money to pay great attention to the quality of the pig iron and then accept a coke that may contain thirty times as much sulphur as is present even in a poor grade of pig iron."

It is all very well to urge this "careful selection," but what is the foundryman away from sources of chemical information to do? Railway foundries are not usually away from such a source and their remedy and relief lies in sampling every car load of coke and iron, and having it analyzed for at least sulphur in the first case and for sulphur, silicon and manganese in the second, to which an ash determination for the coke may well be added. Then pile each carload lot by itself and work from these known piles and do not trust to brands. Ordinarily any single carload of pig will probably come from the same heat and the results can be depended upon to be fairly uniform, but any furnace, no matter how well it may be run, will vary

its output from day to day, and the second which will show from it will present wide variations in composition, especially in the silicon and sulphur contents. This method of handling charges (it was pointed out) is the practice in the present day, and is an economical one, but the benefit in output is considered to be far greater in value than has been universally recognized.

As for those foundries that are not associated with a company employing a chemist, there is no objection to a general expense account, it is quite possible to obtain analyses at such a low figure that when the cost is paid for the cost of iron or coke, it becomes insignificant. There is, therefore, no reason why any foundryman should be troubled with an excess of those impurities that make for bad castings, and his failures may be laid at his own door.

As stated at the outset, the significant thing about Mr. Job's paper is the fact that it sets forth the value of a knowledge of the chemical composition of his materials to the ordinary working foundryman, who has been rather more disposed, up to the present, to place a greater reliance on his own practical skill in foundry manipulation and knowledge of irons than upon these other things that he has been apt to regard as ultra scientific refinements, but which are now coming rapidly to the front.

APPRENTICESHIP.

THE railways were well represented at the recent meeting of the Society for the Promotion of Industrial Education at Boston, although the title of supervisor of apprentices was practically unknown on railways four or five years ago. Among those present were C. W. Cross, superintendent of apprentices of the New York Central Lines, and his assistant, Henry Gardner; F. W. Thomas, supervisor of apprentices of the Santa Fe; Martin Gower, of the Canadian Pacific; W. B. Russell, now director of the Franklin Union at Boston, but formerly assistant superintendent of apprentices on the New York Central Lines, and G. M. Basford, of the American Locomotive Company, who fired the first gun in the interests of modern railway apprenticeship in an address before the Master Mechanics' Association in 1905. The apprenticeship problem in the mechanical department of the railways has not been fully solved, but a tremendous advance has been made during the past few years, and just as fast as weaknesses develop they are being remedied. Splendid practical results are apparent wherever it has been given a fair trial.

MECHANICAL ARTICLES DURING NOVEMBER.

THE following articles of interest to mechanical department readers, and to which Shop Number readers may wish to refer, have appeared in the weekly issues of the *Railway Age Gazette* since that of November 4.

Safety Appliance Standard. Editorial comment on these standards as finally adopted by the Interstate Commerce Commission.—November 11, page 910.

The Western Railways and the Locomotive Engineers.—November 11, page 910.

High Speed Locomotives at the Berne Congress. More attention should be given to the details of design of high speed locomotives.—November 11, page 912.

Heat Treatment of Axles. Communication.—November 11, page 916.

Electric Locomotive for Freight and Switching Service. The Transit Development Company.—November 11, page 927.

Test of Jacobs-Shupert Firebox. An elaborate test was made to demonstrate that boilers with this type of firebox are much safer than the ordinary type in case of low water.—November 11, page 965.

The Survival of the Exhaust Bridge. The increase in the diameter of smokeboxes and the necessarily reduced height of outside smoke stacks has brought about a condition which seems to be improved by the use of exhaust bridges.—November 11, page 993.

Flue Failures. Abstract of a paper presented before the Western Railway Club by J. W. Kelly, foreman boiler maker of the Chicago & North Western at Chicago. Fewer flues and better spacing have improved the boiler efficiency.—November 25, page 1,000.

The Limit of Elasticity. A method to determine this point by temperature measurements.—November 25, page 1,010.

Letters to the Editor.

LENGTH OF WRENCHES.

Worcester, Mass., November 5, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Referring to the letter in the *Railway Age Gazette* of November 4, on page 842, would say that for ordinary work on the nuts specified we believe that the following wrenches are most satisfactory and the safest to use. For $\frac{3}{4}$ in. and $\frac{7}{8}$ in., the 12 in. wrench; for 1 in., $1\frac{1}{4}$ in. and $1\frac{3}{8}$ in., a 15 in. wrench; and for $1\frac{1}{2}$ in. to 2 in., an 18 in. wrench.

Of course, there are places where a longer wrench might be used, but on new work it is not advisable, as the longer leverage gives the erector a chance to exert undue strain on the bolt to its great detriment. We believe that the practice of using lock washers is far better than tightening nuts after they have been brought to a full bearing and have taken up the load they are intended for. It is possible, of course, to lengthen any wrench by a piece of pipe, but it is rarely good practice and the extension is generally needed only to loosen rusty or damaged bolts. If your correspondent refers to set wrenches (drop forged spanners) he is correct in his contention that the handle furnished is generally too short for the work.

We suppose you know that the shortness of the present drop forged wrench handles is due to excessive competition and a continual reduction in the price of these tools. In addition the working length of the handle is further shortened by furnishing double ended wrenches for erection work, thus saving the cost of one wrench in the eyes of the purchasing department. The double ended wrench is all right in some places, but it is not a satisfactory tool to use continuously unless it is long enough to give sufficient leverage for its largest opening.

COES WRENCH COMPANY.

HIGH SPEED TOOL STEEL.

Pittsburgh, Pa., November 2, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In looking over an old number of the *Railway Age Gazette*, July 23, 1909, page 135, I find an article on The New Tool Steel. It makes reference to an English engineering paper which states that there is absolutely nothing in the nature of a revolution in the high duty steels whose remarkable properties we have been enjoying for the past ten years. These steels have been classified as high speed steels. The article refers to an eminent steel maker who illustrates his point by referring to a man who discovered a new drink which turned out to be whisky and soda, with twice the amount of whisky.

I am inclined to believe there is something revolutionary in the composition of high speed steels, especially those that reach their maximum cutting hardness between 600 and 650 deg. Centigrade, a quality that was never secured in tool steels until after vanadium had been admitted into their composition. You mention the era of carbon tool steels, according to F. W. Taylor's classification, as extending up to 1894, self-hardening tool steels following from that date until 1900, and new high speed tool steels beginning with the opening of the new century and continuing to date.

It is true that there was no revolution as long as carbon, tungsten and chromium were used, but when steel makers succeeded in producing tool steels that were so superior in their qualities and that lasted so long in service that it seriously cut into the purchase of new supplies and resulted in steel makers withdrawing these particular brands, or saying nothing particularly about them, it certainly seems that a revolutionary period had been reached.

There is no known element that could have produced these results other than vanadium, and it was through the addition

of vanadium to the original combinations that the revolution was completed. Now that vanadium is coming before the metallurgical world in such prominence, would it not be well to have its services in tool steels brought to light and more openly acknowledged, if for no other reason than for knowing the facts in the case, and doubtless finding other applications with like revolutionary results?

GEORGE L. NORRIS,

Engineer of Tests, The Vanadium Sales Company of America.

EXPANSION IN LOCOMOTIVE BOILERS.

Media, Pa., Nov. 19, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In D. R. McBain's paper on Inequality of Expansion in Locomotive Boilers, found in the Proceedings of the New York Railway Club, the claim is made that the outer sheet, or cover, of the firebox expands more than the inner sheet, or the firebox proper, and this explains the breakage of staybolts and the fracture of the sheets. The outer sheet is exposed to a temperature due to a steam pressure of 210 lbs., or, say, 395 deg. F., while the inner sheet is exposed to the temperature of the hot firebox, 2000 deg. F., and when the heat transmission is resisted by mud or scale its temperature is liable to be higher than that of the steam or water on the opposite side. I should therefore suppose the firebox would expand the most per lineal foot, but as the outer sheet is about 10 in. longer its total expansion might be greater than that of the inner one.

In regard to the cracking of the firebox sheet and its relation to the longitudinal riveted seams in a three-plate firebox, I should explain the condition of stress as follows: A firebox made in three plates would necessarily have a riveted seam or joint at each side; from this fact, the strains could not be neutralized no matter by what formation, on account of the construction being strengthened longitudinally by the riveted seam. From a compression test of a section of the seam or joint with equal section of the plate, it would be found that the section with the joint or seam would be practically double the strength of that of the plate, which explains why neutralization cannot take place. Such being the fact, the extra strength of this riveted seam virtually acts as a longitudinal stay between the back firebox plate and the firebox tube plate, whereas in a firebox made with one plate there are no obstructions to the strains being neutralized on account of the formation.

W. H. WOOD.

EFFICIENCY.

Hoboken, N. J., November 27, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I presume that all mechanical department officers and railway shop foremen have read the accounts of the rate hearing in Washington, as published in the daily papers. We must all realize that there is much to be desired in the way of higher efficiency in the operation of our departments and shops; but the roads have grown so rapidly that we have had all we could do to perfect the organization to secure the necessary output, and have had little opportunity to attempt to develop the so-called scientific management. Most industrial concerns are in the same boat as we are; nor are we at all sure—and the annual reports do not prove—that in the one instance where a betterment engineer was employed in the mechanical department of a railway on a large scale, that the results were entirely satisfactory. If so, why was he not allowed to complete his work? As a matter of fact, to fully install the scientific management will require at least a generation, if not more. Thousands of men must be carefully trained to develop and carry on the work, and even at the best, this will be a slow process and the results will not be apparent for years.

WALTER MACALISTER.

Care and Selection of Shop Equipment.

SECOND PRIZE.

SELECTION AND MAINTENANCE OF MACHINE TOOLS AND SHOP EQUIPMENT.

BY E. I. SPIDY.

Inspection and Inspector, Canadian Pacific, Angus Shops,
Montreal, Can.

The above title covers such a wide range, and has so many aspects that I propose to deal with one only, and that the one which will appeal to the majority of shop engineers today—those whose shops are already equipped with machinery. As the care of machines and also the selection of new tools has to be dealt with by all shop engineers, to assume that we were about to start a new shop would require a deal of thought and inquiry of a different character from that of keeping a shop, already equipped, up-to-date and in good condition. The new shop question would prove highly interesting reading no doubt, but there are more men who need to know more about "how to know what they want, and how to keep it when they have got it," than there are men who want a completely new shop laid out for them.

The Selection of New Machine Tools.—The keen competition today calls for a larger output from machines than ever before. This can only be coped with by instituting a high standard of upkeep of machines. This, then, I believe is the goal before us. Having decided that we need efficient machines, let us consider how we can obtain them. It is a specialist's duty to note and to see that work done on a certain machine may not be done more quickly on another. Applying this rule wherever possible, we find that almost daily we can advantageously transfer some job or other from a chuck lathe to a boring mill, or from a slotter to a miller, and so on, or that by doing work in batches instead of singly we can increase the output with decreased cost. By this means we gradually find that we have more work for certain machines than it is possible to do in the required time, and it becomes obvious that we need an extra machine. By a survey of the work in hand we should have no difficulty in arriving at a conclusive and final decision as to the type and size of machine tool required.

Having decided on the machine, and having fixed it in the shop ready for action, do not be in too much of a hurry to start it. Of course it is realized that the sooner it is running the sooner it will save its cost. I have seen a machine brought into a shop and immediately set to work before the foundation (such as it was) was hardly set. In less than a week it was reported that there was a heavy vibration with anything like a high speed and that the bearings were getting dangerously hot. In such cases the manufacturer is invariably charged with "faulty design." This is perhaps only human nature, although hardly fair, but with the machine in question it was found necessary to remove and reset it on a better and more settled foundation. Truly a case of false economy. Maximum output cannot be expected at once (although it often is) and a machine should be gradually worked up to its maximum. Then, when it is "up to the mark" keep it there and do not allow it to fall off. A machine will give greater satisfaction always if kept up to its maximum than one that is continually working off odd jobs and never doing a regular grade of work. The man in charge of the machine should be allowed to know his machine thoroughly, and all information concerning it should be given him, in order that he may know what is expected from it, and consequently from him.

Repairs.—The operator should be made to report the slightest defect he notices, and that defect, however small, should be at-

tended to at once. Efficient output can only be obtained from efficient machines. What may be a small defect today may be a serious fault if allowed to go on, and the ultimate cost of the repair will be all out of proportion to the cost of the small defect, if repaired when first reported. Too often the repair gang is too small to handle the repairs necessary to efficiency. Men in charge of machinery will do well to study this repair question deeply.

Study Advertisements.—A shop engineer should make it his business to study all the machinery advertisements available, and his company should help in this respect by supplying current literature on this subject. There are many cases, in which by buying a special machine for a job, a great reduction in the cost per unit may be obtained. Present day facilities given by engineering magazines render this by no means a difficult task, and the benefits are enormous.

Machine Tool Equipment or Accessories.—In dealing with the equipment of machine tools, I do not believe in doing a job by halves. If we expect good work we have got to have good tools, and it does not pay to have good machines using old or inefficient tools of all descriptions. Give a man good tools and expect him to turn out good work, but it is folly to provide a good first class machine tool with high speeds, etc., and give a man tools that will not stand up under the speeds. It is difficult to convince the engineer on this point every time, but experience will tell its own tale, if allowed the test.

Lubrication of Machine Tools.—The lubrication of machines is not considered seriously enough. Men are apt to be wasteful with oil by using it for other purposes than that for which it is intended, but it does not do to cut down the supply definitely to one can a week, as a certain company did. It is probable that it is the machine and not the man that will go wasting, if there is any choice. Rather keep a record of how many cans of oil each man uses and you will soon locate the wasteful ones. Main bearings of machines (especially high speed machines) will profit immensely by a treatment of flake graphite mixed with the oil occasionally. The properties of this substance are, I believe—except in the automobile industry—comparatively unknown. But let any engineer judiciously experiment with it, and take a record of the life of the bearing or machine, and he will soon convince himself of its value. Flake graphite can now be obtained that is free from all grit. This in the early stages of its adoption for automobile use was its great failing.

Care of Small Tools.—Every shop with any thing like an up-to-date tendency has its tool stores with a system of checking tools in or out. Checking by means of brass checks is, I believe, the best and most popular method. The tools should be overhauled regularly, and nothing should be allowed to rust for want of a piece of oily waste occasionally. This may seem an unnecessary statement, but one needs to see a good system (as it was once my misfortune to helplessly see) to realize that but for the strict enforcement of such trifles as these, everything would have been well. Pneumatic tools should be kept in a place by themselves. If suspended in benzine, not only will they be preserved but cleaned as well.

To provide proper tool drawers for the men is to put dollars into your own pockets. In the case of files, incalculable loss results from having them put, or perhaps slung with other tools into the same compartment.

Training the Men.—On this continent, where we have a vast army of men who do not understand or comprehend the value of the machines and tools they operate (and they can hardly be expected to do otherwise, since they have never been trained to do so), it is necessary to properly instruct them and to allow them time to overhaul and clean their machines thoroughly at least

once a week. If a man can be made to take a pride in his machine, he will soon begin to take pride in himself, and then in his work. The "bullying" system—under which no one bothers with such "trifles"—is gradually being superseded by a far superior and scientific method of instructing men in the way they should work and care for their machines. If conducted on these, or similar lines, it would not be long before such an article as the foregoing would be unnecessary, because it would be common practice.

CARE AND SELECTION OF MACHINE TOOLS.

BY H. G. BECKER.

Shop Demonstrator, Lehigh Valley, Sayre, Pa.

SELECTING TOOLS.

It is essential that a good selection of tools be made. Sometimes this is left entirely in the hands of the purchasing department, or some other department that is not even indirectly interested in the output and maintenance of the tool after it has been put in operation. The purchasing department is often interested only in the price and delivery. This sometimes results in the buying of inferior tools that are anything but suitable for the work they are to perform, resulting in a decrease of the desired output. Such cases often create a feeling between the two departments that is not of the best, and in some instances it dispels an interest that would otherwise have been shown. Coöperation between the purchasing and the mechanical departments is quite essential in order that proper consideration may be given to every tool purchased. A wise selection of a tool for a given class of work is more difficult than appears on the surface.

In some shops the foreman receives specifications of a machine or machines, together with test sheets showing the work which can be done with it, and is asked for his recommendations as to the machine. Probably it has only been on the market a short time and it is likely that the test papers showing the results obtained, are given by the manufacturers themselves. If the foreman has seen this machine in operation and knows that the results obtained are what is required in his shop, he will not hesitate to recommend it. On the other hand if he has not seen or heard of it, other than seeing the advertisement and the manufacturer's letter, he will, in most cases ask time for consideration and that the company send him to some shop where the tool is in operation, to see the actual work that is being done, in order that he may make an intelligent recommendation. The prime consideration is to select a tool that will give the largest first-class output, at the lowest cost of maintenance. If the tool is something entirely new, it would need to be sent to the shop for a trial of sufficient duration to demonstrate the kind and amount of work it is able to produce.

Again, a foreman will sometimes send in his recommendations for a certain tool that he knows will produce the output that is required, and is the exact tool the shop needs; after a patient wait he is apprised of the fact that the tool he recommended was not just what was needed and an order had been placed for what was deemed the best machine for the purpose, letting the foreman make the best of the output. This brings up the question: "Who is in the best position to know what tool is required to get the results in the shop?"

CARE OF MACHINE TOOL.

After the various tools are selected and properly placed, the next point to be considered is the care that should be given them.

Leveling.—First, it is quite important that the machines be properly leveled and checked up from time to time to insure that they remain so. This applies particularly to the planer; in leveling this machine it is quite important that the center of the bed be raised just a trifle so as to leave the extreme outer ends a little lower. If this is not carefully watched it may re-

sult in a chatter; such cases have been overcome by raising the center of the bed. If the machines are not leveled properly, it may be the cause of a spindle or shaft binding in the bearings, and the best possible lubrication will not keep them from heating. In some cases a piece of work has been spoiled by being leveled by the operator, he taking it for granted that the table or bed of the machine was level, and not trying it before setting up his work.

Lubrication.—After the machines are placed in service, the important point is that sufficient lubrication reach all bearings. These bearings must receive daily attention to see that the oil holes are thoroughly clean, so that the oil can properly reach them. If any cutting is discovered on any of the moving parts, a report should be made at once. Frequently in the case of a cut bearing the operator will make the assertion that he oiled it every day. No doubt he filled the oil hole, but never looked further to see that the lubrication reached the bearing. Some plants have been forced to employ unskilled labor, due to the fact that experienced men are not in the market. This results in men of little or no experience being broken in on the various machines. Some of them may never have seen the inside of a machine shop, and such men, as a rule, do not appreciate the harm that may come from the lack of oil on the bearings. Unless the foreman constantly reminds them of this fact expensive bearings may be destroyed in less than an hour, putting the machine out of service for a day or possibly a week.

The kind of lubrication depends on the kind of bearing that is used and other conditions. For general use some advocate a heavy oil, while others prefer a thin one. The latter may be used with satisfaction, providing it is fed continually. A good grade of oil, having a good body, gives the best results for all-around use, and the very best grade is none too good.

Clean Machines.—Keeping the machines clean is next in order, and this cannot be too thoroughly impressed on the operator. We all know that the oil around the bearings seems to act as a dust magnet, catching flying particles. Unless the machines are cleaned quite often, the amount of dust and dirt that accumulates will soon work its way to the bearings, shortening their life. The smaller machines may be cleaned each day, taking but a short time, while the larger tools may receive a thorough cleaning each week.

BELTING.

In many shops it is the custom to leave the care of belts in the hands of one man, who looks after their maintenance in general; if he is a first-class man, he is as essential to the shop as its best mechanics. He keeps a close watch on all the belts and sees that the countershafts and machines are in line, thus keeping the belts from climbing and otherwise damaging themselves.

A good system, as established in some of the large plants, consists of a belt room provided with a bench, tension scales and other tools necessary for repairing and maintaining the belts. A record is kept of each belt, showing the location, when applied, type, kind of leather, thickness, width and length, etc., and also the dates of their inspection. A belt foreman is put in charge and he, with the additional help that is needed, inspects the belts and attends to all repairs, keeping an accurate record of them. A report is made each month showing the number of repairs, new belts applied, delays caused by belt breakdowns, etc., from which a close check can be made and it may be compared with previous periods, to determine the relative efficiency.

All old belts are taken to the belt room, and if damaged on the edges, are cut down and used for narrower belts; short pieces are scarfed and glued together. In case of an oily belt, the oil is taken out.

An annunciator is placed in the belt room, connected with a series of push buttons placed at different points in the shop, so that in case an accident occurs a foreman pushes the nearest push button, which indicates in the belt room the exact location of the accident. This proves to be a great time saver and insures prompt action.

SELECTION AND MAINTENANCE OF TOOLS.

BY C. C. LEECH.

Foreman, Pennsylvania Railroad, Buffalo, N. Y.

The consideration of this subject naturally divides itself under two general divisions, that of the equipment for an entirely new shop and that of renewing or adding to the equipment of an old shop, the latter possibly already crowded with antiquated machinery. In the case of the new shop we assume, of course, that whoever has charge of the purchase of the machines, be he shop superintendent or foreman, is first of all thoroughly familiar with the class of work that is to be turned out. Knowing this, it is comparatively easy to select the most suitable machines to produce the desired results, providing one is not hampered by having to narrow the equipment so as not to exceed certain appropriations, and also if the output of the shop is to be something that has already been manufactured. We have then the experience and the mistakes of others to profit by. It is always well to go about extensively and see what others are doing and how certain machines do their work. One can tell much more about the merits of certain tools in this way than by the photographs in the catalogue of the builder or in listening to the sales-agent holding forth on their worth, though his words fall in golden cadences. If we are given free hand our selection will be governed by the principles of suitability and durability, coupled with get-there-ativeness and goods producing qualities, when properly handled and each machine is worked to its capacity.

Location of Machine Tools.—The problem of proper location or grouping of the machines in the new shop is not specially difficult. Judgment should be used in order to so arrange each machine or group of machines that the work or the articles manufactured are constantly progressing toward the storehouse or shipping department. Retrograde movements, made necessary by badly arranged grouping of machines, cause confusion, loss of time and added expense. Where possible, space should be allowed for expansion and additional machinery. Room must always be allowed for proper and expeditious handling of the work. If it is necessary to add more tools of the kind already in use it may be better to duplicate in some instances, whereas, in other cases, newer, heavier and more improved tools are best. This is a matter of conditions and of judgment. If the tools are all motor driven it will greatly facilitate the grouping. In an old shop, probably pretty well filled up with old machinery and very likely poorly arranged, a nice problem is presented where one is called on to replace and rearrange them without serious delay to the work, especially if it is a busy season. Here again the exercise of careful judgment is needed and is where experience tells. I had a problem of this character to deal with a few years ago when my company added to and replaced some thirty machine tools, in a comparatively short time, in a shop with a floor space about seventy-five feet square. All of these machines were much larger and heavier than those taken out. All were belt driven, so that the placing had to be governed somewhat by the overhead room for countershafts and belting.

Maintenance of Machine Tools.—If a regular man can be assigned to run each machine or several machines of one kind it is, of course, the best way. He will take a greater interest in caring for the machine and keep up the tools and little labor-saving devices that he will naturally have. You can also hold the man directly responsible for the proper care and appearance of the machine. On the other hand, where there are many more tools than men to run them, the problem is more difficult. Human nature in the mechanic is much the same as in other people, and the natural feeling when he is placed on a machine temporarily to do a certain piece of work is to get through it to the best advantage and without much thought in the way of leaving the machine in good shape for the next fellow. I say this is the natural feeling, but I have found where it is necessary to run a number of our machines in this way, by reason of having a small force of men, a system can be established whereby all are

for one and one for all. Each man takes a personal interest in all the machines he is called upon to use and sees that the tools are in proper shape, not losing sight of the fact that he may have to return to the tool within a short time, and the better condition it is in the better for him, especially under the piece-work system.

Keeping Machine Tools Clean.—Nothing is more attractive to the eye than nice, bright, clean tools. Under some climatic conditions tools are not much affected with rust, and keeping them bright and polished up is comparatively easy. On certain classes of machinery, slow running on heavy work, the operator has abundant time to do this, and will do so if notified that it is expected of him, of course not asking him to go into danger. On small machines where the operator is constantly using his hands on the work, there is no time for cleaning during working hours unless he stops the machine. Shop superintendents must decide just how far they want to go and how much time they are willing to give to it. Again the climatic conditions may be such that it is practically impossible to keep the machinery bright, and I have known it to rust in ten hours after being polished and well coated with oil. I do not refer here to ordinary cleaning and wiping with waste and oil, which of course all machines should receive, and usually do receive almost every day. This latter I require of each man who uses any one of the tools, and about twice a week we send a shop helper over all the tools that have no regular attendants.

Belting.—There are a few simple rules relating to the application, care and preservation of belting that it might be well to consider at this point. It pays to have the best belts. Nothing is more aggravating to the operator than a belt continually giving trouble from stretching more on one side than the other, or that will not run properly on the pulley, to say nothing of loss of time and expense. Part of such trouble may of course arise from the shafts and pulleys being out of line, and they must be watched. Belts should never be tighter than absolutely necessary and should not be overloaded. Use as wide a belt as the pulley will allow. The value of a good machine depends largely on belt performance, and good belting is a work producer because it keeps the machine running up to its maximum capacity. I had a pair of new 4-in. single leather belts that had to be laced ten times in seven days and stretched 24 in., and in the end had to be thrown away, as it was impossible to make them run right. Sometimes a belt that has stretched too much on one edge and will not run properly can be made to do all right by turning it completely over, and I have in addition reversed the belt end for end and had it laced pretty snug and had no further trouble with it. Users of belts are of course familiar or should be with the fact that the grain or hair side is the best to run next the pulley on account of its smoothness, and in order to subject the opposite or flesh side of the belt to the least wear. Also the belt should run with and not against the splicing. A little belt grease should be applied occasionally to keep the belt soft. The best plan is to have a regular man look after all the belts and keep them in good order, not waiting until the belt gives out on some important machine, causing an expensive and vexatious delay. The inspection of belts largely eliminates these troubles.

Care of Pneumatic Tools.—The care of pneumatic tools has grown in importance with their increased use. In our tool room department all air tools come under the supervision of an expert. Each tool is tested and lubricated upon its return from service. Plenty of air hose of various lengths with suitable connections to meet all conditions of the work should be kept on hand.

Tool Checks.—The check system governing the use of tools by the workman can be carried to a high degree of efficiency in the shop and engine house. Our custom is to allow each man, who has need for tools other than his own, five tool checks. These checks are deposited with the tool attendant, one for each tool taken out. When the tool is returned the men receive back the check. A tool room should be located in the engine house at

a convenient point, and should be large enough to take care of all the larger tools, such as sledges, bars, jacks and trucks. Many tool rooms are so small that only the smaller tools, such as wrenches, etc., can be kept there, and in consequence much valuable time is lost in hunting for the other tools, that are left in engine pits and out-of-the-way places. The machine shop tool room should be equipped with all necessary modern machines for maintaining the tools in good condition and there should be enough expert mechanics in the tool room department to carry this out. In addition, every tool should come under the inspection of the tool attendant every day, that all may be kept in repair. If the tool is lost or broken it is an easy matter to follow it up, as the man's check is against it. I believe this system in a modified form can be extended to repair yards and would be the means of a great saving in tool costs through loss and breakage.

SELECTION AND CARE OF RAILWAY SHOP MACHINERY.

BY M. H. WESTBROOK, BATTLE CREEK, MICH.

SELECTION OF EQUIPMENT.

In selecting the machinery necessary to equip a railway shop the first thing to be considered is the amount of each class of machine work to be turned out. This is necessary in order to decide what special machines to recommend. For instance a special frame planer or slotter would not be needed in a shop where but a few frames are handled in a year, but rather a machine which, while not handling a frame as economically, would be in constant service to its fullest capacity on other work the year round.

In purchasing machinery too much attention should not be paid to the claims and recommendations of the machine salesmen, who, while generally found to be good fellows, are inclined to try to sell machinery not adapted to meet the requirements at all. I have had salesmen try to convince me that a special slot milling machine should be installed to be used on piston and valve stem keyways in a shop that would only have use for such a machine about five hours a week.

Before deciding what to recommend a few days could be most profitably spent in some of the modern shops doing similar work, taking notes and observing the various new types of machines in operation. I would recommend the purchasing of all lathes, drill presses, planers, etc., from one maker as far as practicable. When the time comes for repair parts, they are more readily obtained. Also interchange of parts is more easily accomplished should there be more than one machine out of commission due to breakage. This idea should also be carried out in the matter of pneumatic tools. Decide on one good make and then get the motors and hammers from that manufacturer. I have in mind one shop that is carrying repair parts for no less than seven different makes of air tools, although they could easily be confined to two at the most with much better results.

As much attention should be paid to the smaller equipment as to the higher priced machines. Even in a shop equipped with overhead traveling cranes there are times when with but two men working, both require the services of the crane at the same time. The inconvenience and loss of time will be much greater where fifty or more men make use of it. Therefore as far as possible see that each large machine is equipped with some supplementary method of handling material on and off the machine. This is a matter that should not be overlooked or treated lightly if the greatest shop efficiency is to be looked for.

See that modern bench vices are procured and that the benches are not too high for them, a common fault. Have machine reamers and twist drills of high speed steel, with larger shanks than most companies supply. Do not overlook the many special devices now on the market to facilitate the work done in the brass department. This department in many railway shops is not nearly as up-to-date as the others. The new air chucks and

countershafts now on the market have proven great time savers. Such briefly are some of the points to be looked after in the selection of machinery.

THE CARE OF MACHINERY.

By this is meant the system best adapted to keep each machine in profitable service the greatest length of time, reducing to a minimum its non-producing moments. My experience has been that lack of proper first aid has been the most fruitful cause of machinery breakdowns. In caring for machinery first see that every frictional surface has proper means of getting lubrication to it and that the operator is thoroughly posted as to where each oil hole is and what it is for. This should be a personal matter with the foreman and the operator. Very often it is necessary to put in larger oil tubes in newly purchased machinery.

Attention must also be given to the oil used, especially in winter, as certain grades of oil thicken so in cold weather that they will not reach the desired spot. The operators should be trained to look after these essentials. For all overhead oiling I would recommend the services of a special man whose duty it would be to attend to every countershaft and journal box.

At the first slight breakage or threatened breakdown stop at once, if at all possible, and make the necessary repairs. It may be a broken gear tooth, and I have seen them running for months, with no attention given them, until the whole gear and possibly several others were stripped in an instant, where if but one tooth had been inserted at first no more trouble would have occurred. As soon as a journal is found worn, take it out and see that the bearings are properly repaired. This would possibly take a few hours, saving eventually a prolonged period of idleness for the machine.

SELECTION AND CARE OF MACHINE TOOLS.

BY GEORGE BLACK.

Machine Shop Demonstrator, Canadian Pacific, Angus Shops, Montreal, Can.

The selection and care of machine tools and equipment, involving as it does the expenditure of large sums of money and in a large measure determining the output of the shop, is a most important duty of the machine shop foreman. His selection must be justified by results. Immediately the need for the addition of any new machine is felt, either to cheapen the production or increase the output, the up-to-date machine shop foreman should have the machine for the job in mind. He will know that the heavy duty required of modern machine tools by the developments in high speed steel, calls for rigidity to stand up to the heavy feeds and speeds without "spring"; ample power to pull with the heavy duty required; and a wide range of feeds and speeds in order that all operations may be performed at the most economical rate. The best machine on the market is none too good.

With the machine selected, the next important item is to locate it in the best position, so that its work, as far as possible, comes to it as a natural sequence in its progress through the shop towards the finished product and thus unnecessary handling is avoided. This is necessary and greatly to be desired, more especially if the work is heavy and requires a large crane to handle it; in that event we have to face a great amount of lost time and machine hours, through inefficient crane service, which will amount, even in a smart shop, to as much as 8 to 10 per cent.

Time spent in securing a firm and unyielding foundation is well repaid, for without it, it is next to impossible to get the best work out of a machine. Having secured the foundation, see that the machine, no matter of what type, is level and kept level, for we are prolonging thereby its life and insuring the maximum output and efficiency as far as the machine setting is concerned.

Machine hours, i. e., hours the machine is running, is what counts in a machine shop, and every nerve should be strained to keep the machine in operation, and on the work it is specially

adapted to handle. Carelessness cannot be tolerated in handling machines, and every case of breakdown, due to carelessness, should be severely punished. Operators should be encouraged to take a pride in their machines. A machine that is allowed to get choked with chips is not being treated fairly, and with the heavy duty required it will not be long before it gives trouble. "A stitch in time saves nine," they say, and surely it applies with increased force to machine upkeep. Therefore if we make sure of the foundation, the setting of the machine, getting careful operators and encouraging them to keep the machines clean and well lubricated, we are taking all the precautions possible to avoid shut downs. For the rest, we must make sure of a good repair gang boss—a live man, who can be trusted to keep track of minor repairs, which neglected, often result in a much longer and more extensive repair being necessary.

MAINTENANCE OF TOOLS.

BY A. H. KEANE.

General Foreman, Chicago, Burlington & Quincy, Haverlock, Neb.

The greatest destruction of shop tools arises from insufficient and improper oiling. Machine tools should last for an indefinite period, and will, if good care is taken of them. The greatest wear on all machines is in the gearing, and in most railway shops the gears are given but little attention. This is a big mistake, as the oiling and cleaning of these parts is essential in order to gain the highest efficiency. I have noticed machines cleaned and polished on all finished parts, but the gears were neglected, allowing dust and fine cuttings to settle in them, causing them to cut and wear. In the case of pneumatic tools the proper oiling is very essential. A good practice is to have a small vat to place the air hammers in, which keeps them from rusting, and they are always oiled and ready for use. All air motors and hammers should be returned to the tool room once a day for oiling. This will save considerable expense in repairs, and keeps the tools in commission a greater proportion of the time.

I am a believer in the tool check system. Each article should be checked out and a value placed on it. This makes it an object for workmen to take better care of the tools and to promptly return them. With the present economic conditions the greatest caution should be used in the selection of shop tools lest you get something that will not give the best results or be a revenue producer. Having decided on the tool that will prove advantageous, try to get it as soon as possible, so as to keep in the race in these days of *get there*.

THE CARE AND SELECTION OF MACHINE TOOLS AND SHOP EQUIPMENT.

BY GEORGE H. ROBERTS.

Assistant Machine Foreman, New York, New Haven & Hartford, Readville, Mass.

The quality and condition of the tools in a shop are the securities of its output. If a cheap lot of machines are installed, great losses are incurred through cost of making repairs and the time lost in making them. The best is always the cheapest. Good, substantial machines and tools are indispensable. A few years ago the cry was for "better steel," but such results were obtained that it was soon changed to "better and stronger machines" to permit the use of the new steel to its full capacity. Some surprising results have been accomplished through this competition. For instance the wheel lathes of ten or twelve years ago are mere skeletons compared to the massive ones of today. The power required to drive two today would have run the whole shop twenty years ago. The heavy and improved machines of today represent considerably more money than formerly, and more vigilance must be exercised in caring for them, both as to condition and operation, to get returns on the additional investment.

Equipment Inspector.—In a large shop there should be an equipment inspector to examine machines, belting and all appa-

rates, etc., reporting to either the foreman or the general foreman. By this method the condition of the shop equipment is at all times known and is in the hands of the "head" of the shop. In large shops the machine foreman or tool room foreman have not the time to make examinations of the equipment and to oversee their work also. If no special watch is kept over these matters they become neglected; very valuable machines have been allowed to become racked to pieces in a year or two. The old saying, "A stitch in time saves nine," holds true with machines as well as with a pair of trousers.

The Use of T Bolts in Slots.—Bolts should never be used in slots in the tables of planers, slotters, boring mills, etc., as the heads very seldom fit the slot, and if they do the strain is usually on one point and soon breaks out the slots. T shaped blocks should be provided for every machine, tapped out for a stud; these blocks should be from 3 to 4 in. long.

Bearings.—The bearings of machines should be washed out with kerosene occasionally to avoid their becoming clogged or gummed, causing them to run hot and cut.

Pits Under Large Machines.—Large planers and boring mills should have pits large enough to allow a man to go under them for inspection or repairs.

Check on Small Tools.—In all shops the small tool question is an important one, as they are easily lost or stolen, and if no check is kept on them no one knows how they come to be "missing." No tool should be allowed to leave the tool room without a check for it.

Exchanging Cutting Tools.—In the older and smaller shops the mechanics were permitted to go direct to the tool maker to have tools made or redressed, while today in the large modern shops the conditions demand that a system be established by which they shall receive the tools through the tool room by either going direct to it or by the delivery system. If every Tom, Dick or Harry is allowed to go to the tool maker, his time is used up listening to their wants instead of making tools. A reasonable number of each shape of tools should be kept on hand on racks in the tool room, ready for immediate exchange for tools requiring redressing. A mechanic should not have to wait a minute for a tool. Each tool should have its "shape number" and the kind of steel stamped on it.

Some results may be obtained by "rushing," but to get a lasting effect a schedule must be established as for a fast train. The "plodder" usually beats out the "rusher."

Care of Drills, Taps and Reamers.—All tools, such as drills, taps, reamers, etc., should be returned to the tool room as soon as they have served their purpose, and on reaching the tool room should be examined and put in serviceable condition. If they have been damaged the foreman of the department should be made acquainted with the fact, ascertain the cause and, if necessary, use discipline.

Don't Use Twist Drills for Cored Holes.—The drill question is an important one. High priced twist drills should not be used in cored holes. Flat drills can be bought or are easily made. I had a set of high speed flat drills made for roughing out holes in pistons for piston rods, and they are far ahead of either the boring bar or twist drills. The holes are drilled with the flat drill on a boring mill and are then reamed to size.

Twist Drill Tangs Broken by Worn Sockets.—A source of much trouble with twist drills is the tang. The drills and sockets or sleeves become worn and allow the drills to shoulder on the tang instead of fitting on the taper of the shank. This puts the whole strain on the tang and consequently twists it off. There should be a set of master drill shanks and sleeves in the tool room. An inspection should be made of all drills and sleeves as they are received, and the worn ones should be refitted or replaced. The trouble is not with the new drills and sleeves, but the worn sleeves spoil the new drills, and the worn tangs the new sleeves.

Belting.—Nothing but the best grade of belting should be used, as poor and inferior grades constantly cause trouble. All belts

should be examined daily, and as far as possible repairs should be made outside of working hours, for by stopping machines during that time the machine and operator are both idle. All heavy belting, such as motor belts and those for large planers, and boring mills should be cemented instead of laced.

In buying machines the shop requirements should be considered from every viewpoint, for when a mistake is made in selecting them it takes years to make it right.

A modern railway shop should have included in its equipment a gap lathe, triple head slotter, small and large boring mills. Centering machines and bolt cutters should be distributed throughout the shop; also taper bolt turning machines instead of turning them on centers, and Prentice lathes for small work, such as motion work, pins, etc. It should have a quaterning machine equipped to true up crank pins to avoid "pulling" the pins and applying new ones for being 1/16 in. out.

A constant study of the shop conditions must be made in order to keep it on a good working basis; conditions change so that what was good three or five years ago will not do today.

FRICTION OF FREIGHT CAR TRUCKS ON CURVES.

During the past few months extensive tests have been made to determine the relative resistance of squared rigid trucks, and those in which the side frames are free to move forward and backward, parallel to each other, thus allowing the wheels on one side to get ahead of those on the other side in going around a curve. A squared truck is one in which the side frames are held so that the wheels on one side do not get ahead of those on the other, and in this manner the truck is kept square.

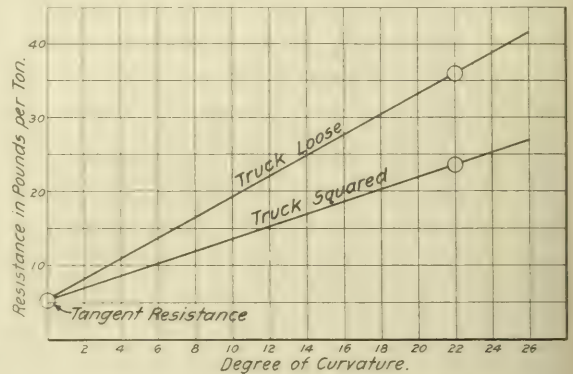
After the adjournment of the American Railway Association at St. Louis, some of these tests were repeated on November 17, and a number of the members of the association were present to witness them. The tests were conducted on a special experimental track at the plant of the American Steel Foundries, Granite City, Ill., by Louis E. Endsley, associate professor of railway mechanical engineering, Purdue University.

The track consisted, first, of an incline having a drop of 36 ft.; second, a short tangent of 30 ft.; third, a 22-deg. curve of 298 ft.; fourth, a tangent of 257 ft., and, fifth, an incline having a vertical rise of 20 ft. The first incline was equipped with an electric hoist for pulling the trucks up the

going around the curve. This loss in kinetic energy divided by the distance traversed by the truck is equal to the average resistance force upon the truck while going around the curve. This average force divided by the number of tons weight of the truck gives the resistance in pounds per ton.

The tests were conducted upon different types of freight car trucks and different modifications of the same type of truck. For this purpose, the trucks tested were taken from 50-ton cars in regular service, owned by fourteen different railways. Some twenty-five trucks in all, together with three specially constructed test trucks not included in the above, were used in the investigation.

The results obtained from the fifteen trucks tested, show that the average resistance, per ton weight of truck, upon a



Resistance of Freight Car Trucks on Curves.

22-deg. curve was 35.90 pounds for the loose truck and 23.63 pounds for the same truck squared, or a saving of 34.1 per cent. in favor of the square truck. These two average resistances for trucks loose and squared have been plotted, together with the resistance upon a tangent, which, for the fifteen trucks tested, amounted to 5.49 lbs. per ton, and a straight line has been drawn between the tangent resistance and the two curve resistances, thus giving two straight lines as shown, the upper one representing results from the loose truck, and the lower one representing results from the square truck. These lines were drawn straight, because it is gen-

TABLE SHOWING RESULTS OF TESTS OF RIGID AND LOOSE FREIGHT CAR TRUCKS.

1-Degree of curve	2	3	4	5	6	7	8	9	10	11	12	13
2-Resistance of loose freight truck	6.87	8.75	9.63	11.91	12.4	13.78	15.16	16.54	17.92	19.31	20.69	22.07
3-Resistance of same truck, squared	6.31	7.13	7.46	8.78	9.61	10.43	11.26	12.08	12.91	13.73	14.55	15.38
4-Difference between square trucks	.56	1.12	1.67	3.23	2.79	3.35	3.90	4.46	5.01	5.58	6.14	6.69
5-Per cent. in favor of square truck	8.1	14.5	17.4	20.2	22.5	24.3	25.8	26.9	27.9	28.9	29.7	30.3
1-Degree of curve	14	15	16	17	18	19	20	21	22	23	24	25
2-Resistance of loose freight truck	14.83	16.77	17.4	18.98	20.36	21.74	23.13	24.51	25.89	27.27	28.65	30.04
3-Resistance of same truck, squared	17.93	17.85	18.68	19.70	20.33	21.15	21.98	22.8	23.62	24.45	25.27	26.1
4-Difference between square trucks	7.80	8.37	8.92	9.48	10.03	10.59	11.15	11.71	12.27	12.82	13.38	13.94
5-Per cent. in favor of square truck	31.4	31.9	32.3	32.7	33.1	33.4	33.7	33.9	34.1	34.4	34.6	35.0

incline. By means of a figure four trip and a dead line, the truck could be released at any desired point. The track was equipped with electric contacts by means of which the velocity of the truck at any desired point along the track could be recorded upon an electric chronograph. In anticipation of the tests, the truck was placed upon the experimental track and pulled up the incline to the desired height and released a number of times until the distance it would run became constant. Five record runs were then made. From these five runs, the average velocity at the beginning and the end of the curve was obtained. From the velocity of the truck at the beginning of the curve, the total kinetic energy was obtained by adding to the energy of translation of the truck the energy of rotation of the wheels and axles. The kinetic energy was also obtained at the end of the curve by the same method. The difference in these two kinetic energies equals the number of foot-pounds absorbed by the truck in

erally accepted that the resistance on curves is in direct proportion to the degree of curvature. From these two lines, the results in the table have been computed, and the resistance for any degree of curvature up to 26 deg. is shown. Line No. 1 of this table gives the degree of curvature. Line No. 2 gives the resistance in pounds per ton for a loose truck, as obtained from the upper line in the diagram. Line No. 3 gives the results in pounds per ton for the square truck, as obtained from the lower line in Fig. 1. Line No. 4 gives the pounds per ton in favor of the square truck, this being the difference between Lines Nos. 2 and 3. Line No. 5 gives the per cent. in favor of the square truck.

It will be seen from the results in the table that the per cent. of saving in resistance in pounds per ton in favor of the square truck varies from 8.1 on a 1 deg. curve to 35.0 on a 26 deg. curve, and, taking 4 deg. as the average main line curve, the saving is 20.2 per cent. in favor of the square truck.

Shop Kinks.

FROM THE LEHIGH VALLEY SHOPS AT SAYRE, PA.

BY R. E. LITTLE.

The shops of the Lehigh Valley at Sayre, Pa., are by far the largest and most interesting of any of the plants yet visited by a staff representative in search of shop kinks. The kinks shown in this collection are especially interesting, because they are ones which are found necessary in a thoroughly up-to-date and fully equipped shop. It has been generally considered that the small, semi-well equipped shop would necessarily produce more and better shop kinks, but an inspection of the devices here shown seems to demonstrate the fact that kinks in any shop, whether it be large or small, are a necessity, and fill a want which is not met in any other way. A. M. McGill, superintendent of shops, has a well-oiled and easy-running organization. His diplomacy

has just been forged, is about to be removed. These yokes are made of 1-in. x 5-in. stock, and have a plate of the same material at the closed end, where it is held by a rivet. The iron is heated in an oil furnace, located just beyond the machine, at the right; the piping at the end of the furnace may be seen near the operator. Three men are required; two handle the yoke, while the third heats the rivets and operates the controller, the machine being motor driven. When the machine is at full back stroke, the two coil springs hold the wings parallel to the bulldozer head. The cold end plate, with the heated rivet, is placed in its position and the stock for the yoke is then placed in the machine. The rivet set, fastened to the crosshead, presses against a movable block with elongated holes, which makes a straight end on the finished yoke. The elongated holes in the block permit of its being pushed back so that the stock may be easily placed in the



Fig. 1—Bending Drawbar Yokes and Rivetting on End Plates in Bulldozer.

in dealing with his subordinates, from the general foreman down, and the fact that he is personally acquainted with every employee, has resulted in obtaining splendid coöperation. To him, and to J. C. Seeger, general foreman locomotive department; J. W. Hamm and Edward Seddon, machine foremen; H. G. Becker, shop demonstrator; J. W. Riley, blacksmith foreman; J. C. Pohl, general foreman car department; T. Lewis, general boiler foreman, and W. H. Dutton, foreman painter, we are especially indebted for assistance in obtaining the collection of shop kinks.

SMITH SHOP KINKS.

BENDING TANDEM DRAWBAR YOKES.

In the foreground of the photograph, Fig. 1, is shown a No. 7 Blakeslee bulldozer in the blacksmith shop. It has been stopped half way back on the return stroke and the drawbar yoke, which

machine. As the machine advances, the two wings complete the bending of the yoke before the crosshead, carrying the rivet set, makes its full stroke and forms the rivet head. The finished yoke is removed from the machine by the lever, which is attached to a wall crane. The loop which holds the yoke has two feet at right angles, and as this loop is placed in position before the yoke is formed, the yoke extends over the feet when the bending is completed. The holes in the stock are cold-punched. The hole through which the end plate is riveted serves to gage the yoke stock for bending. On one run 175 yokes were made complete with riveted plates in 175 minutes.

BENDING BRAKE HANGERS.

A set of formers used on the Blakeslee bulldozer for bending brake hangers is shown in Fig. 2. The machine is shown at full back stroke. The two wings which bend the stock are

drawn full open as soon as the return stroke begins by the coil springs, which permits the formed hanger to be removed and stock for another to be placed before the wings are again carried forward. The machine, therefore, operates continuously and a hanger is formed at each revolution. The arrangement at the left is provided to center the stock. The angle-iron has two pins, over which the stock is placed, and the slot guides the tongs to the center of the stock. It is then carried to position in the formers, a slot in the center block guiding the tongs to bring the stock central. There is a movable block, which slides on two bolts—the heads of which are shown—through slotted

were taken out, annealed, surfaced and again placed in position without hardening. About 90,000 ends have passed through dies since the blocks were renewed and they show no bad effects from the work. The large boss on the right hand die and the knife on the left hand one were used for removing the film of metal that forms when the dies do not close. This provision is not, however, necessary.

CASTLE NUT DIES.

The dies shown at the right in the photograph, Fig. 3, are used for forming large castle nuts. The stock used is $\frac{2}{4}$ -in. round,



Fig. 2—Bending Brake Hangers on the Bulldozer; also Block and Plunger for Making Staples.

holes. This arrangement permits of easily placing the stock and also for making the bends square, as the crosshead forces it tightly against the hanger at the end of the stroke. These hangers are made of 1-in. stock and 125 may be bent per hour.

BENDING STAPLES.

Resting on the left hand stop of the bulldozer in Fig. 2 are shown a block and plunger used in bending $\frac{1}{2}$ -in. staples cold. The block, which stands in an upright position when being used, is provided with six grooves for holding the straight stock. These grooves are cut at an angle, so that the stock will not fall out. The plunger is deep enough to bend the six staples at one time. The stock is cut from $\frac{1}{2}$ -in. scrap rods, on a shear and at an angle to provide the points. This arrangement will bend 700 of these staples per hour.

UPSETTING AND PUNCHING BRAKE HANGER ENDS.

The ends of the hangers, illustrated in Fig. 2, are upset and punched on a machine using the dies shown at the left in the photograph, Fig. 3. The half die at the right of the pair shows a piece of stock in position for being upset. The stock is first bent cold in the bulldozer, three pieces at a time. The pieces are then placed in a furnace, the bottom of which is 5 in. below the opening, which allows the ends to hang downward. After the end is upset, the stock is moved to the position shown in the left half die, and the hole is punched. As both plungers operate simultaneously, one heat only is required for both upsetting and punching. It will be noticed that the dies have inlaid blocks at the points of wear. These blocks are made of high speed steel and when the dies were first made, the steel blocks were hardened before being placed. After upsetting about 3,000 ends, it was found that the steel blocks were full of surface cracks. They

and the completed nut is made in two operations and one heat. The plunger on top of one of the dies is used first, with the stock placed in the lower impressions, as shown. This upsets the metal and forms the castle nut. The stock is then moved to the upper

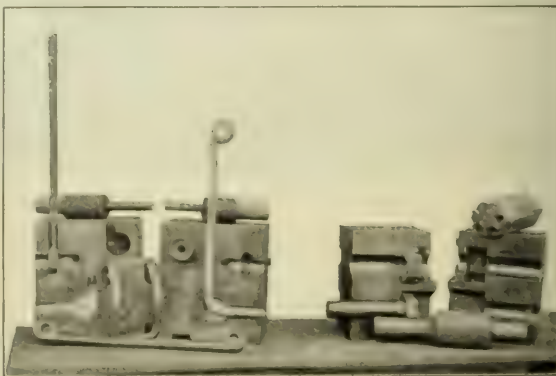


Fig. 3—Dies for Upsetting and Punching Brake Hanger Ends and Forging Castle Nuts.

impressions and the round stock is punched away from the nut, there being no waste of material.

BENDING MAIN ROD STRAPS.

A main rod strap, with the former that is used in bending it under a steam hammer is shown at the left of the photograph.

Fig. 4. A template for the stock is drawn back of the former and to the right. The former is placed on the anvil of the hammer and the heated metal is placed across it, with the oil cap boss against the shoulder on the left side of the die. The block shown in front of the die is then placed on the stock and it is finally formed by a succession of hammer blows, it being necessary to use additional blocks as the strap forms.

COAL CAR HOPPER CARRIER IRON FORMER.

Dies for bending coal car hopper carrier irons, a finished one of which is shown resting on top of the formers, are shown at the

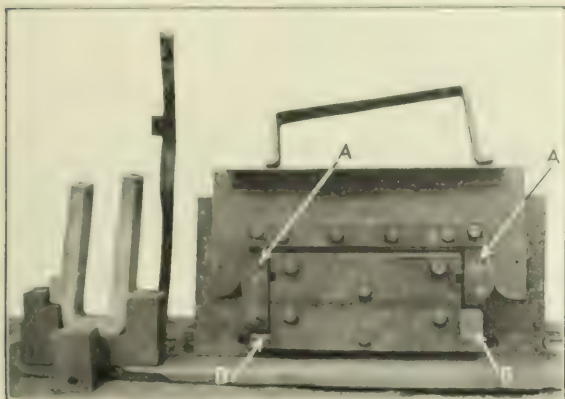


Fig. 4—Dies for Bending Main Rod Straps under a Steam Hammer and for Forging Coal Car Hopper Carrier Irons.

right in the photograph, Fig. 4. The upper former fastens to the crosshead of the bulldozer and the lower one to the bed of the machine. When it is at full back stroke, the swinging arms, A-A, are drawn back by coil springs parallel to the crosshead. That portion of the carrier iron which is horizontal lengthwise when it is in use, slants downward toward the outside and the part of

carrier irons are made in right and left, and the arms and blocks, B-B, are exchanged when making a carrier iron right to left. The blocks, B-B, are made loose, as they have to be removed after the carrier iron is formed, so that it may be gotten out of the machine, due to the slanted side.

FORMING HANGER GIB DIE.

The pair of dies at the extreme left in the photograph, Fig. 5, is used for making locomotive spring hanger gibs, one of which is shown. The stock is drawn out from scrap tires into strips $7\frac{1}{8}$ -in. x $2\frac{3}{8}$ -in. The heated metal is fed into the dies from the top and when the plunger enters, it forces the metal against the knife edges of the steel inlays, cutting off and carrying a portion on into the forms. This then becomes a closed die, and it is necessary to make provision for the air which would be confined. The small grooves machined from the center of the impressions answer this purpose. The gibs are afterward put in a rattler, thus removing the burrs.

WELDING BOTTOM BRAKE RODS.

The dies in the center of the photograph, Fig. 5, are used in welding the jaw ends of bottom brake rods. The completed rod is shown in front of the dies. The plunger has a central rib, which enters between the two forks of the jaw, so that pressure is exerted over the entire welding surface. The drawings used in making these dies were furnished to Mr. Riley by John Roach, master blacksmith of the Philadelphia & Reading.

PUNCHING DIES FOR BRAKE ROD ENDS.

The dies at the extreme right in the photograph, Fig. 5, are used on a power punch for punching the three pin holes in the jaws of brake rods, as shown. The upper die with the three punches, is carried by the movable head, while the lower die is fastened to the bed of the machine. This punching work is done after the welding, the end of the rod being inserted in the die as shown at the edge of the photograph. A wedge is then driven in alongside of the stock to force it against the guiding side of the die and thus insure the centering of the holes. This wedge is loosened after the holes are punched, thus relieving the metal and allowing it to be easily removed. The jaw is then

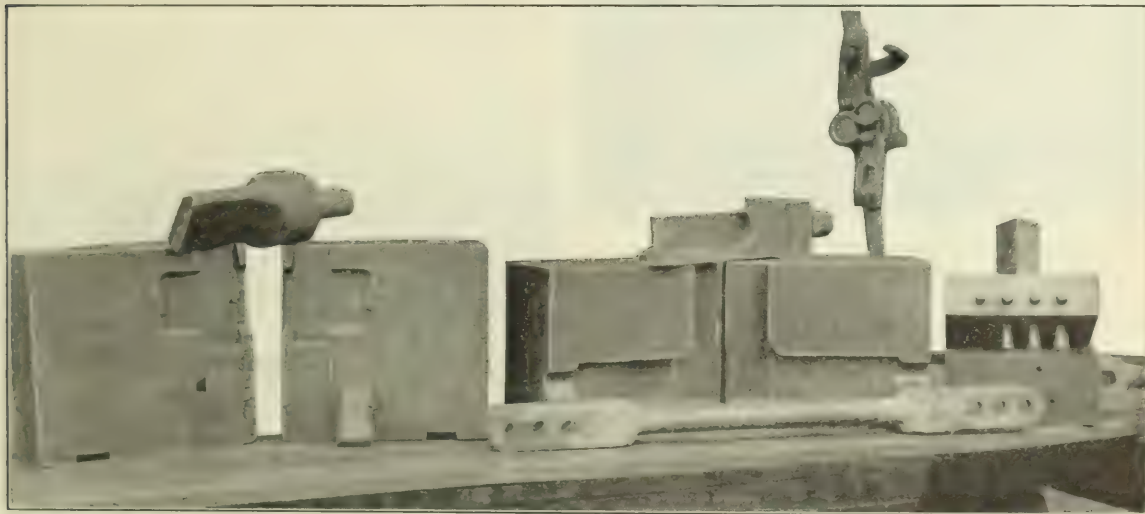


Fig. 5—Dies for Forming Spring Hanger Gibs, Welding Bottom Brake Rods, and Punching Them, and a Device for Bending S-Hooks.

the former which forms it is therefore, made accordingly, as close inspection will show. The two arms, A-A, have slotted holes which allow the bending of the lips without breaking the metal; when the machine reaches its full forward stroke, the arms are pushed forward to make square bends on the two lips. These

turned over for punching the other side. It is necessary in this case to run a strip of thin metal in on the under side of the central portion of the die to prevent the second punching from dropping partly into the punched holes of the lower half of the jaw, thus preventing its removal. The dies were designed for

punching four holes at a time, but this particular job requires only three holes.

BENDING S-HOOKS.

A device for bending S-hooks rapidly by hand is also shown in Fig. 5. The stock used is $\frac{1}{2}$ -in. in diameter and is heated in a small furnace near the anvil, to which the device is fastened.

MACHINE FORGINGS.

A board in the blacksmith shop on which samples of all machine forging work is kept is shown in Fig. 6. Several of the forgings and the dies for making them have been described above.

CAR DEPARTMENT KINKS.

ADJUSTABLE SCAFFOLD.

A coach shop scaffolding, with the widest possible range of adjustment, is shown in the illustration, Fig. 7. The flanges of the end casting act as guides and also provide metal bearing surfaces for the truss rod bolts. The pulley jaw is made separate, of wrought iron, and is secured by a nut on the under side

other metal interior fixtures. At the left of the center of the photograph is shown an easel on which the miscellaneous sign writing, transom glass decoration, etc., is done. This balcony, being at one end of the coach shop and above the line of the coach tops, affords good light, heat, cleanliness and comparative

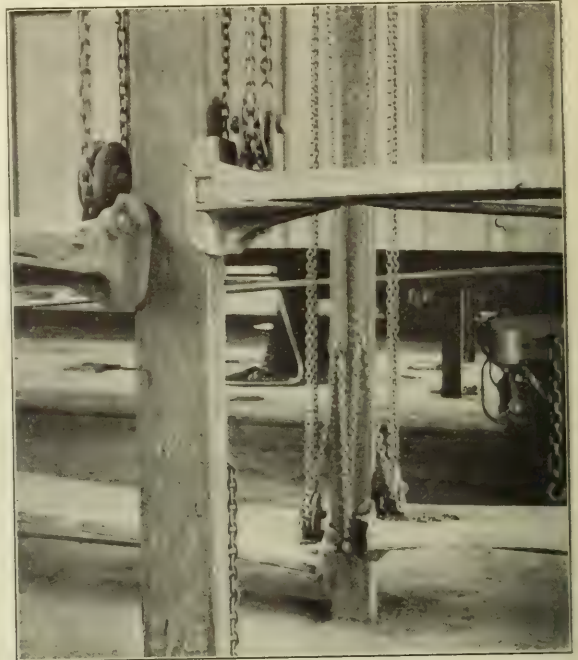


Fig. 7—Details of Adjustable Scaffold.

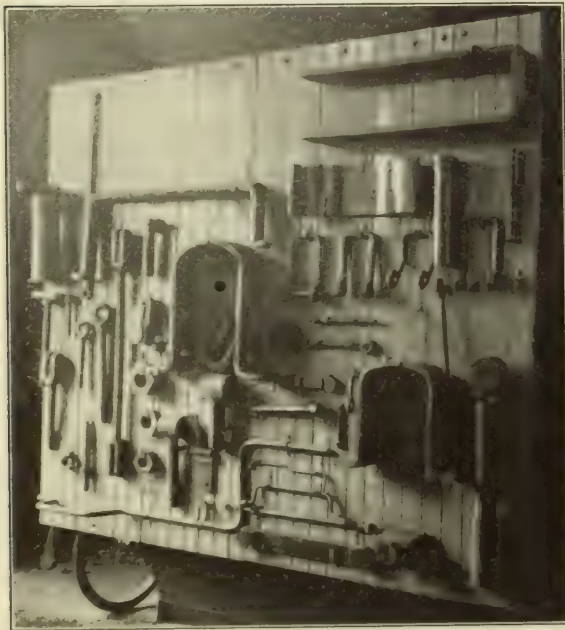


Fig. 6—Machine Forgings Made at the Sayre Shops.

of the scaffold. Pulley wheels, similar to those shown, are mounted near the tops of the posts. Special features of this scaffold are its quick adjustment; the safety afforded; the unusual distance, 11 ft. 4 in., over which adjustment is possible; and the provision for quickly raising the scaffold to the top of the posts and entirely out of the way when it is not being used. The short chains, about 3 ft. long, that are fastened to the posts near the bottom have hooks at the other ends which engage the chains that are used in raising and lowering the scaffold, thus locking the scaffold in any position to which it may have been adjusted.

PAINT SHOP BALCONY.

A general view of the paint shop balcony at the Sayre shops is shown in Fig. 8. The finishing, painting and varnishing of all sash, blinds, detached wooden seat ends, chairs, doors, window steps, window screens and detector boards, etc., is done here. On one end of the balcony is handled the cleaning and bluing of wire baskets, vestibule steps, seat striker arms, toilet boxes and

seclusion from the greater dust and dirt making operations of general coach overhauling.

At the right of the photograph is shown the office of the paint shop foreman, W. H. Dutton and inspector M. C. Hillick. Just beyond the office inclosure are shown three water coolers, mounted in position for painting and varnishing. A detail of these revolving stands is shown in the drawing, Fig. 9. The



Fig. 8—General View of the Paint Shop Balcony.

bases are made from castings formerly used in chair cars. The 12 in. diameter top is made to revolve, facilitating the painting. These stands are also used for any miscellaneous painting when it is advantageous to revolve the work.

SASH RACK.

At one end of the paint shop balcony is located the sash rack shown in the photograph, Fig. 10. This rack will accommodate the sash from a dozen cars at one time, together with the deck and transom sash and the blind. The adjustable partitions,

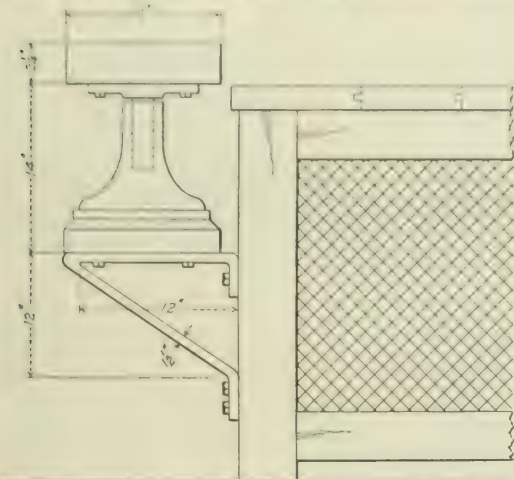


Fig. 9—Revolving Stand for Painting Water Coolers.

which carry cleats beveled to prevent marring the freshly applied paint or varnish, may be moved sideways after loosening the winged holding clamps shown at the top. Similar clamps are provided at the bottom of the rack. Sash racks of this design afford a safe, clean and quick storage for sash and blinds, and allow the circulation of air for drying the fresh paint or varnish.

DOOR RACK.

At the far end of the paint shop balcony is a door rack, a near view of which is shown in Fig. 11. This rack affords a

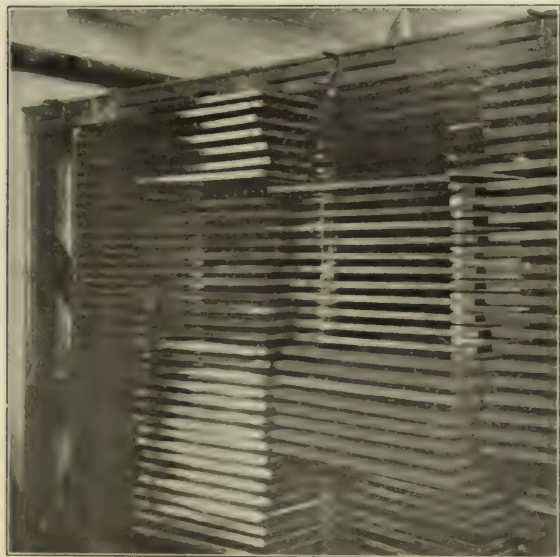


Fig. 10—Sash Rack with Adjustable Partitions.



Fig. 11—Rack in the Paint Shop for Car Doors.

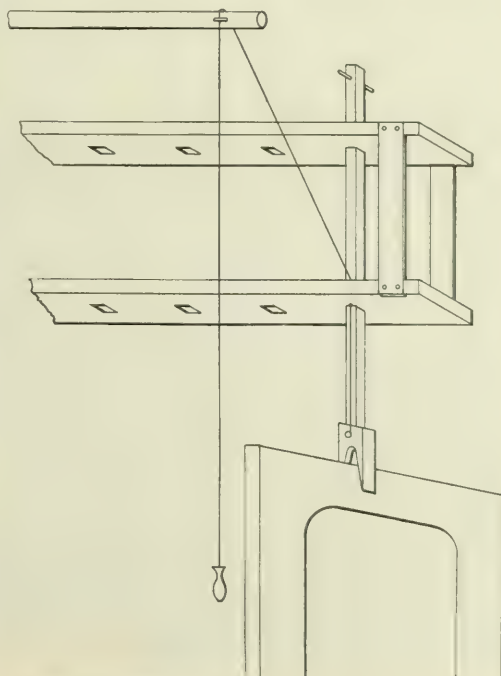


Fig. 12—Details of Top of Rack for Car Doors.

storage for 100 car doors, and utilizes a space which cannot be used to advantage for other purposes. The storage is compact, provides for the necessary air circulation and for a rapid and easy handling of the doors, as each is held independently. The drying of the doors is uniform and certain, assisted by the warm air from the heating system. The perspective drawing, Fig. 12,



Fig. 13—Cleaning Department for Interior Coach Fixtures.

gives a better idea of the construction of the rack than does the photograph. The holding piece is raised to its full upward position when placing a door, and then falls to the position shown by its own weight. The jaw, being tapered, does not mar the freshly painted or varnished surface.

CLEANING INTERIOR COACH FITTINGS.

In one end of the coach shop and below the balcony illustrated in Fig. 8, all removable interior parts of passenger coaches



Fig. 14—Apparatus for Dyeing Plush Seats and Seat Backs.

are cleaned and repaired, preparatory to being taken to the balcony. A general view of this section of the shop is shown in Fig. 13. It is well lighted and heated. At the left one of the

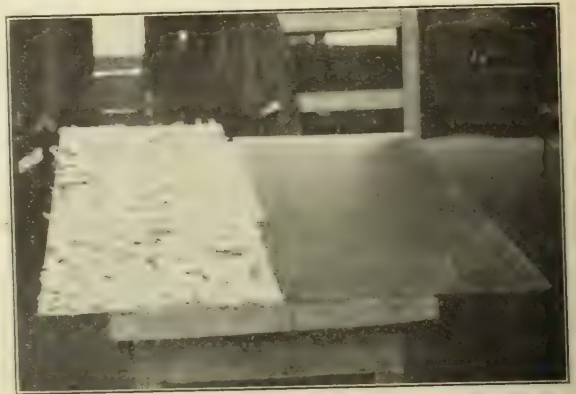


Fig. 15—Manufacturing Crackle Glass.

three copper lined tanks used for washing interior coach parts in lye water is shown. After washing, the parts are placed in the dripping racks located near the tanks. When dry the pieces are handled on the benches beyond, where all the necessary cabinet work is done, after which they are taken up stairs for finishing.

WASHING AND DYEING PLUSH SEATS.

In a portion of the upholstering shop building is a room in which seats and seat-backs are washed and dyed. This room is between the main upholstering shop and the storage room, so that after the cushions are inspected, repaired and cleaned, they are dyed and then sent to storage to await the completion of the car from which they were taken. The photograph, Fig. 14, shows the provision which is made for the dyeing process. Cushions are first dyed on the edges and then the tops, being handled on



Fig. 16—Glue Pot in Cabinet Shop.

the revolving skeleton rest. The dye is put on with a stiff brush, which is dipped into the copper dye tank at the right. After being dyed, the cushion is placed with one end on the floor and the other against the framework, and is flushed with water. After flushing, it is returned to the position shown and thoroughly blown down with a 4 in. flat jet of air at 90 lbs. pressure. As the entire process requires but about four minutes, the water

used in finishing does not have time to soak into the cushion. The opposite side of the small structure is used for soaking leather cushions and backs.

MANUFACTURE OF CRACKLE GLASS.

Two sheets of crack glass for use in state rooms or toilet room panels, or any place where a non-transparent light is used, are shown in Fig. 18. The glass at the right shows the completed work, while that at the left is in the course of preparation. The

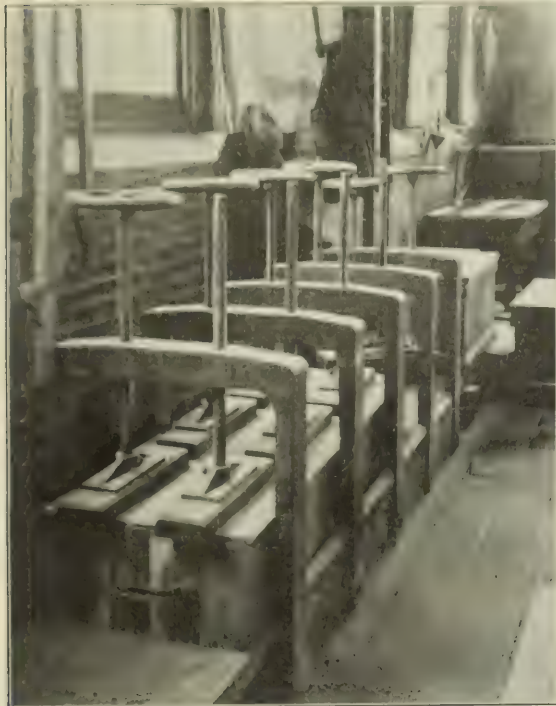


Fig. 17—Clamping Press with Glue Pot in the Background.

sheet of glass is first thoroughly sanded by a sand blast. This gives it a rough surface. It is then coated with a layer of specially prepared "Noodle" glue, about 3/32-in. thick, after which it is placed in an even temperature room, about 75 deg. to 80 deg., and left there until the glue dries. In drying, the glue surface cracks and the small pieces curl up as shown on the



Fig. 18—Portable Gas Tank.

sheet of glass at the left in the illustration. At the surface of the glass that is finished by the sand blast, the glue adheres to it and in drying this mass of the glue are carried off by the wind. There is, of course, no fixed form, but the finished surface is smooth and clean. To make what is called a crack glass, a piece of glass has to be put through the furnace a second time.

GLUE POT.

A cast iron glue pot in the cabinet shop is shown in Fig. 16. It is 62 in. long, 29 1/2 in. wide and 7 in. deep and rests on four iron feet 20 in. high. There are 12 one-gal. and 2 two-gal. kettles, giving a total capacity of about 16 gals. The iron kettles have flanges on their top edges by which they are held suspended in

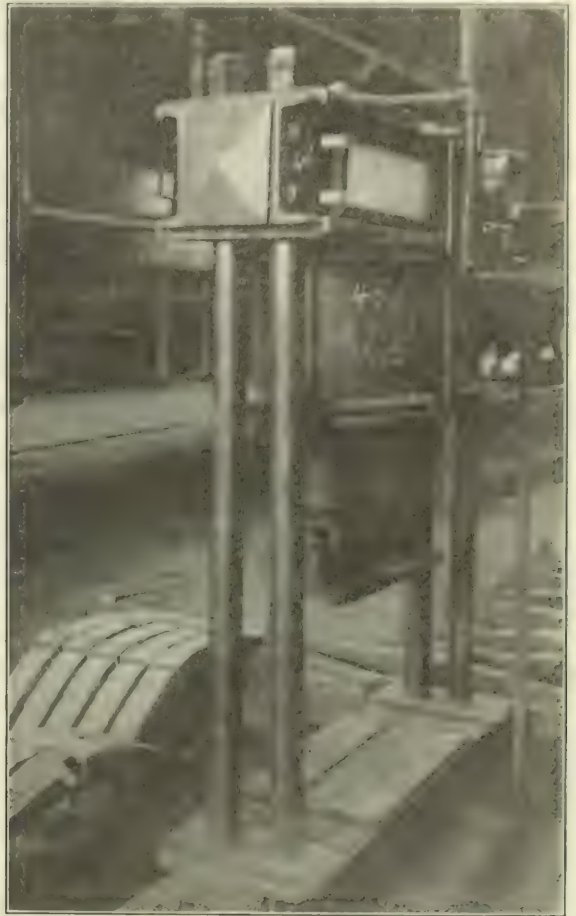


Fig. 19—Device for Testing Coach Springs.

the water. A coil of 5/8-in. copper pipe is placed upon the bottom of the pot and the steam and water regulating valves, etc., are located at one end. The pot is cast in one piece, with a flange to which the ribbed cast iron top is belted.

CLAMPING PRESS.

Near the glue pot described above is a clamping press, shown in Fig. 17, with the glue pot in the background. This is used when gluing together several sections of light material to be bent to circular form. A form for ceiling boards is shown in the press. The frame pieces are made of wrought iron, 4 in. wide. The threaded bolts carry cast iron heads, to which wooden shoes are fastened. The hand wheels slip over the square portion

of the shaft, and may be shifted from one side of the press to the other.

PORTABLE GAS TANK.

A portable gas tank, used when testing the Pintsch lighting systems in passenger coaches, is shown in Fig. 18. It is an ordinary coach gas tank, mounted on cast iron wheels so that it may easily be transported about the shop. It is also used for taking gas from a coach just shopped, for use in another which is ready to leave the shop. In this instance, however, it is only possible to draw gas from the car tank until the pressures in it and the portable one are equalized.

TESTING COACH SPRINGS.

When overhauling coach trucks, springs of greater strength than those removed are used. These need not necessarily be new ones, but they must show a loaded weight at the same height, greater than the ones removed. The spring testing machine shown in Fig. 19 is used in this connection. Previous to removing the trucks from the coach, the springs are calipered between bands. Each spring is then put in the machine and compressed until its calipered distance between bands corresponds to that which was noted when it was under the car. The gage registers the pressure necessary to get this height. A new spring, or an old one from a larger capacity car, is then put in the tester and compressed until the gage shows the same pressure as did the



Fig. 20—Device Used for Drilling Journal Box Bolt Holes.

spring removed from the coach. If the required pressure is attained at a height 0.0001 in. between bands greater than the removed spring, the second one may be used, but if this distance be the same or less than the first one, it cannot be used. The height is noted between the top cross piece of the tester shows some standard pressures, heights and carrying capacities of springs, as at 100 lbs. pressure, a certain spring calipers 7 in. between bands and will have a carrying capacity of 21,500 lbs. Another spring at 90 lbs. 8 1/2 in. in height will have a capacity of

14,500 lbs. The two sets of uprights, set 34 in. apart, are made of 2-in. pipe. The top crossie consists of two 8-in. channel sections, with a 10 in. x 10 in. wood filler block. The two cylinders are 10 in. x 12 in., both pistons being tandem connected to the wrought iron crosshead.

DRILLING JOURNAL BOXES.

The caboose section of the freight car shop is shown in Fig. 20. In rebuilding old freight cars to a capacity greater than that for which they were originally designed, it is necessary to

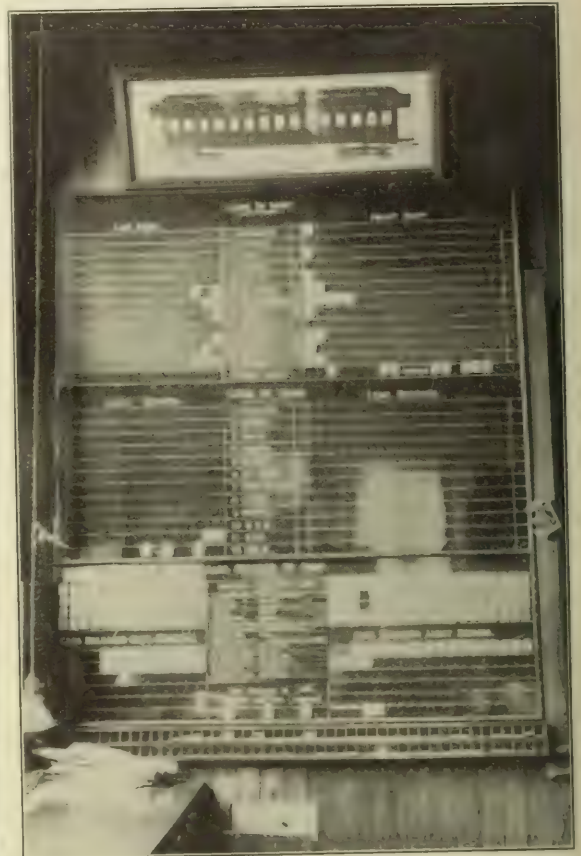


Fig. 21—Passenger Car Repair Board.

strengthen the trucks, using heavier arch bar material, and heavier arch bar bolts. The rigging shown in the photograph is used in connection with drilling the bolt holes in the journal boxes larger. The journal box is held in position by a block wedged against one foot of the upright. A guide, or template, is used in drilling, to prevent the drill from running to one side in the hole as it would be very apt to do otherwise, since the work is that of reaming rather than of drilling. Flat-twisted, high speed drills are used.

Hooked over one of the cross-ties of the built-up building column is shown an all-metal scaffold bracket used in the freight car shop. The extension arm is shown partly thrown up, to illustrate the fact that it may be moved up and out of the way to prevent its being struck by a passing car when not in use.

PASSENGER CAR BOARD.

In the office of J. C. Pohl, general foreman of car repairs, is an interesting passenger car board, as shown in the photograph, Fig. 21. The foremen are able to see at a glance just what cars are in the shop and to make provision for shifting them from

one shop and receiving them in another. The top section of the board shows that two coaches over 60 ft., two less than 60 ft., one combination, one baggage and mail, one express and three milk cars are in the shop. The right side of the top section shows the cars in the paint shop. The central section is for cars in the yard and indicates whether they are for light or

heavy work. The different foremen's lines on the work in yard and paint shop are shown. The cards bearing the car numbers are kept in the pigeon holes below the board.

ROLLING MILL AND CUTTER

Pneumatically operated rolls and a cutter used in shaping and cutting freight car roofing material are shown in Fig. 22.

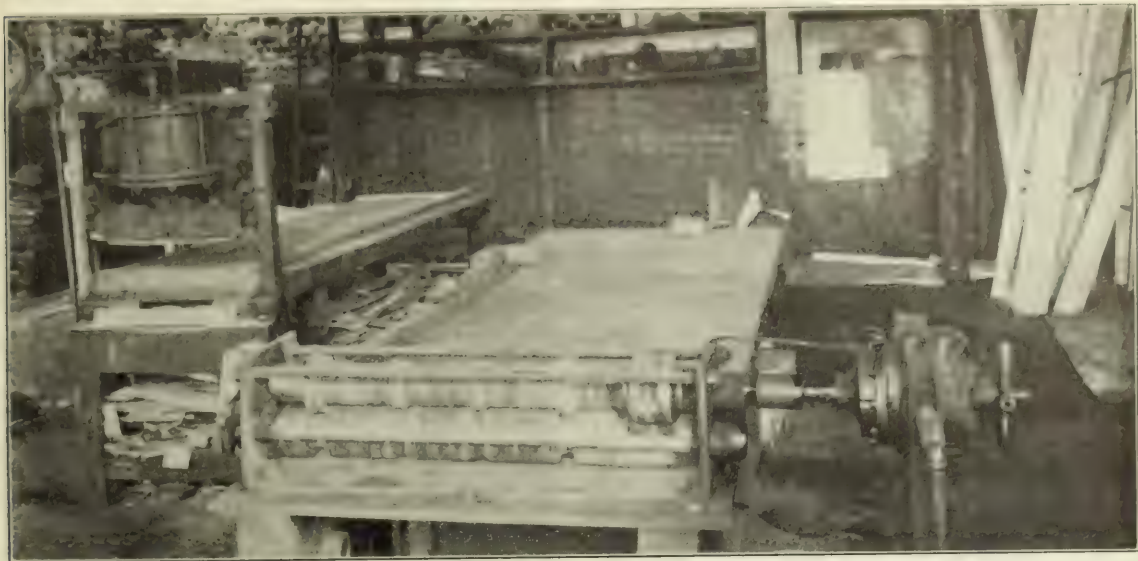


Fig. 22—Cutter and Rolls for Roofing Material.

general repairs, while the lower section is used for cars ordered to the shop. The car numbers on this lower section are sent in from the master car builder's office at South Bethlehem. It

The form at the extreme right of the roll cylinder is used for shaping the ridge pole sheet. The other four are used as one form in shaping the roof sheets. The roofing sheet cutter has an air cylinder mounted on a metal cross-piece that is bolted to the two uprights, which also act as guides for the crosshead carrying the blade. The contour of the blade edge is shown, as is the shape of the cut sheet, one of these being placed on edge below the lower knife.

MACHINE SHOP KINKS.

PLANING SHOES AND WEDGES.

The work of planing shoes and wedges, as done at the Sayre shops, is of especial interest; the three photographs show all the processes from the rough casting to the finished one. As far as possible the number of patterns is reduced to a minimum in

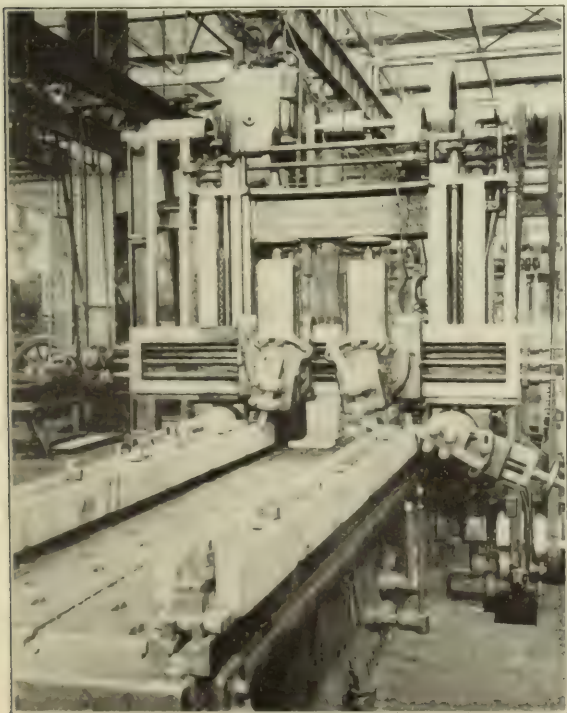


Fig. 23—First Operation in Planing Shoes and Wedges.

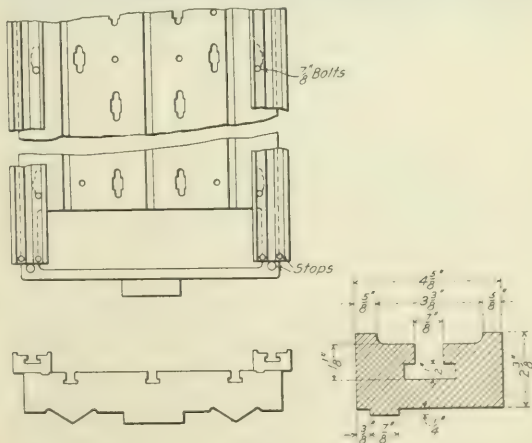


Fig. 24—Application of Extension Parallel Strips to Planer Table.

these shops. This, of course, requires the removal of a large amount of stock in some cases and it is questionable whether it is more economical to save handling a large number of patterns in the foundry, or save the additional time required in the machine shop to remove the surplus stock. Shoe and wedge castings illustrate this minimum-pattern idea strikingly.

A Putnam planer as used in the first operation of this work is shown in Fig. 23. In order to use the four heads of the machine at the same time it was necessary to apply two permanent extension parallels to the platen. The application of these is plainly shown in the photographs. It is also clearly shown in the drawing, Fig. 24, together with a cross-section detail of the parallel. This provision allows the use of the two cross-rail heads for machining the tops of the flanges and the vertical work on those sides toward the center of the platen, while the side heads do the outside vertical sides. As is seen, the castings are held free of the machine bed and are finished on the top of the flanges and

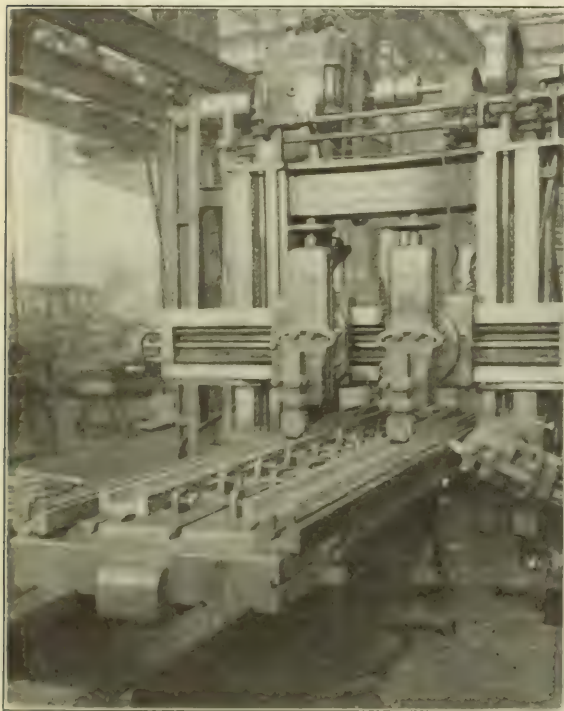


Fig. 25—Planing the Inner Sides of Flanges and Face of Shoes and Wedges.

the sides at one setting. The parallels are made of iron or soft steel and extend the full length of the bed. A special slot is cut in the bed to receive the lug on the parallel. Two permanent stops are provided against which the castings are clamped. The shoes are placed on the parallels as shown, with a clamping bolt between each pair.

After the outside surfaces are machined, the castings are re-chucked as shown in Fig. 25. They are held against sliding by stops in the platen and are forced against the parallel strips by the set screws and chisel points. Two-cutter tools are used for machining the flanges and an ordinary tool on the horizontal surfaces.

After being layed-off, the final operation is handled on the machine shown in Fig. 26. Two small parallel strips are used for supporting and adjusting the casting. The drawing, Fig. 27, shows a detail view of one of these parallels. The wedges are adjusted by set screws, the work being very quickly performed

The casting is clamped firmly in position by the set screws and chisen points, and heavy cuts may be taken.

PLANING CROSSHEAD SHOES.

A two-bar cross-head chucked on a planer bed in position for planing the babbitted shoe is shown in Fig. 28. The tool used is $4\frac{1}{2}$ in. wide. Some of the shavings removed are seen to be

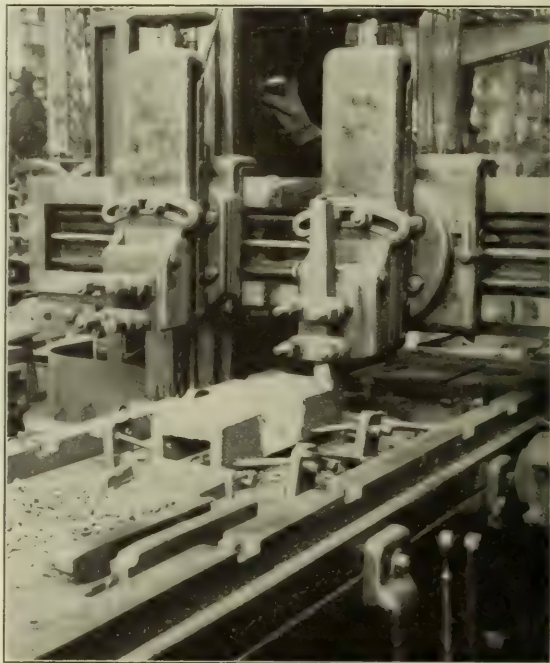


Fig. 26—Final Operation in Finishing Shoes and Wedges.

wide and heavy. It acts largely as a scraping tool and makes a true, even finish, with no possibility of gouging into the soft metal.

PLANING AND DRILLING ECCENTRICS.

Owing to the shape of eccentrics, it is necessary to use jigs to secure rapid production in planing and drilling them. In the photograph, Fig. 29, are shown two box-section plates used for this purpose. The half-eccentrics are first drilled to a template to fit the $\frac{3}{8}$ -in. plugs, two of which may be seen on the side of the upper plate in the photograph. The halves are then clamped to the plates, fitting over these $\frac{3}{8}$ -in. plugs. Each face plate will accommodate six halves, and two such plates are put end to end, on a planer at one time. After the planing is completed, the

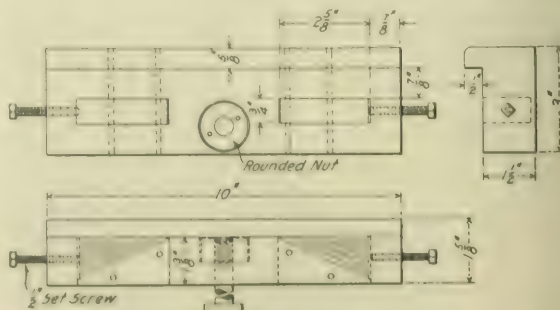


Fig. 27—Device for Supporting and Adjusting Shoes and Wedges for Final Operation.

face plates, with eccentric halves still clamped to them, are taken to the drill press for drilling the large lost holes.

TURNING ECCENTRICS.

A 5/8-in. Ballard vertical boring mill and an eccentric clamped in position for turning are shown in Fig. 31. The drawing, Fig.

31, is of diameter and are then passed up the working side of the boring, using two tools, one for roughing and the other for finishing. The working mandrel consists of a base plate made of soft steel, and four cast iron sectors that are secured by a conical wedge. The base plate has a slot that fits in the end of the table. There are several 1/4-in. holes shown near one end of the base plate to provide for 4-in., 4 1/2-in. and 5-in. throws, by moving the base plate along the slot. Several holes have been drilled in the bed of the mill to correspond to the three holes in the base plate, and a plug is used to locate the base plate.

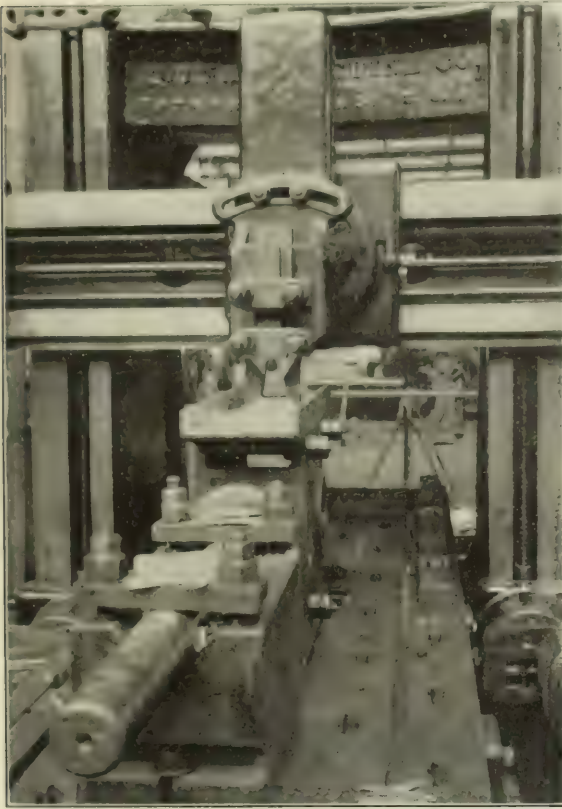


Fig. 28—Planing a Babbitted Crosshead Shoe.

30, shows the detail dimensions of the chucking plate and the clamping sectors. New eccentrics are first bored to minimum



Fig. 29.—Jigs for Planing and Drilling Eccentrics.

The eccentric is fastened to the base plate by the expanding bushing, the four sectors and the conical wedge. It is held from turning by a plug that is driven in the base plate so that the rib will fall central. The machine on which this work is done is used exclusively for boring eccentrics and turning rod brasses.

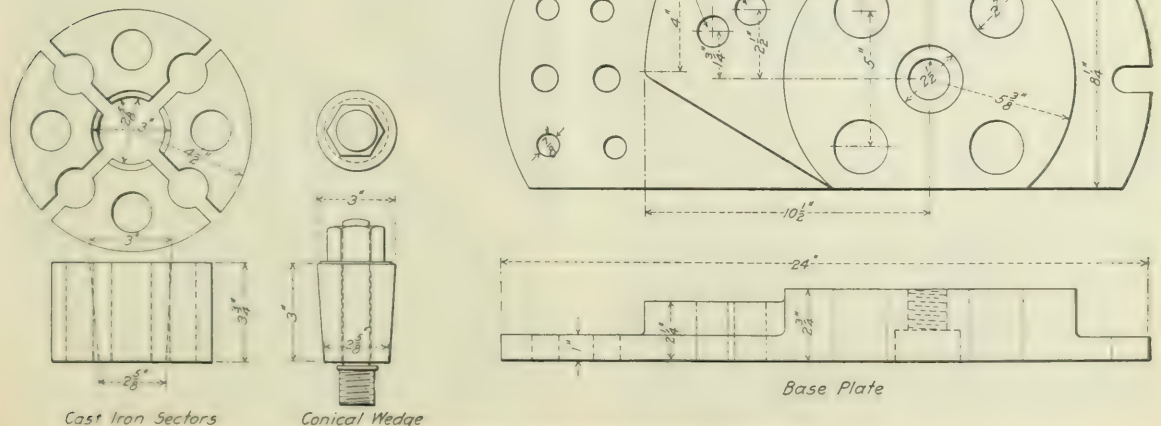


Fig. 30—Details of Mandrel for Turning Eccentrics.

BORING CYLINDERS AND CYLINDER BUSHINGS.

A Barrett Bros.' horizontal cylinder boring machine, used exclusively for boring cylinders and cylinder bushings, is shown in the photographs, Figs. 32 and 33. The V-s., adjustable for 12 to 40-in. diameters, rest on cast iron parallels which are bolted to the bed of the machine. They also move longitudinally on the parallel strips, having wide feet to give stability and to pro-

carries a right-angle hook against which the cutter rests. The tools are set out the proper distance from the head by measurement, so that it is not necessary to run trial cuts and caliper the cylinder or bushing.

TIRE BORING CHUCKS.

Tire boring chucks, which in a general way resemble those used on truck and passenger car tires on the Long Island (Rail-



Fig. 31—Application of Mandrel for Turning Eccentrics.

vide for the holding bolts. Both cylinders and bushings are bored and faced to length on this machine. The boring head was designed and made at the Sayre shops. Fig. 34 shows a face view of this head with the bar drawn back. Provision is made for using six tools. Each one is adjusted by a screw, the end of which is shown. The lower end of the screw adjustment

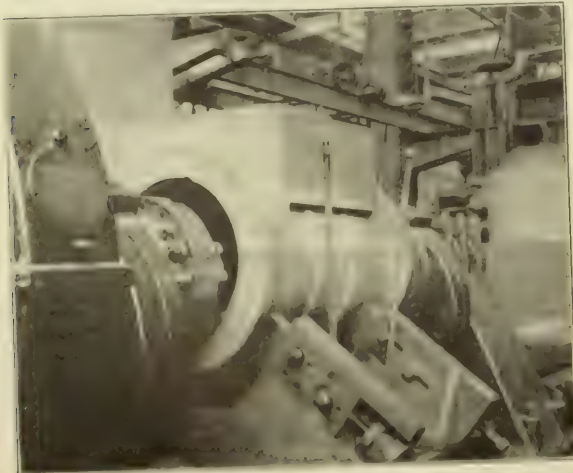


Fig. 32—Cylinder in Place for Boring.

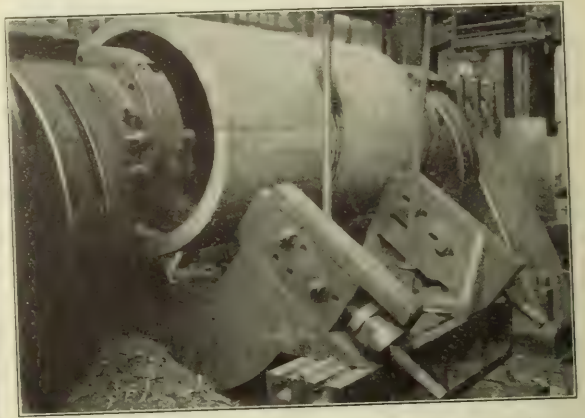


Fig. 33—A Cylinder Bushing About to be Clamped Preparatory to Boring.

way Age Gazette, November 4, 1910, page 856) are shown in the accompanying photographs, Figs. 35 and 36, and the drawing, Fig. 37. The machine used for this work is a 96-in. Niles-Bement-Pond boring mill. There are six chucks in a set, made of cast iron and having a soft steel swinging clamp and a tool steel toothed-plate which assists in gripping the tire. The chucks are fastened to the table by three 1¼-in. T-bolts each. A lug

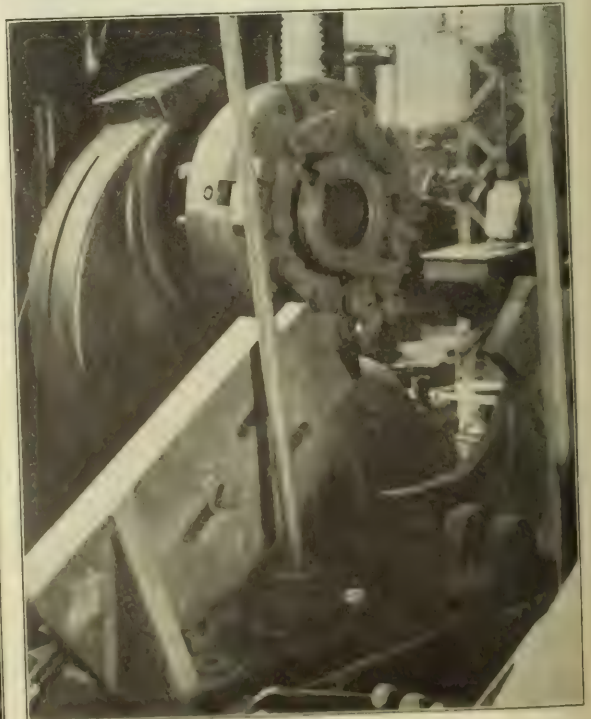


Fig. 34—Boring Head of Cylinder Boring Machine.

is cast on the bottom side of the chuck, to fit the slot in the table. It will be seen that one side of the chuck is about twice the width of the other. This was necessary to provide stock for the

when a heater similar to the one shown in Fig. 39 is used. The oil supply is kept in the reservoir mounted under the furnace, and the furnace may be easily rolled along side of the machine.

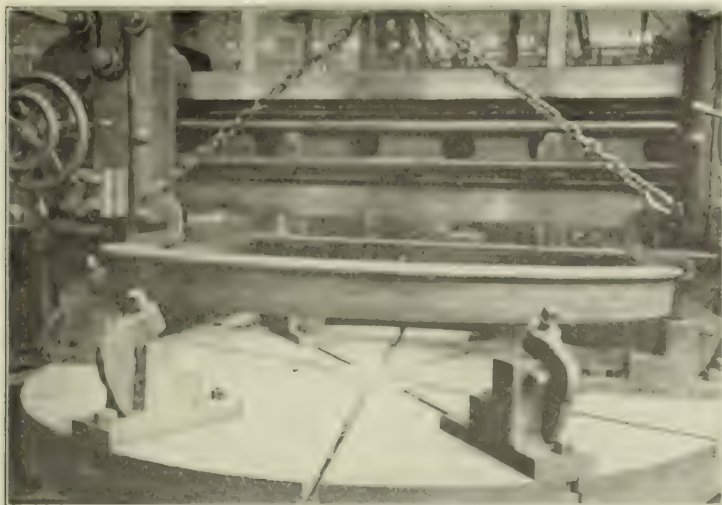


Fig. 35—Driving Wheel Tire About to be Placed in the Chucks.

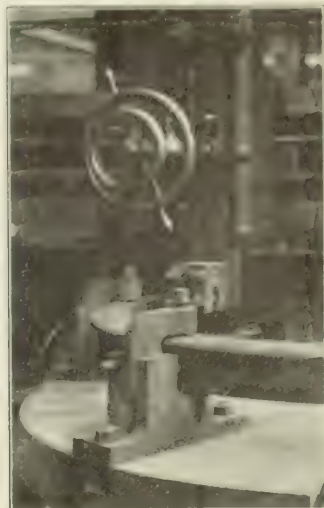


Fig. 36—Chuck Holding Tire.

set screw used in adjusting the tire to a central position on the machine. The soft steel C-clamps are made to swing back on the pin near the base. The shop crane is used in handling tires to and from the machine; Fig. 35 shows the chucks in position for placing or removing a tire. Two tools are used, a roughing and a finishing, and a tire is bored complete in one operation.

THREADING RADIAL STAYBOLTS.

Radial staybolts are ordinarily threaded on a small engine lathe, especially on the head end of the bolt. At the Sayre shops this work is done entirely on bolt machines. The bolts are stripped and the taper fit and facing of the head are done on a horizontal bolt machine, the dies having extensions for making the nick under the head. The bolts are threaded on a vertical machine. The lower head carries the bolt, gripping it on the

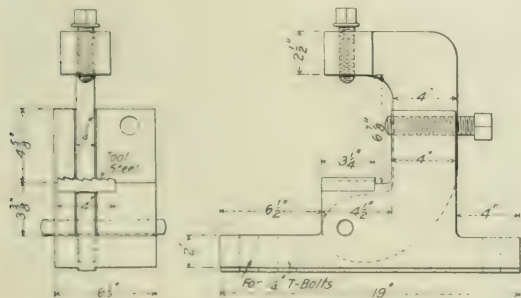


Fig. 37—Details of Chuck for Boring Tires.

square end; the movable head carries the chasers, and is let down from above. In cutting threads close to the head, it is necessary to provide a device for tripping the dies. This device is shown, as it is about to operate, in Fig. 38. It allows the dies to approach within 1/32-in. of the head of the bolt, when they are opened.

PISTON ROD OIL HEATER.

It is not necessary to heat sprung piston rods in the blacksmith shop and hurry them to the lathe centers for straightening,

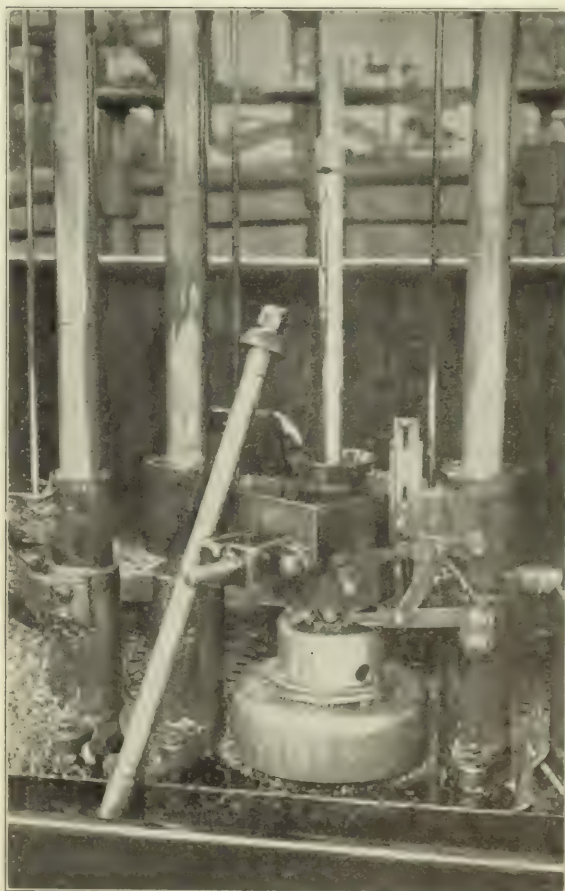


Fig. 38—Threading Radial Staybolts.



Fig. 39—Oil Furnace for Heating Piston Rods Preparatory to Straightening in Lathe Centers.

TOOL RACK.

To avoid having a number of cutting tools of the same kind at each machine, it was decided to issue tools for immediate use only, which has had the effect of better maintenance of the tools



Fig. 40—Rack in Tool Room for Cutting Tools.

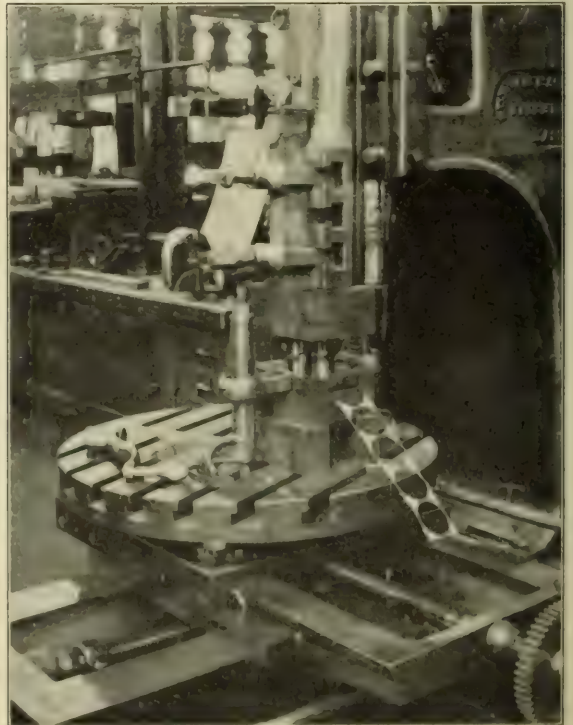


Fig. 41—Punch for Copper Gaskets, as Used on a Slotter.

and a uniformity of setting which for the several kinds of work. All grinding is done in the tool room and by one man, who is also to a set of standard gauges. When a machine operator desires a new tool, or a freshly ground one for a dull one, he applies at the tool room window and is given a new tool or a sharp one in exchange for the dull one. These tools are kept in the rack shown in the photograph, Fig. 40. Each pocket is numbered, and as the tools are numbered accordingly, they may be called for and delivered by number. A tool room attendant who is not familiar with the shop names of the tools, or the uses to which they are put, is thus enabled to hand them out properly.

COPPER GASKET PUNCH

Copper gaskets are made with the punch shown in Fig. 41, on a Putnam slider in the tool room. The lower die block is

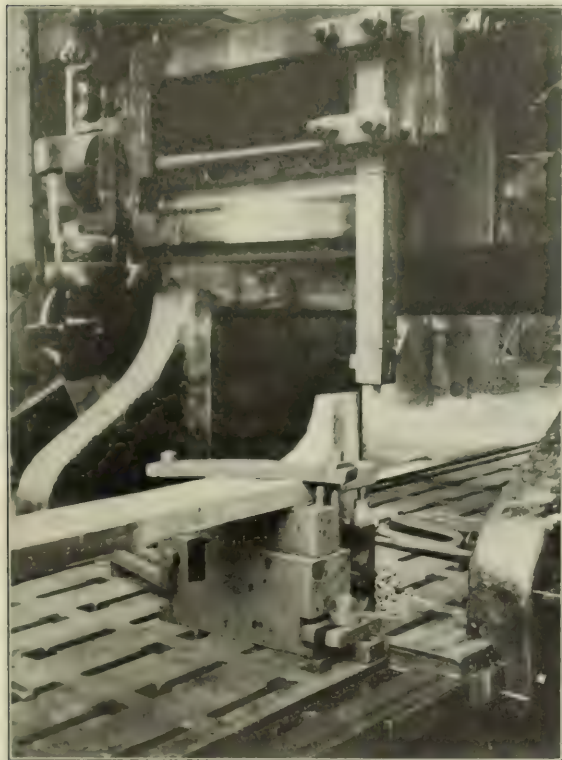


Fig. 42—Slotting the Frame Fit on a Grate Bearer Cross-Tie.

clamped to the bed of the machine, while the upper one, carrying the two punches, is held in the sliding head. The two punches provide for making a gasket at each stroke of the machine. The sheet copper is fed in at one side; the small hole is punched first and the large one next, after which the gasket falls through to the table. There is a small stop provided on the side from which the sheet is fed, which acts as a guide to punch the two holes concentric.

MACHINING A GRATE BEARER CROSS-TIE.

Two positions of a grate bearer cross-tie on a double head slotting machine are shown in the accompanying photographs, Figs. 42 and 43. The first one shows the cross-tie in position for machining the frame fit. There are two parallel blocks used for this work. The lower one is clamped to the bed of the machine and the upper one swings above the lower one and on the bolt, the head of which may be seen at the far end of the lower block just beyond the slot. The opposite, or near end, of the top parallel is provided with a set screw. By this means it

is possible to square up the two ends of the cross-tie. When squaring the end of the top parallel is being set up, the end of the top parallel is turned in and the cross-tie is turned in and attached to fall in the slot in the lower parallel. The foot is then held against movement by the clamping bar.

SHOULDERED PISTON ROD AND VIBRATING CUP

The shouldered piston rod is used on most of the locomotives on the Lehigh Valley, this being done to get a large crosshead fit. It necessitates the use of polishing having a soft turning cup, and the work of machining these cast-iron cups on a Gisholt turret lathe, is of considerable interest. The first operation is shown in Fig. 44. The cup casting is made in halves and the edges which fit against each other are shaped off before the turret lathe work begins. Stock is made the length

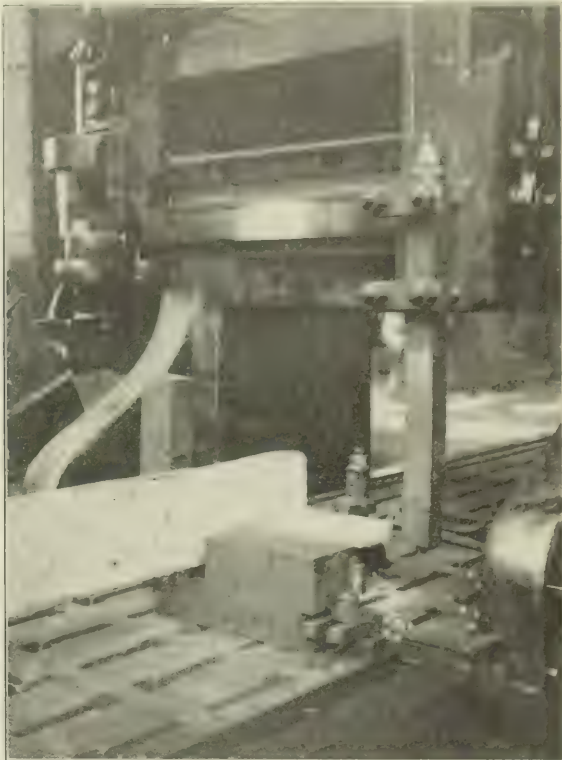


Fig. 43—Slotting the End of a Grate Bearer Cross-Tie.

of two vibrating cups. The illustration shows the first stage of the work completed, that of machining the outside of one cup. The snap gage used for this work is shown on the carriage of the machine. It will be noticed that a four-jawed chuck is used for this work. It was formerly performed with a three-jaw chuck, but it was necessary to drill and dowel the halves before putting them in the machine. This not only required time, but castings were very often ruined by having the small drills broken off in them.

The second operation is illustrated in Fig. 45. At the completion of the first operation, the chucking sleeve, shown in Fig. 45, is placed in the machine. The inside contour of this sleeve corresponds with the outside of the vibrating cup. The second cup is then machined to the snap gage and is cut from the one in the sleeve with a parting tool. The second photograph shows the cup just after it was cut off.

Fig. 46 illustrates the operation in which the cup is machined on the inside. Still clamped in the split sleeve used in the previous operation, an ordinary roughing tool is used to cut away

the sandy rough cast iron. Then two forming tools are used, the roughing one of which is shown on the tool turret, and the other in position in the turret. This shaping is done to the snap gage shown on the machine, near which are the halves of a finished cup.

This vibrating cup, when used, fits into a brass vibrating cup,

forming tools used are shown in Fig. 47, as is a completed cup and a completed combination of the brass and cast iron cups.

An ingenious tool for forming the inside face of the gland used with these vibrating cups is shown in front of the face plate, Fig. 48. The tool has five separate inserted cutters. The gland is, of course, first roughed out with a roughing tool.



Fig. 44—First Turret Lathe Operation in Finishing Two Part Piston Rod Vibrating Cups.



Fig. 46—Finishing the Inside of the Two-Part Piston Rod Vibrating Cup.

the bore of which is made large enough to slip over the shoulder of the piston rod. These brass cups are machined on the same turret lathe, being gripped in the four-jawed chuck, extension straps on the jaws, however, being necessary. The two

The machine on which the soft metal rings used with this packing are finished is shown in Fig. 49. In the foreground are shown the molds on which the packing rings are cast separate. Provision is made for casting 12 piston rod and six valve rod

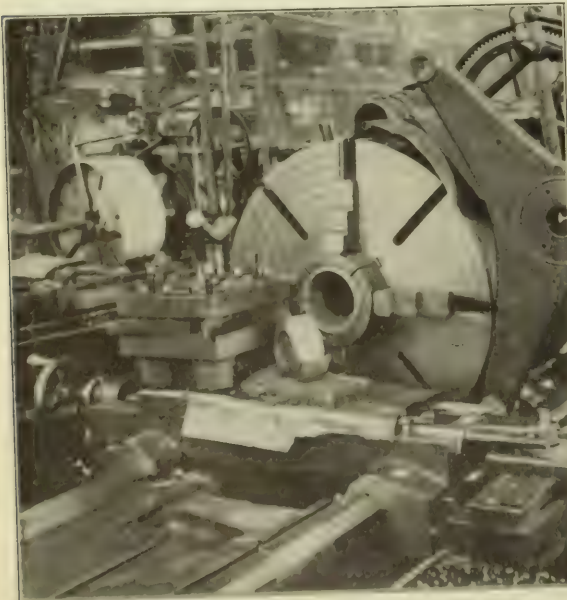


Fig. 45—Second Vibrating Cup Completed on the Outside and Cut from the First One.

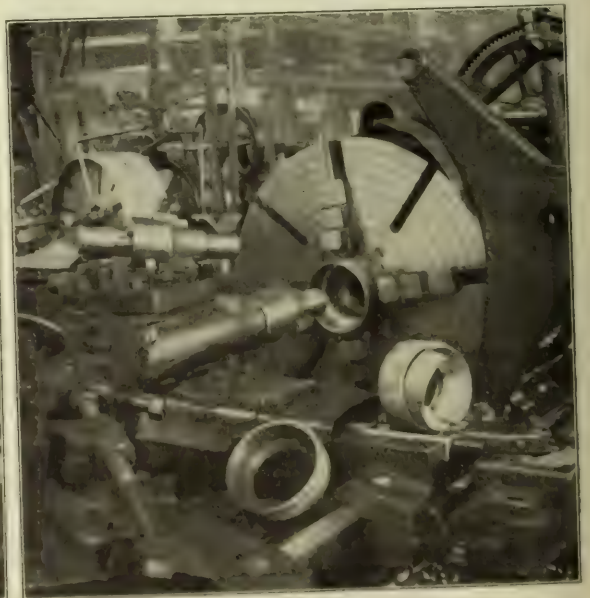


Fig. 47—Finishing the Inside of the Large Brass Vibrating Cup in which the Cast Iron Cup Fits.



Fig. 48—Tool With Five Cutters For Finishing Inside of Piston Rod Gland.

rings at one pouring. After the metal is poured, the cores are raised, by the air cylinders, and the rings may be taken off to cool. Each ring is faced separately, and then a set of three is

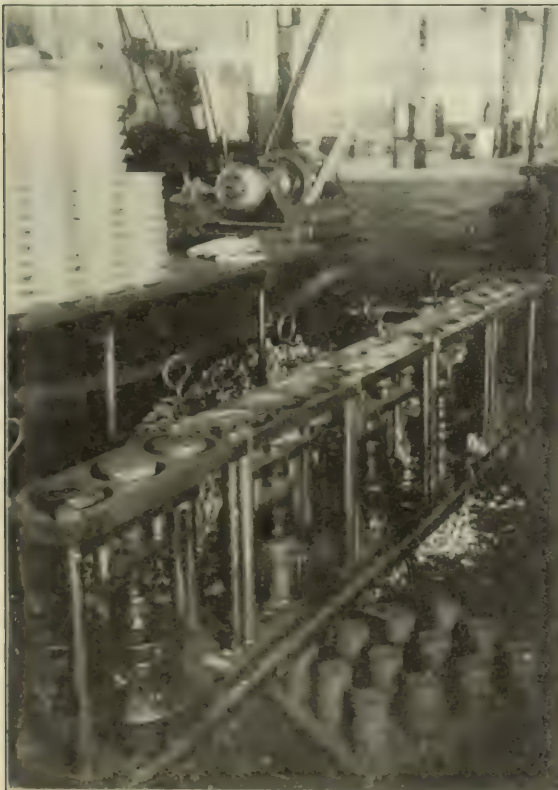


Fig. 49—Molds for Pouring and Machine for Finishing Piston and Valve Rod Packing Rings.

put on the expanding principle and adapted to meet size and contour, using a hand turning tool. The paddle is equipped with a friction clutch, which is thrown in by the lever seen just over the work. This provides for rapid starting and stopping. On the floor is shown one of several boards that fit neatly into boxes in which bunched packing rings are shipped to various points on the road.

CHIEF ENGINEER

The work of removing machine cuttings from a large shop is an important item; the practice of having it done by laborers with wheelbarrows is expensive and is not entirely satisfactory. The photograph, Fig 50, shows a chip box, a number of which are located about the shop, especially near the large machines. These boxes are 36 in. x 36 in. x 36 in., made of $\frac{1}{4}$ -in. boiler steel and will hold about 2 tons of chips. The practice is for each operator to throw the cuttings from his machine into a box. There is no difficulty in getting this done, as the mechanic



Fig. 50—Metal Box for Handling Cuttings.

shovels the cuttings up as they accumulate, his machine being supplied with the necessary broom and shovel. After working hours in the evening, the shop crane handles these boxes to a scrap car, which is run into the shop. The box has four grabs, and one side which is hinged at the top and has a latch at the bottom, provides for easily emptying the boxes when suspended over the scrap car and held by the two back grabs only.

TRUING REVERSE SHAFT BEARINGS.

With the design of reverse shaft shown in the 42-in. Pond lathe, Fig. 51, it is impossible to machine the bearing and use the regular tool slide-rest, unless a long tool be used so that the tool rest will clear the heavy link-arm in the center of the shaft. A tool of this length would not have the necessary stability for even light cuts, and the arrangement would be generally unsatisfactory. To overcome these difficulties, and to provide an

arrangement by which both bearings may be machined simultaneously, the extension tool-slide was designed. The two I-beams are bolted to the carriage of the machine. A rigid cross-bearer extends between the ends of the I-beams, to which it is braced by compression trusses, reaching from just below the

tool post to the bottom edges of the I-beams. The illustration shows clearly how the work is done, the two tools being set for starting the cuts.

HANDLING SMALL STOCK.

An iron crate used for transporting small stock about the

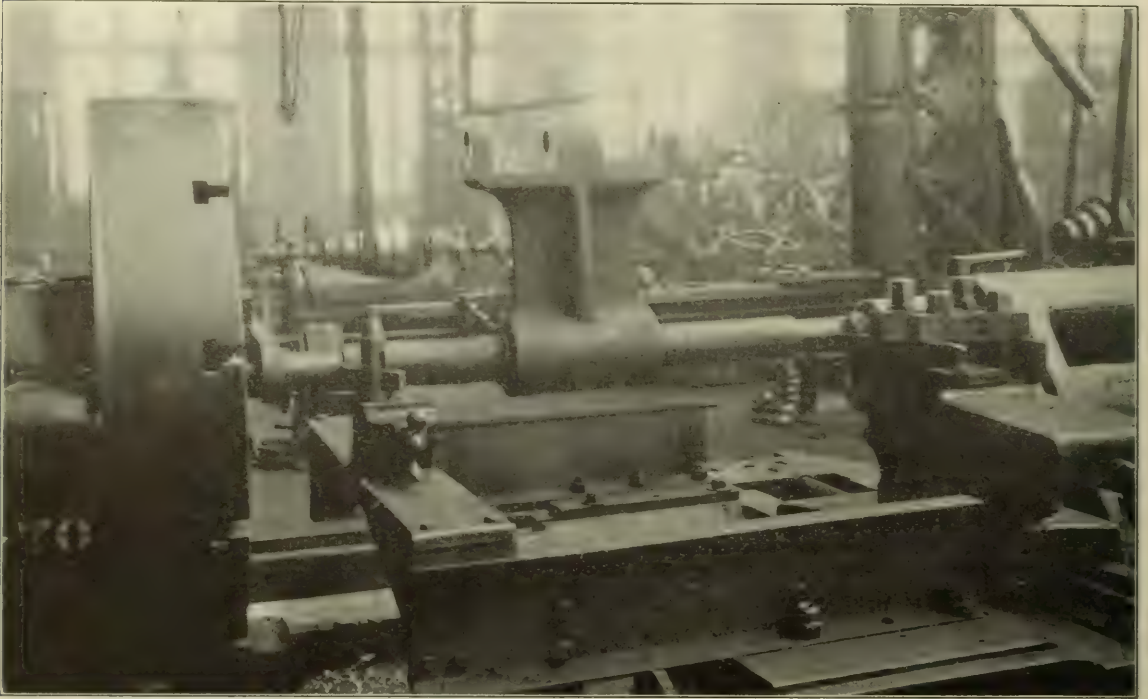


Fig. 51—Pond Lathe Fitted for Truing Bearings on Reverse Shaft.



Fig. 52—Metal Crate for Handling Small Stock in Quantities.



Fig. 53—Truck for Transporting Locomotive Frames.

shop in quantities is shown in Fig. 52. The crate is shown hanging from the large traveling crane. This method of handling is especially efficient with small pieces, such as bolts, and may

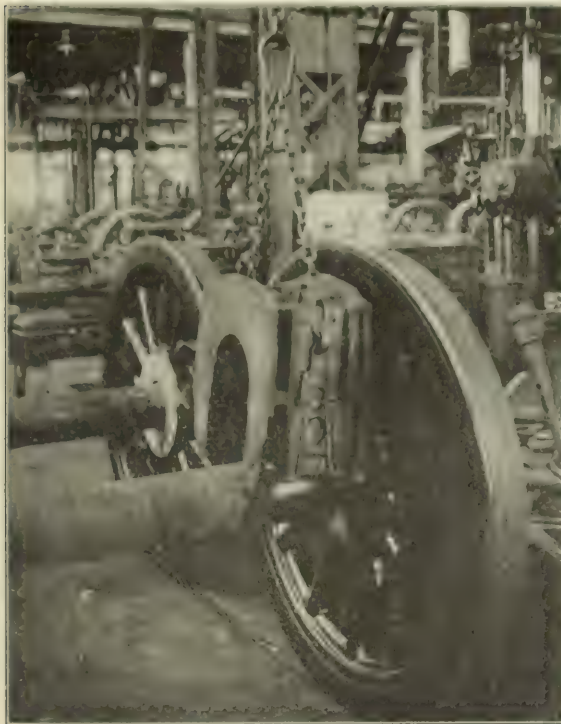


Fig. 54—Expanding Wedge Device Used in Handling Driving Boxes.

even be used advantageously for large pieces. A large number of crates are provided, so that they may be filled by the men doing the work on the pieces which saves extra handling.

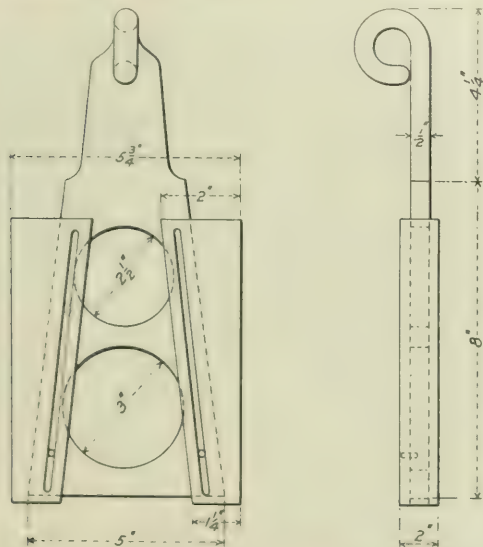


Fig. 55—Details of Expanding Wedge Used in Handling Driving Boxes.

LOCOMOTIVE FRAME TRUCK

A relic of the days before the advent of traveling cranes is shown in the photograph, Fig. 53. Long, narrow type frames are difficult to handle without crane service or when being taken to or from the blacksmith shop. The common method is one of using a hand car, but such a car is so awkward that it is difficult to get it around the shop and between pits, besides it requires some ten or twelve men to handle a large frame in this way. The truck shown is made in two pieces and is held together by the rough bolt seen between the spokes of the wheel. It so happened that the balancing point in this frame fell in the center of one jaw, in which case it was necessary to use a block between the upper ends of the verticals, otherwise the lower frame rail would occupy that position. By balancing a frame on this truck, six men may easily handle the largest ones. This truck will be found especially useful in a small shop not having traveling crane service.

ERECTING SHOP KINKS.

HANDLING DRIVING BOXES.

An ingenious device, consisting of a pair of expanding wedges, is used for grasping the driving boxes while handling them with a crane. One of these is shown in use in the photograph,

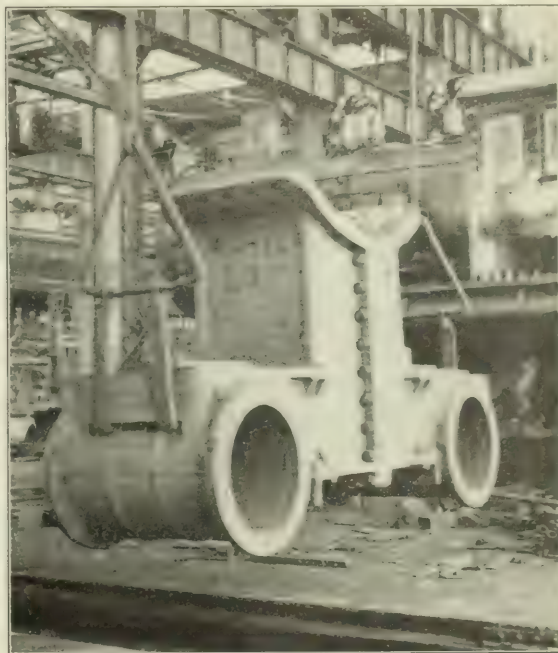


Fig. 56—Transporting Cylinders by a Traveling Crane.

Fig. 54, and in detail in the drawing, Fig. 55. There are two loose shoes, which slide on the edges of the wedge-shaped center piece, guided by two pins and the slots shown. The weight of the box serves to bind the shoes against the flanges of the box.

HANDLING CYLINDERS.

A pair of locomotive cylinders being handled by an overhead traveling crane is shown in Fig. 56. Advantage is taken of the cylinder design which permits the use of the hooks. There is a neavy cross arm above to which the crane block is attached. Cylinders are easily handled to and from the frames with this device.

TIRE AND FRONT END DOOR CLAMPS.

Simple clamps used in handling tires and front end doors with the shop crane are shown in Fig. 57. The tire clamps have hooks that grip the flange. The arm which bears against the inside of the tire has an extension end which, being bent outward, provides pressure, when the tire is lifted, on both the

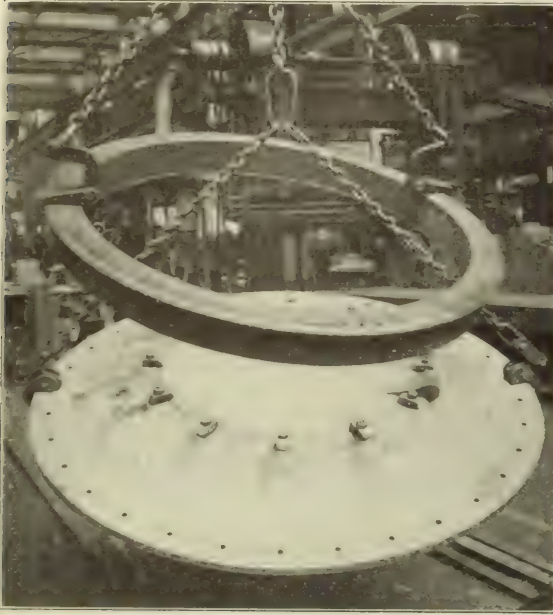


Fig. 57—Clamps for Lifting Tires and Front End Doors.

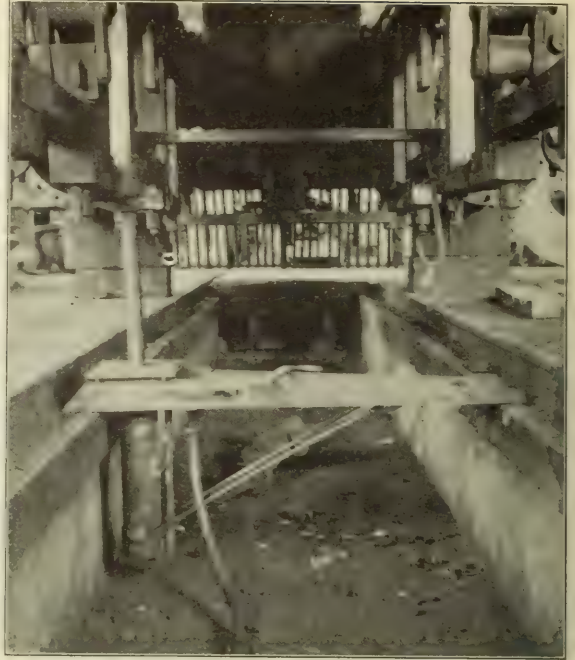


Fig. 59—Jack for Handling Heavy Pedestal Braces.

flange and inside of the tire. The clamp used on the front end door is similar to those often used for handling boiler plate. The hook, which grasps the door, is assisted by the lever action of the central piece. The third piece is not necessary. The chain may be attached direct to the lever, which is supplied with teeth on the other end that grip the metal.

HANDLING STEEL CABS.

Steel cabs are conveniently handled about the shop by the crane and the device shown in Fig. 58. The cross-piece is made of a T-bar, the vertical flange of which is cut off at the ends and the bottom web is turned up for the chain connections. The



Fig. 58—Device for Handling Steel Cabs.



Fig. 60—Portable Rivet Forge for Use in the Erecting Shop.



Fig. 61—Crate for Handling Boiler Tubes.

triangular arms fixed in the windows and pressure for lowering a cab without injury to the newly painted and varnished surfaces.

FACE FOR PEDISTAL BRACE.

Raising and lowering heavy pedestal braces, especially when the wheels are under the locomotive, or when the work is being done in the roundhouse under a hot engine, is a most difficult job. A light, portable jack designed for this work and which—quite efficient is shown in Fig. 59. The cross-pieces are made of light sheet metal, made angular to provide rollers. The air cylinder is mounted at one end and its piston carries a shoe—made from an ordinary engine step—on which the brace rests. In using, the brace is placed on the shoe, air is applied and the brace is carried up and held in place until the nuts are placed.

PORTABLE RIVET FORGE.

A handy, portable rivet forge, used in the erecting shop, is shown in Fig. 60. The hood is made of light sheet iron and rests on a framework, having three cast iron wheels, the third one being a guiding wheel. Coal is carried in the box and air pressure is supplied from the shop air line.

CRATE FOR HANDLING BOILER TUBES.

The crate of tubes shown in front of the locomotive in Fig. 61, illustrates the method of handling boiler tubes to and from the flue shop. When they are removed from the boiler, they are dropped into the crate, as shown.

LYE VAT.

The easiest and quickest method of cleaning the brake rigging, eccentric straps, link motion, driving boxes, shoes and wedges, binders, etc., is to put them in a cage which may be lowered into a lye vat, such as is shown in Fig. 62. As the Lehigh Valley

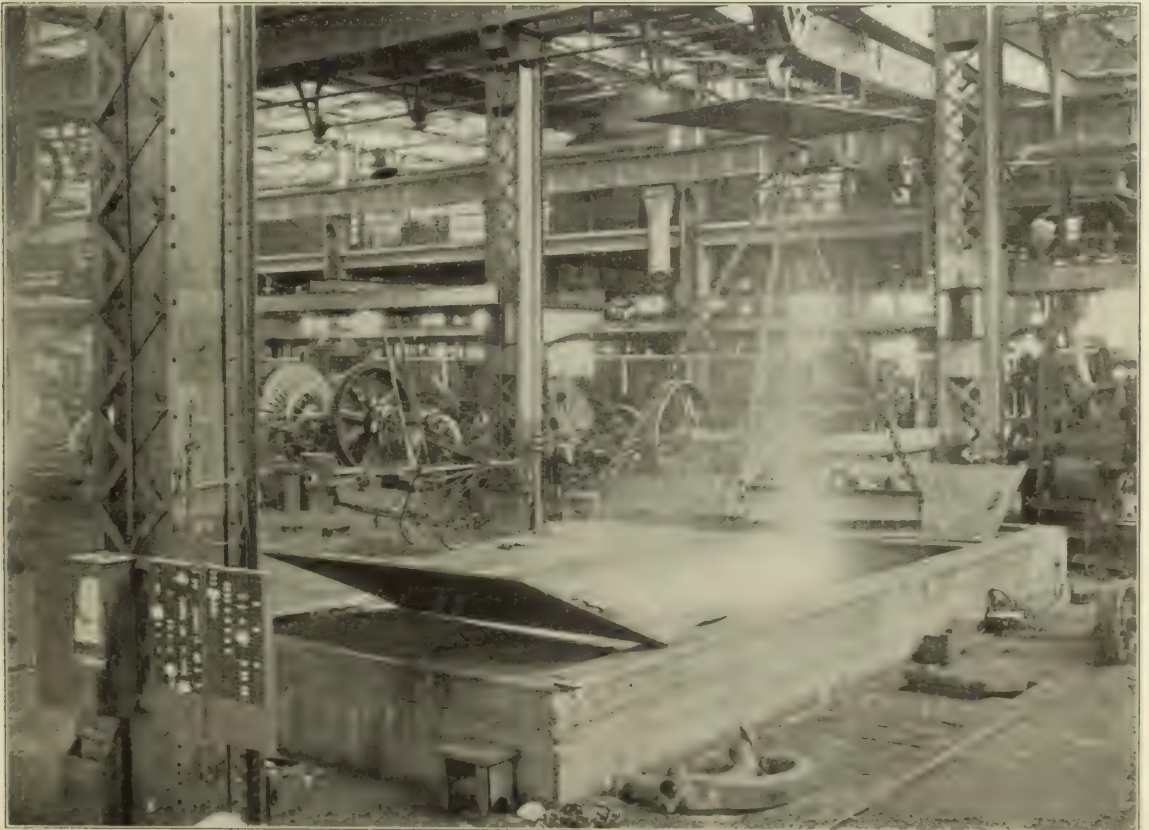


Fig. 62—Lye Vat for Cleaning Greasy Locomotive Parts.

shop provides two erecting floors, one on each side of the building, there are two of these lye vats. Each is 10 ft. wide, 30 ft. long and 14 ft. deep. There are several coils of pipe arranged along the walls of the vat near the bottom. Live steam is passed through these coils for heating the solution. It will be noticed that the crate held suspended above the vat, is handled by the shop crane and that the cover sheet is lifted with the crate. Locomotive parts are lowered into the vats and left there for about twelve hours, when they are taken out and flushed with cold water.

In the center of the photograph, just back of the vat, is shown a tire heater used for placing and removing tires. This heater was illustrated and described in the *Railway Age Gazette* of January 15, 1909, the information and photograph being supplied by J. W. Hamm, machine foreman. One of the gang checking boards and a time clock are shown at the left side of the photograph. Each gang checks separately, so that there are several of these boards and clocks about the shop.

STAYBOLT BREAKER.

Almost every collection of shop kinks that has appeared in these pages has included a staybolt breaker, and nearly every one has shown some points of advantage or particular merit. The breaker in Fig. 63, is shown, not to illustrate the ram action,

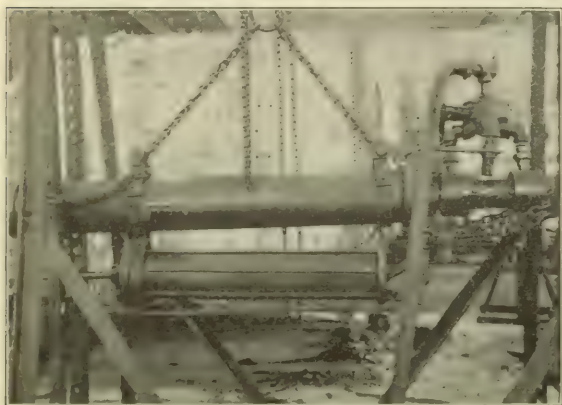


Fig. 63—Staybolt Breaker.

which corresponds very closely to others previously published, but to emphasize a feature which has not been found in the previous ones. The metal framework forms a carriage, or double A-frame, which is mounted on four small wheels. The ram is elevated and lowered by a block and fall fastened to the top cross arm connecting the two A-frames. Suspended below the ram cylinder, is an air cylinder, the piston of which is supplied with a hook. This arrangement provides for holding the breaker ram against the staybolt and for moving the carriage on after a bolt is broken. One man stands upon a platform on the carriage and operates the two air valves, one of which controls the carriage while the other applies air for the ram.

FOREIGN RAILWAY NOTES.

The Japanese Railway board has decided to build a narrow-gauge electric tramway parallel and close to the standard-gauge railway track from Yokohama to Tokio. This tramway may eventually be extended to Kozu and Kamakura.

The British consul-general at Port-au-Prince, Hayti, reports the passing by the Haitian legislature of the following law: Approving the plans submitted for a railway from Port-au-Prince to Pétion-Ville. The trains are to be run by electric traction, and fitted with automatic brakes. Interest is guaranteed by the government on about \$273,000.

CORPORATION SCHOOLS.*

BY G. M. BASFORD.

While listening to a fine orchestra, do you ever think of the organization necessary to the production of its music? Is it possible to suggest a better illustration of perfect individual skill combined in coöperative effort to produce a definite, highly prized result? A result similar in principle is desired in many organizations requiring thousands of men, such as are necessary today in manufacturing and in transportation, and in which it is impossible to secure ready made recruits. If the orchestra leader may be represented in our minds for a moment by the employing officer of a manufacturing organization taking men who apply at the gates for work, how many would he find capable of performing any part whatever in the harmonious performance which he so greatly desires to produce?

Unfortunately fluctuations occur in present day methods of conducting business. Employers of labor find it absolutely necessary occasionally to add to forces which have been depleted in times of depression. In reducing forces the most valuable men are retained. When orders come again and more men are wanted, those who apply for work are asked the question, "What can you do?" Of 1,666 men recently applying for work at the gate of a plant employing about fifteen different trades, only 134, or eight out of each 100 men even pretended to be anything more than unskilled laborers. However, upon such men manufacturers depend for a large part of their output. Unskilled men do, in time, become skilled upon some one, or perhaps two, operations, but the great and pressing need for skilled mechanics is not and never will be supplied in this way. It is impossible to believe that any manufacturer can prefer present prevailing methods to a consistent and sensible system of apprentice training, especially when apprenticeship is so simple, so easily installed and so satisfactory.

People are beginning to understand that the industrial progress of Germany is not due to her superior technical education methods so much as it is due to her consistent adherence to apprenticeship. Technical education has done much in Germany, but without the substructure of workmen skilled through apprenticeship, the education would not have brought that country to its present position. We know that Germany does not depend upon trade schools, as we understand the term, but upon apprenticeship, upon continuation and improvement schools, for skilled and intelligent workmen. These continuation schools are attended by apprentices and the improvement schools by those who have completed apprenticeship.

We need skilled workmen who understand their work and its relations to the work of others, and who are prepared in citizenship to take their places in the organization of human life. To supply the need we must train the hands and the minds of our recruits. The present emergency seems to compel us to take the school to the boy for the training of the mind. Our greatest work is in the shop. The boy is in the shop and we must move the school to him for we cannot move him to the school. We cannot wait for the educators to adapt themselves to our problem, but must take it in hand ourselves. Hence the corporation school. Whether or not the corporation school is permanent is a question which may be safely left to the future. At present it meets an urgent need and will meet it until cooperation with public schools may be effected.

It meets the need because the boys who come to us are those who must work every possible working hour in order to make a living. They cannot afford to go to school. Even if they could learn trades in trade schools they cannot afford to do so. It is most direct and definite educational work. The boys know what they want to do in life and they are doing it. They are learning to use their hands under the direction of skilled teachers of their trades, and the training of the mind naturally asso-

*An address delivered before the National Society for Promotion of Industrial Education, Boston, Mass., Nov. 18, 1910. Mr. Basford is assistant to the president of the American Locomotive Company.

enters itself with the training of the hand. Because the boy is making his place among men while acquiring his education and is educated in his work while at work, this type of school surpasses all others in directness, definiteness and in conservation and concentration of the attention of the mind of the boy. To these advantages another of great importance is added. The boy does not finish his school work and then find it necessary to establish himself in a working position. He is already, in such a position and is fitting himself daily the better to fill it and prepare for advancement. He is already making friends of his superiors who are beginning to rely upon him in the organization. Trade school boys and even technical school graduates do not enjoy this advantage. For these reasons the responsibility of those in charge is great, because the possibilities of achievement are limited only by the scope of the plan and by the sincerity and the ability with which the work is carried out. It may be narrow or it may be broad. It may be selfish or it may be generous. Before many years some of those now in these schools will occupy positions of authority. They may be trusted to improve upon the best plan that we now are able to present, for they will understand better than we do, how the problem may be worked out to obtain the best results.

It is perfectly safe to accept the proposition that apprenticeship is to be a permanent factor as an American institution. By this is meant the new apprenticeship, involving real shop training by men who have direct responsibility for teaching trades, and have time for this work because they have nothing else to do. Trade schools unless followed by apprenticeship, do not, and I believe cannot, meet the industrial need of the times. Advocates of trade schools do not claim that complete preparation for trades may be given in such schools. The boy from the trade school needs apprenticeship for two reasons. First, to provide for his entrance into a manufacturing organization, and second, to complete his trade training. The need is so great as to justify encouragement of every possible method of providing relief. It is, however, significant that the number of authorities on this subject who believe that real apprenticeship is the only method of teaching trades, is rapidly increasing.

Let us hope that we will soon see the day when the new apprenticeship will extend to small manufacturers and to all the trades for boys and girls, and when the corporation schools will be supplanted by the public schools. Let us hope that the public schools will soon include employment officials who will say to the plumber, the mason, the carpenter and the manufacturer something like this—"I can recommend to you a fine, steady, intelligent boy thoroughly prepared to learn your trade. Will you take him as a real apprentice and teach him your trade? If not, I must find one who will do so and you may keep on with your present method, losing money through poorly trained workmen." For such boys our boards of education will sometime provide continuation schools. Until public continuation schools are provided for the apprentices of the tradesman and the manufacturer, the corporation school has an important place to fill in our educational plan.

Is the corporation school selfish and narrow? A number of the plans now in operation provide for prizes to their apprentices in the form of scholarships in engineering colleges. A plan whereby a boy may not only learn a trade but secure an education at no expense to himself and also may win a scholarship leading to a technical school diploma, is not narrow.

In a few years much has been accomplished. It is reasonable to expect that the good results which are promised with certainty to those broad-minded enough to establish these schools will lead to their multiplication. The movement was carried completely across the continent in two jumps by the New York Central and the Atchison, Topeka and Santa Fe railways. Manufacturers are not likely to be slow in adopting methods which have so abundantly proven their merit as these methods have done.

The number of employers who have undertaken the new ap-

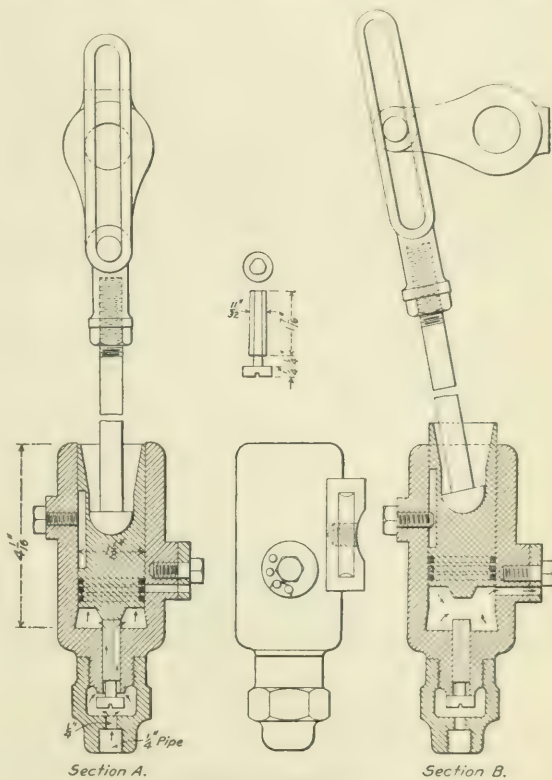
prenticeship is small as yet, so small as to lead to the argument that something besides apprenticeship is needed as a remedy for the need for skilled workmen. The remedy is more apprenticeship. It is to be hoped that this great organization will inform itself of the true value of apprenticeship and lend its influence strongly in the direction of trade training in the shop and educational development coordinate therewith.

At the inauguration of this society, apprenticeship was referred to as a discarded, outworn system. This is not true today. The new apprenticeship has "made good" and is rapidly advancing. The society has recognized this fact in its program of this day and the influence which it might exert toward an extension of apprenticeship would be very helpful to all concerned.

Let us bear in mind that corporation schools and apprenticeship are dedicated to the proposition that trades may best be learned in the shop, that the great problem is in the shop and that the school must be taken to the boy because, unless he is fortunately situated, he cannot go away from his work to attend school. Let us also remember that many boys with the best possibilities, for one good reason or another, are obliged to leave school at an early age, and that the world today places great responsibilities upon men who have risen from the ranks of such boys.

LOCOMOTIVE BELL RINGER.

The bell ringer, illustrated, known as the Howe and Sowter, has been adopted by the Burlington, Great Northern and Northern Pacific. It is claimed to be the cheapest, simplest and best bell ringer in use, as there are so few parts to get out of order.



Locomotive Bell Ringer.

Engines on the Burlington have used these bell ringers for three years and they are about as good as when first put on. They require only a very small volume of air.

The section at A shows the bell crank passing the bottom

service. Strict attention is given to this branch of the drawing course, as a boy who is unable to read a blueprint makes very slow progress in his shop work. The problems deal with arithmetic applied to shop work and practical mechanics.

The shop superintendent is personally interested in all the boys and watches their advancement closely. The general foreman, as well as the department foreman, give all the aid necessary to them in their shop work. All boys are watched closely by each separate foreman, as after a boy has finished his apprenticeship he is often called to some department to do special work at the request of the foreman.

REARRANGEMENT OF MACHINE TOOLS; UNION PACIFIC LOCOMOTIVE SHOP, OMAHA, NEB.

[WITH AN INSET.]

The arrangement of the machine tools in the locomotive shop of the Union Pacific at Omaha, as here illustrated, affords a good opportunity to point out some of the advantages of the direct motor drive. This shop was built before direct connected motors were used to any extent in railway shops, and many of the belt drive tools are old. The location of tools to be driven from countershafts is often determined by the best belt arrangement rather than the best floor arrangement, and this results in the lathes being staggered back to back, planers crosswise, and other tools out of line, so that the main aisles for delivering material to the machines are broken up and made very indirect. In purchasing a number of new machine tools for the Omaha shop, it was determined to order most of them, even the rather small ones, with direct motor drives. In placing them in the shop advantage was taken of the fact that the location was independent of belt requirements.

The erecting shop, which is in the same building, has three longitudinal tracks with a pit capacity for 20 locomotives; the normal capacity of the shop is 24 engines per month with general repairs—30 per cent. of them with new fire-boxes. Including light repairs, over 300 locomotives are turned out per year; the tool equipment here shown is comparatively small for such an output.

The rearrangement of the tools was done under the direction of G. J. Hatz, superintendent of the Omaha shops. Although the shop was apparently full of tools when the large new equipment was bought, by the removal of a few old ones and the symmetrical location of the new ones, it was possible to find ample room for the new tools and obtain some open spaces for future additions. Two avenues are provided for delivering material to the machine tools by track—the wide gage track to the right of the center, which extends to a casting platform at the storehouse, and the narrow gage transverse track, which also connects with the storehouse platform. The cylinder planer and boring mill are placed at one end of the shop alongside the castings track, and the boring mill for tires and centers is opposite. These tools finish the principal heavy pieces. The 60-in. frame planer is located along this aisle and also two radial drills, which are placed so they can both operate on a frame at the same time. The frame slotter is on the opposite side of the aisle between the planer and the drill presses. The track to the left of the center was found unnecessary and has been removed; the space is available for the storage of material and for an open aisle.

The two driving wheel lathes are seen in the extreme opposite corner. One of these is a modern lathe driven by a 50 h. p. motor and the other, an older and lighter machine, is driven by a 22 h. p. motor. The latter is used principally for turning driving journals. It will be seen, therefore, that this large shop is able to take care of all tire turning, tire boring and wheel center turning with one wheel lathe and one boring mill. Piston heads and cylinder heads are turned on two 54 in. vertical boring mills, and directly back of them

is the lathe for turning piston rods; a jib crane connects this lathe with the 100-in. Norton grinder. The lighter machinery for cylinder packing, throttle and reverse levers is placed near the wall and close to the iron benches where this work is finished. Driving boxes are delivered on the transverse narrow gage track to the 24-in. slotter, and they are planed and drilled and the bearings bored in the driving box section. Opposite the latter is a group of tools for finishing the link motion, and farther on are benches for the hand work on these pieces. The rod gang is located around the locker room, and the machine tools required for this work are near at hand.

We have mentioned the tools required for the principal operations. There is a traveling crane traversing the whole length of the middle section, and the heavier tools have been placed within its reach. It will be noticed that nearly all the tools are arranged in straight lines with ample spaces at the ends, and there are free avenues not only at the sides of the tools, but at their ends; this is especially true of the lighter tools that are not within reach of the traveling crane. Convenient access to all tools has here received special emphasis, and for this reason the plan will be worth the careful study of those interested in locating machines in locomotive machine shops.

EXPOSITION OF SAFETY DEVICES.

Fifty per cent. of the accidents in American industries are preventable, is the claim of the American Museum of Safety. In proof of this, it has just opened a permanent exposition of safety devices in the Engineering Societies building, New York, to show how the dangerous parts of the machines and processes may be protected so as to save the lives and limbs of the workmen. It thus becomes a clearing house for every worthy device and every worthy thought concerning safety. It is its purpose to place this new museum idea on the highest plane; namely, the realization of the greatest ideal regarding conservation—the conservation of human life.

The exposition consists of machines in actual operation, models and photographs of safety devices for circular saws and planers, presses and grinding machines; safety exit doors and fire escapes; respirators and helmets for supplying pure air; elevators, safety lamps, and containers for gasoline and other volatile liquids. The building trades, textile industry, transportation, quarrying, the chemical industries and wood-working contain their appropriate safeguards.

At the formal opening of the exposition on November 21, S. C. Dunham, president of the Travelers Insurance Company, presented a gold medal to the United States Steel Corporation as the industrial institution whose management had done most during the past year to conserve human life and prevent accidents. A medal is offered by the *Scientific American* for the best safety device exhibited during the forthcoming year.

ARGENTINE RAILWAY BUILDING.

The Buenos Aires Western has been granted a concession for building a section of line, 45½ miles, from La Zanja to Meridiano V. The Buenos Aires Great Southern has been given permission to build and operate a line, either single or double track, to connect its system with the Buenos Aires harbor lines. Work must be commenced within six months after the approval of the plans, and be completed within two years thereafter. A concession has been granted to Señor Damian M. Torino for the building and operating of a railway from Rufino, in the province of Santa Fe, via Pegasus and Nauman, to San Rafael, in the province of Mendoza. Work must be begun within six months after the approval of the plans, and completed within three years thereafter.

Sacramento
not train.
any
rd than are
he car will
one has a
d of high
k revolving
the
feeds 14,000
million of
00; on the
restaurants,
65 cents on
tions. The
The annual
for wages
rear for the
g cars.

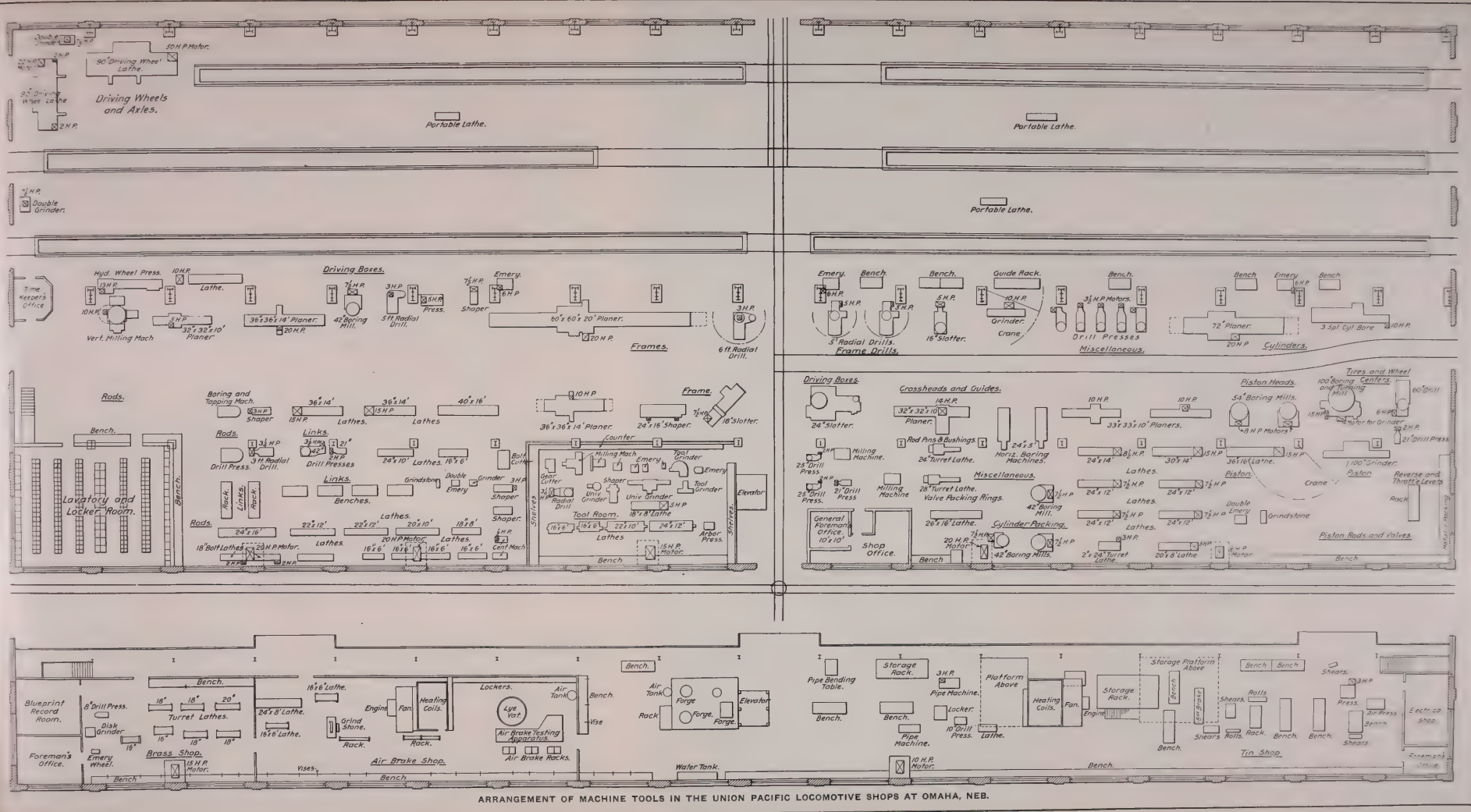
sued a cir-
rules to be
sent to the
payment of
ents of the
use in legal
must be re-
see the re-
; giving his
person, on
ns, may see
ted on duly
corporations
by the cor-
in the office
ington, and
returns will
n.

p?

p so nearly

deis, counsel
i of the At-
* * *. 'We
i applied to
th pig iron,
r from 12½
introduction
w you, other
e under the
of new de-
ior. For in-
itures, large
se of appro-
ling and un-
nly reducing
ition of the

mual tribute
States gov-
d from the
oyed in the
presents the
eral govern-
reau in place
g out bonds,
1898 at the
ction of this
droit in the
in Congress.



ARRANGEMENT OF MACHINE TOOLS IN THE UNION PACIFIC LOCOMOTIVE SHOPS AT OMAHA, NEB.

General News Section.

On the Pennsylvania Railroad telephone operators now have the same rights and privileges as telegraph operators.

The New York State Board of Weights and Measures is testing the truck scales at railroad stations throughout the state. The New York Central requested that these tests be made, and provided for the trailer a special car.

The Postmaster-General, in his annual report, soon to be issued, will recommend the establishment of a limited parcels post on the rural free delivery routes. He proposes that the limit of weight shall be 11 lbs., which is the same as that which prevails in international mails.

On December 1 the Chesapeake & Ohio Railway Company of Indiana, formerly the Chicago, Cincinnati & Louisville, began running its trains over the track of the Chicago & West Indiana from Hammond, Ind., to the Dearborn street station in Chicago. It is also using suburban stations at Forty-seventh and Sixty-third streets in Chicago. At the same time the differential of \$1 between the passenger rate of this road and other roads between Cincinnati and Chicago was abolished, its rate being raised to the regular \$6 basis.

"The Erie Roll of Honor," which appears in the November number of the *Erie Railroad Employees' Magazine*, contains the names of a flagman, two telegraphers, a section foreman, a yard conductor and a pumper who have lately received letters of commendation from their superintendents for vigilance in discovering things out of order. The section foreman, O. Smith, is commended for "making diligent inquiry" of an engineman as to whether he had passed over any rough spots in the track and for promptly attending to those rough spots when they were disclosed.

The New York Central & Hudson River has bought for \$1,350,000 the real estate of the Hospital at the corner of Forty-second street and Lexington avenue, New York City, thus completing its purchase of practically all the real estate between Madison and Lexington avenues, from Forty-second street north to Fiftieth street, and making of the Grand Central Terminal a symmetrical plot. Some of the buildings on this plot will stand, however, for a number of years, the land not being required for those parts of the new station which are included in the present plans.

The Illinois Central, which for some time has had telephones in use for train despatching on more than 2,000 miles of its road, has lately established such a circuit between Paducah, Ky., and Central City, 99 miles, with 37 stations, at 16 of which are no telephones. These 16 stations are mostly booths at side tracks where there is no agent. The booths are fitted up with all suitable connections, but the telephones are carried by the freight train conductors in their cabooses. A telephone is delivered to each conductor as he begins his run and he signs a receipt for it; and at the end of the run he returns it to the proper officer. To make a connection at a side track station he simply has to insert a plug into a jack in the booth.

Frank B. Harriman, formerly general manager of the Illinois Central; Charles L. Ewing, formerly general superintendent; John M. Taylor, formerly general storekeeper, and Joseph E. Buker, formerly superintendent of the car department, were indicted by a grand jury at Chicago on November 25 on a charge of fraud in connection with the repair of cars belonging to this road. Harriman, Ewing and Taylor gave bonds for \$10,000 each. Buker is believed to be in Canada, and a capias was issued for his arrest. The indictment charges the defendants with conspiracy, and names December 10, 1909, as the date on which the conspiracy was formed. The indictment names the Ostermann Manufacturing Company, the Blue Island Car & Equipment Company, and the Memphis Car Company as concerns with whose cooperation the frauds were committed. The total amount of the frauds is estimated at \$1,500,000, and the amount of business given to the companies named is stated to have been \$4,825,650.

The Southern Pacific is building at its shops in Sacramento two lunch-counter cars, designed to be used on passenger trains, with a view to giving all of the passengers on a train more democratic facilities for satisfying hunger while on the road than are afforded by the ordinary dining car or cafe cars. The car will have a kitchen, though in most respects it will be more like a lunch counter than a regular dining-room; but instead of high revolving stools the car will be fitted with high-back revolving chairs. In connection with the announcement of these cars the reporter gathers that the Southern Pacific at present feeds 14,000 people a day on its dining cars and at its hotels. The number of meals served in the dining cars in a year is 2,750,000; on the steamers of the company, 1,100,000; and at station restaurants, 1,000,000. The average receipts per meal are about 65 cents on dining cars and about 30 cents on steamers and at stations. The number of employees in this department is 1,200. The annual expenses amount to \$1,000,000 for supplies; \$600,000 for wages and \$500,000 for other expenses, including \$12,000 a year for the flowers with which to decorate the tables of the dining cars.

Corporation Records in Washington.

The Treasury Department at Washington has issued a circular, approved by President Taft, prescribing the rules to be followed in giving out information which has been sent to the Treasury by corporations in connection with the payment of the annual corporation tax. If any other departments of the government desire information of this kind, as for use in legal proceedings, the application for permission to inspect must be referred to the Attorney-General. A shareholder may see the returns of his corporation upon application in writing, giving his reasons, and proving that he is a shareholder. Any person, on making written application and giving suitable reasons, may see the returns of all corporations whose stock is listed on duly organized stock exchanges in this country, and all corporations whose stock is advertised or offered to the public by the corporation itself for sale. Returns can only be seen in the office of the Commissioner of Internal Revenue, at Washington, and the applicant must appear in person. No copies of returns will be furnished except to the corporation making them.

An Argument for Government Ownership?

The following newspaper despatches, turning up so nearly simultaneously, are worth considering together:

"WASHINGTON, Nov. 21.— * * * Louis D. Brandeis, counsel for the traffic committee of the national association of the Atlantic seaboard, outlined the case of the shippers. * * * 'We shall show you how scientific management, when applied to the simple operation of loading a railway car with pig iron, increased the performance of the individual worker from 12½ to 47 tons * * *. Besides economies from the introduction of scientific management, there are, as we shall show you, other economies possible in railway operation, attainable under the present system of management by the introduction of new devices like the substitution of machines for hand labor. For instance, for comparatively small capital expenditures, large economies are believed to be possible through the use of appropriate machinery in the handling of freight, in loading and unloading, warehousing and accounting; thus not only reducing the terminal expense, but overcoming the congestion of the terminals.'—*New York Evening Post*.

"WASHINGTON, Nov. 22.—Unionism exacts an annual tribute of \$778,000 from one bureau alone of the United States government. Each year this large sum is contributed from the federal treasury to the union plate printers employed in the bureau of engraving and printing. This \$778,000 represents the amount that would be saved annually by the federal government if power presses were introduced into the bureau in place of the old hand roller presses now used in turning out bonds, notes and checks. An act of Congress passed in 1898 at the instance of union labor has prevented the introduction of this economy. The total plate printers have been adroit in the methods they have adopted to entrench themselves in Congress.

They have sent speakers out to aid members of the house of representatives in Congress and on several occasions have presented to influential members of both the house and the senate beautifully engrossed resolutions certifying that said member or senator was a friend of union labor."—*New York Sun*, Nov. 23.

Standard Height of Drawbars.

The Interstate Commerce Commission in accordance with an act of Congress of April 14, 1910, whereby it was authorized to modify or change and to prescribe the standard height of drawbars and to fix the time within which such modification or change shall become effective and obligatory, has ordered: That (except on cars specified in the proviso in section 6 of the Safety Appliance Act of March 2, 1893, as the same was amended April 1, 1896), the standard height of drawbars heretofore designated in compliance with law is hereby modified and changed in the manner hereinafter prescribed—to wit: The maximum height of drawbars for freight cars measured perpendicularly from the level of the tops of rails to the centers of drawbars for standard-gage railways in the United States subject to said act shall be 34½ in., and the minimum height of drawbars for freight cars on such standard-gage railways measured in the same manner shall be 31½ in., and on narrow-gage railways in the United States subject to said act the maximum height of drawbars for freight cars measured from the level of the tops of rails to the centers of drawbars shall be 26 in., and the minimum height of drawbars for freight cars on such narrow-gage railways measured in the same manner shall be 23 in., and on 2-foot gage railways in the United States subject to said act the maximum height of drawbars for freight cars measured from the level of the tops of rails to the centers of drawbars shall be 17½ in., and the minimum height of drawbars for freight cars on such 2-foot gage railways measured in the same manner shall be 14½ in. Such modification or change shall become effective and obligatory December 31, 1910.

New Passenger Station for the Milwaukee Road at Missoula.

An officer of the Chicago, Milwaukee & Puget Sound furnishes the following description of the new passenger station at Missoula, Mont., now under construction by that company:

The station consists of two detached buildings; a main building 44 ft. by 94 ft., two stories high; and a baggage and express annex 28 ft. by 76 ft., one story high. The first floor of the main building contains a large general waiting room, smoking room, ticket office, women's rest room, men's and women's toilet rooms, tower entrance vestibule, and rear hall and stairway leading to the second floor. The second floor will contain offices for the division superintendent, superintendent's clerks, trainmaster, roadmaster, telegraph and telephone department, division engineer, bridge and building department, division freight and passenger agents, store room for records, and toilets. The baggage and express annex, in addition to ample baggage and express rooms, contains a battery room and the steam heating plant.

The exterior presents a pleasing appearance with its two towers as a mark of special distinction. The color scheme of the exterior has been taken care of by selecting such materials as will produce desirable contrasts in the buildings themselves and with their surroundings. The base to a height of 5 ft. above the platform is of reinforced concrete, which harmonizes with the heavy belt courses and other stone trimmings, all of which are of buff Bedford stone. Above the base the exterior walls are of mottled cream colored pressed brick and the roofs of red Spanish tile. The cornice overhang is just enough to well protect but not dwarf the appearance of the buildings.

The first floor of the main building is of reinforced concrete construction, finished with Akron red and black tile, laid with wide joints of black cement mortar. The waiting rooms will have beamed ceilings and high paneled wooden wainscoting. All interior trim will be of fir, neatly moulded and stained mission finish, with hardwood settees, etc., to harmonize. The lighting will include both gas and electricity, so arranged that a maximum, minimum or intermediate amount of light can be had for all rooms of the first story. There will be both combination and ceiling light fixtures controlled by switches. The exterior lights placed on under side of cornice brackets are intended for

platform lighting and are controlled by switches from the ticket office. The building was designed by the bridge and building department of the company, C. F. Loweth, engineer and superintendent bridges and buildings, and J. A. Lindstrand, architect. The work is being done under contract by Olson & Johnson, contractors, Missoula, Mont.

Investment as Distinct from Speculation.

About 99 per cent. of the shareholders who received their dividends on Pennsylvania Railroad stock on Wednesday have filed permanent dividend orders with the railway. The total number of shareholders of the Pennsylvania Railroad on November 5 was 64,869, and all but 617 of these have filed their permanent dividend orders with the company.

Hearings by the Hadley Commission.

The commission to investigate questions pertaining to the issuance of stocks and bonds by railways, which was appointed by the president in accordance with section 16 of the Mann-Elkins law of last June, and of which Dr. Arthur T. Hadley is chairman, held its first public hearing in Washington on Monday of this week. The first day's session was devoted wholly to hearing the views of Interstate Commerce Commissioner Clements. Mr. Clements said that the Interstate Commerce Commission was on record as favoring a physical valuation of railways and federal control of stock and bond issues of interstate carriers, but no plan for valuation had been worked out; such a valuation would be a formidable task. He called attention to the fact that physical valuation alone would not be a proper basis for rate making. The bill presented in Congress last winter contained a provision prohibiting railways from selling their stocks and bonds below par. This was one of the things that killed the bill. Sales below par are made to induce investment in speculative construction, but Mr. Clements thought that the period of speculative railway building was past. Except in the far West there is no speculative railway construction now going on. He denounced stock bonuses as vicious; but railways ought to be allowed to issue bonds to pay for betterments and to settle debts. In a law to control the issue of securities it would be fair to make a difference between old roads and new roads. The witness thought that a national incorporation law would be useless unless it could be made compulsory. Without uniformity there can be no complete regulation. Capitalization abuses cannot be corrected by publicity alone, for as a rule publicity does not come until after the abuse has been consummated.

On Tuesday the commission listened to W. P. Hall, chairman of the Massachusetts Railroad Commission, and to James F. Jackson, former chairman of the same commission. Mr. Jackson thinks it would be a mistake for the federal government to regulate the issuance of stocks and bonds as strictly as was done by the former Massachusetts law. Mr. Hall thought that the law should permit the issue of securities at less than par or else recognize higher dividends. Where stock is sold at less than par the price might be stamped on the question if a reasonable return is a local one. What is considered a fair dividend in Arizona would be unduly high in Massachusetts.

Chairman Hadley asked if the electrification of existing railways could be considered speculative building, justifying the issue of securities at less than par. Mr. Hall did not think so. He said that such improvements and the building of terminals, like the Pennsylvania station in New York, gave benefits to the public justifying a slight increase in rates, if necessary.

J. J. Hill on the Outlook.

That the United States—and the world, in fact—will soon harvest the fruit of extravagance, J. J. Hill is absolutely positive. The country faces no panic and matters will finally adjust themselves; but the American people are too complacent. They spend too freely and are greatly inclined to take a rosy view of things entirely unwarranted by circumstances.

"Extravagance has been our great fault. We have been wasting entirely too much in non-productive undertakings. As a rule we have been given too much to adornments. We have become obsessed with 'the city beautiful' in municipal affairs. We have followed like policies in the state and national governments. Battleships, not only in this country, but also abroad,

are illustrations of the extravagance with which the world has been plunged for the last few decades. The money for the construction of these has been withdrawn from commercial enterprises and is now being squandered as far as any possible return can be derived.

If a man have a talent and cultivates it, he contributes to the material wealth of society. If he permits the land to lie idle he has subtracted from the general wealth by withdrawing his money from commerce and investing it in a non-productive enterprise. This illustration serves to indicate our trend in all departments of our government.

Do you think of any definitely systematic plan for improving things during the next year? There is none. Factories and such other enterprises which are productive in their nature and which contribute to wealth are not contemplated by those who have the money to invest. This means that those who have nothing to sell but their time will be without employment. There will have to be shutting down of the mines, the fields and coal and other minerals that go into production of commercial articles will not be in demand. The same might be said about the lumber business and other forms of activity.

"In preparing our Great Northern orders for next year we find that we are going to need very few supplies. This is because we are making no extensions. Last year we ordered 245,000 tons of rails and had no surplus. For the next year we will need only about 70,000 tons. Last year we had to have 11,000 new freight cars; this year we shall need but 3,000. Last year a large number of passenger coaches; this year we shall need none. We ordered over 300 locomotives last year; twenty new ones will be an abundance for next season."—*Newspaper interview.*

A Very Unusual News Item.

Following out its policy adopted a year ago of sharing the benefits of increased business with employees, the Brooklyn Rapid Transit Company has voluntarily increased the wages of all motormen, conductors and guards employed on its elevated and surface lines, by sums equal to 5 per cent. The increase becomes effective January 1, and will add about \$300,000 to the year's payroll. The higher wages will be 10 per cent. above the level of January 1, 1910, a general increase having been made on April 1 last.

The new scale is based in part on the employees' period of continuous service with the company. This system has been found to be very successful in securing loyalty to the company. The increase affects more than 4,000 men, most of whom received advances last year. The general manager says that the increases were made without any demands from the men, and that there was no hint of dissatisfaction with the old scale. There is no union among these employees, and the company has followed the policy of giving its men higher wages as rapidly as increased travel justified them. Futile efforts have been made at various times by special organizers to build up a union in Brooklyn, but the men have steadfastly refused to be organized.

Pennsylvania Station in New York.

The new station of the Pennsylvania Railroad in New York City was opened for general business last Sunday, according to announcement, the express trains to and from the West and South beginning to use the station at 12:02 a. m. A part of the station had been in use by the trains of the Long Island for about two months. On the opening day about 100,000 people visited the station simply as sight-seers. These, according to a morning paper, came en masse to gape at this fresh mechanical miracle. "In thousands they flooded the acres of its floor space, gazed like awestruck pigmies at the vaulted ceilings far above them, inspected curiously the tiny details of the place, so beautifully finished, on their own level, and pressed like caged creatures against the grill which looked down upon subterranean tracks, trains and platforms. W. W. Egan, the station master, was of the opinion that some of them had been there all night. There was no let up all day.

"Aside from its colossal dimensions and great distances, the most noteworthy feature of this human achievement is its silence. It's too big to be noisy, too dignified in its spaciousness for staccato sounds. The steady hum of its tense life spells only peace, like the drone of bees in a summer garden. The stealthy

trains circulate in its underworld unnoticed. Even the announcements made into the trains are seldom in a hurry."

The location of the station is just an indication in the main of this monster. Passengers came and went or waited without inconvenience or crowding, though they were outnumbered five to one by the sightseers. * * * The station was crowded in the early morning, but as the day wore on and the shifting crews became more familiar with their duties the time table was adhered to much more closely. In the afternoon the only appreciable delay was the case of the Southern Railway Express, due to leave at 4:38. For three-quarters of an hour after the time set no cars appeared on the track, but the wonders of the place engaged the attention of the passengers and they discussed them quietly with one another or with the red-capped porters presiding over their hand baggage, forgetting to complain."

Views of the interior of this station were published in the *Railway Age Gazette* April 15 last, page 998, and other descriptive articles have been given as follows: February 9 and May 25, 1906, floor plans and architect's perspectives; August 20, 1909, page 328, exterior view of the completed building.

Following the announcement by the Pennsylvania of a complete hourly express train service between New York and Philadelphia which met, and more than met, the hourly schedules of the Central of New Jersey-Philadelphia & Reading line, which have been in effect for several years past, the Central announced that all of its two-hour trains between these cities would be quickened to run through in one hour and fifty minutes; and additional trains were put on also, making the service about the same in frequency as that of the Pennsylvania. The announcement calls attention to the fact that for Philadelphia passengers the Central is the only line having a downtown station in New York. It appears, however, that the Pennsylvania continues to run a few Philadelphia expresses to and from the old terminus at Jersey City—two eastward in the morning and three westward at night. These trains have connections at Manhattan Transfer to or from the Thirty-second street station.

Under the new schedules Central-Reading expresses run from Jersey City to Philadelphia and vice versa in 96 minutes, equal to 56.25 miles an hour.

The franchise from the City of New York authorizing the Pennsylvania tunnels and station was granted October 9, 1902, and the first work was begun on June 10, 1903. Work on the station was started May 1, 1904, so that practically six years and seven months were consumed in making the excavations for the foundations of the building and in constructing it. To clear the eight acres of ground occupied by the station meant the razing of some five hundred buildings, among which were a number of churches. The stone work of the station was completed on July 31, 1909. A total of 550,000 cubic feet of "Milford pink granite" have been utilized in the construction and ornamentation of the building.

In connection with the opening of this station and the transfer of a large part of the Pennsylvania's passenger car storage and cleaning to Sunnyside, east of Long Island City, about 400 families of employees of the company are moving from Jersey City to the Borough of Queens.

Good Roads Association.

The American Association of Highway Improvement was organized at Washington, D. C., November 22, and permanent headquarters will be established in that city. The officers are L. W. Page, director of the United States bureau of public roads, president; W. C. Brown, president of the New York Central, vice-president; Lee McClung, treasurer of the United States, treasurer, and J. R. Pennypacker, secretary. The board of directors includes L. W. Hill, president of the Great Northern, chairman; James McCrea, president of the Pennsylvania; W. W. Finley, president of the Southern; B. F. Yoakum of the St. Louis & San Francisco; L. W. Page and A. G. Spaulding.

The American Society of Mechanical Engineers.

The thirty-second annual meeting of the society will be held in the Engineering Societies Building, New York, beginning Tuesday evening, December 6, which will be the occasion of the annual presidential address, and of a reception by the president and the president-elect. The professional papers to be presented are unusual in variety and

merit. On Wednesday morning, following the transaction of business, an account of the joint meeting in England will be given by the secretary, Calvin W. Rice; and there will also be a paper by George A. Orrok of the New York Edison Company, on the transmission of heat in surface condensation. On Wednesday afternoon a session on steam engineering will be held, with a paper on carbon dioxide as an index to combustion, by E. A. Uehling of the Uehling Instrument Company; two accounts of tests on steam turbines in the locality of San Francisco, one by S. L. Naphtaly of the City Electric Company, and the other by F. H. Varney of the Pacific Gas & Electric Company. Other related topics will also be presented. The reception by the local membership will be held on Wednesday evening instead of Thursday evening, as heretofore.

On Thursday there will be three sessions: one in the morning upon miscellaneous topics; and in the afternoon two simultaneous sessions, a machine shop meeting devoted to the subject of grinding, with papers by C. H. Norton of the Norton Grinding Company, W. A. Viall of the Brown & Sharpe Manufacturing Company, and B. M. W. Hanson of the Pratt & Whitney Company; and the meeting of the gas power section, beginning with a paper by E. P. Coleman upon the blast-furnace gas-power installation of the Lackawanna Steel Company. On Thursday evening there will be an address by Dr. Georg Kerschensteiner, superintendent of schools in Munich, on the industrial continuation schools of Munich. Dr. Kerschensteiner has been foremost among educators in Europe in bringing industrial establishments into co-operative relations with the public school system. So much importance is attached to this address that it is proposed to make the session a joint meeting with the National Society for the Promotion of Industrial Education, the American Institute of Mining Engineers and the American Institute of Electrical Engineers. Dr. Kerschensteiner is a brilliant lecturer, and the opportunity for hearing so distinguished an educator is exceptional. Friday will be devoted to excursions to points of engineering interest, thus making it possible for the out-of-town members to become more familiar with New York, as well as concluding the meeting in an informal way which should give opportunity for increased acquaintanceship in the society.

Canadian Society of Civil Engineers.

At a meeting of the mining section, held November 24 in Montreal, a lecture on "Railway Construction and Tropical Experiences in the Gold Mines of Ashanti, West Africa," illustrated with lantern slides, was given by Hilder Daw.

MEETINGS AND CONVENTIONS.

The following list gives names of societies, dates of next or regular meetings, and places of meeting.

AMERICAN ASSOCIATION OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., New York; annual, Dec. 6-9; New York.
ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; April 26, 1911; New Orleans, La.
ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; May, 1911; Montreal, Can.
ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Colegrove, I. C. R.R., Chicago.
ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston, Mass.
ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Place, New York; Dec. 13-14, 1910, Chicago; June 20-21, 1911, Cape May City, N. J.
CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tuesday in month, except June, July and Aug.; Montreal.
CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays; Montreal, annual, last week January.
CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.
CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo, N. Y.
CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul; 2d Monday, except June, July and Aug.; St. Paul.
ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.
ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesdays; annual, Jan. 17, 1911; Pittsburgh.
FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich. & Pot R.R., Richmond, Va.; 20th annual, June 21, 1911; St. Paul, Minn.
GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—H. D. Judson, 209 East Adams St., Chicago; Wednesday preceding 3d Thursday; Chicago.
INDIANAPOLIS RAILWAY AND MECHANICAL CLUB.—B. S. Downey, C. & H. & D., Indianapolis, Ind.
INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; next convention, Omaha, Neb.
INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; May 15-18, 1911; Chattanooga, Tenn.
INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.
INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio.
INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.
IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; June 19-21, 1911, Atlantic City, N. J.
MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.
NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July and August; Boston.
NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
NORTH-WEST RAILWAY CLUB.—T. W. Flannagan, Soo Line, Minn.; 1st Tues. after 2d Mon., except June, July, August; alternately at St. Paul and Minneapolis, Minn.
NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. & M. & St. P.; 4th Saturday; Duluth, Minn.
OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Bldg.; second Wed. RAILWAY CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City; 3d Friday in month; Kansas City.
RAILWAY CLUB OF PITTSBURGH.—C. W. Alleman, P. & L. E., Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.
RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio; annual, May, 1911.
RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.
ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Oct., 1911; St. Louis.
ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.
SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.
SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Prudential Bldg., Atlanta, Ga.; 3d Thurs.; Jan., April, August and Nov.; Atlanta.
TOLEDO TRANSPORTATION CLUB.—L. G. Macomber, Woolson Spice Co., Toledo; 1st Sat.; annual, May 6, 1911; Toledo.
TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; 1st Sat. after 1st Wed.; annual, Dec. 13, 1910; Buffalo, N. Y.
TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.
TRUCKING CLUB OF PITTSBURGH.—J. J. Walter, Oliver building, Pittsburgh, Pa.; annual, Dec. 13, 1910; Pittsburgh.
TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 20, 1911; Baltimore, Md.
TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.
WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August; Winnipeg.
WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.
WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, First National Bank Bldg., Chicago; annual, Jan. 12-19, 1911, Chicago.

Traffic News.

The regular use of the Chicago and St. Louis line has increased to 100,000 tons for the first time in five months, and from carrying about five million bushels were started more the other line some 100,000 tons of corn and other products.

A recent meeting in St. Louis, Mo., of passenger officials of the line meeting Mr. Egan, a report was received from the committee representing investment, the desirability and feasibility of establishing a joint downtown ticket office. The committee reported the plan and mentioned that possibly for some time it was decided, however, to make further inquiries regarding a proper location, and the matter will be reported on at a meeting on the second Monday in December.

The Transportation Club of Cincinnati is to be rejuvenated. A lease has been taken on the fifth floor of the Harrison building in the central business district, and a committee of 26 will furnish the rooms and make a program for the year that, it is expected, will attract the leading transportation men. The following committee will have general charge of the campaign for new members: C. V. Shinkle, chairman; C. L. Netherland, J. H. Bunker, Walter G. Remelin, William Fallon and F. H. Talbot.

The Trans-Mississippi Commercial Congress, which met at San Antonio, Tex., on November 23, adopted resolutions favoring valuation of railways, the prescription by the Interstate Commerce Commission of rates to gulf ports on the basis of distance, the enactment of a law by Congress to regulate the issuance of stocks and bonds by railways "without trenching on the rights of States to regulate their corporate affairs," the enforcement by the President of the anti-trust laws against rail and water carriers as well as other offending corporations, and the infliction of the penalty of imprisonment as a remedy for violations of the anti-trust law.

A conference between the Interstate Commerce Commission and attorneys representing a number of railways took place at Washington Nov. 28. The first question discussed was whether the long and short haul clause as amended should be applied to import and export business: Whether it in effect prevents the carrier charging less for the haul from the seaboard to the interior destination on business coming from a foreign country than it charges on the same commodity from the interior bound to the same destination, the commodity being of domestic origin. George Stuart Patterson of the Pennsylvania Railroad and representing the carriers generally contended that the law did not apply to import and export rates. He relied largely on the history of the law itself and constructions of the Interstate Commerce Commission. In referring to the history of the law he quoted extensively from debates in Congress delivered at the time of its passage. F. H. Wood, of the St. Louis & San Francisco supported Mr. Patterson in his view of the case. E. C. Lindley of the Great Northern and F. C. Dillard of the Southern Pacific and the Union Pacific lines disagreed with Mr. Patterson, these attorneys contending that the law did apply to import and export rates. Mr. Wood discussed that phase of the law relating to the absorption of switching charges by the carrier on business from competitive points while refusing to absorb switching charges on business from non-competitive points. He contended that such practice did not constitute a violation of the long and short haul clause. R. Walton Moore, special counsel of railways in the southeast, closed the discussion by saying that at first advised concerning the effect of the long and short haul law he was confident that it was not applicable to export and import business, but as the discussion of the subject had progressed he had been thrown into complete bewilderment as to what the proper construction of the law should be.

Representatives of transcontinental lines have discussed the advisability of increasing the class rates from the East to Pacific coast terminals so as to make them exceed the rates fixed by the commission as reasonable to Reno and other intermediate points. The first-class rate from New York to San Francisco is now \$3 per 100 pounds and the commission having fixed the rate of \$3.50 as reasonable to Reno, the carriers will probably ask to make the rate to Pacific coast terminals somewhat more than the Reno rate. They have not filed any such new

schedules with the Interstate Commerce Commission. The main reason for this Pacific coast rate is that a part of the traffic that reaches these points, it is said. It is also stated that there is no intention on the part of the carriers to attempt to obtain any increase in their freight rates in the Pacific coast.

Interstate Commerce Commission Hearing at Washington on Freight Rate Increases.

The testimony of Messrs. Glasgow, Hathaway and Dodge; Joseph Ramsey and the Grand Rapids furniture men was noticed in the *Railway Age Gazette* last week, pages 1018 and 1026.

The next prominent witness was Henry C. Barlow, formerly a railway traffic officer and now representing the traffic committee of the Chicago Association of Commerce. When he said that the proposed increase in the freight rate would add about one cent to a pair of shoes from New England sold in Chicago, Chairman Knapp asked questions suggesting that possibly so small an addition to the cost would not be felt by the consumer. Moreover, if by the increase in freight rates, general prosperity were promoted, the retailer would probably sell more shoes, and the profit on a single pair, additional, would more than offset the increased cost for freight. Following this colloquy W. L. Fisher, of Chicago, representing shippers, demanded to know if the commission had already reached the conclusion that an advance in rates would be justified because it was small. Mr. Barlow quoted statistics of railway gross and net earnings for the calendar year 1909 and declared that the increase over the preceding year was very much more than the sum which the railways said they had been obliged to add to their pay rolls.

Mr. Butterfield, representing the New York Central, cross-questioned Mr. Barlow, aiming to show that he did not represent actual shippers, the Chicago Association of Commerce having a small membership. Mr. Barlow admitted that his presence at the hearing was due to the action of a traffic committee, consisting of a few large firms, which, under the constitution of the organization, could take such a step without the approval of the general body of members. Mr. Barlow denied that these committee members, of which the firm of Marshall Field & Company was one, were disgruntled because the large rebates formerly enjoyed by them had been discontinued. Mr. Barlow said that in former years, when he was in the railway service, he had paid large shippers rebates amounting to 40 per cent.; "the larger the shipper the higher the rebate."

The witness claimed to know that in Ohio and Indiana the state authorities were going to forbid advances in freight rates, which action would put an unequal burden on interstate shippers.

E. F. Williamson, of Cincinnati, representing the Receivers' and Shippers' Association of that city, formerly in the railway service but for the last seven years traffic manager for the Cincinnati shippers, presented a mass of statistics to show that the railways in trunk line and central territory had made excellent net earnings during the past two years. He reviewed the state of the Lake Shore, Michigan Central, Baltimore & Ohio, Wabash, New York Central, Lehigh Valley, Philadelphia & Reading, Erie and the Pennsylvania. The burden of his statement was that practically all the lines comply with the rules laid down by the presidents who have appeared during the hearings as to what railways should be able to earn to maintain their credit and enjoy prosperity. He asserted that the roads, through their own agencies, had attacked the value of their own securities by agitation based on publications they have issued predicting insolvency unless rates are increased.

George E. Ide, president of the Home Life Insurance Company, testified concerning the interest of life insurance companies in railway properties. Of the nine billions of steam railway bonds in this country, the life insurance companies doing business in the state of New York hold about one-eighth. This ownership is divided among about twenty million policy holders. Any move which even sentimentally affects unfavorably the railways of the land will strike a blow at these securities, which will affect this vast army of thrifty citizens. It is not necessary to reduce railways to a condition of bankruptcy before the value of the underlying securities is affected.

On Tuesday, D. O. Ives, of Boston, representing trade organizations in Atlantic Seaboard cities, gave testimony concerning rebating as practiced when he was a railway traffic officer a

few years ago. He declared that class rates on freight ought not to be changed until the classification of freight has been extensively revised. C. C. McCain, chairman of the Trunk Line Association, explained some of the statements in his pamphlet published some months since containing an argument in favor of increased freight rates.

Following the claim made last week by Mr. Brandeis, counsel for the shippers, that he could show the railways how to make great savings by more economical management, a number of railway officers in Chicago joined in sending him a telegram that if he could make good his claim they would employ him, at his own price. A day or two later the *Chicago Tribune* printed comments on Mr. Brandeis' statement from a number of railway officers.

Daniel Willard, president of the Baltimore & Ohio, said: "There are practically only two ways in which the roads can reduce operating expenses—one, by the purchase and use of less material, and the other by the employment of less labor. The roads have held their purchases of material on the lowest possible plane for some period back, and this no doubt has had some effect, at least on the general business situation. Even Mr. Brandeis would not dare to urge that improper or insufficient material be left or continued in use in any car or structure; consequently the relief which he says can be found to the extent of \$300,000,000 a year by improving operating methods means bluntly that the railways should reduce their pay rolls \$300,000,000 a year."

Darius Miller, president of the Burlington, expressed views similar to Mr. Willard's. H. U. Mudge, president of the Rock Island, said:

"Of course, there are possible ways to introduce further economies in railroad operation, but many of them are more theoretical than practical. * * * We know what our unit costs are. We have the piecework system in many of our shops and would like to establish it in others, but we can't afford so many strikes. The piecework and bonus system for shops are good things, but they are obnoxious to organized labor."

Extracts from the statements of other railway officers follow.

T. P. Shonts: "Mr. Brandeis' deductions and conclusions coincide so closely in almost every particular with those expressed by Mr. Harrington Emerson in his book on 'Efficiency' as to lead one to believe Mr. Brandeis' remarks are in a great measure premised on that work.

"Nature's operations are bountiful in waste, and we can hardly excel where nature has failed. Therefore, to measure the work of man on a basis of 100 per centum efficiency in all undertakings, and then calculate in dollars and cents the difference between 100 per centum efficiency and the actual attainment in determining waste, is a fallacy—it is a Utopian condition which cannot, unfortunately, be reached in practice, either in agricultural, mining, industrial or transportation pursuits. * * * If the gentlemen who are now discoursing so learnedly on this problem of railroad waste were in a position to guarantee results they would be in greater demand than any other set of men in the whole world, because railroads today are looking for men who can accomplish these things."

L. W. Hill: "The largest waste of the present day appears in the reckless statements of this kind by prejudiced and uninformed persons. * * * However wide the knowledge of Mr. Brandeis may be in other fields, no one has ever heard him mentioned as possessing a single qualification to entitle him to a respectful hearing as a practical railroad man. If his intemperate utterance contained a modicum of fact, and if he could really show how to save his \$1,000,000 a day, he might name his own price for his services to any American railroad."

I. E. Jones: "I do not believe the suggestions put forward by Mr. Brandeis are likely to be of value. Railway officers have spent and are spending untiring efforts in evolving and applying unit tests of efficiency. The results—and they will compare favorably with other lines of business activity—are that the capital investment involved in the movement of a unit of traffic has fallen since 1882 from 12.08 of a cent to 5.75 of a cent, and the charge to the public has been reduced from 1½ cents to a shade less than 1 cent. I am no person who the tendency, though perhaps not the rate of progress, should not be continued, but, so far as it is the result of intelligent effort and capital investment, it would seem that the results should primarily belong to the shareholders rather than to the public."

On Tuesday of this week, Mr. Brandeis replied to the telegram from Chicago offering him a position (which was signed by O. L. Dickeson, inspector of transportation of the Chicago, Burlington & Quincy), saying that he would be glad to confer with the western presidents and that he would like to have the eastern presidents also invited, but he declined to accept any compensation, "for the same reason that I have declined compensation from the shipping organizations"; for he is doing all this for nothing, as a public service.

Switching Allowances to Shippers.

Notwithstanding the opposition from the Wheeling & Lake Erie and other small trunk lines, including the roads owned by the Steel Corporation, the large trunk lines are going ahead with their plans for wiping out all terminal allowances to industrial railways in which the principal shipper has a majority interest. A majority of the railways in the Trunk Line Association have voted to eliminate these allowances on and after January 1, next. Unless the roads voluntarily settle this situation in the near future the commission has threatened to hand down its decision in the Buffalo Furnace case. The effects of this would be so far reaching, the commission has unofficially intimated, that they (the commissioners) hope the matter can be settled without the necessity of a decision, which has now been purposely delayed for over a year.

Considerable criticism has been directed against the Wheeling & Lake Erie, which has interposed the strongest opposition. Receiver Worthington believes that terminal allowances such as exist on his road are legal and can be proved so. He has issued several pamphlets presenting a defense of the system. He claims that without these the small road cannot exist in competition with the large road. * * * Receiver Worthington has always aimed to grant slightly better terminal allowances and per diem arrangements to industrial roads than the other large lines were willing to concede. The large lines could, if they wished, meet this allowance, but if this practice were started there is no telling where it would end.

For instance, he has allowed the Newburgh & South Shore, a Steel Corporation road, five cents a ton larger allowance than any of its competitors would concede, and in one year the Wheeling took \$1,000,000 worth of traffic away from the Pennsylvania by this method. In the old days of pooling arrangements it would have been a simple matter to have made some traffic arrangement by which the Wheeling could have an offset for the traffic it would lose by elimination of these allowances. This is no longer possible. There seems to be a well-rooted impression that the large trunk lines will not find it possible to effect the adjustment on January 1. The New York Central, Baltimore & Ohio and the Pennsylvania are leading the movement.—*Wall Street Journal*.

INTERSTATE COMMERCE COMMISSION.

Reparation Awarded.

Hydraulic-Press Brick Co. v. Mobile & Ohio et al. Opinion by Commissioner Prouty:

Reasonable rate for transportation of brick from Cheltenham, Mo., to Tuscaloosa, Ala., prescribed. (19 I. C. C., 530.)

J. W. Johnson Co. v. Clyde Steamship Co. et al. Opinion by Commissioner Lane:

Various less-than-carload shipments of cotton-shoddy lining from Philadelphia, Pa., to Chicago, Ill. (19 I. C. C., 512.)

George M. Spiegle & Co. et al. v. Southern Railway Company. Opinion by Commissioner Lane:

The milling-in-transit rates on lumber at Newport, Tenn., are excessive and discriminatory. (19 I. C. C., 522.)

Block-Pollak Iron Co. v. Houston East & West Texas. Opinion by Commissioner Lane:

Initial carrier failed to route a shipment over a line carrying a rate inserted by the shipper in the bill of lading when such route was available. (19 I. C. C., 505.)

St. Louis Hay & Grain et al. v. Mobile & Ohio et al. Opinion by Commissioner Clements:

The question involved in each of these cases is the reasonableness of defendants' reconsignment charge at East St. Louis on

shipments of less than 100 lbs. at points north, east and west thereof, and consequently the defendant's freight rates. Complaint was not made in case No. 22, and the commission in that case found the cost to the carriers of such re-conignment service at East St. Louis not to exceed 1 cent per 100 lbs. and suggested mitigation to that limit. 11 I. C. C., 90. The defendants refused to pay the re-conignment and suit was brought in the United States circuit court for the eastern district of Illinois, which rendered judgment for complainant in accordance with the order of the commission, and this judgment was affirmed by the United States circuit court of appeals for the seventh circuit. The Supreme Court, on appeal, reversed the lower court and held that carriers are entitled to a reasonable profit on the service performed by them under a reconsignment privilege as well as on the transportation proper. The case was remanded to the circuit court with instructions to send the matter back to the commission for further investigation and report, 214 U. S., 297.

In the meantime the other complaints were presented to the commission.

On these stipulations the claims barred by the limitation provision of the act as interpreted by the commission have been eliminated and the reparation agreed upon is based on one-half cent per 100 lbs. In other words, accepting the commission's finding of the cost to the defendant carriers of this reconsignment service at East St. Louis to be 1 cent per 100 lbs., the carriers have been allowed a profit of one-half cent per 100 lbs. (19 I. C. C., 533.)

Reparation Denied.

Orange Grocery Co. v. Morgan's Louisiana & Texas Railroad Steamship Co. et al. Opinion by Commissioner Prouty:

Rate of 55 cents per 100 lbs. collected on mixed carload of groceries from Orange, Tex., to Eunice, La., a distance of 105 miles, not found unreasonable. (19 I. C. C., 502.)

The Label as an Indication of the Nature of a Commodity.

J. B. Ford Co. v. Michigan Central et al. Opinion by Commissioner Clark:

The complainant manufactures chemicals, one of which is soda ash, intended for a cleanser and for which the trade name, "Wyandotte Cleaner and Cleanser," has been adopted. Official classification ratings are as follows: Washing powder, soap powder, bleach or bleaching, dry in kegs or barrels, washing soda powder, cleaning and cleansing, N. O. S. dry and packages, and C. L., minimum weight 36,000 lbs., fifth class; soda ash same minimum weight, sixth class. The defendants say that Wyandotte Cleaner and Cleanser is advertised as a household washing and cleansing compound, and that as such it enters into competition with other cleaning compounds which take the fifth-class rate, and that it differs from the soda ash of commerce in that the latter is of a lower grade of less value. The commission expresses in effect the opinion that if Wyandotte Cleaner and Cleanser is to be carried as soda ash and at the soda ash rates, shipments should be so billed or at least this name should be included as well as the trade name. The complainant, while willing to insert in the bills of lading "soda ash" (trade name, Wyandotte Cleaner and Cleanser), objected to show such designation on the packages. The commission could not justify giving this commodity the benefits of a low rating as soda ash unless the shipments were in fact soda ash and were shipped and designated as such. The commission believes that if a simple commodity is given a trade name which does not disclose its real nature and is shipped and sold in competition with other compounds intended for the same uses, it should be rated the same as those other compounds, and that in order to be entitled to the low rating it should be shipped openly as the simple commodity which it is in fact.

Suspensions of Tariffs and Proposed Hearings.

The Interstate Commerce Commission will begin at New Orleans, La., on December 8 an investigation of the relations between the trunk lines and the so-called "tap line" railways. The Commission has already accumulated a large amount of information on this subject through its examiners, which will be used as a basis for the public investigation.

Upon presentation by the transcontinental lines of the inequalities that would result from the enforcement at this time of the new transcontinental rates ordered by the Commission in the

Sacramento, Fresno and Pasadena cases, the Commission has changed the date for these rates to a later date from December 1 to January 1. The reasons adduced for application of these rates would bring out of adjustment some of their tariffs and they desired the extra time to make all rates harmonious.

Truck Farm Products Rates.

Ponchatoula Farmers' Association, Limited, v. Illinois Central. Opinion by Commissioner Campbell:

Defendant's rule authorizing carload rates on mixed carloads and providing that any deficit in minimum shall be made up by adding to the weight of the highest rated article, found unreasonable and ordered amended to provide that deficit in weight shall be made by adding to the weight of the heaviest loaded article. Minimum weight of 18,000 lbs. on strawberries from Ponchatoula, La., to Chicago, Ill., unreasonable in so far as it exceeds 17,000 lbs. Carload rate of 58½ cents per 100 lbs. on lettuce from Ponchatoula, La., to Chicago, Ill., unreasonable in so far as it exceeds 55 cents. Defendant's "owner's-risk" rule was vague and misleading and warranted complainant's objection. Rule as corrected, effective June 6, 1910, appears to remove cause of complaint. Many other matters complained of are either beyond the commission's jurisdiction or are not presented on any basis that would authorize the commission to grant relief. (19 I. C. C., 513.)

STATE COMMISSIONS.

The Railroad Commission of Wisconsin, in regard to a complaint against an increase in rates on beer from Waukesha to Milwaukee from 3 to 4 cts. per 100 lbs., holds that freight rates that have been in effect long enough so that industrial and commercial conditions have been adjusted and established under them should not be increased except for good reason, and that the burden of proof for such increase rests on the carrier. On the basis of the cost of the service involved, the competitive and commercial conditions with which the petitioner is confronted, a rate of 3 cts. per 100 lbs., is reasonable under all circumstances.

The Railroad Commission of Wisconsin, in a case brought by a railway company against certain individuals and a township, has decided in favor of the complainant (the railway). The railway company had been authorized to build a line from Clyman through Dodge county into Juneau county, and at one point where the survey called for the line crossing a highway the two intersect at such an angle that to carry the highway over on a bridge would have necessitated a dangerously long structure. The railway proposed to move the highway. The commission holds that a practical solution of the difficulty has been suggested by the petitioner, and that since the railway company is to bear all the expenses its petition is reasonable.

The New York Public Service Commission, First district, will hold a public hearing on November 30 on an order which has been prepared by the board changing the period during which the Interborough company must provide in its trains a number of seats equal to the number of passengers from thirty minutes to fifteen minutes. Under the existing order the company is required to run only enough trains every half hour to provide seats for all passengers offering during that half hour. It is possible, therefore, for the company to run crowded trains during a portion of the half hour period and make up for the congestion by running trains during the remainder of the period in which there will be enough vacant seats to counterbalance the standing passengers in the trains passing during the first part of the period.

A movement has been started by the Texas railway commission to compel the complete segregation of all railways operating in Texas from all lines operating outside of Texas. William D. Williams, a member of the commission, said in a recent statement that the Texas roads are being constantly milked by the parent system in such a way as to make it appear that their net earnings are smaller than they actually are. Under the existing law each line doing business in the state is required to maintain general offices there. N. A. Stedman, who has been attorney for the principal railways in Texas, said that the charge that the parent companies have not given proper divisions of rates to the lines in Texas is without foundation, and that the books of the companies are kept as required by the Interstate Commerce Commission.

Illinois Coal Rates Increased.

The Illinois Railroad and Warehouse Commission has granted the railroad the right to increase rates 2 cents a ton on coal between Illinois mines and various industrial centers of the northern part of the state. Chairman Berry, in announcing the decision, said:

"After hearing the testimony offered by both sides, the commission employed experts of its own to make a careful investigation into the books of the railroads. This was done in great detail, and the figures show that without considering interest on the funds or dividends on the stock, the actual cost of transporting coal is such that the roads are compelled to some advance. Then, applying certain principles to the bonds and improvements, and 6 per cent. on the stock, with perhaps one exception we have decided to give the roads what these figures and principles would entitle them to."

COURT NEWS.

The United States circuit court for the northern district of California on November 25 denied the applications made by the Southern Pacific, the Atchison, Topeka & Santa Fe and their connections for injunctions to restrain the Interstate Commerce Commission from enforcing the orders made by it in the transcontinental rate cases for reductions in the rates to and from Reno, Nev., and to Phoenix, Ariz.

At Reno, Nev., last week an injunction was issued restraining the governor, attorney-general, board of railway commissioners and the Tonahill & Goldfield Railroad from putting into effect the rate on forest products lately ordered by the state board of railway commissioners. An injunction will also be issued against the Southern Pacific. The constitutionality of the state railway commission law is challenged. The bill states that the new rate is confiscatory.

Deductions for Obsolescence Justified.

The Supreme Court of New York in a decision by Justice Le Boeuf, handed down November 25, sustains the Brooklyn Rapid Transit Company in its protest against a special franchise tax assessed against it. In assessing this tax the state tax commissioners fixed the value of certain property of the company in the Borough of Queens at \$1,365,842. This included a large sum for franchises which Judge Le Boeuf holds have no value which can be taxed, under the law, according to the net earnings rule, and the assessment is ordered reduced about 80 per cent.

In reaching this conclusion Justice Le Boeuf enunciates a new principle in connection with the valuation of special franchises by the State Tax Commission, in that he holds that there may be a charge off from the gross earnings of a public service corporation for obsolescence of railway equipment, as distinguished from depreciation from ordinary wear, thus reducing the value of a special franchise when the value is based on net earnings. He says:

If the State Tax Commission's decision is to be construed as laying down the rule that no allowance shall be made for obsolescence or inadequacy of equipment, not yet sustained, but capable of reasonable ascertainment for the future, it does not appear to me to be consistent with the expressed policy of this state. As surely as humanity travels from the cradle to the grave the machinery and equipment of a public service corporation travels toward the scrap pile.

But another form of depreciation takes place. The machinery or equipment while still capable of years of service becomes inadequate to do the work demanded. In the case particularly of electrical machinery the type becomes obsolete by reason of invention. Some of these changes are capable of definite ascertainment. Many of them may be provided against for the future by setting aside from gross earnings a reasonable sum to create a reserve against the day when they shall come. The Public Service Commission law recognizes this amortization principle, and yet the State Tax Commission is insistent that no reasonable basis exists for the creation of an amortization fund. If a public service corporation comes into court and requests that it be permitted to set aside a reasonable amount of its gross earnings for such an amortization fund it is difficult to understand why the court should refuse to consider that request.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

L. C. Farber has been appointed acting auditor of accounts receipts of the Illinois Central, with office at Chicago, succeeding A. D. Joslin, deceased.

D. Crombie, assistant to general transportation manager of the Grand Trunk, at Montreal, Que., has been appointed assistant to first vice-president, with office at Montreal.

William T. Noonan, vice-president and general manager of the Buffalo, Rochester & Pittsburgh, has been elected president, with office at Rochester, N. Y., succeeding Adrian Iselin, Jr., who becomes vice-president, with office at New York.

Operating Officers.

J. A. Jones has been appointed a trainmaster of the San Pedro, Los Angeles & Salt Lake, and C. H. Esender has been appointed chief dispatcher, both with offices at Los Angeles, Cal.

H. J. Plumbhof has been appointed an assistant superintendent on the Idaho division of the Oregon Short Line, with office at Pocatello, Idaho.

B. A. Campbell, traveling conductor on the Western division of the Southern Pacific at Oakland Pier, Cal., has been appointed trainmaster of the Suisun district, with office at Oakland Pier, succeeding G. D. Wright, promoted.

E. W. Deuel, assistant superintendent on the Fourth division of the Denver & Rio Grande at Durango, Colo., has had his jurisdiction extended over the First and Second districts and the Creede and Santa Fe branches. J. R. Yeager has been appointed an assistant superintendent, with jurisdiction over the Third district and the Silverton and Farmington branches. His headquarters will be at Durango.

The lines operated by the Atchison, Topeka & Santa Fe (western lines), the Southern Kansas Railway of Texas, the Pecos & Northern Texas and the Eastern Railway of New Mexico have been divided into two districts as follows: the Northern district, comprising the Western, Arkansas River, Colorado, New Mexico and Rio Grande divisions, under the jurisdiction of J. M. Kurn, general superintendent at La Junta, Colo.; and the Southern district, comprising the Panhandle, Plains and Pecos divisions. G. C. Starkweather, superintendent of the Eastern Railway of New Mexico and the Southern Kansas Railway of Texas at Amarillo, Tex., has been appointed general superintendent of the Southern district, with office at Amarillo. The Pecos division is a new division consisting of a portion of the Rio Grande division of the Atchison, Topeka & Santa Fe and a portion of the Eastern Railway of New Mexico. E. W. Peabody has been appointed assistant to the general manager, with office at Amarillo. J. E. McMahon, trainmaster of the Santa Fe at La Vegas, N. Mex., has been appointed superintendent of the Pecos division, as above, with office at Clovis, N. Mex.; and D. Elliott, assistant superintendent of the Eastern Railway of New Mexico and the Southern Kansas Railway of Texas at Amarillo, has been appointed superintendent of the Plains division, with office at Amarillo.

William W. Waits, whose appointment as superintendent of terminals of the Southern Railway, at Atlanta, Ga., has been announced in these columns, was born February 9, 1869, at Atlanta. He was educated in the public schools and began railway work on February 16, 1887, with the Central of Georgia, as a switchman. He was later yard conductor and night yard master. In October, 1890, he went to the East Tennessee, Virginia & Georgia, now a part of the Southern Railway, as yard conductor, at Atlanta, and then for five years was yard conductor and yard master of the Western Railway of Alabama and the Atlanta & West Point, at Montgomery, Ala. In October, 1896 he went to the Southern Railway as yard conductor, and one year later was appointed assistant yard master. The following year he was appointed general night yard master, remaining in that position for six years. In August, 1904, he was promoted to

general yard master, which position he held until his recent appointment as superintendent of terminals, at Atlanta. When Mr. Waits went to the Southern Railway, the company worked at Atlanta 12 switch crews night and day; it now has 35 crews, and there are 48 daily passenger trains and an average of 90 freight trains. The number of yard employees is 500, and the number of cars handled is 2,500 a day. The terminals and belt lines aggregate 35 miles of line and 325 miles of track, including storage for 7,000 cars. The number of regular passenger crews coming into Atlanta is 90, and of freight crews 115. The Atlanta terminals handles the business from five divisions. There are four large freight houses and 118 industrial plants to be served daily.



Edward Raymond

Edward Raymond, whose appointment as general superintendent of the Atchison, Topeka & Santa Fe at Newton, Kan., has been announced in these columns, was born on May 31, 1858, at Kendal Corners, N. Y. Mr. Raymond received a common school education and began railway work in 1878, with the Atchison, Topeka & Santa Fe as a section foreman. He was promoted to roadmaster, and was later appointed trainmaster. His next position was assistant superintendent. He was then appointed division superintendent, and at the time of his recent pro-

motion he was division superintendent with office at Chilli-cothe, Ill.

Traffic Officers.

H. K. Mack has been appointed a commercial agent of the Chicago, Burlington & Quincy, with office at Paducah, Ky.

J. C. Hall has been appointed a traveling freight claim agent of the Sunset Route, at Houston, Tex., succeeding J. C. Gilbert, deceased.

J. P. Stephens has been appointed a commercial agent of the Rock Island Lines, with office at Atchison, Kan., succeeding F. M. Darrah, deceased.

H. C. Moran has been appointed contracting agent of the Missouri, Kansas & Texas, with office at Houston, Tex., succeeding L. H. Saunders, promoted.

John K. Thorn has been appointed a soliciting freight agent of the Seaboard Air Line, with office at Philadelphia, Pa., succeeding William F. Barwell, resigned to go to another company.

T. E. Harris, traveling freight agent of the Georgia, Southern & Florida at Cordele, Ga., has been appointed a traveling freight and passenger agent of the Georgia & Florida, with office at Valdosta, Ga.

L. B. Washington has been appointed district passenger agent of the St. Louis & San Francisco, the Chicago & Eastern Illinois and the Evansville & Terre Haute, with office at Jacksonville, Fla., succeeding W. L. Evans, promoted.

W. I. Jones, chief clerk to the freight traffic manager of the Missouri Pacific-Iron Mountain system at St. Louis, Mo., has been appointed assistant general freight agent, with office at St. Louis, Mo., succeeding R. E. Eggebrecht, resigned to become vice-president of the Standard Collieries Company.

A. F. Burnard, district passenger agent of the New York Central & Hudson River, the West Shore and the Boston & Albany, at Williamsport, Pa., has been appointed general traveling passenger agent, with office at New York. Frank G. Halloran, traveling passenger agent at Williamsport, succeeds Mr. Burnard.

Emmett J. Carland has been appointed traveling agent of the Chicago, St. Paul, Minneapolis & Omaha on lines of the Northern Pacific and the Great Northern west of Mandan and Minot, N. D., and east of De Smet and Columbia Falls, Mont., succeeding Wm. T. Condon, deceased. He will report to the general agent at Helena, Mont.

L. J. Spence, general eastern freight agent of the Southern Pacific Company, and general freight agent of the Southern Pacific steamship lines at New York, has been appointed assistant director of traffic of the Union Pacific and the Southern Pacific System, with office at Chicago, succeeding T. M. Schumacher, resigned.

Truman H. Clark, contracting freight agent of the Chicago, St. Paul, Minneapolis & Omaha at Minneapolis, Minn., has been appointed general agent, with office at Superior, Wis., succeeding George H. Kirk, resigned on account of ill health. He will have charge of freight and passenger traffic at Superior and South Superior, Wis. Thomas G. Keogh succeeds Mr. Clark.

Clarence M. Knox has been appointed district freight agent of the Sunset Route (the Galveston, Harrisburg & San Antonio, the Texas & New Orleans, the Louisiana Western, Morgan's Louisiana & Texas and the Atlantic steamship lines of the Southern Pacific, with office at Los Angeles, Cal. Walter R. Van Sickler has been appointed a traveling freight agent, and Fred D. Ogden a contracting freight agent, both with office at San Francisco, Cal.

Albert H. Hanson, passenger traffic manager of the Illinois Central and the Indianapolis Southern, with office at Chicago, will retire from that office on December 31 on a pension. Mr. Hanson was born at Salem, Mass., in 1846, and has been with the Illinois Central continuously for 41 years. He began in the general freight office, was then placed in charge of claims in that office, was secretary to the general superintendent and then assistant general passenger agent. For 25 years from June, 1880, he was general passenger agent, and since 1905 has been passenger traffic manager.

Harry W. Brodie, whose appointment as general passenger agent of the Canadian Pacific, western lines, west of Revelstoke, B. C., with office at Vancouver, B. C., has been announced in these columns, was born June 8, 1874, at Fredericton, N. B. He was educated in the public schools, and began railway work January 1, 1895, with the Canadian Pacific, as a stenographer, at St. John, N. B., and was later transferred to Boston, Mass. In October, 1895, he was appointed chief clerk, at Toronto, Ont., and from October, 1899, until the time of his recent appointment as general passenger agent, he was chief clerk and assistant general passenger agent of the same company, at Winnipeg, Man..

Charles B. Foster, who was appointed general passenger agent of the Canadian Pacific, western lines, Revelstoke, B. C., and east, with office at Winnipeg, Man., as previously announced in these columns, was born September 30, 1871, at Kingston, Kings county, N. B. Mr. Foster was educated in the public schools, and began railway work April 1, 1891, with the Canadian Pacific, as a stenographer, at St. John, N. B. In September, 1893, he was appointed traveling passenger agent, remaining in that position until August, 1899, when he was appointed chief clerk in the district passenger department at St. John. From February 8, 1902, to November 22, 1904, he was district passenger agent at St. John, and was then transferred to Toronto, Ont. He was appointed assistant general passenger agent at Vancouver, B. C., in September, 1908, which position he held at the time of his recent appointment as general passenger agent.

Engineering and Rolling Stock Officers.

George S. Hunter has been appointed assistant master mechanic of the Missouri Pacific-Iron Mountain system, with office at Jefferson City, Mo.

E. J. Snell has been appointed a master mechanic on the Pennsylvania division of the New York Central & Hudson River, with office at Corning, N. Y.

Alfred E. Calkins has been appointed assistant to the superintendent of rolling stock of the New York Central & Hudson River, with office at New York.

William Kelly, master mechanic of the Buffalo division of the Lehigh Valley, has been appointed assistant to the general superintendent of another part of the Atlantic Coast Line.

George H. Felt has been appointed master mechanic of the Hudson river division of the New York Central & Hudson River, with office at New Durham, N. J., succeeding C. F. Brennan, resigned.

John Lovestrom, signal engineer of the Hudson & Manhattan, at New York, has been appointed to the new position of signal engineer of the Illinois Traction system, with office at Peoria, Ill., effective December 15.

A. R. Flinn, formerly assistant signal engineer of the Chicago & North Western, has been appointed signal engineer of the Louisville & Nashville, with office at Louisville, Ky., succeeding C. J. Cannon, resigned.

A. Dinan, whose appointment as mechanical superintendent of the Southern district of the Atchison, Topeka & Santa Fe, with office at Amarillo, Tex., has been announced in these columns, has been appointed also mechanical superintendent of the Southern Kansas Railway of Texas, the Pecos & Northern Texas and the Eastern Railway of New Mexico.

D. D. Robertson, master mechanic of the Wyoming division of the Lehigh Valley, at Wilkesbarre, Pa., has been appointed master mechanic of the Buffalo division, with office at Buffalo, N. Y., succeeding W. Kells, resigned, to go to another company. W. G. Burrows, master mechanic of the Mahanoy & Hazleton division, at Weatherly, Pa., succeeds Mr. Robertson, and T. H. Malican succeeds Mr. Burrows.

Purchasing Officers.

W. J. Diehl, traveling storekeeper of the Lake Shore & Michigan Southern, has been appointed general storekeeper of the Mobile & Ohio and the Southern Railway in Mississippi, with office at Mobile, Ala.

OBITUARY.

W. H. Field, until a year ago treasurer of the Houston & Texas Central, with office at Houston, Tex., died at Montgomery, Ala., on November 23.

Charles A. Johnson, commercial agent of the Chicago, Burlington & Quincy at Chicago, died in Chicago on November 24. Mr. Johnson was 54 years old and had been connected with the Burlington for 38 years. He was one of the founders of the Traffic Club of Chicago.

Jonathan Dwight, formerly connected with the engineering department of the New York Central & Hudson River, died at his home in New York this week at the age of 80 years. Mr. Dwight was a graduate of Harvard in the class of 1852. After leaving Harvard he went to West Point and studied civil engineering and was later instructor in military engineering there. He then went West and was interested in building one of the first railways west of the Mississippi river, the Hannibal & St. Joseph, now a part of the Chicago, Burlington & Quincy. He was later a consulting engineer and for a time was a chief engineer on the New York Central. He also supervised the construction of many of that company's bridges. He had charge of the laying of the foundations of the Statue of Liberty in New York harbor.

Danton H. Nichols, of Springfield, Mass., former president of the Kansas Southwestern, died November 27, at Monroe, La. Mr. Nichols was born August 14, 1849, at Lima, Ohio, and began railway work July 12, 1866, as a clerk and office boy on the St. Louis & San Francisco. In October, 1875, he was appointed superintendent of the Atlantic & Pacific division of the same road. He was appointed superintendent of transportation in June, 1881, and about five years later was made general superintendent. In November, 1890, he was appointed superintendent of the New York & New England, now a part of the New York, New Haven & Hartford, and the following month was made general superintendent of the same road. He was out of railway service from January, 1892, to February, 1896, when he

was appointed superintendent of the Peconic Valley Railroad, and from October, 1896, to January, 1900, was general manager of the Peconic System and Peconic Railway Construction & Land Company, and superintendent of the Peconic & Western Lines. He was general manager of the Eastern & Western in Jamaica, 1902, and in February of the following year was appointed superintendent of the St. Louis & East and District superintendent of the St. Louis, Memphis & Southeastern, both of which are Frisco Lines. At the time of his death Mr. Nichols represented New York interests engaged in promoting the building of a line from Monroe, La., across southwestern Arkansas.

Octave Chanute died on November 23 at his home in Chicago. Mr. Chanute was seriously ill of pneumonia in Europe last summer but recovered sufficiently to come home in October. He was born in Paris in 1832 and was brought to this country as



Octave Chanute

a child. He began work in 1849 on the construction of the Hudson River Railroad. After four years on this road, he was on construction work on part of the Chicago & Alton. In 1854 he was made chief engineer of the eastern part of the Toledo, Peoria & Warsaw. After he built this he remained in charge of maintenance of way until 1861, when he went to the Pittsburgh, Fort Wayne & Chicago as division engineer. A year later he was made chief engineer of maintenance of way of the Western division of the Ohio & Mississippi, and in 1863 went to the Chi-

cago & Alton as chief engineer. Four years later he was made chief engineer in charge of the construction of the Missouri river bridge at Kansas City, having, while still on the Alton, won a prize for a design for a bridge across the Missouri at St. Charles, Mo., and also made a design for the union stock yards at Chicago. While he was building the Kansas City bridge he was made also chief engineer of the Kansas City, Fort Scott & Gulf, and later put in charge of the building of several other roads in Kansas. He also designed and built the union stock yards at Kansas City. In 1871 he was made general superintendent of the Leavenworth, Lawrence & Galveston, and in 1873 went to the Erie as chief engineer. During his ten years' service on the Erie he put through important improvements, including double-tracking, grade revision and making the road standard gage. He was made assistant general superintendent in 1875. In 1884 he opened an office as consulting engineer at Kansas City, and during the next few years was in charge of construction of certain bridges on the Chicago, Burlington & Northwestern and the Atchison, Topeka & Santa Fe, including the one over the Mississippi at Ft. Madison, Iowa, and the one over the Missouri at Sibley, Mo., being consulting engineer for the latter. In 1885 he organized the Chicago Tie Preserving Co., using zinc chloride. This company, which has been succeeded by the firm of O. Chanute & Co., later took up also zinc-tannin, zinc-cresote and other processes.

Mr. Chanute became a member of the American Society of Civil Engineers in 1868. He was vice-president in 1880 and president in 1891. He was president of the Western Society of Engineers in 1901, and at the time of his death was an honorary member of that society, as well as of the Institution of Civil Engineers (Great Britain), the Society of Civil Engineers (France) and the Chilean Society of Engineers. He was a member of the Canadian Society of Civil Engineers, the American Institute of Mining Engineers, the American Railway Engineering and Maintenance of Way Association and a number of aeronautical societies. He leaves a son and three daughters. We publish in another column some brief comments on Mr. Chanute's career.

Railway Construction.

New Incorporations, Surveys, Etc.

ALBERTA CENTRAL.—This company has applied to the parliament of Canada for power to build a line from Saskatoon, Sask., north-easterly to Hudson Bay, with terminals at both Fort Churchill and Port Nelson. The company has under consideration the question of building a line from Red Deer, Alb., westerly for 70 miles, also easterly from Red Deer to Moose Jaw, Sask., 40 miles. J. T. Moore, president; J. G. MacGregor, chief engineer, Red Deer, and Smith & Johnson, solicitors. (October 21, p. 759.)

BARTLETT-FLORENCE.—An officer writes that this company was organized to build from Milano Junction, Tex., northwest to Lampasas, 94 miles. The line is now in operation from Bartlett, west to Jarrell, about 11 miles, and grading work has been finished, ready for ties between Jarrell and Florence, on 12 miles. The work has been stopped for the present.

BOSTWICK RAILROAD.—This company, which operates a line from Bostwick, Ga., to Apalachee, six miles, has projected an extension from Bostwick to Monroe, 14 miles.

CALIFORNIA ROADS.—G. W. Cartwright, Sacramento, Cal., and associates are said to be back of a project to build a line between Fresno and Monterey.

CAZENOVIA & SAUK CITY.—This company is planning to build a line from Cazenovia, Wis., southeast to Sauk City.

CHERRYVALE, OKLAHOMA & TEXAS.—Grading has been finished on about 20 miles between Caney, Kan., and Vinita, Okla., 62 miles. The Continental Construction Company, Caney, are the contractors.

CHICAGO, MILWAUKEE & PUGET SOUND.—Work is now under way between Eagle Butte, S. D., and Faith, 42 miles; from Lewistown, Mont., northward 12 miles, and from Lewistown, eastward 24 miles.

COLORADO & NORTHERN.—Surveys are being made for a line from Hayden, Colo., to Hahn's Peak, 45 miles. A. A. Johnson, vice-president and general manager, 721 Equitable building, Denver.

COPPER RANGE.—An officer writes that work is now under way by the company's men on about one-half mile of line, to the Indiana mine, in Michigan, and surveys are being made for a line, about one-quarter of a mile long, from Greenland Junction to South Lake mine.

DENVER, NORTHWESTERN & PACIFIC.—An officer is quoted as saying that surveys have been made for piercing a tunnel, 4.1 miles long, through the main range of the Rocky mountains; the eastern portal of the tunnel is to be located at a point three miles west of Tolland, Colo., at an elevation of 9,470 ft., and the western portal in the Fraser river valley, about three miles southeast of Vasquez. The existing line crosses the mountain at an elevation of 11,600 ft. at Corona. The proposed tunnel will save a climb of 2,130 ft., and will shorten the main line about 16.5 miles.

EL DORADO & WESSON.—An officer writes that this company, which operates about 10 miles of line from El Dorado, Ark., to Wesson, has work under way on an extension from Wesson, southwest for 20 miles. The Edgar Lumber Company are the contractors. The line is eventually to be extended to Shreveport, La., 82 miles from Wesson.

FLORIDA RAILWAY.—An officer writes that work is now under way by the Florida Construction & Realty Company, Jacksonville, Fla., on an extension from Live Oak, east to Jacksonville, 82 miles, and from Jacksonville, north to Fernandina, 29 miles. Grading work is about half finished. Surveys are being made for an extension from Perry to Tallahassee, about 50 miles. (March 11, p. 305.)

GARDEN CITY, GULF & NORTHERN.—An officer writes that work is now under way by A. J. Canady, Scott City, Kan.; Green & Davis, and P. Gleeson, both of Liberal, from Garden City to the Chicago & North Western, to make a line from Scott City to Grove, 20 miles, and surveys are being made on an additional 50 miles. (September 23, p. 558.)

GEORGIA, SOUTHWESTERN & GULF.—An officer writes that this company has finished locating a line from Albany, Ga., southwest via Newton and Colquitt to Donaldsonville, 60 miles. No

construction work has yet been done. D. B. Dunn, chief engineer, Albany.

GRAND TRUNK.—Work is now under way by the Midland Construction Company, Midland, Ont., on a line from Midland to Wyevale, 8.9 miles.

GREAT NORTHERN.—The report of this company for the year ended June 30, 1910, shows that new lines were completed and opened for operation during the year as follows: From Columbia River station, Wash., northeast to Mansfield, 60.62 miles; extension from Nashwauk, Minn., south to a connection with the main line at Gunn (near La Prairie), 22.07 miles; extension of the Vancouver, Victoria & Eastern Railway & Navigation Company, from Keremos, B. C., northwest to Princeton, 40.91 miles; branch line from Spokane, Wash., to a connection with the tracks of the Spokane, Portland & Seattle, 2.16 miles; branch line from Bainville, Mont., north to Plentywood, 52 miles, is nearing completion, track laying has been finished; the branch from Stanley, N. D., northwest to Powers Lake, 24 miles, has been extended to Wildrose about 51 miles from Stanley, grading to Wildrose and bridging between Stanley and Powers lake, will be finished in 1910, and the line will be ready for track laying early in 1911.

Work was begun during the year on new lines as follows: Oroville, Wash., southerly, following the Okanogan and Columbia rivers to Pateros, 78 miles. Grading will be finished in 1910, and the line will be ready for track laying early in 1911. This line will traverse a fruit and agricultural section already partially developed and settled, and ultimately will be extended southerly along the Columbia river to a connection with the main line at Wenatchee, considerable right-of-way for this extension has been secured; a line from the main line at Fargo, N. D., northwesterly to a connection with the main line at Surrey, about 255 miles, is to be built through a good agricultural section already well settled and under cultivation. This new line will shorten the distance for through traffic and relieve congestion on the present main line through North Dakota, about 18 miles of track will be laid on the Surrey end during 1910; a branch from Vaughn, Mont., west of Great Falls, westerly to Augusta, about 40 miles, has been located and grading work has been begun between Vaughn and Simms, this line will run through the Sun river valley and through the territory to be served by the government's Fort Shaw or Sun river irrigation project, the work has been suspended for the present; grading work is now under way on an extension of the Vancouver, Victoria & Eastern, from Princeton, B. C., northwest to Tulameen, and on another section from Abbotsford, near Sumas, easterly to Chilliwack; surveys for and locations of several other lines, principally in North Dakota, Montana and Washington, have been made during the year. A number of new passenger stations have been built at various places and some shop improvements have been carried out during the year. The building of additional passing tracks, extension of existing ones, and laying other sidings and spur tracks, has been continued. The work of building a sea wall and grading for second-track between Everett, Wash., and Ballard was continued during the year, 15,333 lin. ft. of sea wall having been completed between Everett and Mosher. Second main track was laid between the company's ocean docks and the north portal of the tunnel under the city of Seattle, 1.78 miles, and between Hillyard and Spokane, 3.52 miles. Revision work on the present main line and construction of new second main track is in progress from the summit of the Rocky mountains to Java, Mont., 14.38 miles. It is expected that this work will be finished during 1910. The curvature on the present line will be materially reduced, and the construction of the second-track will avoid delays and congestion in handling traffic over the mountains, the grade on the east side of the mountains being 1 per cent. against west-bound traffic, compared with a grade of 1.8 per cent. on the west side of the mountains against eastbound traffic. (See report of this company elsewhere in these columns.)

HUDSON BAY RAILWAY.—J. L. Armstrong, chief engineer in charge of surveys, is quoted as saying that the survey for the first 200 miles from The Pass, Keewatin, towards Hudson Bay, has been finished, and construction work will be started on this section next year. It has not yet been decided where the northern terminus will be located, as the reports of surveys made this year at the harbors at Fort Churchill and Port Nelson on Hudson Bay are not yet completed. (September 16, p. 520.)

HURON & MADISONVILLE.—An officer writes that this company has completed the railway system from the Pennsylvania station, Jersey City, N. J., to Grace street, 0.83 mile, and to the Borough of Manhattan, New York City, from Twenty-third street and fifth avenue to Thirty-third street and Broadway, 0.45 mile. Work is under way from Grace street, Jersey City, to Summit avenue, 1.30 miles.

KENTUCKY MISSOURI.—There are now being made for an extension from Earls, Ky., west to Madisonville, 14 miles.

LAKE HURON RAILROAD.—This company has projected an extension from Huron, Ohio, west for three miles. The company has finished a one-mile spur, connecting with the stone quarry near Canton.

LEXINGTON & EASTERN.—See Louisville & Nashville.

LOUISVILLE & NASHVILLE.—This company has recently assumed control of the Lexington & Eastern, which is building an extension from Jackson, Ky., up the north fork of the Kentucky river to a point near the headwaters of Boones Fork, about 96 miles. (See Lexington & Eastern, October 21, p. 760.)

MANITOULIN & NORTH SHORE.—Work is now under way by O'Boyle Brothers Construction Co., Ltd., Sault Ste. Marie, Ont., on an extension from Little Current to Whitefish, 18 miles. A further extension is projected from Whitefish to Crean Hill, 38 miles.

MEXICO TRAMWAY COMPANY.—The Mexican Congress has authorized this company to build two electric lines; one line is to run from Mexico City, Mex., southeast to Puebla, 125 miles, and the other from Mexico City, southwest to Toluca, 45 miles. The new company is a subsidiary of the Mexican Light & Power Company. Preliminary surveys have been made and work is to be started soon.

MEXICAN ROADS.—The Mexican Petroleum Limited, Ebano, Mex., will build a railway, it is said, along the Tuxpam river, 70 miles long.

MISSOURI, KANSAS & TEXAS.—The double-tracking work from Durant, Okla., north to Atoka, has been finished, it is said, and this section has been opened for service.

MUSCATINE NORTH & SOUTH.—This company will open for business on December 15, an extension from Oakville, Iowa, to Kensington, nine miles. The General Construction Company are the contractors. Surveys are being made for an extension from Kingston to Burlington.

NEVADA ROADS.—G. T. Wiswell and associates, of New York, will build 36 miles of railway, it is said, near Goldfield, Nev., to connect the Tonopah & Tidewater with the Las Vegas & Tonopah.

OCEAN SHORE.—This company has some grading work finished on an extension from Tunitas Glen, Cal., east to Scott creek, 26 miles.

SALISAW, McALESTER & SOUTHERN.—Grading work is now under way from McAlester, Okla., to Savanna, 14 miles. J. C. Wilkinson is the contractor, McAlester.

SPOKANE & BRITISH COLUMBIA.—An officer writes that surveys are being made for an extension from Republic, Wash., southeast to Spokane, 140 miles. (April 15, p. 1017.)

ST. LOUIS SOUTHWESTERN.—An officer writes that work is under way on about 45 miles of the line between England, Ark., and Stuttgart and Hazen, also on another section of 69 miles between Gatesville, Tex., and Comanche. Thompson & Scott, St. Louis, Mo., has the contract for the work.

STOCKTON TERMINAL & EASTERN.—This company has work under way on an extension from Linden, Cal., to Bellota, four miles.

TREMONT & GULF.—Surveys have been made for an extension from Rochelle, La., to Natchez, Miss., 65 miles.

TUSCALOOSA MINERAL.—An officer writes that surveys have been finished from Tuscaloosa, Ala., east to Brookwood, 20 miles. Woolsey Finnell, Tuscaloosa, may be addressed.

UTAH RAILWAY.—An officer writes that surveys are being made for an extension from Dragon, Utah, to Turtle, 12 miles.

WARREN, JOHNSTOWN & SALINE RIVER.—Surveys are being made for an extension from Goepel, Ark., to Johnsville, five miles. The company now operates a 16-mile line for freight traffic only, from Warren to Hermitage.

Railway Financial News.

BOSTON RAILROAD HOLDING COMPANY.—The Massachusetts Railroad Commission has authorized the Boston Railroad Holding Company to issue \$3,000,000 4 per cent. debenture bonds to retire by February 1, 1911, \$2,000,000 4 per cent. debenture bonds of the Holding company. A month's notice from the governor of Massachusetts and from the last legislature recommending that Railroad Holding Company bonds be made legal investments for savings banks, but through the opposition of the banks the plan was abandoned. It was also found to be impossible to pass a valid law making the bonds so exempt. The proposed stock of the Railroad Holding Company, it is understood, will be tax exempt in Massachusetts.

CHICAGO, ROCK ISLAND & PACIFIC.—A. J. Miller, James Douglas, James McLean and Arthur C. James were elected directors of the Rock Island Company, succeeding E. G. Boissevain, F. S. Pearson, Percival Farquar and E. D. Kenna. Mr. McLean was elected also a member of the finance committee, and Mr. James was elected also a director and a member of the executive committee of the Chicago, Rock Island & Pacific Railroad, succeeding Mr. Kenna. Mr. Miller succeeds Mr. Boissevain as a representative of the Dutch stockholders and the other three new directors represent Phelps, Dodge & Co., succeeding representatives of the Pearson-Farquar syndicate.

CHICAGO SOUTHERN.—See Chicago, Terre Haute & Southeastern.

CHICAGO, TERRE HAUTE & SOUTHEASTERN.—This company has been incorporated in Illinois and in Indiana as a successor to the Southern Indiana and the Chicago Southern.

DETROIT, TOLEDO & IRONTON.—The collateral deposited under the defaulted \$5,500,000 5 per cent. notes of 1905 were sold at public auction on November 25 to Joseph A. Ramsey, Jr., the only bidder. Attorneys representing F. J. Lismar & Co., and the King committee filed a formal protest. The \$5,000,000 consolidated mortgage 4½ per cent. bonds of the Detroit, Toledo & Ironton were sold for \$500,000, and the \$3,001,000 Ann Arbor common stock and the \$2,190,000 Ann Arbor preferred stock were together sold for \$2,000,000. This stock carries with it control of the Ann Arbor.

LEXINGTON & EASTERN.—See Louisville & Nashville.

LOUISVILLE & NASHVILLE.—This company has bought all of the \$500,000 stock of the Lexington & Eastern, and nearly all of the \$1,500,000 general mortgage bonds and \$330,000 deferred debentures, "thereby assuming an issue of first mortgage bonds (\$800,000) which mature during the year 1911, so that it is expected that within a reasonably short time the property will be entirely clear of all mortgage obligations." The Lexington & Eastern runs from Lexington, Ky., to Jackson, 93 miles.

MOUNT AIRY & EASTERN.—This road has been sold under receiver's sale for \$20,000, to John Hare, of Washington, D. C. The road, which is narrow gage, runs from Mount Airy, N. C., to Keblers Mills, Va.—12 miles.

NEW YORK CENTRAL LINES.—J. P. Morgan & Co. have bought an additional \$7,500,000—4½ per cent. New York Central Lines equipment trust certificates. This is the remainder of the \$30,000,000 authorized issue of equipment trust certificates, and the block of bonds now sold mature \$500,000 annually from 1911 to 1925. The *Wall Street Journal* says that the bonds were placed on terms which represent a cost to the company of 4.65 per cent. for the money.

SOUTHERN INDIANA.—See Chicago, Terre Haute & Southeastern.

WABASH-PITTSBURGH TERMINAL.—Bankers interested in the reorganization plans of this company and of the Wheeling & Lake Erie are quoted as saying that the Wallace Protective committee within the past ten days adopted a plan for the reorganization of both of these companies. When circulated unofficially it met with so much opposition that it was decided to withdraw the plan and attempt to draw up one more satisfactory to the bondholders and especially to the interests represented by the Chaplin committee.

Supply Trade Section.

The Union Switch & Signal Company announces that on and after November 28, 1910, the western district office will be located in Room 1041, Peoples Gas building, Chicago.

Bids are asked for 12 third-class passenger cars for the Imperial Chinese Tientsin-Pukow Railway. Specifications may be obtained from the railway purchasing agent, Taotai Y. C. Tong, Imperial Chinese Telegraphs, the Bund, Shanghai, China.

Bids were asked for supplying 19 locomotives for the Imperial Chinese Tientsin-Pukow Railway, northern district. Specifications and drawings may be obtained at the office of Deutsch-Chinesische Eisenban Gesellschaft mit Beschränkter Haftung, Berlin, Germany.

The Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, has appointed Thos. F. Meek as its representative for southern Michigan, with offices at 415 Moffat building, Detroit, Mich. Mr. Meek was secretary and manager of sales for the Detroit Steel Casting Company for 20 years.

C. H. Duell, of the law firm of Duell, Warfield & Duell, New York City, has been elected a director of the Safety Car Heating & Lighting Company, 2 Rector street, New York City. Mr. Duell was at one time Commissioner of Patents, and later a Judge of the Court of Appeals of the District of Columbia.

Otto Best, for eighteen years air-brake inspector of the Nashville, Chattanooga & St. Louis, has resigned, to accept the position of assistant to the president of the Nathan Manufacturing Company, 149 Broadway, New York. Mr. Best will be in charge of the works of this company and will perform such other duties as may be assigned him by the president.

He started in railway work as a machinist's apprentice for the Vandalia Railroad at Terre Haute, Ind., and after serving his term accepted a position with the Southern Pacific at Los Angeles, Cal. He served in various departments of that road for some time and was put in charge of the tool department, and later took up air brakes. After being with the Southern Pacific for seven years he accepted the position of air-brake inspector of the Nashville, Chattanooga & St. Louis in March, 1892, which position he has held ever since. In 1907 he was placed in charge of the Atlanta yards of the Western & Atlantic, a subsidiary line of the Nashville, Chattanooga & St. Louis, and remained there for two and a half years, returning to Nashville to look into the question of loss and damage to freight, to which question the road was giving considerable attention.

He was at one time president of the Air Brake Association and at present is treasurer of that association.

The St. Louis & San Francisco turned out of its Springfield, Mo., shops on November 19, an Atlantic type locomotive, No. 1007, with the drivers and trailing wheels fully equipped with Smith locomotive adjustable hub plates. The engine will be placed in service on a fast mail run between Monett and Newburg, Mo., and the device will be given a thorough test. It is made by the Smith Locomotive Adjustable Hub Plate Company, Pittsburg, Kan.

The Grip Nut Company, Chicago, announces the appointment of Thomas P. Swan as northwestern representative of that company, with headquarters at 315 Minnesota street, St. Paul, Minn.

Mr. Swan was at one time connected with the mechanical department of the Great Northern, and has a wide acquaintance among railway and supply men in the vicinity of the "Twin Cities."

John I. Rogers has opened a New York office in the City Investment building at 165 Broadway and will use it as his main office. He is making a specialty of forging by the steam hammer, the drop hammer and the hydraulic press; of special rolling, such as railway tires and rolled wheels; of the use and manufacture of alloy steels; of machine shops and power plants and of general iron and steel works engineering. Mr. Rogers resigned from the Midvale Steel Company of Philadelphia about one year ago to take up professional practice and since that time has been engaged in consultation work and design along the above lines.

"The Institute of Industrial Research" has been established at Washington, with the object of undertaking the investigation of industrial problems in all lines, particularly problems in metallurgy, agricultural chemistry, hydraulic cement, paint technology and all chemical industries. The director is A. S. Cushman, heretofore engaged in this kind of work for the government. His office is at 804 Hibbs building, and he is to build laboratories in the southwestern part of the city, near the Washington monument. Among Mr. Cushman's associates will be Henry A. Gardner and Dr. N. M. Hopkins.

TRADE PUBLICATIONS.

Manual of the American Articulated Compound Locomotive.—The American Locomotive Company has issued Bulletin No. 1006, relating to the articulated locomotive in the form of a manual of instruction to engineers, firemen and shop repairmen; the purpose being to make such employees more familiar with the construction and operation of this type of locomotive. The first part relates to a general description of the articulated compound locomotive. Then follows plain illustrations of the different details of the intercepting valve and a very complete description of its operation. This portion is illustrated by specially prepared cuts in transparent perspective, which will be found very useful in obtaining a thorough understanding of the operation of the intercepting valve as applied to the Mallet compound engines. The pamphlet also contains good drawings of the power reversing gear, by-pass valves and vacuum relief valve. There are also illustrations of flexible joints in the large steam and exhaust pipes, with directions especially prepared for instruction in the maintenance of the packing. The articulated locomotives built by the American Locomotive Company are provided with "trim" bolts, which are intended for the adjustment of the alignment on the front engine frames. These are also illustrated, and a clear explanation is given of their use and operation. The pamphlet closes with a summary of rules for operating the American articulated locomotives, especially with respect to starting, drifting, care of special parts, repairs to flexible joints, and lubrication. This manual should be in the hands of all those connected with the operation and repair of this type of engine, and doubtless will assist materially in a better understanding and better maintenance of the parts peculiar to it.

RAILWAY STRUCTURES.

HOMESTEAD, PA.—Surveys have just been finished by the Pittsburgh Railway Company for a subway at Fourth avenue and West street, Homestead, under the tracks of the Pittsburgh & Lake Erie and the Pennsylvania railways. This improvement will abolish the dangerous grade crossing at Amity street.

MISSOULA, MONT.—See an item regarding the new passenger station for the Chicago, Milwaukee & Puget Sound in General News.

STEVEN'S POINT, WIS.—The Minneapolis, St. Paul & Sault Ste. Marie has started work, it is said, on a new roundhouse at Steven's Point.



Otto Best

Date News.

The items in this column were accepted after the interested departments were notified.

Carroll Post, passenger traffic manager of the Union Pacific at Omaha, Neb., has been appointed also passenger traffic manager of the Oregon Short Line, with office at Omaha.

H. J. Harp, assistant general manager of the Chicago, Burlington & Quincy line west of the Missouri river, at Omaha, Neb., has been appointed assistant to the president of the New York, New Haven & Hartford, with office at New Haven, Conn.

At a special meeting at Salt Lake Wednesday, Oregon Short Line stockholders authorized a \$1,000,000 mortgage on the property, including all branches built under the Harriman management. This is part of the plan for new financing of the Union Pacific affiliated lines. None of the new bonds will be issued for some time.

L. J. Ferritor, division superintendent of the Wabash Railroad at Decatur, Ill., has been appointed superintendent of the Northern and Southern divisions of the Chicago & Alton, with office at Bloomington, Ill., succeeding P. G. Walton, formerly superintendent Northern division, resigned, and C. F. Smith, superintendent Southern division, assigned to other duties.

A Chicago despatch says that the Harriman lines are making inquiries for 196 locomotives of all types, evenly distributed, and contemplate buying between 100,000 and 115,000 tons of rail, compared with 275,000 tons last year. Decision regarding rail and equipment needs, outside of locomotives, is not definite, but rail orders will be based on ordinary renewals without regard to new construction, except what the old rails can accommodate.

At the rate hearing on Wednesday before the Interstate Commerce Commission several witnesses were called from the railway supply industry, all of whom testified to the fact that while their commodities have not increased in cost to the railroads, unit for unit, they are now turning out a more finished and efficient product which will do a great deal more work. L. D. Brandeis put on witnesses representing several branches of various industries, all of whom protested against the increase in rates because it would limit their selling territory.

E. M. Rine, superintendent of the Delaware, Lackawanna & Western, at Hoboken, N. J., has been appointed assistant general superintendent, with office at Scranton, Pa. S. S. Stone, assistant superintendent at Hoboken, has been appointed acting superintendent of the Morris & Essex division, succeeding Mr. Rine, and H. H. Shepard, superintendent of the Scranton division, at Scranton, has been granted an extended leave of absence and his duties will be performed by the assistant general superintendent. F. M. Benning, passenger trainmaster, at Hoboken, has been appointed assistant superintendent of the Morris & Essex division, with office at Hoboken, and J. W. Pierce succeeds Mr. Benning.

Judge Gary, chairman of the board of the United States Steel Corporation, on Wednesday afternoon gave out the following statement:

"Representatives of about 95 per cent. of the manufacturers of steel in America met at luncheon [in New York] today, and the two hours following were occupied in ascertaining the condition of business in this particular line and in the expression of opinions concerning current prices. It was stated that on the average of all branches the bookings are about 50 per cent. of capacity and the shipments somewhat in excess. There has been a slight though marked increase of daily bookings month by month since the first of August to the present time. Prices as a rule are well maintained, though in some lines as usual there is some cutting on the part of small producers who were not represented. Without exception the views expressed by those present regarding the future were favorable. Also each one voiced the opinion that present prices are fair and reasonable and should not be changed. For some time past purchasing by railway companies has been very much below normal; but it is the consensus of opinion that there will be an increase in the near future. The amount of daily bookings at the present time is about equal to the capacity of the mills ten years ago. 'The disposition of the manufacturers of steel to cooperate so far as it is proper, remains unchanged.'"

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Worcester Plan company, 3 Main street, Worcester, Mass., has ordered 2 ten-wheel superheaters from the American Locomotive Company. They will have 18 in. by 24 in. cylinders, 30 in. driving wheels, and will weigh 112,000 lbs. in working order.

The Grand Central has ordered 12 passenger consolidation locomotives from the American Locomotive Company. They will have 22½ in. and 35 in. by 32 in. cylinders, 63 in. driving wheels and will have a total weight in working order of 205,000 lbs.

The Delaware & Hudson has ordered 11 locomotives from the American Locomotive Company. The order includes 5 ten-wheel passenger locomotives with 21 in. by 28 in. cylinders, 63 in. driving wheels and having a total weight in working order of 186,000 lbs.; one ten-wheel superheater passenger locomotive with 23 in. by 26 in. cylinders, 63 in. drivers and having a total weight of 190,000 lbs.; one consolidation superheater locomotive with 24 in. by 30 in. cylinders, 57 in. drivers and a total weight of 202,000 lbs.; and 4 Mallet articulated compound locomotives with superheaters and having 26 in. and 41 in. by 28 in. cylinders, 51 in. drivers and a total weight of 450,000 lbs.

The New York Central Lines have ordered 275 locomotives from the American Locomotive Company, as shown on the accompanying table. These orders have been placed from time to time recently, but this is the first announcement that has been made concerning them. They are all for 1911 delivery:

Number.	Type.	Cylinders.	Driving Wheels.	Total Weight.
10	4-6-2	26 x 26 in.	66 in.	266,000 lbs.
50	4-6-2	24 x 26 "	69 "	262,000 "
10	4-6-2	22 x 26 "	75 "	234,000 "
10	4-6-2	22 x 26 "	75 "	247,000 "
30	4-6-2	23 x 26 "	79 "	266,000 "
25	2-8-0	23 x 32 "	63 "	236,000 "
55	2-8-0	23 x 32 "	63 "	239,000 "
15	2-8-0	23 x 30 "	57 "	241,000 "
20	0-6-0	21 x 28 "	57 "	165,000 "
25	0-6-0	20 x 26 "	51 "	153,000 "
35	2-6-6-2	21" and 34 x 32 in.	57 "	354,000 "

CAR BUILDING.

The Chicago Railway Company is in the market for 215 pay-as-you-enter cars.

The Illinois Central is building 22 cabooses, and will build 30 more at its Burnside, Ill., shops.

The Spokane, Portland & Seattle has ordered a number of tank cars from the Pressed Steel Car Company.

The Great Northern is in the market for 400 50-ton hopper cars, 500 50-ton ore cars and 75 50-ton tank cars.

The Richmond, Fredericksburg & Potomac, it is said, will build 25 box cars in company shops. This item is unconfirmed.

The Baltimore & Ohio has ordered 50 all-steel passenger coaches, of which 30 will be built by the American Car & Foundry Company and 20 by the Pullman Company.

IRON AND STEEL.

The Pennsylvania Railroad has ordered 150,000 tons of rails for 1911 delivery from the United States Steel Corporation, the Lackawanna Steel Company, the Pennsylvania Steel Company, the Cambria Steel Company, and the Bethlehem Steel Company.

SIGNALING.

The Chicago Signal Club held its second November meeting on Monday night, November 28, at 303 Dearborn street. The meeting took up a study of the methods of switch protection in automatic territory. The various methods in common use, the simple shunt, the series shunt and the line control were considered and the advantages of each noted. The various combinations possible with these forms were described and discussed by their advocates. The club then took up means of remedying foreign current trouble and a number of useful suggestions were brought out from the experience of the members. The next meeting will be held at the same place.

Shop Equipment.

Cyclone Chain Hoist.

The Chisholm & Moore Mfg. Co., Chicago, have added a 40-ton size to their line of Cyclone hoists. The construction permits making the parts of such a size as to give great strength and wearing capacity. The head of the hoist is divided into three sections by two partitions, the two outer sections each containing a load chain wheel, and the central section a pinion and three spur gears. This pinion is mounted on the hand-wheel shaft. The two load chain wheels are each mounted on a hollow steel shaft; the hand-wheel shaft passes through these hollow shafts, carrying a pinion in the central division, which drives three spur wheels. These spur wheels are mounted on shafts $1\frac{3}{4}$ in. in diameter, turned down to eccentric ends of $1\frac{1}{4}$ in. diameter. These three eccentrics carry in each of the outer divisions spur wheels having 48 teeth, which mesh into internal gears on the load chain wheels, having 50 teeth, so that each revolution of the eccentric gives a gyratory movement to the spur wheel, moving the lead chain forward two teeth.

The hand-wheel shaft turns in graphite bronze bushings, the eccentrics in hardened steel roller bushings; the eccentric shafts are hardened, and hardened and ground steel bushings are pressed into the malleable iron frame; the steel rollers are contained in cages. The hoist has a multiple disk brake, which effectually locks the load, and at the same time permits free lowering by a reverse movement of the hand wheel.

It also has two independent load chains moving together; the idler 40-Ton Cyclone Hoist. sheaves are so placed as to permit the doubling up of the chain, so that the load is carried on eight strands of $\frac{3}{4}$ in. chain. The idler sheaves are all bushed with graphite bronze self-lubricating bushings. None of the bearings require oiling. The hoist is compact in form; the minimum distance between the upper and lower hooks is 82 in. and the weight is 2030 lbs., the forged hooks alone weighing about 140 lbs. each. The hoist has a high efficiency, a pull of 80 lb. on each of the two hand-chain wheels raising 40 tons.

The 16, 20 and 30-ton sizes are similar in construction, except that the 16-ton size handles its load on four strands of $\frac{5}{8}$ in. chain, the 20-ton size on four strands of $\frac{3}{4}$ in. chain and the 30-ton size on six strands of $\frac{3}{4}$ in. chain. The 16-ton size has one hand-chain wheel and the larger sizes two hand-chain wheels.

Machine Tool Exhibit at the Buenos Ayres Railway Exhibition.

The Niles-Bement-Pond Company, according to *The Railway Gazette* of London, has an extensive exhibit of machine tools at the Buenos Ayres Railway exhibition. It is specially noteworthy for the striking manner in which it has been arranged, the machines being staged in line on one side of a broad aisle, with a considerable free space between each machine, so that every facility is afforded for inspection of the various tools without any overcrowding. Framed photographs, giving different views of the machines, are shown to advantage in the intervening spaces.

The heavy driving wheel and car wheel lathes are exhibited with work in place, the latter machine being shown in actual operation. It is designed for turning at the same time two 42-in. or smaller, car wheels on their axles, and while being turned each wheel is firmly supported on both sides so that there is no chance of spring or chatter, thus insuring maximum output. Driving plates located between the wheels equalize the pressure on the tools. The axle centers are grouped by self-

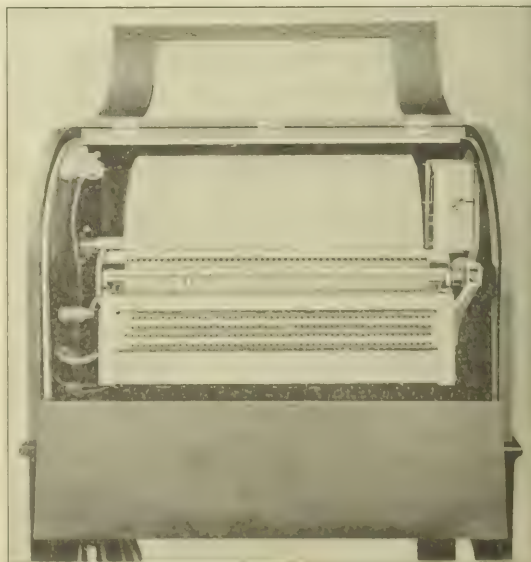
centering bushings which insures the tires being concentric with the journals. Excellent results have been obtained with this lathe by inexperienced Argentine operators, the average time required for turning a pair of car-wheels being less than 35 minutes. The best record for turning a pair of wheels was 30 minutes, 17 seconds, which includes the time occupied in placing the wheels in position on the machine and returning them to the floor.

The new model Niles locomotive driving wheel chucking lathe, a heavy motor-driven tool, has a capacity of 10 pairs of locomotive driving wheels per day of 10 hours. A novel feature is the method of driving the face-plate, which is effected by means of internal instead of external gears, leaving the outer rim of the face-plate and gear perfectly smooth. The tool rests are of massive construction and are arranged to swivel. The machine is made in two sizes, of which the smaller will take wheels of from 42 in. to 76 in. and the large from 42 in. to 86 in. In each case a 50-h.p. motor is employed for the main drive.

In addition to these two machines a universal radial drill, a 300-ton hydraulic wheel press, a heavy double axle lathe and several other tools made by the Niles-Bement-Pond Company are on exhibition.

National Machine Recorder.

The National machine recorder, which was described in the *Railway Age Gazette* of October 2, 1908, has been perfected since that time by the addition of a number of important devices. The new features include an adding attachment, a time setting device and a set of production counters. The adding attachment shows in large figures the net amount of time that each producing unit in the shop has been working, or, if desired, the amount of idle time that has occurred at any time during the day and the total at the end of the day. The time setting device is particularly valuable, as it schedules every part that goes through the shop and allows the management to see instantly whether an operator has consumed any fraction of time in performing his operation above that which has been allowed. The production counters are placed directly above the time adding attachment and record each piece produced by either machine, as it is finished, and show at a glance the exact output, the time consumed and the time wasted in producing this output for any given time. This machine is now in operation and is greatly assisting in accurate supervision of producing plants, and has proved highly valuable in permanently increasing plant efficiency, as it furnishes



National Machine Recorder.

data as to the three essentials to increased efficiency, namely, output, producing time, wasted time and cause. The National Machine Recorder Company, Chicago, is the manufacturer of the device above described.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY TUESDAY AND DAILY EXCEPT TUESDAY IN JUNE, BY THE RAILROAD GAZETTE (INC.), 31 ELDON ST., NEW YORK.

CHICAGO: PIERCE & FENNER. CLEVELAND: Williamson Bldg.
LONDON: Queen Anne's Chambers, Westminster.

W. H. BRADMAN, *President*.

E. A. SIMMONS, *Vice-President & Legal*.

HENRY LEE, *Secretary*.

The address of the company is the address of the officers.

EDITORS:

W. T. BRADMAN, *Editor*
S. J. O. DENN,
Managing Editor, M. M.
BRADLEY BRADMAN,
Editor, L. E. M. M.

ROY A. WRIGHT,
G. L. FOWLER,
WILLIAM TORSYTH,
S. W. DUNNING,
CLARENCE DEXING

B. B. ADAMS,
W. E. HOOPER,
T. W. KRAEGER,
H. H. SIMMONS

Subscriptions including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada.....	6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies.....	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49. DECEMBER 9, 1910. NUMBER 24.

CONTENTS

EDITORIAL

Editorial Notes.....	1101
Proposed Reductions in Sleeping Car Rates.....	1102
Ventilating Misrepresentation of Railway Affairs.....	1102
The Railways and the Automobile.....	1103
Business and Place Relations.....	1103
Tie Plates on American Railways.....	1104
Specimens as Check-Station for Waterways.....	1105

LETTERS TO THE EDITOR..... 1106

ILLUSTRATED:

Tie Plates on American Railways.....	1112
Electric Motor Inspection Car.....	1117

MISCELLANEOUS:

The Atchison's Fair Attitude Toward the Public.....	1107
The Interstate Commerce Commission's Own Investigation of the Cause of Railway Corruption.....	1108
President Taft on Railway Regulation.....	1110
Football Traffic on the New Haven.....	1110
The Introduction of All-Steel Cars.....	1117

FOREIGN RAILWAY NOTES..... 1109

GENERAL NEWS SECTION..... 1118

SUPPLY TRADE SECTION..... 1132

AS indicated in these columns last week, we are not optimistic as to Mr. Brandeis' chances of success in his role of instructor in a course on practical railroading before a class room full of railway presidents. But we can hope for some indirect results of the publicity given to his claims. It is well to emphasize high ideals, even though they be im-

possible in flood. Mr. Walter Eastman, Chief of the Interstate Commerce Commission, has been at the head of motive power for a long time. But the principle is not the best of the road, and his commission is almost at the end of the road. It will be good to see the single object of motive power, betterment, work. History is whatever we call it. These operations, which are many, are not of course used to know what efficiency means. Confronted with the fact that the expense of this is not what it means. A superintendent of motive power has gone through a hard winter with his power in bad shape. He is told to get it in good shape for the next winter, perhaps with the intimation that his position depends on his success. He builds up a well organized, smooth working shop force, improves his repair shop facilities and gathers the right men at his coaling stations. Along in June an order comes down from above him telling him to cut expenses in two. What can he do? His motive power starts the next winter in worse shape than ever. One cannot get a high unit of efficiency without holding trained employees during slack periods so as to be ready when the rush comes. It takes an expensive plant to do a wide variety of work cheaply.

WE publish elsewhere in this issue certain analyses of the cost of railway operation compiled by the Interstate Commerce Commission. There are certain very significant facts that are apparent to even a casual examination of the figures now complete. With the single exception of the two Hawley roads—the Iowa Central and the Toledo, St. Louis & Western—the operating ratio was higher in the last five years than it was in the five years previous; and with the exception of the Delaware, Lackawanna & Western and the Toledo, St. Louis & Western the operating ratio in 1910 was higher than the average for the last five years. With the exception of the Toledo, St. Louis & Western, the ratio of cost of material, fuel and all other like items to total operating revenues was higher in the last five years than in the five years previous, and was higher in 1910 than in the last five years. With the exception of the Delaware, Lackawanna & Western, and the two Hawley roads, the ratio of compensation paid directly to labor to total operating revenues was higher in the last five years than in the five preceding years; and with the exception of the Lackawanna and the Clover Leaf, the ratio of compensation paid directly to labor to total operating revenues was higher in 1910 than the average for the last five years. With the exception of the two Hawley roads only, the operating income in the last five years was a smaller proportion of total operating revenues than in the five years previous.

THE New York State Public Service Commission, second district, has ordered the New York Central to install a crossing bell at the creamery crossing in New Paltz, Ulster county; and the company is required to report to the commission the failures of the bell to operate. The company is also required to station an employee on the crossing whenever a switching movement is made over it. Here again we have commissioners rushing in where railway officers fear to tread (almost). What if the signal engineer, or man in charge, should claim exemption, under the constitutional proviso, from telling of his bell's failures, on the ground that his testimony might incriminate himself? At the recent meeting of the signal association, when a proposal to report certain kinds of failures was discussed, it was remarked by one prominent member that if such reports actually were to be required by a government authority the results would be such that probably Ananias would feel like "backing off the map." We trust that the New York commission will not forget to ask also for reports of instances when the bell fails to cease to "operate." Some of the worst defects have been those which caused bells to ring hours or days continuously.

PROPOSED REDUCTIONS IN SLEEPING CAR RATES.

THE Pullman Company has greatly disappointed the state attorney-generals and other politicians who have been running for office by trying to compel it to reduce its rates. It has offered to reduce the rates before the prosecutors and politicians have had time to get a reputation at its expense. Furthermore, it has offered to make reductions not only where they have been sought by formal proceedings but throughout the country. The Pullman Company ought to be indicted for cruel and inhuman treatment of politicians. How can they get credit for reductions made where they did not ask for them? The company plainly is seeking to dish the politicians. It is trying to get for itself credit from the public for reductions in its rates instead of letting others have it. This tendency to cultivate public opinion is getting chronic among large corporations. If it keeps up the public and the corporations may get together in spite of the statesmen. We are beginning almost to sympathize with the anti-corporation agitators. It looks as if the time is coming when they may have to change their business; and this for a man who knows how to do only one thing is very hard.

Of course, the attorney-generals of the states who have complained to the Interstate Commerce Commission about the Pullman Company's rates will not accept the reductions it offers. To do so might be good for the public, but it would not be good for them. You cannot successfully run for office on a platform constructed of popular acts done by those that you attack. The Interstate Commerce Commission seems apt to regard the matter differently. The reductions offered amount to about 20 per cent. for all upper berths and are not negligible for lowers. The differentials proposed between uppers and lowers would remove all ground for the complaints heretofore made, because the rates for them have been the same. It would seem also that, assuming the rates fixed for uppers are reasonable, ground for complaint about sleeping car rates in general would be abolished. For under the proposed arrangement the traveler might choose whether he would pay, say, \$2 for one kind of sleeping accommodation, or \$2.50 for another kind. If he chose to pay the extra 50 cents his action would afford conclusive evidence, it would seem, that the lower was worth 50 cents more to him. If he afforded such evidence, how could he rationally be heard to complain that the extra charge of 50 cents, which he did not have to pay, was an unreasonable exaction?

The demand for a differential between upper and lower berths is an interesting commentary on the question of cost of service versus value of service in rate-making. It costs more to build the upper berth into the car. It also takes more labor on the part of the porter to make it up. On the cost-of-service theory, therefore, the rate for the upper should be higher. But, regardless of differences in cost, people prefer lower berths. Therefore, the very public officials who denounce the railways for often disregarding cost of service demand that the Pullman Company and the railways shall disregard it in respect to sleeping car rates. To charge a higher rate for a lower than for an upper berth is, on the cost-of-service theory, an unfair discrimination. On the value-of-the-service theory it is perfectly proper, simply because people prefer lower berths.

It is an interesting question what effect the proposed change will have on sleeping car earnings and service. Heretofore most sleeping cars have been run with most or all of their upper berths empty. If it should develop that many of those who heretofore have bought lowers will in future buy uppers, and there be no increase in the total number of people using sleeping cars, the reductions in rates will result in reductions in earnings. If most of those who heretofore have bought lower berths continue to do so, and the lower rates for uppers cause many persons who heretofore have stood in chair cars to take sleepers, the result will be an increase in earnings. The latter result seems the more probable. If it takes place, the reductions in the rates will cause a deterioration in the value of

the sleeping car service; not because the service given by the company will be different, but because, owing to the increase in the number of people in a car, there will be less room and less comfort for each passenger. In that event, the reduction in rates will prove a good thing for the sleeping car companies and a good thing for the additional people that it enables to take sleepers; but it will not be a good thing for those who would take sleepers without the reductions in the rates.

VENTILATING MISREPRESENTATION OF RAILWAY AFFAIRS.

ONE of the most striking developments of recent years in railway affairs has been the change in the attitude of railway managers toward publicity. The technical officers for years have publicly discussed their problems in the meetings of their associations. They have done so largely because their questions are technical and, therefore, outside public understanding and interest. The discussion of railway questions in general by those knowing most about them has been in something like inverse ratio to the amount of interest the public has taken in them. The reticence of railway managers about these things prevented popular education and bred popular suspicion. Most of the railway managers now see and concede this, and all over the country railway officers, from the chairmen of the boards and the presidents down, are arguing railway questions with their neighbors, public men and the press.

This has good results of two kinds. It tends to prevent the doing of things that ought not to be done; when a man intends to defend what he does, he is apt to try not to do anything he cannot defend. And it is also causing the public, which is apt to take the scriptural view that men love darkness because their deeds are evil, to regard the railway business with less suspicion. But the work of educating people about railway matters has only begun. The newspapers and the magazines still team with misrepresentations. For instance, we find in *Hampton's Magazine* for November the following fearful and wonderful misstatements:

"Last spring the railways hastily issued new schedules, making sweeping advances in rates and involving, it has been estimated, an increase of something like a billion dollars in the country's transportation bill. Already it has been shown that the proposed advances are almost entirely in rates which do not affect products controlled by the trusts. It has been shown that by thus favoring trust products the increases have been so applied that traffic which contributes only 52 per cent. of total revenue is subjected to increases of 18.6 per cent., while the traffic representing trust products is practically not increased at all."

The total freight earnings of the railways of the United States in the year ended June 30, 1909, were but \$1,677,000,000. In order to increase their freight earnings \$1,000,000,000 a year it would be necessary for the roads to raise all their rates an average of 60 per cent. But *Hampton's Magazine* says that traffic which contributes only 52 per cent. of total revenue is subjected to an increase of only 18.6 per cent., and implies that other traffic is not subjected to any increases. Fifty-two per cent. of the total freight revenue in 1909 would be \$872,040,000, and 18.6 per cent. of that would be \$162,199,000. This leaves a trifling alleged advance of \$838,000,000 to be accounted for! When such utterly idiotic statements can get publication, even in the most irresponsible and disreputable of muck-raking magazines, it is evident that the efforts of the railway managers to get the facts about railways before the public are going to have to continue for a long time to come. The public's knowledge about such matters is now so little that we venture that a great majority of those who read the above statements in *Hampton's* actually believed they had some foundation. A mere flat denial of a false statement has a better effect than ignoring it. A denial accompanied by its conclusive disproof usually makes both the deliberate liar and the man whose misstatements are merely the result of ignorance more careful. And if it does not make them more careful it at least undermines public confidence in what they say.

Hampton's Magazine paradoxically heads the editorial from which we have quoted, "Getting at Railroad Facts." The great difficulty nowadays is not to get at the facts about the railway

business, but to keep certain classes of people from telling lies about it and getting them believed. The only way to stop these misrepresentations is to keep right on refuting them day after day, week after week, month after month, year after year; and unless the work is participated in by railroad officers and employees from Maine to California, and from Washington to Florida, it will not be effectively enough done.

THE RAILWAY AND THE AUTOMOBILE.

THERE are those, led by our strenuous ex-President, who extol college football as a stimulus of courage, manhood and character. There are others who decry it as physical brutality, a foe of scholarship. Without committing ourselves on this question, we can pluck from football and its massive figures an economic suggestion. The figures, which we print elsewhere in this issue, of passenger traffic to and from the Yale-Harvard game last month throw some light on the mystic subject of the automobile as a diminisher of railway business.

The number of automobiles at the game were not counted, but they were parked by acres and the estimates of their numbers ranged from 1,500 to 2,000. They represented, also, a very large increase indeed as compared with the numbers at the game two years before. That increase also tallies with the familiar fact of the greatly expanded use of the automobile during the two-year interval. There were three constant factors at both games: The two days were pleasant; the capacity of the Yale stands of 33,000 spectators was practically the same; and the trolley service between the football field and the city of New Haven was unchanged. A somewhat larger number of admission tickets went to Boston and Cambridge in 1910 than in 1908. But many of them found their way back to New Haven, and the difference of 1,000 in the number of Boston-New Haven railway passengers probably represents about the real disparity, while the other local distributions of tickets were much varied. Under such conditions it ought to be possible, by analysis of the football traffic by rail, to arrive at a rough approximation of its diminution by the automobile during the period named.

The railway carried 35,763 passengers—counting evidently one-way trips—in 1910, and 39,777 in 1908. Allowing for the extra 1,000 Boston-New Haven passengers the difference would be 3,014, to express the automobile subtraction from the railway traffic. But as the railway apparently carries about one-half the spectators who go to the game and the 1,000 tickets would have normally been divided in that ratio the number diverted by the automobile rises to 3,514, or nearly 9 per cent.

Taking the returns in more detail, they become suggestive. The total revenue from the game rises from \$71,299 to \$72,378. But, excluding parlor and sleeping car receipts, it falls from \$62,534 to \$62,430; and the increased revenue from Boston, whence the tide of travel was swelled by the looked-for delights of victory, was \$4,606. At every other local point of traffic given there was a passenger decrease; except at one—the nearby city of Bridgeport—where the gain of 286 passengers is probably more than accounted for by stop-over automobilists from New York, skeptical of New Haven capacity for man and machine, and who stayed at Bridgeport over night and took the railway to New Haven next day. If Bridgeport is omitted, there was a diminution of passengers for every one of six passenger groups named except that of Boston. One of these groups shows a very significant reduction. It is that under the head "excess regular business" on the day before and the day after the game. It falls from 13,113 passengers to 9,413, or a drop of more than 28 per cent. This loss was mainly from Connecticut points, many of them not far from New Haven. It raises clearly the presumption of a very large group of spectators of the "short distance" type who in 1908 stayed over night in New Haven, but in 1910 took their automobiles home after the game.

These short distance passenger losses, coupled with the slight loss of New York passengers—about $4\frac{1}{2}$ per cent.—saying both

of the positive gain in the Boston passenger group, indicate almost conclusively the character of the automobile as a short distance rather than a long distance competitor, especially in cases where the traveler carries no heavy baggage. But in actual and every day experience that dictum must carry its limitations. If the automobile—like the trolley—is a rival of the railway between stations near together, it is a feeder to the ultimate ones. It may be a rival between stations A and B, but a feeder to stations C, D and E. It is a railway feeder also as a lateral which shortens practically by 80 per cent. the distance between the nearest railway station and the automobile owner living back from the main railway routes.

FIREBOX AND TUBE FAILURES.

THE recent railway club papers relating to locomotive boiler failures indicate that the remedies which have been so generally accepted as effectual have not been properly applied or that something further is needed to overcome the conditions that give rise to continued reports of leaky tubes and cracked side sheets. The illustrations in these papers make an exhibit of boiler failures which we supposed could only be found in the "dark ages," before so much had been learned about expansion and contraction, scale and corrosion, flexibility and corrugation. It comes as a shock to find that in recent practice back sheets, side sheets and tube sheets still crack, that staybolts break in large numbers and that tubes get loose and leak almost as frequently as in former years. Remedies that have been suggested and largely used have somewhat reduced the number of such failures, but these remedies are principally in the nature of improved methods in the treatment of the boiler, such as preventing, as far as possible, unequal expansion of the firebox sheets; regulation of the water level, and using better methods of handling the locomotive over the cinder pit, cooling off, washing out and filling the boiler. These all require regular and exact practice, and depend on good work on the part of the men who are engaged in this disagreeable employment and who are paid ordinary wages for what is considered ordinary work. It seems to be necessary in these days to pay a premium for a fair day's faithful service. This may be necessary also in order to secure care and regularity in the treatment of boilers in cleaning the fires, washing out, etc. In so far as failures are due to poor work of this kind, a premium could be paid for certain mileages attained without failure, and the supervision of this class of work should be intrusted to a man of higher grade than is ordinarily found in charge.

The two papers to which we have referred are those of D. R. MacBain, in the May proceedings of the New York Railroad Club, and J. W. Kelly in the November proceedings of the Western Railway Club. In addition to improvements in operation, they suggest new designs for the construction of boilers, and these are more likely to prove of permanent benefit, as they are independent of carelessness on the part of the workmen at locomotive terminals. Mr. Kelly suggests a simple rule, governing engineers, to prevent tube leakage after clinking which could be followed without difficulty. This is to have all engines approach the cinder pit with the water level with the top gage, a good fire and plenty of steam. His principal suggestion for improved boiler construction relates to a reduction in the number of tubes and an enlargement of the bridge in the tube sheet. Thus, an engine as received from the locomotive works had 342 tubes with $\frac{5}{8}$ -in. bridges. The new tube sheet provided for only 280 tubes, or 62 less than were originally used, and the bridges were increased to $1\frac{1}{2}$ -in. The tubes left out were principally those in the lower portion and around the outer edges of the sheet. This change was the result of a three-years' test with 40 tubes plugged up; no appreciable effect was observed on the steaming qualities or coal economy of the boiler. Mr. MacBain's principal recommendation relates to the loose application of flexible staybolts. A full installation of these bolts was made on a

Lake Shore engine in heavy passenger service in January, 1907, and at the last examination, in February, 1910, after the engine had made 243,000 miles, there was not a broken staybolt or a vertical crack in the side sheet, or a trace of a crack in the back head or tube sheet. No cracks or signs of cracks leading from the arch tubes were found, and the engine had not been held out of service for boiler work, other than expanding tubes, in all that period. This remarkable service is so unusual that the methods employed to secure it should be seriously considered, as large savings should result from their general application.

An unusual record for tight tubes was also obtained by the same railway, by depressing all the tubes at the center so that they sagged about 1 in. below the normal. The expansion of the outer portion of the boiler being greater than that of the tubes, the tendency with straight tubes, as ordinarily applied, is to cause a movement of the tube in the tube sheet. But when there is a sag in the tubes this expansion causes them to rise and assume a nearly horizontal line. An indicator placed on the boiler with a rod extending through a stuffing box to a tube showed that in firing up there was a gradual raise of the tubes, and when 200 lbs. pressure had been reached they had raised 15/16 of an inch. In service the engine made nearly 70,000 miles without a tube failure, while other engines with ordinary tube setting had several detentions charged to tube leakage in the same period in similar service.

The rapid introduction of smoke tube superheaters makes it still more desirable that the cause of leaky tubes be well understood and proper preventives used, as it is difficult to remove tubes when superheaters occupy so much space in front of them in the smokebox. The use of large numbers of 4-in. and 5-in. tubes for superheaters also affects matters materially, for these tubes must be of uniform thickness and very carefully set in order to prevent leaks. All that has been learned and unlearned about the strange and annoying action of 2-in. and 2 1/4-in. locomotive tubes must now be supplemented with a study of the ills and cures for combinations of small and large tubes in the same tube sheet.

The use of larger locomotives renders the small failures which disable engines much more expensive, and leaky tubes frequently not only remove an engine from service, but if such an engine remains on its run the leaky tubes are a continual cause of low pressure, and, therefore, interfere with and defeat the very object for which these large units have been built, namely, the hauling of maximum tonnage with lower cost of fuel. With these large engines there is, therefore, the imperative necessity of a constant investigation as to the cause of tube failures so that proper remedies may be applied.

The necessary care of locomotive boilers in the prevention of unequal expansion of the sheets should include some provision for protection in severe winter weather, and a special shield from the cold blast of the winter wind while clinkering—through apparently no provision has seldom been suggested or used. To remove the hot coal suddenly from the firebox and let air at zero temperature circulate over the fire sheets and through the tubes, although common practice, does not seem to be a correct one. On some of the Canadian lines a special protection is provided; with the exception of the Southern states, winter conditions in the United States would warrant some shelter at the clinker pit. On some lines a portion of the engine house has been used for clinkering purposes in cold weather, but the introduction of so much dirt and dust is objectionable. In the approach to the engine house a long concrete or brick building could be provided and kept at a temperature of 40 to 60 deg. in winter. It should have an exhaust fan to remove the dust. The work of clinkering would then be made more comfortable for the workmen, and the boiler would be protected from sudden changes in temperature. Such an adjunct to the engine house promises to improve conditions in cleaning the fires, just as the elaborate hot water plants for blowing down, cooling off and filling boilers are doing after it reaches the house.

TIE PLATES ON AMERICAN RAILWAYS.

THE *Railway Age Gazette* recently finished a pretty thorough canvass, which was undertaken to ascertain the present practices of American railways in the use of tie plates. A letter of inquiry brought 98 replies from engineers on 76 lines, representing very fairly all sections of North America. In answer to a request for drawings showing the standard tie plates used 80 blue prints were sent. In addition a number of engineers and manufacturers were interviewed on the subject.

In other pages of this issue many drawings are shown, together with significant statements of fact and opinion quoted from many of the 98 replies received from railway engineers.

A tie plate is a piece of metal inserted between the base of the rail and the top of the tie. It varies in width from 5 in. to 7 in., and in length from 7 in. to 9 in., with a thickness of 3/4 in. to 1/2 in. The variations in thickness are confusing, as attempts are made to design plates for each size of rail. There are lugs, ribs, knife edges, claws and waffle patterns on the bottom and many different shapes and sizes of channels on top. The Santa Fe conducted extensive tests, with the result of tentatively favoring a plate with no projections below. This is now being tried out.

The ingenuity of manufacturers has been taxed to produce a pattern on which a patent could be obtained, and in the railway offices the ingenuity of designers has been taxed to produce a pattern that will not infringe some patent. In spite of the best efforts, however, a few railways are now facing suits for patent infringement. The manufacturers naturally desired to have something to sell which was different from that which a rival was selling. Each point of difference was made a "talking point." Now the manufacturers are bidding on all designs furnished. One manufacturing company has a pattern which, it believes, covers every desirable quality, and this is made in six different sizes and weights. In addition to the six sets of rolls for this special product the company owns more than 35 sets of rolls of patterns designed in the offices of various lines. The company bid on these special designs and, having obtained the contracts, had to make the rolls at considerable expense. In a number of instances the tie plates were found to be lacking in some particular and the railway company changed the patterns within a year or two, thus leaving the manufacturer with useless rolls on hand.

We know of no railway which has formally adopted a standard tie plate; all are experimenting. In the 98 letters, few engineers express full approval, or even satisfaction, with the plates they are using. The uncertainty of the present situation is shown by the facts that some roads have six sizes and weights of each of three patterns in present use. The size and weight properly vary with the service to be rendered, but it is quite safe to say that there is a present enormous waste which can be stopped by assembling and digesting the results of experiments on different roads. It is an inspiring subject for a committee of the American Railway Engineering & Maintenance of Way Association.

For preserving gage some sort of bottom projection is considered necessary and the details illustrated are the result. Some believe that a very slight projection is sufficient, while others favor deep knife edges. When placed across the grain the effect is no doubt bad, for the wood fibers are cut and decay is hastened. Longitudinal ribs are better, for they merely press the fibers apart, but if too close together and too deep they have been known to cut out blocks of wood from the top of the tie, the deep ribs holding the wood firmly and shearing off the fibers at the bottom edges. With the use of screw spikes the plate with the smooth bottom is apparently sufficient.

Lately the idea of using the tie plate as an anti-creeper has been gaining strength. On this point the letters show great difference of opinion with a tendency against it.

Canting rails inward, by using wedge-shaped tie plates, is seriously considered by many engineers. It is easy to say that it is

destructive in bettering the contact of wheel with rail because these surfaces become worn. An important purpose in designing is to bring contact which will result in least wear. The Westinghouse brake trials in England, better stops have been made than in this country, difficult to account for unless it was due to wheels canted 1 in 20 running on rails canted 1 in 20. The added power of canted rails to resist overturning and perhaps other forms of track spreading, should be carefully studied out. If a wedge-shaped tie plate thickens it where it is most liable to buckle, it should be known. The whole subject deserves full and complete investigation.

Because of comparatively low cost, rolled steel plates are now often used. Some companies make wrought iron plates, believing them more durable than steel under all conditions and much more durable when exposed to salt brine from refrigerator cars. The malleable iron plate is considered to be the best, especially for resisting the action of brine, but it must be heavy, and weight is costly.

RAILWAYS AS OBSTRUCTIONS TO WATERWAYS.

IN a contribution printed elsewhere E. S. Dowe, president of the New Haven Towing Company, takes up, both in generality and specification, the question of the obstruction of waterways and water terminals by the railways as outlined heretofore by Commissioner Herbert Knox Smith. Mr. Smith is a Connecticut man, as is Mr. Dowe; and it is hardly a far-fetched inference that the original motif of each runs back to Connecticut water terminal conditions and the relation to them of the New York, New Haven & Hartford Railroad Company. To those localized conditions at three Sound ports—Bridgeport, New Haven and New London—named by Dowe we may, therefore, justly limit the present inquiry and substitute the concrete cases for the generality. In passing, however, it may be well to call attention to Mr. Dowe's admission of the inefficiency and lack of enterprise of independent boat lines on the Great Lakes, where the business is handled practically by great industrial corporations, with the United Steel Corporation at the front, and by lines owned by railways. That concession is the clue to a general situation that extended far beyond the Lakes.

At all three of the Connecticut ports named by Mr. Dowe conditions antecedent to railway monopoly were substantially the same. There were two independent railway lines running northward from Bridgeport—the Housatonic and the Naugatuck—operating in connection with a boat line to New York. There was the Hartford & New Haven Railway Company—working with a boat line to New York; and there was the New York & New England railway, with its leased line, the Norwich & Worcester, connected with New York by a controlled boat line from Norwich, Conn., and New London. Consolidation of the railways naturally and by the inevitable law of mergers brought all three of these boat lines under one interest, just as it did the larger boat lines at terminals further eastward—Stonington, Providence and Fall River. The Bridgeport and New Haven water lines were bought up; the New London line was already controlled by the absorbed New York & New England railway system. With the acquisition of the boat lines naturally came acquisition of additional harbor properties for purposes of extension, new trackage and general addition to the terminal plant.

Such acquisition was in the nature of the most commonplace commercial foresight and would be so regarded by any business man. Sometimes the property has been improved, sometimes not, according to the exigencies of the controlling railway corporation.

But how far, in the cases of the three Connecticut ports, has railway consolidation resulted in positive monopoly and exclusion on the water front? Taking up Bridgeport first, the impartial map of the local United States engineer shows that by the New Haven Company owned 4,440 feet on the west side below the railway drawbridge at the head of the harbor, and 1,770 feet on the Pequonnock River above where the channel is more easily and

cheaply accessible. But on the river private interests hold and have largely developed business ground for 1,770 feet on the west and on the east side of the narrow harbor, where the railway apparently owns but some 80 feet, private enterprise has left the frontage almost undeveloped. On Bridgeport harbor there also hang other tales. How some years ago the plan of the company of straightening the harbor line and removing a big wharf running out into the harbor and obstructing it—this in exchange for a federal grant of mudflat—got into city politics and resulted in a loss of \$400,000, which the company planned expending for dock coal business—later shifted to New Haven. There is also the tale of a bill put through the Connecticut legislature unresisted for condemnation of part of the water front for the benefit of the city, but with no condemnation proceedings as yet—the company having previously offered to sell the property to the city at less than its cost.

We turn next to the United States engineer's map for the harbor of New Haven. It shows a harbor line—counting wharfage and wharfage potentiality—of 1,555 feet owned by the city on the immediate harbor front; 1,470 feet in private hands, and 200 feet of the Starin line—a total of 3,225 feet, not in the hands of "monopoly." This is on the immediate city front. On each side of the harbor and, in one stretch near the channel, there is private ownership exclusively for several miles, saying nothing of other miles but partly used on the Quinnipiack River east and north. At New London we have no official figures beyond a total ownership of available shipping water front there by the company of 1,880 feet. But every one familiar with that harbor knows of its depth, of its grand unimproved facilities on both sides and of the large rival wharf terminal of the Grand Trunk—Vermont Central. New London, indeed, with her splendid harbor almost facing the high sea, her intersection by two important railway lines, and her two boat lines, yet her stagnation when population through four decades, 1850-1880 inclusive, rose only from 8,991 to 10,537, is a mystic study in harbor undevelopment, which still goes on though her population has later considerably risen? Where is her deadly flaw? Surely not in monopolized water front. Not surely, perhaps, but more probably, in lethargic private enterprise.

Broadly speaking, it may be that her experience teaches, hence the decline of her whaling industry, that good harborage avails not without the antecedent business.

Finally applying to the three Connecticut ports the government improvements of navigation lauded by Mr. Dowe in the case of the Great Lakes, one finds by the records approximately \$2,082,000 spent or appropriated—almost all spent—on New Haven harbor and breakwaters—\$753,000 on the harbor alone; \$996,000 at Bridgeport; and at New London \$159,000 on her harbor and \$539,000 on the Thames River—the small harbor appropriations incidentally proving the natural excellence of her commercial waters. Surely no default of the federal "pork barrel" in the case of New Haven, New London and Providence as causation of backward water terminals.

The actual conception in the case of the three ports and many like them on river as well as on coast lies deeper and in many cases along the lines suggested by President Delano. Superior energy of the railways; their more stalwart, ramified and efficient trade organization; their intrinsic character as feeders of the hinterland to and from the ports; and their sharp competition often even when their terminals are not at ports—at this point their competition suggesting their effective rivalry with the old canals with the incidental vantage of avoiding trans-shipment. When they own boat lines of their own it is as certain and reasonable that they will favor them as that they will accept traffic from boat lines that they do not own. But through the whole texture of the subject the major strand that runs is the fact that, wisely or unwisely, private venture has not reached out. While to some degree its obstacles have been artificial in much larger degree, they are natural—or, at least, the outcome of natural and fundamental economic law.

Letters to the Editor.

RAILWAYS AND WATER TERMINALS.

New Haven, Conn., November 11, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

While not a railway man, myself, I am deeply interested in their doings, for they very largely control the business in which I am specially interested, water traffic. A railway friend knowing this, sends me from time to time copies which contain articles bearing upon the subject, "Water Traffic." My attention has been called to an article headed in your issue of October 14, 1910, "Railways and Water Terminals," by President Delano, of the Wabash, criticising the recent report of Herbert Knox Smith, commissioner of corporations, on "Water Terminals."

I have not Commissioner Smith's report before me, but I read it carefully when it was first printed, and I repeat with emphasis now, what my impressions were then; namely that it is astonishing how closely he reached the facts as they exist with us to-day.

On the other hand, President Delano is so far afield that I feel sure that the evidence upon which he gave his verdict came second hand, and by freight. The fact that he compares conditions on the Great Lakes with conditions on the coasts and rivers leading to them suggests to me his lack of knowledge on the subject.

The writer knows something of the coast from Maine to Florida, and of those advantages to water traffic which are made conspicuous by their absence. He spent considerable time on the Great Lakes enjoying the many advantages (in fact every conceivable aid to navigation) that the government has given to that busy region. We coveted nothing we saw, for we realized that every light, buoy and mark was a necessary cog in that giant wheel of commerce that has astounded the world. By inquiry we learned that the great evolution was brought about by railway interests, as they had to resort to water traffic in order to carry the vast amount of freight that offered, especially ore for steel production. The steel interests having no other alternative but water traffic to obtain material got busy and secured appropriations sufficient to give a channel depth of 21 ft. from Duluth to Buffalo, with such day and night markings as the world had never seen before.

On the coast we are not so fortunate in having any combined interests sufficient to obtain the actual needs of navigation, let alone the luxuries, nor will we have them until the railways realize the fact that there is more money in the quick short haul than there is in the long haul.

For illustration. It takes from three to four weeks for a car to go to the mines and return to almost any part of Connecticut. Prevailing rates are \$2.60 to \$2.85 per ton, and \$1.50 of this is given to the roads west of the Hudson river, while for the short haul, say New Haven to Springfield, Mass., the rate is 85 cents, and a car can easily make one trip per week. To be added to 85 cents would be the income from loading on cars from the boats at New Haven. This is done by the railway, which charges, when weighed, 23 cents per ton, out of which gross a net income has been given of 21 cents, making a total of \$1.06 per ton, per week, against the maximum \$1.35 for the minimum time, three weeks, or \$1.83 per car ton in favor of the short haul for the three weeks. Other local rates would show greater gains. For instance 70 cents is the rate for places only 12 miles from New Haven, and 35 cents for factories within the city limits, to any of which cars should make at least two trips per week.

We have diverged somewhat from the subject, but it is a big problem, and an interesting one—one that will bear investigation from many angles. As to water terminals, the real subject, we are sorry to say Commissioner Smith is right, and of course President Delano wrong. Connecticut has several harbors that should be distributing centers, as they all have rail connections. The most important are New Haven, Bridgeport and New Lon-

don. New Haven can boast of more abundant dock property than any other city of its size in the world. All of that property is owned by the New York, New Haven & Hartford, and held for no other purpose than to prevent water competition. A large percentage of this property was used successfully previous to its being purchased by the railway.

Terminal property was bought here not long since and when a spur track was asked for, the railway refused to grant it, for no other reason than it would be a competitor to an existing customer. The project was abandoned, and the property now lies idle.

Bridgeport was practically deprived of its water front by the railway in its new layout a few years ago, and has had to make rivers and streams where none existed before. The railway of course did not anticipate any such enterprise on the part of the business men of that growing city when they were made to give up all they had.

New London can boast of *no dock* where it can unload from boat to cars of the New York, New Haven & Hartford, one ton of commercial freight. The only dock that could have been used for such a purpose was sold by the railway and removed.

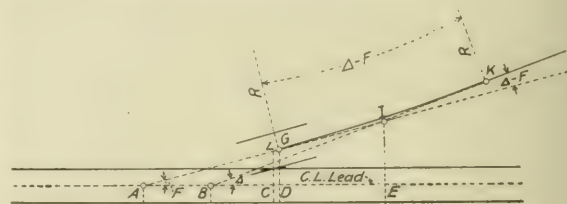
E. S. DOWE,
President, New Haven Towing Company.

LOCATING THE POINT OF FROG.

Albany, N. Y., Nov. 1, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

It was with pleasure that I noted on page 511 in the issue of the *Railway Age Gazette* of September 16, the solution of a problem that has baffled me for several years, viz.: locating point of frog, the heel of which is to be connected by a curve of known radius to a known tangent some distance back from the heel of the frog. The solution referred to is that offered by T. H. Brown, assistant engineer of the B. & O.



Locating the Point of Frog.

Given:

F = frog angle.
 R = radius of curve back of frog.
 H = length of frog from point to heel.
 W = width of frog at heel.
 Δ = angle between tangent and main track.

Then:

$$\begin{aligned} DE &= GI \cos F = R \tan \frac{1}{2} (\Delta - F) \cos F. \\ CD &= H - [\frac{1}{2} g \sin F + W \sin \frac{1}{2} F]. \\ AC &= CL \cot F. \\ CL &= \frac{1}{2} g + \frac{1}{2} g \sec F. \\ AC &= (\frac{1}{2} g + \frac{1}{2} g \sec F) \cot F. \\ &= \frac{1}{2} g \cot F + \frac{1}{2} g \end{aligned}$$

$$AC = \frac{1}{2} g \cot \frac{1}{2} F.$$

Then:

$$\begin{aligned} AE &= DE + CD + AC. \\ EI &= AE \tan F. \\ BE &= EI \cot \Delta. \\ AB &= AE - BE. \end{aligned}$$

If

$$\begin{aligned} AB &\text{ is less than } AC. \\ BC &= AC - AB. \end{aligned}$$

If

$$\begin{aligned} AB &\text{ is greater than } AC. \\ BC &= AB - AC. \end{aligned}$$

In looking this over I fail to check Mr. Brown completely, however. In the last statement of his axioms, if I may so call them, he says that $A C = 4766 \cot F$. Can this or any other constant be used in this place? I think not, as the quantity

represented by this constant varies with "F." I have arrived at the accompanying solution as a substitute for the one given by Mr. Brown, but if he can satisfactorily explain how he gets this constant, I would be very glad to withdraw my change.

A. E. SIMPSON.

Baltimore, Md., Oct. 10, 1910

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The solution of this problem given by Mr. Simpson is identical with that of the writer except as to the value of A C. In the former this is given as $C \cot F$. This is of course correct for the theoretical P. F., but this is not what is used in staking out frog and switch layouts. In staking out work of this character what is desired is the location of the actual P. F. (generally $\frac{1}{2}$ in.) and this point would be from 2 in. to 10 in. back of the point located by $C \cot F$ for frogs No. 4 to No. 20. The value $A C = 4.766 \cot F$ is correct for the location of the $\frac{1}{2}$ in. point of a No. 8 frog, and the error in using this value for all frogs varies from 0 to 0.2 ft. for frogs No. 8 to No. 4 and from 0 to 0.3 ft. for frogs No. 8 to No. 20. For frogs commonly used in yard work, i. e., No. 6, No. 7, No. 8 and No. 10, the greatest error is 0.06 ft. In order to make Mr. Simpson's formula applicable to locate the actual $\frac{1}{2}$ in. point of frog the value of A. C. would be

$$A C = (\frac{1}{2} g + \frac{1}{2} g \sec F + \frac{1}{2} \text{ in.}) \cot F$$

Of course this value of $\frac{1}{2}$ in. is theoretically incorrect when we consider a line at right angles to the ladder track passing through the center of the P. F., but the difference is too slight to be taken into account.

The formula for A C was put in the form of a constant times a variable in order to render it less cumbersome and at the same time provide a degree of accuracy well within the limits attained in construction, and it is thought that the general formula as stated does provide this.

If extremely accurate results are desired values of A. C. should be

For No. 4 frog, A C =	4.82 cot F
For No. 6 frog, A C =	4.77 cot F
For No. 10 frog, A C =	4.76 cot F
For No. 12 frog, A C =	4.76 cot F
For No. 20 frog, A C =	4.75 cot F

These variations are extremely small and hardly worth taking into account on this class of work where a working formula, as simple as possible, is desired.

However, Mr. Simpson is of course correct in stating that A C cannot theoretically be a product of a variable and a constant. This point should have been explained when the formula was submitted and the writer is glad of the opportunity of doing so now.

T. H. BROWN.

ACCIDENT RECORD—CORRECTION.

The Galveston, Harrisburg & San Antonio Railway,
Houston, Texas, November 26.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

On page 1013 of your issue of November 25 you give an account of train accidents in October, stating that the information is based on accounts published in the local daily newspapers. You show a derailment October 17 on the Southern Pacific, at Chocar, classed as unexplained, in which two persons were killed and two were injured. There was no one killed in this derailment and no one seriously injured. The accident was due to a defective rail, known as a piped rail, with the defect concealed. This rail broke while the train, consisting of a locomotive and thirteen passenger cars, was passing over it. Two passengers sustained injuries, not serious, and several others claimed slight bruises. The broken rail in question was 75-lb., laid in 1900, and showed practically no wear. The accident occurred, not at Chocar, but at Collado.

T. FAY.

THE ATCHISON'S FAIR ATTITUDE TOWARD THE PUBLIC.*

In controversies respecting railway rates attention is generally centered upon the active contestants, who are usually the merchants and shippers and the railway companies. But the public interest in the conservation and development of the country's transportation service reaches far beyond these classes of society. . . . The general interests of the public require that railway companies should be given an opportunity not merely to earn interest and dividends with respect to their existing property, but also to earn an adequate surplus to serve as a basis for providing the money needed for the continual improvement and expansion of railway properties so as to keep up with the progress of civilization, the development of new territory, and the growth of population and business.

The Atchison, Topeka & Santa Fe is one of the great railway properties of the country. It has a mileage of about ten thousand miles, and serves a vast area of country. The original Santa Fe Railroad began business about 1875, but railways were extended too rapidly, and in 1895 the company became hopelessly bankrupt. The present company began business in January, 1896. Roughly speaking, it paid for the property about \$337,000,000 in stock and bonds. Since then it has spent in the development of the property not less than \$150,000,000, raised by the sale of additional bonds, and fully \$50,000,000, more which it has taken out of surplus earnings. That the stock and bond holders have not received an unreasonable share of the earnings is indicated by the fact that the bond interest and stock dividends actually paid have averaged for the last fourteen and a half years $3\frac{1}{4}$ per cent. per annum. . . . Why has the company had to spend \$200,000,000 in fourteen and a half years? For additional and improved equipment, a second track, improved track and roadway, improved terminal facilities, and in part on account of additional mileage. The expenditures on account of additional mileage have averaged for the fourteen and a half years about \$4,500,000 per year, but for the year ending June 30, 1910, were nearly \$9,000,000, more and more of such work will become essential as the country develops. But by far the greater part of the capital expended has been for additional and improved equipment and for other additions and betterments to lines already in the system. These expenditures tend to increase.

	Year ending June 30.	
1896 (6 months).....	\$396,615	1904..... \$8,109,373
1897.....	1,301,308	1905..... 4,312,065
1898.....	2,848,710	1906..... 16,402,112
1899.....	4,292,165	1907..... 18,168,100
1900.....	4,452,713	1908..... 21,457,543
1901.....	3,581,521	1909..... 6,241,127
1902.....	11,030,816	1910..... 19,632,586
1903.....	7,835,408	
		Total (14½ yrs.)..\$130,062,262

It is the opinion of the officers of the company that in the next few years these expenditures for betterments should continue to average from twenty million to twenty-five million dollars a year, and perhaps more, in order to meet the never-ceasing requirements for additional and improved equipment, and for innumerable improvements of the existing lines. In addition, there should be provided funds for construction of new mileage to the extent of five to ten million dollars a year.

It is not practicable to forecast the more remote future, except to say that there is every reason to believe that all such expenditures will increase continually and progressively. As population and business increase and civilization advances, there is an ever-increasing necessity for the continual remaking of the existing railways and their equipment, and for the construction of additional mileage.

. . . It must be apparent that the raising of enormous amounts of money for improvements and extensions is a prime function of the company, and one of the very highest importance to the public. There are only four ways by which the money for these expenditures can be raised. . . . Surplus earnings

*From an article in *The Outlook*, by Walker D. Hines, chairman of the Executive Committee of the Atchison, Topeka & Santa Fe.

cannot be drawn upon unless there are surplus earnings; nobody will buy stock unless it can be expected to pay reasonable dividends; property which is already fully covered by mortgage cannot be mortgaged anew; and a borrower whose credit is not good (that is, who is not doing a profitable business) cannot borrow money on unsecured bonds or promissory notes. The property of the Santa Fe is covered by first and second mortgages for nearly two hundred and fifty million dollars, and therefore is not available as security for additional mortgage bonds. Fortunately, the success and conservatism of the company created sufficient confidence in the investment value of its common stock to make it practicable for the company in the five years ending June 30, 1910, to raise about one hundred and fifteen million dollars by the sale of bonds convertible into stock. These bonds are not secured by mortgage or otherwise, and the company has been able to sell them on favorable terms solely because the bonds conferred the privilege upon the bondholder to convert them at his option into an equal amount of common stock.

Thus it appears that up to the present time the company would have failed very largely in the performance of the function of raising the needed funds to improve and extend its system but for its ability to raise the larger part of those funds upon the strength of the attractiveness of its common stock. It is clear that its common stock would not have been attractive if the company had not been able to pay a fair dividend upon it (never, however, in excess of 6 per cent).

But it must be remembered that, while the company has spent on the property not less than \$150,000,000 of borrowed money, it has also spent upon the property over \$50,000,000 of surplus earnings. It is clear that the ability of the company to borrow the \$150,000,000 was vastly promoted by, and indeed dependent upon, the fact that it expended fully one-third as much out of earnings. If the company's income had become so reduced that it could not, after paying interest and dividends, expend this fifty millions out of earnings, the company would have had to borrow two hundred millions instead of one hundred and fifty millions. If this had been practicable at all, it would have increased the permanent fixed charges upon the property by not less than two and one-half millions yearly; probably the increase in fixed charges would have been much greater, because the increased borrowing would have made the securities less attractive and would have necessitated the payment of higher interest rates.

The theory that improvements and extensions should be made only by borrowing new capital, and that the return on the entire amount of such expenditures will be assured by the increased receipts from such improvements and extensions, fails to work in practice. Many improvements which are necessary and distinctly in the public interest (such as improved station buildings) will never yield any pecuniary return at all.

The increasing demands of the public are responsible for a great many expenditures which do not appreciably increase the profits. The railways at Kansas City have recently found it necessary, in order to handle the increased business through Kansas City, to rearrange and extend their terminals, both freight and passenger, at that place, and have been compelled on account of local public sentiment to provide for the erection of a magnificent passenger station, much of the expense in connection therewith being simply to gratify local pride. The city of Wichita, Kan., is insisting that the Santa Fe elevate its tracks, which at present are upon the surface of a city street. While this is a very proper demand, it is evident that the elevated tracks will be no more profitable than the surface tracks. Increased safety appliances bring little specific benefit, because the constantly increasing ideas of injuries as to the amount of damages which ought to be awarded for personal injuries will not more than offset the decrease in the number of such injuries.

The notion is frequently suggested that when earnings are expended upon betterments and improvements the result is that money is unjustly taken from the shipping public and converted to the benefit of the stockholders of the railway companies.

The stock of the Santa Fe company has never been in-

creased on account of surplus earnings expended upon the property, and there is no plan for increasing the stock on any such account.

It has been exceedingly fortunate for the country served by the Santa Fe that it has been able to earn enough to pay fair dividends on its stock and to put back large amounts of earnings into the property. The comfort and safety of the traveling public have been enhanced; the business and the convenience of the shipping public have been greatly promoted; new territory has obtained much-needed railways; the demand for railway labor has been greatly increased, and the consumption of railway material and supplies has been vastly enlarged. All this has constituted an important factor in the civilization and in the prosperity of the country.

The theorist may urge that increased business will make up for increased expenses, but the fact is that, after meeting increased operating expenses due to higher wages and prices and to increased expense of public regulation, after meeting increased taxes, and after meeting the interest and dividend requirements, the surplus earnings available for expenditure upon the property threaten to diminish very rapidly.

The amounts of surplus earnings so available have been about as follows for the past five years:

For the year ending June 30.	
1906	\$4,500,000
1907	9,600,000
1908	340,000
1909	9,000,000
1910	4,000,000

It is anticipated that there will be very large increases in operating expenses for the year 1910, on account of increased wages of employees, and there will probably be a still further increase in taxes, so the outlook is that the company will have even less to put back into the property for the current year.

The Santa Fe has been an exceptionally prosperous company, and yet the increasing burdens of operation make it imperative that the company should have increased revenues if it is to fulfill the reasonable expectations of the public. If such imperative need exists as to the Santa Fe, it exists even more clearly with respect to numerous other less fortunate railways.

THE INTERSTATE COMMERCE COMMISSION'S OWN INVESTIGATION OF THE COSTS OF RAILWAY OPERATION.

[WITH AN INSET.]

The accompanying tables are taken from figures prepared by order of the Interstate Commerce Commission for use by the commission in its investigation in regard to rate advances. The table for the New York Central & Hudson River is given in full in the form in which it was prepared for the commission. The figures we have selected for other roads, as may be seen from a comparison with the New York Central table, are certain significant ratios, comparing 1910 with a ten-year average, and with the five-year average from 1900 to 1905 and 1906 to 1910. The roads whose figures are complete to date are shown. A foot note explaining minor adjustments in the New York Central table and other tables, which the Interstate Commerce Commission has included in its exhibit, is omitted in our table because it is a detail which, although it shows with what care the figures have been compiled, is, for the purpose of general interest, unimportant. It must be borne in mind in studying the tables that these figures were prepared by a disinterested party—the commission itself—and are not a form of special pleading submitted either by the railways or by the shippers.

A word of explanation is needed in regard to the accumulated surplus available for distribution. This is profit and loss surplus, and, as will be seen from a study of the complete New York Central exhibit, is arrived at before the payment of dividends in the current year:

n 1910
 29 3.2
 1 1.2
 42,441.
 111 100

e-year
 page.
 1906
 19
 1909
 73.63
 41.12
 1.46
 39.66
 2.93
 23.43
 .90

n 1910
 0 was
 75,942;
 This is
 obvious

e-year
 page.
 1906
 19
 1910.
 60.45
 37.85
 .34
 22.26
 1.03
 38.52
 39.38

n 1910
 0 was
 \$8,556,-
 \$32,268.
 ith the

e-year
 page.
 1906
 19
 1910.
 64.37
 39.16
 .61
 24.36
 3.68
 31.93
 3.26

y 1910
 as \$1,-
 \$4,191;
 This is
 obvious

olivian
 2 spent
 ; from
 Santa
 KS.

NEW YORK CENTRAL AND HUDSON RIVER RAILROAD COMPANY.

		Year ending June 30												Ten-year average		
		1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1901 to 1910.	1901 to 1910.	1901 to 1910.		
A. MILEAGE.																
Operated—single track.....		817.45	810.5	810.25	808.64	805.64	806.70	806.66	806.18	805.47	805.48	806.77	811.45	806.10		
Owned—single track.....		2,713.31	2,710.07	2,713.24	2,820.83	2,922.43	2,975.88	3,043.31	3,099.49	3,128.08	3,128.08	3,128.08	3,128.08	3,128.08		
Owned—double track.....		5,088.07	5,082.06	5,082.06	5,082.06	5,082.06	5,082.06	5,082.06	5,082.06	5,082.06	5,082.06	5,082.06	5,082.06	5,082.06		
Owned—double track.....		6,008.41	6,008.41	6,008.41	6,008.41	6,008.41	6,008.41	6,008.41	6,008.41	6,008.41	6,008.41	6,008.41	6,008.41	6,008.41		
B. COST OF ROAD AND EQUIPMENT.																
Per mile owned—single track.....		\$183,659.202	\$186,704.315	\$191,146.66	\$194,767.868	\$197,453.050	\$201,182.131	\$214,131.267	\$215,964.880	\$221,682.653	\$225,519.750	\$201,182.131	\$201,182.131	\$201,182.131		
Per mile owned—double track.....		234,125	230,438	237,238	240,859	245,933	249,389	252,680	257,887	263,221	268,705	234,125	234,125	234,125		
Per mile owned—all tracks.....		66,272	67,401	68,789	69,946	71,496	72,804	74,421	76,068	77,843	79,766	66,272	66,272	66,272		
C. TOTAL CAPITALIZATION.																
Per mile owned—single track.....		\$308,727.941	\$315,691.356	\$327,000.346	\$333,137.736	\$336,264.845	\$339,910.335	\$343,906.845	\$347,356.845	\$351,156.845	\$355,156.845	\$308,727.941	\$308,727.941	\$308,727.941		
Per mile owned—double track.....		376,305	376,305	376,305	376,305	376,305	376,305	376,305	376,305	376,305	376,305	376,305	376,305	376,305		
Per mile owned—all tracks.....		111,418	111,418	111,418	111,418	111,418	111,418	111,418	111,418	111,418	111,418	111,418	111,418	111,418		
CAPITAL STOCK.....		111,418,000	111,418,000	111,418,000	111,418,000	111,418,000	111,418,000	111,418,000	111,418,000	111,418,000	111,418,000	111,418,000	111,418,000	111,418,000		
Per mile owned—single track.....		193,772.941	193,772.941	193,772.941	193,772.941	193,772.941	193,772.941	193,772.941	193,772.941	193,772.941	193,772.941	193,772.941	193,772.941	193,772.941		
Per mile owned—double track.....		234,125	234,125	234,125	234,125	234,125	234,125	234,125	234,125	234,125	234,125	234,125	234,125	234,125		
Per mile owned—all tracks.....		66,272	66,272	66,272	66,272	66,272	66,272	66,272	66,272	66,272	66,272	66,272	66,272	66,272		
D. TOTAL OPERATING REVENUES.																
Per mile operated—single track.....		\$54,736.994	\$56,899.004	\$57,540.701	\$57,473.951	\$57,889.896	\$58,898.366	\$59,318.885	\$59,388.440	\$59,370.736	\$59,370.736	\$54,736.994	\$54,736.994	\$54,736.994		
Per mile operated—double track.....		18,883	20,756	22,038	21,624	21,122	20,472	20,342	20,342	20,342	20,342	18,883	18,883	18,883		
Per mile operated—all tracks.....		8,615	9,612	10,221	9,948	10,040	10,087	11,406	11,406	11,406	11,406	8,615	8,615	8,615		
E. TOTAL OPERATING EXPENSES.																
Per mile operated—single track.....		35,113.268	45,530.650	52,251.650	54,141.432	55,417.292	57,185.550	59,979.889	68,864.280	65,427.864	73,830.953	35,113.268	35,113.268	35,113.268		
Per mile operated—double track.....		12,113	13,514	15,506	15,512	15,512	15,512	15,512	15,512	15,512	15,512	12,113	12,113	12,113		
Per mile operated—all tracks.....		5,655	6,351	7,080	7,137	7,053	7,750	8,710	8,167	7,608	8,512	5,655	5,655	5,655		
Ratio to total operating revenues.....		64.15	66.07	69.27	71.73	71.73	72.25	73.10	73.10	73.10	73.10	64.15	64.15	64.15		
F. MAINTENANCE OF WAY AND STRUCTURES.																
Per mile operated—single track.....		6,710.193	8,600.032	10,469.570	10,090.893	11,143.292	12,066.263	11,905.010	11,906.136	10,485.899	12,929.301	6,710.193	6,710.193	6,710.193		
Per mile operated—double track.....		2,315	2,591	2,891	2,891	2,891	2,891	2,891	2,891	2,891	2,891	2,315	2,315	2,315		
Per mile operated—all tracks.....		1,081	1,200	1,340	1,340	1,340	1,340	1,340	1,340	1,340	1,340	1,081	1,081	1,081		
Ratio to total operating revenues.....		12.26	12.48	13.88	13.88	14.13	14.13	14.13	14.13	14.13	14.13	12.26	12.26	12.26		
G. MAINTENANCE OF EQUIPMENT.																
Per mile operated—single track.....		6,718.146	9,270.564	10,882.375	11,358.295	11,137.824	13,091.333	15,174.357	12,845.576	15,018.831	16,084.172	6,718.146	6,718.146	6,718.146		
Per mile operated—double track.....		3,018	3,793	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	3,018	3,018	3,018		
Per mile operated—all tracks.....		1,081	1,200	1,340	1,340	1,340	1,340	1,340	1,340	1,340	1,340	1,081	1,081	1,081		
Ratio to total operating revenues.....		12.27	13.45	14.43	14.97	14.12	16.10	17.15	14.20	17.64	18.09	12.27	12.27	12.27		
H. TRAFFIC AND TRANSPORTATION EXPENSES.																
Per mile operated—single track.....		20,386.630	25,916.637	29,152.142	30,677.062	30,991.833	33,869.620	39,665.703	38,466.226	24,113.157	37,878.933	20,386.630	20,386.630	20,386.630		
Per mile operated—double track.....		7,042	7,907	8,912	8,912	8,912	8,912	8,912	8,912	8,912	8,912	7,042	7,042	7,042		
Per mile operated—all tracks.....		3,233	3,704	4,380	4,380	4,380	4,380	4,380	4,380	4,380	4,380	3,233	3,233	3,233		
Ratio to total operating revenues.....		37.24	37.62	37.62	37.62	37.62	37.62	37.62	37.62	37.62	37.62	37.24	37.24	37.24		
I. GENERAL EXPENSES.																
Per mile operated—single track.....		1,298.299	1,736.267	1,747.563	2,014.582	2,143.830	2,492.425	2,431.790	1,975.703	2,032.253	2,088.229	1,298.299	1,298.299	1,298.299		
Per mile operated—double track.....		209	242	262	262	262	262	262	262	262	262	209	209	209		
Per mile operated—all tracks.....		38	38	38	38	38	38	38	38	38	38	38	38	38		
Ratio to total operating revenues.....		2.09	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.32	2.09	2.09	2.09		
J. COMPENSATION PAID DIRECT TO LABOR.																
Per mile operated—single track.....		21,973.007	28,741.653	33,674.653	33,657.360	31,399.441	37,595.336	45,195.739	43,799.189	39,751.321	45,506.173	21,973.007	21,973.007	21,973.007		
Per mile operated—double track.....		4,614	4,614	4,614	4,614	4,614	4,614	4,614	4,614	4,614	4,614	4,614	4,614	4,614		
Per mile operated—all tracks.....		4,614	4,614	4,614	4,614	4,614	4,614	4,614	4,614	4,614	4,614	4,614	4,614	4,614		
Ratio to total operating revenues.....		40.14	41.71	43.31	44.59	43.60	43.26	48.53	48.40	43.51	44.89	40.14	40.14	40.14		
K. COMPENSATION PAID GENERAL OFFICERS.																
Per mile operated—single track.....		231.042	302.357	321.542	345.350	366.800	400.778	414.712	347.222	305.215	296.615	231.042	231.042	231.042		
Per mile operated—double track.....		91	91	91	91	91	91	91	91	91	91	91	91	91		
Per mile operated—all tracks.....		37	42	43	43	43	43	43	43	43	43	37	37	37		
Ratio to total operating revenues.....		4.42	4.44	4.43	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.42	4.42	4.42		
L. MATERIAL, FUEL, AND ALL OTHER ITEMS.																
Per mile operated—single track.....		12,909.310	16,480.478	19,255.453	20,188.722	20,651.038	23,863.538	24,369.438	24,717.860	25,413.326	28,082.137	12,909.310	12,909.310	12,909.310		
Per mile operated—double track.....		4,453	5,295	5,926	5,926	5,926	5,926	5,926	5,926	5,926	5,926	4,453	4,453	4,453		
Per mile operated—all tracks.....		2,299	2,659	2,659	2,659	2,659	2,659	2,659	2,659	2,659	2,659	2,299	2,299	2,299		
Ratio to total operating revenues.....		23.59	23.92	25.53	26.68	26.68	26.68	26.68	26.68	26.68	26.68	23.59	23.59	23.59		
M. TAXES.																
Per mile owned—single track.....		2,362.367	3,644.464	3,634.657	3,454.507	3,733.611	4,257.642	4,061.633	3,407.016	4,577.237	4,523.356	2,362.367	2,362.367	2,362.367		
Per mile owned—double track.....		2,083	4,008	4,008	4,008	4,008	4,008	4,008	4,008	4,008	4,008	2,083	2,083	2,083		
Per mile owned—all tracks.....		852	1,316	1,301	1,214	1,278	1,431	1,335	1,009	1,449	1,449	852	852	852		
Per mile operated—single track.....		815	1,098	1,062	1,081	1,189	1,189	1,189	1,189	1,085	1,085	815	815	815		
Per mile operated—double track.....		380	508	493	493	493	493	493	493	493	493	380	380	380		
Per mile operated—all tracks.....		431	529	482	454	473	473	473	473	493	493	431	431	431		
Ratio to total operating revenues.....		4.31	5.29	4.82	4.54	4.73	4.73	4.73	4.73	4.93	4.93	4.31	4.31	4.31		
N. OPERATING INCOME.																
Per mile operated—single track.....		17,361.359	19,730.700	19,544.424	17,908.012	17,939.066	20,781.672	19,097.072	18,217.164	17,370.636	19,066.097	17,361.359	17,361.359	17,361.359		
Per mile operated—double track.....		1,015	1,015	1,015	1,015	1,015	1,015	1,015	1,015	1,015	1,015	1,015	1,015	1,015		
Per mile operated—all tracks.....		2,780	2,780	2,780	2,780	2,780	2,780	2,780	2,780	2,780	2,780	2,780	2,780	2,780		
Ratio to total operating revenues.....		31.54	33.73	33.73	33.73	33.73	33.73	33.73	33.73	33.73	33.73	31.54	31.54	31.54		
O. INCOME ACCOUNT.																
OPERATING INCOME FROM RAILROAD OPERATION.....		\$17,261.359	\$19,730.700	\$19,544.424	\$17,908.012	\$17,939.066	\$20,781.672	\$19,097.072	\$18,217.164	\$17,370.636	\$20,010.920	\$17,261.359	\$17,261.359	\$17,261.359		
Per cent. on cost of road and equipment.....		9.40	10.57	10.17	9.19	10.01	10.33	10.61	9.84	9.64	9.55	9.40	9.40	9.40		
ADDITION TO INCOME (total of items 1 and 2 following).....		6,172.144	6,857.267	7,501.908	8,172.831	8,411.038	9,045.700	11,556.819	14,754.974	12,099.053	14,835.331	6,172.144	6,172.144	6,172.144		
1. Rents received from other roads for the use of road, equipment, and facilities of the operating property.....		1,682.260	2,031.471	2,272.229	2,275.115	2,188.317	2,339.799	2,384.311	2,879.157	1,940.885	1,682.634	1,682.260	1,682.260	1,682.260		
2. Interest on bonds and dividends on stocks in separately operated railroads.....		4,489.884	4,819.796	5,230.669	5,900.716	6,222.212	6,705.901	9,172.508	11,875.817	10,158.168	13,202.897	4,489.884	4,489.884	4,489.884		
DEDUCTIONS FROM INCOME (total of items 1, 2 and 3 following).....		\$15,597.621	\$18,271.250	\$18,021.418	\$18,465.980	\$19,746.351	\$19,838.172	\$21,776.111	\$24,131.751	\$20,212.713	\$21,883.680	\$15,597.621	\$15,597.621	\$15,597.621		
1. Rents paid for lease of roads which form a part of the operating property.....		6,788.638	9,421.239	9,421.474	9,466.577	9,489.997	9,441.327	9,522.215	11,728.911	9,839.671	10,900.913	6,788.638	6,788.638	6,788.638		
2. Rents paid for other roads for the partial use of road, equipment, and facilities needed in operating the property.....		1,041.535	1,316.729	1,262.140	1,678.208	1,939.000	2,081.502	2,733.594	1,447.510	1,901.819	1,653.690	1,041.535	1,0			

BALTIMORE & ANNE ARUNDEL

	Ten-year average.		Five-year average.	
	1901 to 1910.	1901 to 1910.	1906 to 1910.	1906 to 1910.
Ratio of total operating expenses to total operating revenues.....	69.53	68.67	61.76	65.16
Ratio of compensation paid direct to labor to total operating revenues.....	.....	.....	.....	.....
Ratio of compensation paid general officers to total operating revenues.....	.....	.....	.....	.....
Ratio of material, fuel and all other items to total operating revenues.....	.....	.....	.....	.....
Ratio of taxes to total operating revenues.....	3.81	3.81	3.21	3.74
Ratio of operating income to total operating revenues.....	26.99	32.82	35.03	31.10
Ratio of corporate income to capital stock outstanding.....	7.25	8.84	9.68	8.32

Total accumulated surplus available for distribution in 1910 was \$47,084.00; the ten-year average from 1901 to 1910 was \$47,838.80; the five-year average from 1906 to 1910 was \$48,000.00. This is an increase in the last five years as compared with the previous five years of 74.9 per cent.

CHICAGO, MILWAUKEE & ST. PAUL

	Ten-year average.		Five-year average.	
	1901 to 1910.	1901 to 1910.	1906 to 1910.	1906 to 1910.
Ratio of total operating expenses to total operating revenues.....	69.53	68.67	61.76	65.16
Ratio of compensation paid direct to labor to total operating revenues.....	.....	.....	.....	.....
Ratio of compensation paid general officers to total operating revenues.....	.....	.....	.....	.....
Ratio of material, fuel and all other items to total operating revenues.....	.....	.....	.....	.....
Ratio of taxes to total operating revenues.....	3.81	3.81	3.21	3.74
Ratio of operating income to total operating revenues.....	26.99	32.82	35.03	31.10
Ratio of corporate income to capital stock outstanding.....	7.25	8.84	9.68	8.32

Total accumulated surplus available for distribution in 1910 was \$66,777,994; the ten-year average from 1901 to 1910 was \$41,897,897; the five-year average from 1906 to 1910 was \$52,922,018. This is an increase in the last five years as compared with the previous five years of 71.4 per cent.

CHICAGO, ROCK ISLAND & PACIFIC.

	Ten-year average.		Five-year average.	
	1901 to 1910.	1901 to 1910.	1906 to 1910.	1906 to 1910.
Ratio of total operating expenses to total operating revenues.....	73.49	68.57	65.54	70.44
Ratio of compensation paid direct to labor to total operating revenues.....	42.84	39.75	37.03	41.42
Ratio of compensation paid general officers to total operating revenues.....	.45	.63	.72	.58
Ratio of material, fuel and all other items to total operating revenues.....	30.20	28.19	27.79	28.44
Ratio of taxes to total operating revenues.....	4.38	3.50	3.44	3.52
Ratio of operating income to total operating revenues.....	22.13	27.93	31.02	26.04
Ratio of corporate income to capital stock outstanding.....	6.59	8.96	9.82	8.19

Total accumulated surplus available for distribution in 1910 was \$18,835,459; the ten-year average from 1901 to 1910 was \$19,585,331; the five-year average from 1906 to 1910 was \$19,687,213; the five-year average from 1906 to 1910 was \$19,483,450. This is a decrease in the last five years as compared with the previous five years of 1.05 per cent.

DELAWARE, LAKEWATNA & WESTERN.

	Ten-year average.		Five-year average.	
	1901 to 1910.	1901 to 1910.	1906 to 1910.	1906 to 1910.
Ratio of total operating expenses to total operating revenues.....	56.34	57.32	57.14	57.46
Ratio of compensation paid direct to labor to total operating revenues.....	33.25	35.45	36.00	35.07
Ratio of compensation paid general officers to total operating revenues.....	.48	.43	.41	.44
Ratio of material, fuel and all other items to total operating revenues.....	29.60	21.44	20.73	21.95
Ratio of taxes to total operating revenues.....	3.89	2.04	1.26	2.59
Ratio of operating income to total operating revenues.....	39.77	40.64	41.60	39.95
Ratio of corporate income to capital stock outstanding.....	49.77	39.43	29.94	48.64

Total accumulated surplus available for distribution in 1910

was \$2,000,000; the ten-year average from 1901 to 1910 was \$4,442,800; the five-year average from 1906 to 1910 was \$25,000,000. This is an increase in the last five years as compared with the previous five years of 73.1 per cent.

PITTSBURGH & READING.

	Ten-year average.		Five-year average.	
	1901 to 1910.	1901 to 1910.	1906 to 1910.	1906 to 1910.
Ratio of total operating expenses to total operating revenues.....	77.17	75.77	78.47	77.64
Ratio of compensation paid direct to labor to total operating revenues.....	46.16	44.97	47.34	41.52
Ratio of compensation paid general officers to total operating revenues.....	1.17	1.61	1.83	1.46
Ratio of material, fuel and all other items to total operating revenues.....	29.84	30.67	29.30	30.66
Ratio of taxes to total operating revenues.....	2.92	3.15	3.44	2.93
Ratio of operating income to total operating revenues.....	19.91	21.08	18.09	21.43
Ratio of corporate income to capital stock outstanding.....	.19	.34	.22	.90

Total accumulated surplus available for distribution in 1910 was \$2,219,296; the ten-year average from 1901 to 1910 was \$1,619,978; the five-year average from 1906 to 1910 was \$2,364,015. This is an increase in the last five years as compared with the previous five years of 269.8 per cent.

PITTSBURGH & READING.

	Ten-year average.		Five-year average.	
	1901 to 1910.	1901 to 1910.	1906 to 1910.	1906 to 1910.
Ratio of total operating expenses to total operating revenues.....	61.10	58.86	56.75	60.45
Ratio of compensation paid direct to labor to total operating revenues.....	37.06	37.69	37.49	37.85
Ratio of compensation paid general officers to total operating revenues.....	.31	.44	.57	.34
Ratio of material, fuel and all other items to total operating revenues.....	23.73	20.73	18.69	22.26
Ratio of taxes to total operating revenues.....	1.26	1.02	1.09	1.03
Ratio of operating income to total operating revenues.....	37.64	40.12	42.25	38.52
Ratio of corporate income to capital stock outstanding.....	43.51	32.47	25.54	39.38

Total accumulated surplus available for distribution in 1910 was \$18,443,567; the ten-year average from 1901 to 1910 was \$13,194,532; the five-year average from 1906 to 1910 was \$8,556,795; the five-year average from 1906 to 1910 was \$17,832,268. This is an increase in the last five years as compared with the previous five years of 208.4 per cent.

TOLEDO, ST. LOUIS & WESTERN.

	Ten-year average.		Five-year average.	
	1901 to 1910.	1901 to 1910.	1906 to 1910.	1906 to 1910.
Ratio of total operating expenses to total operating revenues.....	63.24	66.26	68.62	64.37
Ratio of compensation paid direct to labor to total operating revenues.....	38.43	39.88	40.89	39.10
Ratio of compensation paid general officers to total operating revenues.....	.88	1.02	1.10	.91
Ratio of material, fuel and all other items to total operating revenues.....	33.03	25.36	26.63	24.36
Ratio of taxes to total operating revenues.....	4.36	3.71	3.73	3.68
Ratio of operating income to total operating revenues.....	32.40	30.03	27.65	31.95
Ratio of corporate income to capital stock outstanding.....	3.84	2.02	.77	3.26

Total accumulated surplus available for distribution in 1910 was \$3,475,019; the ten-year average from 1901 to 1910 was \$1,433,853; the five-year average from 1906 to 1910 was \$2,513,516. This is an increase in the last five years as compared with the previous five years of 609.7 per cent.

Of the proceeds of a loan of \$7,500,000 which the Bolivian government has been authorized to make, \$1,400,000 is to be spent on sanitary works and \$275,000 on surveys of railways from La Paz to Yungas, Cochabamba to Chimora, Yacuiba to Santa Cruz, and Potosi to Sucre; and \$825,000 on various works.

PRESIDENT TAFT ON RAILWAY REGULATION.*

There has not been time to test the benefit and utility of the amendments to the Interstate Commerce law made June 18, 1910. The law as enacted did not contain all the features which I recommended. It did not specifically denounce as unlawful the purchase by one of two parallel and competing roads of the stock of the other. Nor did it regulate the power of corporations engaged in operating Interstate railways to issue new stock and bonds; nor did it authorize the making of temporary agreements between railways, limited to thirty days, fixing the same rates for traffic between the same places.

I do not press the consideration of any of these objects upon Congress at this session. The object of the first provision is probably generally covered by the anti-trust law. The second provision [is being considered by], the special commission consisting of President, Arthur T. Hadley of Yale University, chairman; Frederick C. Strauss, Frederick N. Judson, Professor B. H. Meyer and Walter L. Fisher.

The third proposal led to so much misconstruction of its object, as being that of weakening the effectiveness of the anti-trust law, that I am not disposed to press it for further consideration. It was intended to permit railway companies to avoid useless rate cutting by a mere temporary acquiescence in the same rates for the same service over competing railways, with no obligation whatever to maintain those rates for any time.

SAFETY APPLIANCES.

The protection of employees from personal injury is a subject of the highest importance and demands continuing attention. There have been two measures pending in Congress, one for the supervision of boilers and the other for the enlargement of dangerous clearances. Certainly some measures ought to be adopted looking to a prevention of accidents from these causes. It seems to me that with respect to boilers a bill might well be drawn requiring and enforcing by penalty a proper system of inspection by the railway companies themselves which would accomplish our purpose. The entire removal of outside clearances would be attended by such enormous expense that some other remedy must be adopted. By act of May 6, 1910, the Interstate Commerce Commission is authorized and directed to investigate accidents, to report their causes and its recommendations. I suggest that the commission be requested to make a special report as to injuries from outside clearances and the best method of reducing them.

VALUATION OF RAILWAYS.

The Interstate Commerce Commission has recommended appropriations for the purpose of enabling it to enter upon a valuation of all railways. This has always been within the jurisdiction of the commission, but the requisite funds have been wanting. Statistics of the value of each road would be valuable for many purposes, especially if we ultimately enact any limitations upon the power of the interstate railways to issue stocks and bonds, as I hope we may. I think, therefore, that it would be wise to make a reasonable appropriation to enable the Interstate Commerce Commission to proceed with due dispatch to the valuation of all railways. I have no doubt that railway companies themselves can, and will, greatly facilitate this valuation and make it much less costly in time and money than has been supposed.

FRAUDULENT BILLS OF LADING.

Forged and fraudulent bills of lading purporting to be issued against cotton, some months since, resulted in losses of several millions of dollars to American and foreign banking and cotton interests. * * * For the protection of our own people and the protection of our credit in foreign trade I urge upon Congress, the immediate enactment of a law under which one who, in good faith, advances money on credit upon a bill of lading issued by a common carrier upon an interstate or foreign shipment can hold the carrier liable for the value of the goods described in the bill at the valuation specified in the bill, at least to the ex-

tent of the advances made in reliance upon it. Such liability exists under the laws of many of the states. I see no objection to permitting two classes of bills of lading to be issued: (1) Those under which a carrier shall be absolutely liable, as above suggested, and (2) those with respect to which the carrier shall assume no liability except for the goods actually delivered to the agent issuing the bill. The carrier might be permitted to make a small separate specific charge in addition to the rate of transportation for such guaranteed bill, as an insurance premium against loss from the added risk, thus removing the principal objection which I understand is made by the railways to the imposition of the liability suggested, viz., that the ordinary transportation rate would not compensate them for the liability assumed by the absolute guaranty of the accuracy of the bills of lading.

I further recommend that a punishment of fine and imprisonment be imposed upon railway agents and shippers for fraud or misrepresentation in connection with the issue of bills of lading issued upon interstate and foreign shipments.

FOOTBALL TRAFFIC ON THE NEW HAVEN.

The returns for railway football traffic on the New Haven this year, being presented in somewhat different shape from heretofore, are significant as allowing a full comparison of New Haven's two "biggest" football games, namely the Yale-Harvard games at New Haven, which are two years apart. They also allow a further, if somewhat rough, study of the effects of the automobile on railway travel, which is made elsewhere in the editorial pages. Last year, at the Yale-Princeton game in New Haven, the total number of football passengers was 32,295. This rose to 35,763 last month. In both cases "excess of regular business" includes the increased passenger business on the day before and the day after the game.

The total receipts last month were \$72,376, as contrasted with \$45,058 at the Princeton-Yale game last year. This obviously is due to the "long haul" between Boston and New Haven, as compared with the shorter haul between New Haven and New York. But there was an increase also of 1,000 in the number of Boston-New Haven football passengers and of \$4,606 in the same day of revenue as compared with two years ago. This is attributed to the sentimental factor of expectation this year of a Harvard victory in the game and its after-joys—a hypothesis probably correct. Had a forecast of the actual tie game been accepted, it would very likely have lost the New Haven company some thousands of dollars.

Comparison of the football "bulge" of traffic with the regular traffic in passengers of the New Haven system is something more than a mere railway curio. The total passenger receipts of the company for the last fiscal year on its 4,361 single track miles owned and leased were \$24,885,864, or an average of \$68,180 per day, including Sundays. The \$72,378 of football receipts exceeded this by \$4,198, to which may justly be added \$1,693—representing 33,840 passengers—or excess over business of an ordinary Saturday on the New Haven trolley system, controlled by the steam corporation, besides indefinite receipts on its outlying trolley lines and on its New Haven boats. In respect to actual profits of the football business, however, the statement of President Mellen some years ago may be cited. He emphasized losses due to the obstruction on the system of regular passenger and freight business due to the day's football traffic, to say nothing of the risk of costly accident.

Thus far, however, the New Haven has for many years handled its football rush without any mishap worth the mention—last month without any mishap at all—while on its local trolley system the breaking of one fender of an automobile was the limit. Between New York and New Haven the company has four tracks. Eastward and beyond these divide into two double track routes to Boston via Springfield and Providence, respectively. But at New Haven the lines converge at a station not too ample, with but a single frontage on the tracks and served in traffic

* President Taft, Message to Congress, December 8, 1910.

awayward direction by last one double track trolley line. The main line, as indicated by the simplicity of handling special trains, leaving them to return passengers after the game and applying a group system to individual ones.

All this involved a large output of special railway literature as instructions for the day. The instructions fill 26 long pages for the railroad employed alone, besides 27 pages of bulletins for the instruction of passengers, the latter giving location of return trains and special cars, diagram of entrances and seats at the football field, trolley and automobile routes, a practical map of the city, as well as of the station and tracks, and a mass of other pertinent information, all going far to solve successfully the problem of handling the inrush and outrush of more than 25,000 passengers in a line with great normal density of traffic, especially on a Saturday.

Annexed are the schedules of the service for the day, summaries of the volume of traffic handled and the financial receipts, absolute and compared with 1908:

NEW YORK NEW HAVEN SCHEDULE				
Train.	New York.	New Haven.	Passrs.	Cars.
A	7:55 A.	9:50 A.	149	12
B	9:00 A.	10:47 A.	878	12
C	9:50 A.	11:13 A.	716	12
D	9:25 A.	11:25 A.	284	10
E	9:30 A.	11:26 A.	370	10
F	9:40 A.	11:32 A.	855	12
G	9:50 A.	11:41 A.	641	12
H	10:02 A.	11:50 A.	455	12
I	10:03 A.	11:48 A.	114	8
J	10:10 A.	12:06 P.	338	10
K	10:15 A.	12:12 P.	304	10
M	10:35 A.	12:33 P.	886	12
N	10:55 A.	12:50 P.	641	13
O	10:45 A.	12:44 P.	298	10
P	10:50 A.	12:44 P.	436	10
46	8:01 A.	9:50 A.	395	11
50	9:16 A.	11:09 A.	675	12
10	10:00 A.	11:36 A.	148	7
12	10:05 A.	12:06 P.	436	12
2	11:01 A.	12:55 P.	500	12
34	12:01 P.	1:41 P.	200	11
Q	*11:35 A.	12:04 P.	303	12

Train.	New Haven.	New York.	Passrs.	Cars.
15	4:19 P.	6:00 P.	149	5
A	4:21 P.	6:17 P.	922	12
B	4:35 P.	6:27 P.	896	12
C	4:48 P.	6:36 P.	1,078	12
G	5:07 P.	7:00 P.	1,318	12
H	5:26 P.	7:45 P.	712	12
I	5:54 P.	7:51 P.	658	12
J	6:05 P.	8:01 P.	284	10
F	6:14 P.	8:06 P.	327	10
L	6:20 P.	8:15 P.	310	10
K	6:26 P.	8:39 P.	284	10
O	6:32 P.	8:56 P.	284	10
Ex. 2/10	6:30 P.	8:25 P.	137	8
Q	6:37 P.	8:45 P.	387	12
M	Annulld.			
N	Annulld.			
17	5:16 P.	7:11 P.	760	12
55	6:27 P.	8:21 P.	127	12
21	6:58 P.	9:10 P.	357	11
5	7:12 P.	9:06 P.	261	11
23	8:01 P.	9:42 P.	473	9
25	8:23 P.	10:00 P.	103	6
28	9:31 P.	11:22 P.	290	11

NEW HAVEN BOSTON SCHEDULE.				
Train.	Left Boston.	Arrd. New Haven.	Cars.	No. Passrs.
61	8:00 A.	11:54 A.	10	390
BA	8:05 A.	12:03 P.	10	314
BE	8:10 A.	12:12 P.	10	339
BF	8:15 A.	12:31 P.	10	415
BD	8:20 A.	12:36 P.	10	203
BE	8:25 A.	12:50 P.	10	280
BF	8:39 A.	12:55 P.	10	450
BG	8:41 A.	1:11 P.	10	681
HA	8:00 A.	11:55 A.	8	411
HB	8:32 A.	12:39 P.	7	568
HC	8:35 A.	1:07 P.	7	496
SB	10:40 A.	12:24 P.	11	488
SD	10:55 A.	12:58 P.	11	359
SE	(a) 8:50 A.	10:20 A.	10	342
	(c) 10:50 A.	11:50 A.	10	372

Train.	Left New Haven.	Arrd. Boston.	Cars.	No. Passrs.
BE	5:12 P.	9:12 P.	10	430
BA	5:15 P.	9:41 P.	10	344
BB	5:25 P.	10:12 P.	10	401
BC	5:35 P.	10:25 P.	10	339
BD	5:40 P.	10:15 P.	4	131
BE	5:45 P.	10:35 P.	10	280
BG	6:01 P.	10:54 P.	10	677

Train.	Left New Haven.	Arrd. Boston.	Cars.	No. Passrs.
HA	8:00 A.	11:55 A.	10	411
HB	8:32 A.	12:39 P.	7	568
HC	8:35 A.	1:07 P.	7	496
SD	10:55 A.	12:58 P.	11	359
SE	(a) 8:50 A.	10:20 A.	10	342
	(c) 10:50 A.	11:50 A.	10	372

SUMMARY OF TRAFFIC HANDLED					
1909.			1908.		
Passrs.*	cars.	Revenue.	Passrs.*	cars.	Revenue.
Regular bus.	26,350	\$47,854	26,664	\$44,179	\$314
Excess regular bus.	9,413	14,565	13,113	18,355	\$3,700
Grand Total	35,763	\$62,419	39,777	\$62,534	\$4,014
Net after deducting amount due Pullman Company.					\$1,193

* One way. † Decrease. a Net after deducting amount due Pullman Company.

The accuracy of the running time, averaging about two hours on the crowded New York division, will be noted and, as a curiosity in train crowding, the after-game train leaving New Haven at 5:07 p. m. with its 1,318 passengers in 12 cars—about 110 passengers per car—with the train just preceding a good second in passenger capacity—including standing room.

Some of the more important and suggestive instructions for the train service of the day follow:

The schedules and instructions contained herein shall not be construed to confer track, running or timetable rights to any train. Familiarize yourselves with the time of all trains, both special and regular, and also with the special instructions contained herein.

All specials to change power at Stamford (Tower 38), except those making station stop.

Harlem River.—Engine 292 to be headed east and subject to call at any time during the day to handle wrecker.

New Rochelle.—Regular wire train to be ready and subject to call at any time during the day.

New Haven.—Engines arriving on BH 1 and the Harlem River Pier Local—one headed east and one west—to be ready and subject to call at any time during the day to handle wrecker.

Midway.—Engines 265 and 280—one headed east and one west—to be ready and subject to call at any time during the day to handle wrecker.

Providence.—Engines 701 and 765—one headed east and one west—to be ready and subject to call at any time during the day to handle wrecker.

Hartford.—Engines 297 and 419—one headed east and one west—to be ready and subject to call at any time during the day to handle wrecker.

Readville.—Engine 908, headed west, to be ready and subject to call at any time during the day to handle wrecker.

Westmoreland coal to be furnished engines of all specials. Coal shovellers and fire cleaners will be located at Cedar Hill and ash pit, New Haven, where coal will be located in cars.

The working limits of work trains must be restricted as necessary to absolutely prevent interference with passenger trains during the movement of football service.

Chief dispatchers must see that freight trains clear all specials and first-class trains at least thirty (30) minutes during the movement of football service.

Drawbridges must not be opened within fifteen (15) minutes in advance of any special or first-class train during the movement of football service, except in case of extreme necessity, and chief dispatchers shall see that towermen are instructed accordingly.

Operators in block stations must use great care in plunging for the release of block, so that there will be no delays on account of signal failures, and must announce and clear up all trains clearly and promptly.

Enginemen are cautioned to use care in approaching all congested terminals, particularly New Haven, Hartford and Stamford, and proceed only as the way is known to be clear.

NEW HAVEN TERMINAL.

Special Instructions.

Between towers No. 78 and 79, in both directions, trains must run carefully, prepared to stop at any point and proceed only as they know the way to be clear.

Conductors will, whenever possible, station themselves on the rear end to personally superintend the flagging.

Conductors of special trains must notify passengers to unload promptly, as trains will be moved to distant part of yard.

Closets must be locked from arrival to departure of trains.

Immediately on arrival at New Haven, conductors of special trains will leave a duplicate of Form T 418 at station master's office. Particular attention is called to reporting correct engine numbers, with full name of conductor and engineer.

Conductors must see that all articles left by passengers after leaving cars are delivered to station master's office.

Engines when released from their trains will turn, spark, water, etc., promptly returning to their trains ready for the return movement.

Train crews must remain with their trains to assist and direct passengers,

* Left Pullman.
(a) Left Stamford.
(c) Left Hartford.
(b) Arrived New Rochelle.
(d) Arrived Springfield.

see that their cars are properly carded, and do everything in their power to facilitate the work in yards.

Conductors must see that all cars are properly coupled, and that their trainmen have cars well lighted before 3:30 p. m.

Conductors and trainmen will call frequently the destination of their trains, announcing the stops.

At completion of inspection, the inspectors will notify the rear brakeman, who will signal his conductor from the rear platform of rear car. Conductors and engineers must be prepared to depart from New Haven by 3:30 p. m., and the absence of any member of their crew must be immediately reported to the station master's office by the conductor.

Trains departing from New Haven requiring train orders will receive them at telegraph station office in train master's office.

TIE PLATES ON AMERICAN RAILWAYS.

Ninety-eight answers have been received, from engineers on eighty railways in the United States, Canada and Mexico, to circular letters from the *Railway Age Gazette* asking questions about forms of tie plates. On an editorial page in this issue the facts indicated in these letters are discussed. Our questions were:

1. A blue print of the standard you may have adopted, or else dimensions and trade name or description of lugs, ribs, claws or corrugations?
2. Your use of them on bridges? Curves? Tangents? Soft wood ties only?

3. Set on the ties or countersunk?

4. Your opinion on malleable iron tie plates.

5. On all British railways the rails are set in their chairs so as to have an inward cant of about 1 in 20. The wheels are coned 1 in 20, so as to have a theoretical complete contact. On a number of American railways, tie plates, slightly wedge shaped, are used to cant the rail inwardly. We should like to have your experience or opinion of the results of a cant made by thickened tie plates.

6. Can a tie plate be made effective as an anti-creeper?

There is a substantial agreement as to certain principles of practice: Where tie plates are used at all, they are put on all sharp curves, whether ties are soft or hard wood. Treated ties and soft wood ties are protected whether on curve or tangent. Hard wood ties in tangent are protected only where the traffic is quite heavy. Bridges are ordinarily plated, except when the ties are so close together as to give a great bearing area per rail. Tie plates are not countersunk.

In the captions of the accompanying drawings we have used the word "transverse" when the ribs are transverse to the fibers of the tie, and "longitudinal" when they run parallel to the tie.

H. T. Douglas, chief engineer Wheeling & Lake Erie, prefers malleable iron to steel, "the objection to the latter being manifest and accentuated on roads handling any number of refrigerator cars. No tie plate under modern rolling stock that is not at least $\frac{3}{8}$ in. thick, and preferably $\frac{1}{2}$ in., in my judgment can be justified in the economics of railway maintenance, as the period of their usefulness is too severely limited. A tie plate to be effective should form cohesion between the rail and tie. I believe that malleable iron is vastly superior to steel for tie plates. The injurious effects on steel tie plates from the drippings from refrigerator cars, sulphuric gases, sulphuric acid, and corrosion from moisture, are very much greater than in any form of iron subjected to like conditions. The malleable iron is a radical improvement and is the only proper metal yet introduced for tie plates. As to canting rails, I believe the British practice is correct. It is the ideal track construction, but the poor class of labor we have prevents many refinements. All tie plates with a shoulder act to some extent as anti-creeper, but none that I have observed are effectual, particularly on railways with heavy descending grades."

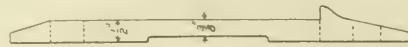
A. O. Cunningham, chief engineer Wabash, believes a slight inward cant is good and favors a wedge shaped tie plate for that reason. He is doubtful as to the utility of a tie plate for preventing rail creeping, believing an anti-creeper should have a bearing against the side of the tie, instead of depending on the spike for resistance.

C. H. Spencer, engineer Washington Terminal Company, reports success at some very difficult places in using tie plates as anti-creeper in connection with slotted angle bars at the joints. But he finds that, in general, a good anti-creeper is desirable.

John D. Isaacs, consulting engineer Harriman Lines, says that for equal strength the malleable iron tie is heavier and costs more than one of steel, consequently rolled steel tie plates are used exclusively. The practice of canting rails is not advocated and is considered to be hardly practicable with the Continuous

joint. He does not think a tie plate can be made effective as an anti-rail creeper, as any attempt to rigidly attach the tie plate to the rail tends to break the flange.

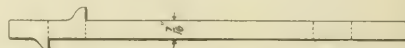
S. B. Clement, chief engineer Temiskaming & Northern Ontario, says: "I have had no experience with the use of malleable iron tie plates, except a combination tie plate and rail brace. This combination tie plate no doubt has served a good purpose on the sharper curves, but I believe similar results could have been obtained by using shoulder tie plates on each tie, instead



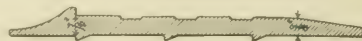
Flat Plate, 6 in. x 9 in.; Central of New Jersey.



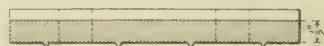
Transverse Ribbed Plate, $6\frac{1}{2}$ in. x 9 in.; Kansas City Terminal.



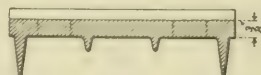
Transverse Ribbed Plate, 7 in. x 9 in.; Washington Terminal.



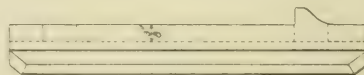
Transverse Ribbed Plate, 5 in. x 8 in.; Intercolonial.



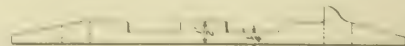
Longitudinal Ribbed Plate, $6\frac{1}{2}$ in. x $8\frac{3}{4}$ in.; Chicago & Eastern Illinois.



Longitudinal Ribbed Plate, 5 in. x 9 in.; New York, New Haven & Hartford.



Transverse Ribbed Plate, 6 in. x 8 in.; Cleveland, Cincinnati, Chicago & St. Louis.



Flat Plate, $7\frac{1}{2}$ in. x $8\frac{3}{4}$ in.; El Paso & South Western.

of the combination tie plate on every third tie and our standard tie plates on the intermediate ties."

H. J. Pfeifer, engineer maintenance of way Terminal Railroad Association of St. Louis, believes a slight inward cant of rails desirable, and the tie plate the proper place in which to bring this about. He has had very little experience in the matter of canting the rails and hesitates to express a definite opinion. His company purchased for experimental use a number of the Clark malleable iron tie plate and anti-creeper, but they have been in use too short a time for an opinion to be given as to their merit. He is doubtful as to the value of any of the present tie plates when used as anti-creeper, but

believes it is possible to obtain a combination that will do the work and sell at a reasonable price.

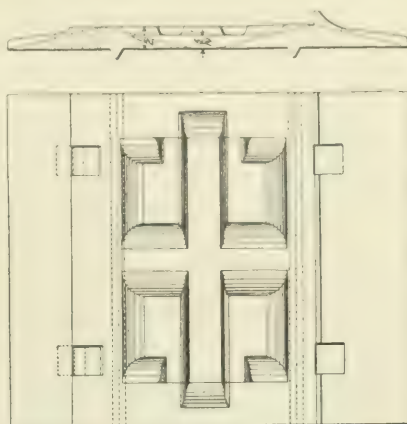
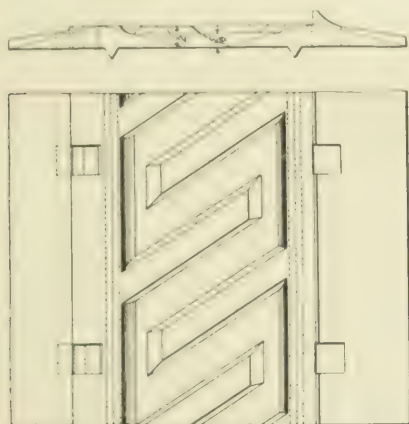
S. G. Franklin, general manager Santa Fe, has tried canted tie plates with this result: that in future years more will be used, first tie plates having a slope of 1 in 16. He further says: "Our rail is light and the tendency is to spring under a load and to force up and loosen the spikes. By increasing the distance between the spike holes a rigid fit is made and spikes are firmly retained in place."

M. C. Byers, chief engineer St. Louis & San Francisco, considers malleable iron plates better than steel plates, the only objection being the higher cost. He can see no benefit from canting the rail and has had no experience with combined tie plates and anti-rail creepers. He says: "Their cost would probably exceed the cost of a simple tie plate by such an amount that one could afford to purchase separate anti-creepers and separate tie plates and save money. There are very few cases where three or four anti-creepers to the rail will not hold the rail from creeping. The only metal tie plates on sharp curves, but on treated ties on straight track he is using wooden tie plates; these, however, are used only to avoid the first cost of steel tie plates.

R. K. Brown, engineer maintenance of way San Pedro, Los Angeles & Salt Lake, reports as follows on the tie plate as an

anti-creeper: "We use the ordinary hook-head track spike, 5½ in. x 9/16 in. Our rail base is 4 13/16 in. broad, A. S. O. E. standard 75 lb. rail. This makes a close fit between the back of the spike and the outside of the spike hole in the plate, causing the spike to slightly grip the rail in driving. We have considerable mileage of rail laid on 2 per cent. grades with this style of tie plate and find that there is almost no indication of the rail creeping under these conditions. Some of the track has been down for five years, and while the speed is not high, the loads and motive power are heavy. Whether these plates, so punched, will continue to hold the rails in position indefinitely remains to be seen. We hope it will." The plate used on this line has a thickness of 7/16 in., with two channels under the rail and parallel with it, 1 in. wide x 3/16 in. deep. Two spike holes are punched for each flange, the distance between them being 4 11/16 in. for the 4 13/16 in. rail base.

C. H. Ewing, engineer maintenance of way Philadelphia & Reading, gives the following experience with the plates as anti-creepers: "In a recent installation on a grade of 175 ft. per mile, it was found that rails did not creep as much after tie plates were installed as previously, but they did not prevent creeping entirely, although the conditions on this grade are exceptionally bad, due to heavy loaded traffic on the descending grade. Under ordinary conditions anti-creepers are not necessary where proper tie plates are used." His rule in putting in tie plates is: First, tie-plate low side of curves where there is heavy freight traffic and where curves are elevated for high speed passenger trains; second, tie plate high rail on curves; then tie-plate tangents, after all curves are provided for.



Transverse Ribbed Plates, 7½ in. x 9 in.; Atchison, Topeka & Santa Fe.

anti-creeper: "We use the ordinary hook-head track spike, 5½ in. x 9/16 in. Our rail base is 4 13/16 in. broad, A. S. O. E. standard 75 lb. rail. This makes a close fit between the back of the spike and the outside of the spike hole in the plate, causing the spike to slightly grip the rail in driving. We have considerable mileage of rail laid on 2 per cent. grades with this style of tie plate and find that there is almost no indication of the rail creeping under these conditions. Some of the track has been down for five years, and while the speed is not high, the loads and motive power are heavy. Whether these plates, so punched, will continue to hold the rails in position indefinitely remains to be seen. We hope it will." The plate used on this line has a thickness of 7/16 in., with two channels under the rail and parallel with it, 1 in. wide x 3/16 in. deep. Two spike holes are punched for each flange, the distance between them being 4 11/16 in. for the 4 13/16 in. rail base.

J. B. Berry, chief engineer Rock Island Lines, reports that, "after two years of experience with malleable iron tie plates and screw spikes on a piece of high speed track very difficult to maintain to line and gage, we are favorably impressed with malleable iron for tie plates, provided they are made of sufficient thickness and bearing area to distribute the load. We are opposed to canting the rail. In theory, with a perfect wheel tread there may be a more complete contact of wheel with rail. As a matter of fact, the average condition of all wheels is a mean between the perfect tread and the maximum wear permissible,

W. C. Cushing, chief engineer maintenance of way Pennsylvania Lines West, reports that his rather limited experience with malleable iron tie plates has given him a favorable opinion of the material. In addition to the standard tie plate the company is experimenting with special plates for use with screw spikes in treated ties. On the special plates there are no projections on the bottom and the plates are somewhat larger than the standard, on account of the softness of the wood and the long life expected from the ties and the plates. Thomas H. Johnson, consulting engineer Pennsylvania Lines West, says: "We laid an experimental piece of track with bevelled tie plates, canting the rail to meet the coning of the wheels. The result indicated no advantage gained thereby. It is a theoretical refinement, the supposed advantage of which is nullified by the practical fact that the majority of wheels passing over the track have the treads more or less worn, thus destroying the theoretical relations of wheel and rail."

L. R. Zollinger, engineer maintenance of way Pennsylvania, says: "We use rail anchors where necessary. We have been quite successful in some experiments with an anti-creeping tie plate of standard cross section made long enough to tie the joint to four or more ties instead of two ties. This form of anti-creeper is used in the New York tunnels on account of heavy grades." This plate, which is rolled in one piece, consists, virtually, of four plates joined by a strap 3¾ in. wide.

Ralph Budd, chief engineer Oregon Trunk, believes the malle-

able iron tie plate has some advantage over the steel plate for durability, especially where a large number of refrigerator cars run over the track and the brine drippings are considerable. He believes the inward slope of 1/16 in., the standard tie plate on his road, has a theoretical advantage, but is a nicety of design without much practical value. The extra thickness on the outside of the plate is good, for this is the place where tie plates commonly buckle. He thinks that diagonal corrugations on the upper side of tie plate should help to prevent rail creeping, but he has had no experience on which to base a conclusion.

J. P. Congdon, supervising engineer Oregon Short Line, does not favor canting the rails, and believes the springing of the rail and tie underneath passing trains soon loosens the spikes so the tie plate is of little use as an anti-creeper.

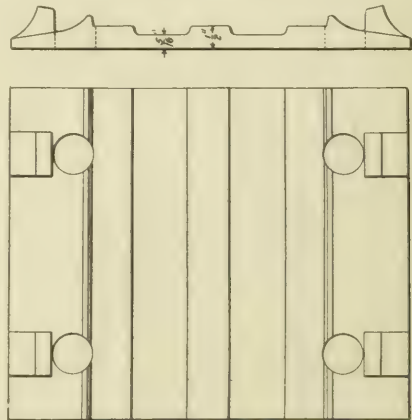
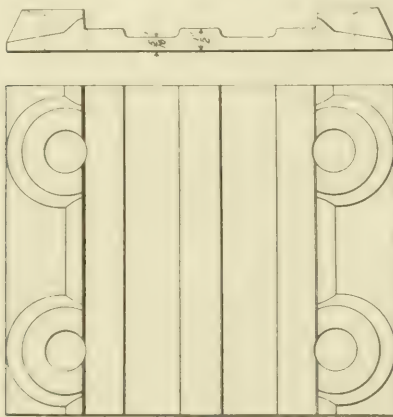
G. W. Vaughan, engineer maintenance of way New York Central, has found that shoulder tie plates when three or four spikes are driven through them act as anti-creepers. The spikes seem to wedge or slightly grip the base of the rail and thus hold it. His tie plates at present are rolled of the same thickness. In order to slightly cant the rail inward, the plates are made from 3/4 to 3/8 inch longer on the shoulder or outside than on the non-shoulder or inside. So far he has found that this is suffi-

by binding the tie more firmly to the rail base by the metal of the tie plate supporting the back of the spikes, reduces the tendency of the tie to get slewed or out of square."

F. H. Bainbridge, resident engineer Milwaukee, Sparta & Northwestern, says: "I think that tie plates should not be used as anti-creepers, and that the use of anti-creepers should be limited. I find that anti-creepers bunch the ties on curves and do not accomplish the ends for which they are intended. On bridge work, where ties can be held, I have found anti-creepers satisfactory."

T. H. Hickey, roadmaster Michigan Central, says: "Where tie plates are applied continuously on every tie, as in laying heavier rail or laying new track, tie plates are set on ties; where used in tie renewals, they are countersunk. I would not, however, recommend their use in track where hard and soft wood ties are mixed, with tie plates applied only on the soft wood. Such use may prevent a uniform bearing for the entire length of rail base, unless neighboring ties are adzed to the same plane. If creosoted ties are in, or may be put in service, the question of adzing too freely should be considered, as we know adzing to be detrimental to treated wood."

Thomas Money, general roadmaster Louisville & Nashville



Experimental Plates for Screw Spikes, 7 1/2 in. x 9 in.; Atchison, Topeka & Santa Fe.

cient to cant the rail, hold it in its correct position and require the passing wheels to fully cover the top of the rail.

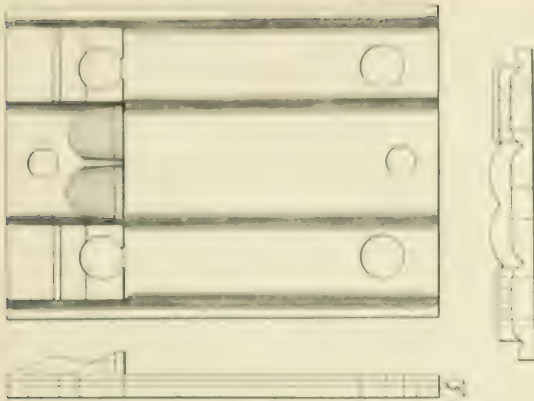
W. J. Benton, assistant engineer Missouri Pacific, says: "I am personally very much in favor of giving the rail an inward cant, such as is the practice on British railways. In laying new rail the ties should be so adzed that the first wear comes outside of the ball of the rail. On curves, except where the elevation is excessive, I believe the inner rail should be laid vertical and the outer rail should have an inward cant." John R. Leighty, engineer maintenance of way Missouri Pacific, has had some experience with 85-lb. rail canted inwardly about 3/8 in. on curves, and believes it to be good practice. The anti-creeper tie plate has been considered by him and he believes that possibly such a tie plate may some day be designed. He thinks that any method of clamping the rail to the plate will be unsuccessful, as reversal of pressure will loosen the grip, the reversal of pressure being bound to occur with the usual forward and backward movement of rail. In working on a design for a tie plate he once hit on the scheme of rolling the edge of the rail base scalloped and designing a shoulder tie plate with a corresponding scallop to engage the base of rail. He found, however, that this scheme had been patented a number of years before, and, moreover, as he had never heard of it being used, concluded that it had no merit.

R. G. Kenly, chief engineer Minneapolis & St. Louis, says: "A tie plate is effective as an anti-creeper insofar as the strengthening of the rail supports reduces wave motion; and,

says: "I do not believe that a tie plate can be made effective as an anti-creeper without sacrificing its efficiency as a means of protecting the tie and preserving the gage of the track. A very important feature of the tie plate is that it should adhere to the tie and that there should be no movement of the plate on the tie. If a tie plate be used to resist the creeping of the rail, its hold on the tie is apt to be destroyed. There will also be a tendency of the tie to overturn in its bed, resulting in irregularities in the line, surface and gage of the track, and injury to the tie. I think the logical point at which to resist the tendency of the rail to creep is at the side of the tie about midway between the top and bottom."

William M. Kennedy, division engineer Lehigh Valley, thinks the wedge shaped tie plate an improvement over the flat plate, and also believes a tie plate can be made that should be effective as an anti-creeper. E. B. Ashby, chief engineer Lehigh Valley, favors the wedge shaped tie plate with rail having sloped sides and head, but does not believe a tie plate can be made effective as an anti-creeper.

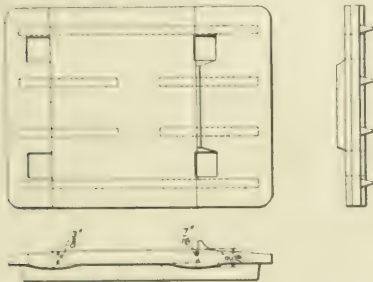
R. C. Young, chief engineer Lake Superior & Ishpeming says: "We prefer the plates with the 3/8-in. lugs running crossways of the grain of the wood. We have tried the so-called flange plates and find that they do not resist the thrust as well as the lugs and also leave an opening for water to come in, causing rot to the tie. I think the Sellers tie plate meets our requirements better than any we have used. It adheres to the tie better and all the metal adds to the strength of the plate itself."



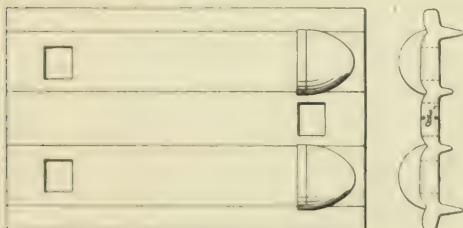
Screw Spike Plate, 7 in. x 9 3/4 in.; Delaware, Lackawanna & Western.



Plate with Transverse Ribs and Longitudinal Lugs, 6 in. x 8 1/2 in.; Chicago, Burlington & Quincy.



Longitudinal Ribbed Reinforced Plate, 6 in. x 8 in.; Chicago, Milwaukee & St. Paul.



Wolhaupter Tie Plate, 5 in. x 8 in.; Elgin, Joliet & Eastern.

...engineer of the same road, says that his tie plates are usually driven in from the side so that the rib exactly enters the wood and the bottom of the plate bears on the tie. The plate has a angle along its edge, 1/4 in. deep, parallel to the face of the wood. The inner end of the flange is also sharpened, facilitating its insertion in the way he describes. C. C. Cleveland, assistant road engineer Lake Shore, thinks the rail should be slightly canted so that the wheel will entirely cover the rail. In laying rail he tries to do this by adzing the tie. He says a wedge shaped tie plate would do this.

J. A. Lahmer, principal assistant engineer Kansas City Southern, believes a cant of about 1 in 20 toward the center of the track with wheels coned to fit would be good, for even on the inside of curves there is a tendency on the part of rails to gradually cant outward. He doubts whether a tie plate alone would be effective as an anti-creeper, for he has seen ties split on account of the rail having been anchored to them on trestles. A. F. Rust, resident engineer on the same road, reports malleable iron plates as giving better satisfaction than steel plates. He does not believe a tie plate can be effective as an anti-creeper.

T. C. Burpee, engineer of maintenance Intercolonial of Canada, believes in canting the rail slightly and says his experience with tie plates as anti-creeper has been unfavorable. He tried some combination tie plates and rail braces of malleable iron, and found that they bent too easily.

A. S. Baldwin, chief engineer Illinois Central, reports good results with malleable iron plates and is of the opinion that canting the rails will cause excessive rail wear, because most wheels are worn to adjustment to uncanted rails.

M. S. Blaiklock, engineer maintenance of way Grand Trunk, believes good results follow if wheels were coned similar to British practice, and says that tie plates giving a slight cant are needed, for the rails on his road turn over. He believes that putting a shoulder on each side would help to make a tie plate a good anti-creeper.

F. J. Stimson, division engineer Grand Rapids & Indiana, prefers a plate with a rib instead of a flat bottomed plate, because he has found that it becomes more a part of the tie and as a consequence is less noisy and less destructive to the tie.

B. F. Beckman, superintendent Fort Smith & Western, says: "In my opinion, on tangent track, a slight cant might be of some advantage, though I am rather doubtful, as it seems to me that the rail should be vertical in all cases on tangent. On curves, however, I have noticed that frequently, where the tendency is to over-elevate the outside rail, thereby placing an abnormal weight on the inside rail, the inside rail becomes warped, with the joint remaining nearly normal and the center of the rail canting outward, this being caused by a vertical load on a badly canted rail, the joint being stiffer laterally than the rail alone. In such cases I think it would be highly advisable to use a wedge-shaped tie plate, bringing the inside rail vertical, and a slightly wedge-shaped tie plate canting the top of the outside rail slightly inward. A tie plate should not be used as an anti-creeper. The anchorage for an anti-creeper should come close to the center of the resisting force, which is the ballast in front of the tie, and therefore should come down close to the centre of the tie."

A. Swartz, division engineer Erie, uses tie plates on the sharper curves and also on tangents in places where the roadbed is soft and the track spreads very easily. R. C. Falconer, assistant engineer Erie, says that joint tie plates on bridges are not spiked through the slots in the angle bars; otherwise, creeping rails would tilt the joint ties. As to the use of a tie plate as an anti-creeper, he says: "It would seem that if such a tie plate could be produced it would be an ideal method of preventing rail creeping on account of the many points at which the rail is held and the corresponding smaller stress at each point."

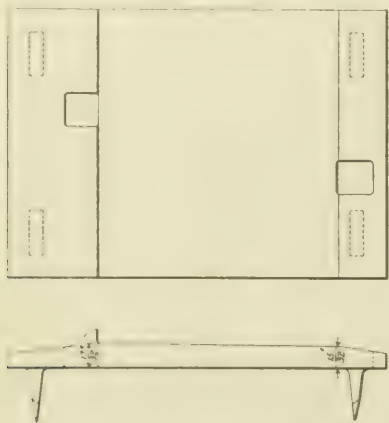
C. A. Paquette, assistant chief engineer Big Four, says: "We have used no malleable iron tie plates, but believe that we must come to the use of a malleable tie plate or add very materially to the thickness of the tie plate now in use, so as to overcome

corrosion. This is particularly true in view of the fact that we anticipate a life of something like 18 years from our creosoted ties." He believes the tie plate cannot have much virtue as an anti-creeper.

W. D. Williams, chief engineer Cincinnati Northern, favors a tie plate giving a cant of about 1 in 20, but as yet has used none but plates of uniform thickness.

W. L. Breckenridge, engineer maintenance of way Burlington, sent in a drawing for the standard tie plate on the Burlington showing a cant or inclination of $\frac{1}{8}$ -in. in base of rail. He reports using the Security combined tie plate and rail anchor.

Edward Laas, engineer maintenance of way Chicago, Milwaukee & St. Paul, reports satisfaction with malleable iron tie plates when made large enough and thick enough. He believes a slight taper would not be objectionable and would probably be beneficial. The plates he uses on curves project out much further on the outside of the rail than those used on tangents; the purpose for elongating the plates used on curves being to prevent the rail from canting outward. He is getting good results from this particular type of plate. The plate is slightly tapered. As to anti-creepers, he says: "In my opinion the tie plate should be considered as an integral part of the tie, and when once seated in the tie should not be subject to any displacement or movement by the rail. The wave action of the rail, if the plate is fastened



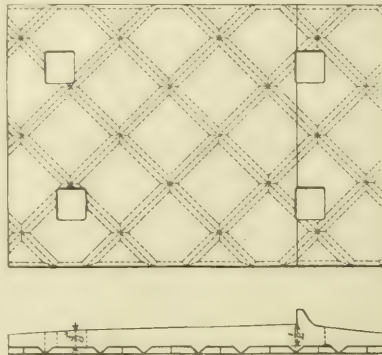
Goldie Tie Plate, 6 in. x $8\frac{1}{2}$ in.; Great Northern.

to it, will work the plate up and down and back and forth on the tie and soon pulverize or grind the wood, so that it will be loose on the tie. This condition in my opinion would be objectionable. The rail expands and contracts daily, especially during the autumn months, when the days are warm and the nights cool. It is not an uncommon thing to find anti-creepers that were tight against the tie in the evening a quarter of an inch or more back in the morning, showing that the rail has contracted and worked backward during the cool period of the night. The heat of the day will move these creepers forward again up against the ties. This movement of the rail, which has been little considered by trackmen, would be very detrimental to tie plates used as anti-creepers. It might be possible that every plate being in the shape of an anti-creeper would hold the rail so firmly that no movement could take place, but this would make a strain on the tie plate that would be transmitted to the tie and would not benefit it."

C. W. Huntington, general superintendent Central of New Jersey, says: "While it is doubtless true that a new wheel will get a better bearing on a rail, which is canted to suit than one which is laid horizontally, the ordinary wheel soon comes to a good bearing on a rail laid in the ordinary way. There is a distinct advantage in laying the rails flat, as this must be done in passing through switches and crossings in order to work out satisfactory details. We are inclined to the opinion that the tie plates diminish somewhat the wave motion of the rail, and consequently the

creeping. Without tie plates the rail cuts into the tie and has more freedom to move vertically and in the direction of traffic."

F. F. Busted, general superintendent Canadian Pacific, says: "The only malleable iron tie plates that I know of were placed in the track around MacMillan on the first district east of Winnipeg. This was a special kind of a plate with lugs gripping the rail, the

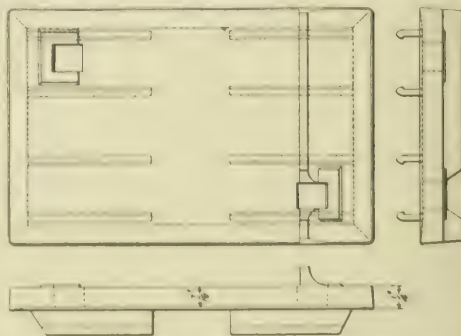


Sellers Tie Plate, 6 in. x $8\frac{1}{2}$ in.; Canadian Pacific.

plate thus acting as a rail brace. I inspected this piece of track about two years ago and found that the plates were in good condition. The difficulty with them was that when a derailment occurred the derailed wheels would strike the plate acting as rail brace and force it so tight up to the rail that it was next to impossible to get the plate off."

J. G. Sullivan, assistant chief engineer Canadian Pacific, says: "We have recently decided to change the standard on account of the difficulty in shimming under the ribbed plate, and also on account of the danger of the deep ribs cutting through the protected timber where we may use creosote. In lieu of a new standard we are at present accepting Sellers tie plates." J. E. Schwitzer, assistant chief engineer Canadian Pacific, Western Lines, says: "I have had no experience in connection with canting rails so as to have complete contact with the wheels on account of the coning, and I am of the opinion that this is not called for unless all railways were to adopt it simultaneously and arrange for changing the wheels. I think that if the wheels were checked up the coning would be found to vary a great deal in the different wheels after they have been in service for a short time; besides being badly worn."

G. D. Brooke, division engineer maintenance of way Baltimore



Fish Hook Plate, $5\frac{1}{4}$ in. x $8\frac{1}{8}$ in.; Kansas City Southern.

& Ohio, says: "Our plates are set on the ties. Countersinking reduces the effective depth of the tie at the rail bearing and forms a receptacle for moisture. In regaging track on curves and in adzing when laying new rail, the best trackmen adze the ties so as to give the rail a slight inward cant."

E. Stimson, chief engineer maintenance of way Baltimore, Ohio, says: "The tie plates are placed to proper gage and given

A portion of it, and not left to be driven loose by the weight of the train passing over them."

C. A. Merriam, chief engineer, Atchison, Topeka & Santa Fe, expressed his opinion only after a careful study of the plates. He says that two or three years ago the Atchison, Topeka & Santa Fe used a tie plate with a bevel on the cant, but in the present plate this cant is omitted. Personally he is in favor of the cant in the tie plate. As to the combined tie plate and anti-creeper he says: "I think it is possible to make a tie plate effective as an anti-creeper. The ordinary tie plate with the cut spike, however, has exactly the opposite effect, there being less friction between the rail and the tie plate than between the rail and the surface of the tie." R. J. Ayer, assistant general manager, Atchison, Topeka & Santa Fe Coast Lines, says: "From experience which we have had with the standard tie plates now in use, I strongly favor the bevel on the plate, as before this style plate was used the cant was adzed in the tie to keep the rail from turning outward." J. E. McNeil, inspector track and roadway Atchison, Topeka & Santa Fe, says: "Personally I like a beveled plate, but owing to the use of Continuous and Weber joints on our line, without tie plates at the joints, our management decided that it would not be best to use beveled intermediate plates when not having the joints beveled to conform to the balance of the rail. For that reason the use of beveled plates has been discontinued on our line."

The extracts given above fairly represent the sum of the opinions expressed. Other engineers, not quoted, favor the beveled rail as helping to prevent overturning. Several engineers, in speaking of tie plates as anti-creeper, suggested a shoulder on each side of the plate, fitting closely to the base of the rail so as to bind it as soon as the tie slewed perceptibly. Others said that the diminished friction between rail and plate, as compared with rail and wood, allowed more rail creeping.

THE INTRODUCTION OF ALL-STEEL CARS.

BY W. H. RABBITTE.

The all-steel express trains recently placed in operation on the Pennsylvania Railroad are encouraging to the public in that the time is hastened when all-steel cars for both Pullmans and day coaches will be a reality, but are somewhat discomfoting for those who ride in the wooden cars of local trains run on the same tracks as the all-steel express trains, and for those in the wooden cars of trains made up partly of wooden cars and partly of all-steel cars. There is less assurance of safety to them than in the case of express trains composed either entirely or in part of wooden Pullmans.

That there is reason for discomfort is proved by the fact that collisions between trains composed of both steel cars and wooden cars result in the almost complete destruction of the wooden cars, with but little, if any, damage to the steel cars. In fact, the excellent showing of steel cars in collision is made possible by the wooden cars forming a part of the trains; the wooden cars being weaker than those of steel act as cushions, and by becoming crushed, modify the force that otherwise would be exerted on steel cars.

Although the same conditions exist in a more modified form in a train composed of wooden day coaches and the stronger wooden Pullman cars, and also between a train made up entirely of wooden Pullmans and a train made up entirely of wooden day coaches, the strengthening of the Pullmans by all-steel construction, without proportionally strengthening the day coaches, still further protects the passengers in the Pullmans at the expense of those in the day coaches.

When both local and express trains become entirely composed of steel cars a collision will not mean the same immunity from death or injury that the occupants of steel cars have hitherto enjoyed, for it is probable that these cars, if of approximately the same strength, will in certain collisions be crushed or telescoped—at any rate they would certainly not carry off the honors which are now literally thrust upon them.

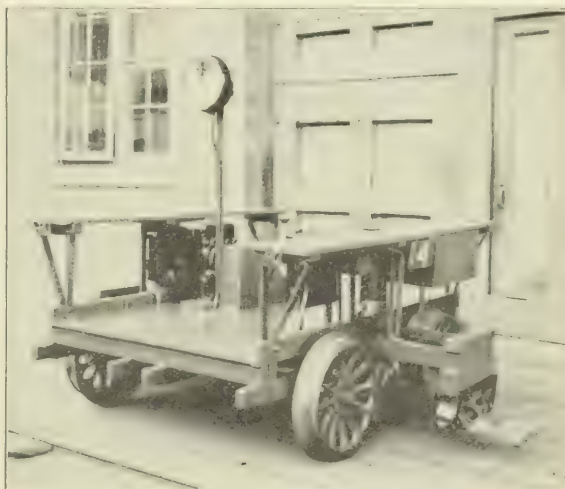
It is not the intention of this article to discourage the ex-

clusive use of steel cars on passenger trains, but rather to urge that the period of transition from wooden to steel cars be made without accident. The greatest good to be accomplished fits the largest number of people, and in no direction could all-steel car construction be better applied than on steam railways, where, on passenger lines, Pullman passengers are made safe from collisions on account of the greater risk incurred by the occupants of day coaches. The all-steel cars also reduce the fire risk to a minimum, which so often adds to the horrors of a collision.

The decrease in our timber supply and the continued demand upon our forests make desirable, wherever practicable, the substitution of steel for wood. The great quantities of timber employed in the building of cars is already a heavy drain on our forests, and it would be well if other railways followed the example of the Pennsylvania in adopting all-steel car construction, and used it not only for the Pullman cars but for the day coaches as well.

ELECTRIC MOTOR INSPECTION CAR.

The electric motor inspection, or emergency, car shown herewith was designed for use in case of trouble on the line of the electric zone of the Long Island Railroad, especially in connection with high tension lines which supply current to the third rail, when it is imperative that linemen reach the scene of the trouble without delay. A crew of from six to eight men, with all the necessary tools, etc., may be carried on this car at a rate of 30 miles an hour. The car has two third rail shoes, one on each side, so that it may be operated on any track and



Long Island Electric Motor Inspection Car.

in either direction. When out on the line this inspection car runs the same as a regular train, ringing all crossing bells and operating all crossing gates.

The car is propelled by a small pump motor—the design used on the regular car equipment—which drives one pair of wheels through a Morse silent chain, connecting the motor shaft to a sprocket keyed to the axle.

The braking system consists of four inside hung shoes and a system of levers by which they are operated through a foot lever. An air whistle is provided, the air being supplied when required by a hand pump, the handle of which is seen above the seat board near the controller.

Four markers, one at each corner, and the main headlight shown in the photograph are used, all being equipped with incandescent lamps.

The car has been patented by the Long Island company, this being for self-protection only.

General News Section.

The working hours in the locomotive shops of the Philadelphia & Reading at Reading, Pa., have been reduced from 40 hours a week to 32 hours, and in the car shops from 50 to 45.

The pension fund of the United States Steel Corporation, furnished partly by the corporation and partly by Andrew Carnegie, will go into effect January 1, next. The fund at the start will amount to \$12,000,000. The minimum monthly pension will be \$12, and the maximum \$100.

Mrs. Jennie Edgar, a stockholder of the Illinois Central, has filed suit in court at Chicago against the directors of the road on account of the car repair frauds, declaring that the directors have neglected to perform their duties. Mrs. Edgar alleges that the total sum lost by the company in consequence of these frauds was \$6,500,000.

The state of Kentucky has begun a suit in court to recover from the Illinois Central \$511,719, alleged past due taxes. It is charged that during the past five years the reports made by the road to the state, on which were based the valuation of the franchises, were incorrect and fraudulent. A similar suit for \$640,000 has been begun against the Louisville & Nashville.

The governor of Indiana has issued a call for a conference, on December 13, when he will hear the objections of the interurban railways, if any there be, to the recommendations which he proposes to submit to the legislature in January, relative to the operation of interurban roads; that is to say, to the prevention of collisions. The governor proposes to make this conference open to the public, a decision to which the railway officers, it is said, have strongly objected.

As heretofore noted, some sleeping cars from the Southern states, not all-steel, will be run, temporarily, through the New York tunnels of the Pennsylvania Railroad. For the management of these cars the road has issued an order to the effect that they will be accepted provided they do not carry gas, gasoline or oil as illuminants. Fires in coal or charcoal ranges must be extinguished before entering the tunnels under the Hudson river. All except private cars must have vestibule and trap doors, so arranged that the vestibule side door may be opened over the top of the trap doors.

The Interstate Commerce Commission, which, under the law of March 4, 1909, has authority to prescribe regulations for the interstate transportation of explosives, and which has issued such regulations in accordance with the recommendation of the American Railway Association, proposes to take up the question of transportation of inflammable articles and acids, and a hearing has been appointed for January 13 in Washington. The announcement of the hearing refers to the regulations of the American Railway Association concerning inflammable articles and acids, and sets forth that complaints have been received charging that these regulations are unreasonable; and the action of the commission seems to be based on the view that the question of safety in this connection is of such general importance that the commission ought to institute an investigation. As the action of the government has been beneficial in the matter of explosives, there would seem to be no reason why good results should not follow from corresponding action in the present case.

The Federal Grand Jury at Savannah, Ga., has returned indictments against the Merchants & Miners' Transportation Company, the Seaboard Air Line Railway, the Atlantic Coast Line, Harvey C. Miller and Morris F. Miller. The offences charged are the carriage of grain from Philadelphia to Jacksonville at 10 cents per 100 lb., when the rate filed was 15 cents. The transportation companies are indicted for giving this concession, and the members of the firm of L. F. Miller & Sons, for receiving it. Harvey C. Miller offered himself to the United States Attorney at Savannah as a witness, but the offer was declined. Mr. Miller was arrested some days ago pending action by the grand jury, and placed under ten thousand dollars bond. On the present indictment the court fixed the bond at \$10,000. The facts in this matter were brought out by Attorney John H. McBride of the Interstate Commerce Commission at a hearing held in Philadelphia last July before Commissioner Clements. The shipments referred to were made about two years ago. They were sent from Philadelphia to Savannah by truck and thence by railway.

Poetry and Truth.

It is not an uncommon thing for railways to receive letters from patrons criticising shortcomings in their service, but rather unusual to receive letters commending their service. The Chicago & North Western was gratified recently to receive the following letter from a prominent citizen of Chicago:

"We are having a most restful and enjoyable time in the beautiful train. As I have sat out most of the transit of Iowa on the observation platform, I have been deeply impressed with what your road is doing for this state. The evident untellable economic value of the road to the commonwealth I do not here dwell upon. I am thinking rather of the tremendous value of its educational influence, esthetically and ethically. The logic of its long, straight, shining lines; the poetry of its perfect curves; the prudence of its block system signals; the trimness of the right of way; the neat effectiveness of its ballasting; its handsome stations and their surroundings; its unwinking eyes of light all night; the courtesy and skill and 'well-dressedness' of the officials and employees, etc., must be exercising an enormous educational influence upon all who come into business or observational contact with them, making these farming and village folk, though they may never realize the fact, every way better people in all relations of life. It is a big educational affair."

Union Pacific Educational Bureau.

An article describing the Educational Bureau of Information of the Union Pacific was published in the *Railway Age Gazette* of June 10, last. The Bureau since then has enjoyed a substantial growth. The total enrolment on December 5, exclusive of the Japanese, who are mainly track laborers, had been 1,703, of which number 327 had left the service of the company. Of the 1,376 still in service, 285 are delinquent, that is, have not shown sufficient interest in the work to warrant the Bureau continuing to carry them. This is but 20.7 per cent. of the total number enrolled and in service, leaving 1,091 student employees in good standing, a percentage of 79.3, which seems very creditable. About 130 Japanese track laborers also are enrolled and in the service. The Bureau is correcting an average of about 600 lessons a month, and is sending out about 12 student helpers a month from the station training school. Of the total number of students sent out from the training school since its establishment, 18 per cent. have been promoted, and about 10 per cent. more are ready for promotion and awaiting positions. Only 5 per cent. of those who have received instruction in the training school have left the service.

The Bureau on December 1, issued a circular announcing the courses of instruction offered by it to employees of the road. The courses now given include: block signaling, interlocking, electrical, electric light and power, telegraph and telephone, station work, railway accounting, railway mechanical engineering, gas engine, McKee motor car running, locomotive, air brake, mechanical drawing, machine designing, sheet metal, pattern drafting, boiler-shop practice, tool tracing, pipe fitting, plumbing, track. The following courses are in preparation: railway operation, freight and passenger traffic, analysis of statistics, car building and car repairing, refrigeration, railway civil engineering, surveying and mapping, plain and reinforced concrete.

Legislation on Industrial Education.

The National Society for the Promotion of Industrial Education, with headquarters in New York, has recently issued Bulletin No. 12, entitled *Legislation upon Industrial Education in the United States*. The book is divided into five parts, the first of which is a reprint, with a few slight changes, of the first section of a pamphlet issued in 1909 by the American Association for Labor Legislation, prepared by Dr. Edward C. Elliott, of the University of Wisconsin. This part of the book gives a general summary of the legislation relative to industrial education in our public elementary and secondary schools. The remainder of the book was prepared especially for the National Society by C. A. Prosser, deputy commissioner of education for the state of Massachusetts. After proposing a more definite nomenclature for the subject, Mr. Prosser has traced the trend of legislation, giving an analysis of the legis-

lation in Massachusetts, New York, Connecticut, Wisconsin and New Jersey. Mr. Prouty has brought to this work the advantage of a local training, many years of practical school experience and an extensive professional knowledge of the field of industrial education, and his work has been done with a high degree of thoroughness, efficiency and insight.

Railway Exhibits at the Chicago Land Show.

Western railways furnished some of the most elaborate and instructive exhibits at the United States Land & Irrigation Exposition, held at the Coliseum, Chicago, November 19-December 4.

The Atchafalaya, Tulelake & Santa Fe brought 14 Navajo and Hopi Indians, who entertained the visitors by weaving Navajo blankets, making pottery and baskets, and singing and dancing. Their booth was a replica of an adobe mission building in New Mexico, a type of architecture familiar to Santa Fe travelers. The Harriman Lines exhibit filled the entire Coliseum annex, and in addition to a booth for the products of each of the important states reached by the lines of the system, a lecture room seating 500 people was maintained, in which lectures illustrated by moving pictures were given every day of the exposition.

The Rock Island lines showed a model and gave illustrations of scientific methods of crop rotation. The Minnesota State College of Agriculture was in charge of a portion of this company's exhibits, and agricultural college professors from 13 states lectured in the big lecture room in the balcony.

Other roads that furnished lecturers were the Frisco lines, and the Great Northern.

The Missouri-Pacific-Iron Mountain System had a large exhibit of the products of Texas and the adjoining states, and the St. Louis Southwestern featured 23 forage crops from Texas and Arkansas.

Other railway exhibitors included the Kansas City, Mexico & Orient, the Missouri, Kansas & Texas, the Denver & Rio Grande, the Kansas City Southern, the San Pedro, Los Angeles & Salt Lake, the Jonesboro, Lake City & Eastern and the Prescott & Northwestern.

• The Grangers.

With railway men of 30 years ago this term was one of the most familiar. If anyone thinks that the grangers are all dead, let him glance at the following summary of resolutions adopted by the National Grange convention at Atlantic City, N. J., last week. " * * * Giving the Interstate Commerce Commission power to nullify freight and passenger rates proved to be too high; radical changes in the Payne-Aldrich tariff bill; physical valuation of railway trunk lines; federal aid for road improvement; the parcels post; conservation of natural resources; a national income tax; direct election of United States Senators; the speedy construction of a ship canal connecting the Mississippi river with the Great Lakes and the Atlantic ocean; canal lines and the dredging of all great arteries of commerce to cheapen marketing of produce, and federal aid to promote the sale of farm products in foreign lands."

Discipline in Brooklyn.

The Brooklyn Rapid Transit Company's recent announcement of an advance in wages has already been noticed. The officers of the company disclaim any credit for either generosity or charity in this connection. They say that no other traction company maintains so complete and effective management of its men. Their scheme has produced such good results that it is now being adopted by street railway companies in other cities. It is based on the idea that better service is obtained by rewarding efficiency than by punishing for delinquency.

A complete record of every employee is kept on file. More than 8,000 large cards, indexed according to the employee's badge number, are so arranged that it is only an instant's work to look up any man's record. There is a debit and credit column on each card. On one side there are charged demerits for any violation of rules, while on the other are given credits for continuity of service.

The demerits are automatic. Under the old system there were nine superintendents in charge of motormen and conductors, and these men punished infractions of discipline. The weakness of

this plan lay in the different nature of the superintendents, so that it depended on the supervisor with whom an employee came into contact whether his offense brought punishment or not. Now every violation of rules carries with it a certain number of demerits. There is a great surplus of such credits possible, and it is rare that either motorman or conductor go long without incurring demerits. On the other hand, enough credits are awarded at the conclusion of six months' service to extinguish a normal debit of demerits and make it possible for a reasonably careful and efficient employee to benefit by an advance in wages.

When a man gets forty demerits he is called into headquarters and given some friendly advice. When he gets eighty he is called in for a hearing, and if unable to disprove charges is dismissed from the service. Most dismissals result from the use of intoxicants.

The company keeps 200 inspectors out on the line to check up the behavior of employees. In addition to these, it has plainclothes men, who ride about to detect men guilty of stealing fares, trading in transfers or abusing passengers. This espionage is not popular, but it seems to be the only way in which the company can protect its cash.

As a result of the reward system more than 70 per cent. of the employees to-day are "old men" in the sense that they have been with the company more than one year. One motorman has been continuously employed since 1873 and many others have long terms to their credit. They will receive pensions when they retire.

Another effect of the system is the strike insurance which it furnishes. There is no union among the employees and organizers have been unable to interest the men in one. They say they have no grievance and get more individually than they would get in a body.—*Wall Street Journal*.

Efficiency of Labor.

Railway men are generally agreed that the efficiency of labor has decreased ever since the higher wage scales went into effect. "We have found by bitter experience," says an official, "that the higher the wages the lower the efficiency. As soon as a man's pay is raised he seems to consider himself more independently fixed and consequently able to let down a bit on either the quality or quantity of this work."

Another operating man says that labor is about 75 per cent. as efficient now as it was during the hard times of 1907 and 1908. "We notice this in the greater average length of time required in track work and in repairing, comparing the time consumed on a job now with the time required for similar work during times when the men were not so sure of steady employment and worked a little harder to keep themselves on the payroll."—*Wall Street Journal*.

The Storm at Key West.

W. J. Krome, chief constructing engineer of the Florida East Coast, says in regard to the effects of the severe storm in November on the Key West extension:

"The extension work north of Knight's Key was not severely damaged and the equipment was practically uninjured. Several of the temporary trestles were partly destroyed by floating debris, and the necessity of repairing these prevented the operation of regular trains for about a week. At Boca Chica one pump barge was destroyed and the steamer Virginia drifted into the bridge and was a total wreck. The concrete arch work suffered no damage. From Key West to Boca Chica the loss was very heavy. The extreme height of the water and the fact that the wind came from what was considered the least exposed side of the road-bed; caused the washing out of a long section of track and embankment. The loss at the Key West end of the line was much heavier than in 1909, and was the greatest damage that has been incurred. With full protection, such as would have been completed within a few months, it is probable that trains could have been operated from the terminal to Trumbo Island without delay. No lives were lost at any point along the extension work."

Careless Letters.

Many people send letters addressed merely to the "—Railroad Company," which causes delay in referring the matter to the particular department. An official receiving a letter not con-

cerning his department should promptly send it to the department it concerns, without further comment. A letter of transmittal is not necessary. Here are a few samples of letters addressed to a railway company at a branch office street number:

1.—Would like to sell you stone for your new abutment at....
2.—As you are double-tracking here, I suggest changing the culvert for my land to new location for our mutual benefit. 3.—We think of moving our hardware factory from New England.
4.—Please quote your freight rates to Nome, Alaska. 5.—Would like your company to try our new grated ginger. 6.—Are the coupon bonds quoted below exchangeable for registered. 7.—What is the fare to Salinas, Mexico. 8.—Your company and my father jointly got a decision in their favor in regard to the water rights on the property. Can you furnish me with a copy or reference to the case?—*Erie Railroad Employees' Magazine.*

Numbers on Switch Targets.

The switch target which appears in the accompanying illustration is one in the yard of the Atchison, Topeka & Santa Fe, at Wellington, Kan., and is shown for the purpose of illustrating the practice of the Atchison, in cases like this, in putting the numbers on targets. The switch admitting to each ladder track bears the number of that track. The figures, about 4 in. high, are painted in white on the red background of the target. The disks of these targets are about 10 in. in diameter.



Numbers on Switch Targets.

In the view here shown the back side of the target faces the observer. On the front side the figure is placed in the center. The convenience of showing numbers on switches in this way was first made apparent by experimental numbering with chalk, but chalk numbers easily became erased and so the systematic numbering was substituted.

"Labor Unions, P. I. Bureaus, Etc."

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have just called my another year's subscription. We add our railway news monthly and have ever since been trying to get rid of it. After I got used to getting rid of it, I don't want to see a railway or any railway literature, so you may discontinue my subscription. Labor unions, legislatures, railway commissions, courts, personal injury bureaus, etc., have made my life miserable in the last few years and I want to get out of hearing of a railway entirely, and as far as possible.

I was an assistant engineer on the New York road in 1868, and was engaged on construction of the line between K. and C.

At that time I made my first subscription to the *Railroad Gazette*, then published in Chicago; and I have been a subscriber almost continuously ever since. I regret to discontinue; but, for the reasons given above, and as railway methods have changed so greatly, I am going to try to dissociate myself and take a rest. * * *

Protected Against Himself.

In the chorus of good advice of which the railways at present are the beneficiaries, there is something obviously sincere in the following communication to a contemporary by a "Stockholder." It is at least luminous as regards the attitude of this class towards the people who control their properties:

"I happen to be a stockholder in several railways, and it is absolutely unnecessary to mail their very voluminous and expensive annual reports to every stockholder. They are never read, and go into the waste paper basket. They need only to advertise that reports will be sent when asked for."

Some of the railways annual reports cost net about 50 cents, and the postage is a few cents more. Such reports will be correctly summarized and thoroughly analyzed in the columns of such a newspaper as this. This stockholder, therefore, who seems hardly intelligent enough to read the *Wall Street Journal*, is willing to sacrifice the most valuable protection the law has ever devised for his benefit, for a saving which might amount to a dollar or two for each stockholder over a long period of years if his own officials, protected by secrecy, should not make ducks and drakes of his property in the meantime.

This kind of stockholder, moreover, is in the majority, in numbers, at least. It need hardly be said that the majority control of the railway protects itself effectually by knowing all about the property. The kind of stockholder we quote, however, has some vague idea that statutes can be passed to keep directors honest, and that failing this manifest impossibility, the newspapers have nothing else to do but to protect him where he ought to look out for himself. He does not know what his rights are, even as a minority stockholder. He is the despair of popular and democratic government. He throws his annual report in the waste paper basket, and we may be very sure that he never really reads it in any other form.

Over and above his recognized inalienable rights, the minority stockholder has constitutional rights and indestructible equities which the strongest majority combination in the country dare not defy. No one can protect these equities but himself. The newspapers at best can only secure him that publicity which he is too stupid to appreciate. Legislation can give him the means to redress his wrongs. The rest lies with himself.

It is incumbent upon every stockholder in every corporation in the United States (and elsewhere, for that matter) to read and understand the reports of his company, to have a fair working knowledge of his legal rights, to attend the meetings, and above all to subject the officers in charge of his interests to constant questioning, backed by the power of the law, if necessary. No majority control can stand up against a large number of intelligent stockholders all asking pertinent questions.—Editorial in the *Wall Street Journal*.

New York Subway Proposals.

W. G. McAdoo, president of the Hudson & Manhattan, on Saturday last, notified the New York State Public Service Commission, first district, that the proposal recently made by this company to operate the new subways which are to be built by New York City, will be withdrawn unless the commission takes reasonably prompt action. He suggests that the principal questions concerning this matter which are to be decided by the commission ought to be settled by December 15.

On the Monday following, the Interborough Rapid Transit Company presented a proposition more extensive than that of the Hudson & Manhattan. The Interborough lays out a plan which will cost 128 millions, and offers to itself furnish 75 millions of this money, leaving 53 millions to be furnished by the city. The Interborough would also expect to improve its elevated lines, provide equipment and make other expenditures to the extent of 39 millions, making 114 millions in all. The proposition is to build from the present Interborough line at Forty-second street and Seventh avenue southward through Seventh avenue (past the Pennsylvania station) to the southern end of the city, with

a branch from Liberty street across the East river, to build from the present station on Broadway and street and Park Avenue northward through Manhattan Avenue to the Harlem river, and thence to extend from the northward to Pelham Bay park and northward through Jerome Avenue to Woodlawn, where extension in Brooklyn through Flatbush Avenue and Eastern Parkway, extension of the Fulton Avenue subway in Brooklyn to Fort Hamilton and to be extended west to Canal Street, and the construction of the Fulton Avenue subway in Brooklyn to Broadway. The proposed lines will amount to a length of over 45 miles, while it is greater by 10 miles than the total length of the present subway lines. As in the other propositions made by the Interborough recently, the third-tracking of the elevated lines in Manhattan is a part of the plan, and the cost of this work is included in the 39 millions mentioned above. The Interborough controls the Steinway tunnel under the East river, and proposes to include that line in the system. The sum of \$1,500,000 will be needed to put this tunnel in condition for operation, and that would have to be provided by the city. The Interborough proposes to modify the leases under which it is now operating the existing lines so that the city shall become owner of the entire system, at one time. The fare throughout the system is to be five cents; and to provide against a possible inability to pay interest from traffic receipts, elaborate stipulations are made concerning the apportionment of the burden between the operating company and the city.

The Latest Refinement.

It is not now popular nor deemed desirable to use the word 'wreck' in speaking of a railway accident. It is proposed to refer to a wreck as a derailment, if conditions will permit, and if very serious to designate it as an accident, studiously avoiding the shorter and uglier word. This idea is already being carried out to such an extent that one hears in place of the old familiar 'wrecker' only such colorless and innocent terms as 'derrick' or 'tool car.' It is the 'crane crew' that is sent out on the road to pick up damaged cars and clear the track.—*New York Commercial*.

And to think of the barbarous times, in days gone by, when we heedlessly spoke of "wild" trains—trains liable at any moment to become so unruly as to cause wrecks from innate devilry! And how fortunate that today we know enough to say "stop signal," no longer scaring away passengers with frequent references to "DANGER" indications. English is not a dead language.

German Praise for McPherson's "Transportation in Europe."

The readers of the *Railway Age Gazette* who have followed the series of articles in this paper by Logan G. McPherson on transportation in European countries will be interested to know of the very high praise that has been given to his recent book entitled, "Transportation in Europe," by Dr. von der Leyen, chief councillor of the German railways, who contributed a review of the book to a recent number of the *Archiv für Eisenbahnwesen*. Dr. von der Leyen says in part:

"It is truly astonishing that this American, who until this visit had been quite unacquainted with European conditions of traffic and who, for example, had only a partial knowledge of the German language, succeeded within the short space of a few months, in gathering such rich material and in working it over with such skill. Moreover, he has aimed at a thoroughly objective presentation and his judgment is only seldom influenced by his own views, preconceptions which he held particularly concerning railways of his own country. In so far as the railway conditions in the United States are different from those of Europe, Mr. McPherson by no means always gives the advantage to those of America. Quite the contrary. He frequently acknowledges that many of our ways are better, and where his comparisons happen to favor the United States, he takes pains to explain the differences by pointing out the unfavorable actual conditions here and makes these clear to his readers. In this respect his work differs, much to his own advantage, from that of many other American writers, who admire America blindly and shrug their shoulders in pity over antiquated Europe. As Mr. McPherson fully understands the policy of state railways in Europe, he expresses himself throughout in regard to it with appreciation; for instance, explaining how the relation of railways to waterways developed in Germany.

Nevertheless, he considers the system of government railways as undesirable in America and would also disapprove if at any time the government of the United States should decide to expend indefinite amounts of public funds for the improvement of existing waterways and the construction of new ones. He considers it scarcely possible, and not at all necessary, that the policy of inferior waterways be altered in the course of several decades, should undergo any essential change.

"A large part of the contents of the book is not new to German railway men. Nevertheless, there is much of interest in reading this short and clear representation from the pen of a well-informed foreigner. The book is chiefly intended, however, for the author's countrymen, and it should be warmly welcomed if it will aid in giving Americans a right understanding of European traffic conditions and in dispelling the various prejudices which are still prevalent among them."

Nine Derails.

In the roundhouse of the Idaho & Washington Northern at Spirit Lake, Idaho, each of the nine tracks leading from the house to the turntable has in it a derail, fixed about 20 ft. from the table. Each derail is interlocked with the turntable lock, so that a movement cannot be made over it except when the table is in proper position for that track.

Texas General Managers.

At the annual meeting held December 1, at Fort Worth, Tex., J. H. Hill, manager of the Galveston, Houston & Henderson, was elected president of the General Managers' Association of Texas, succeeding Charles Hamilton, vice-president and general manager of the Texas Central.

American Society of Civil Engineers.

At a meeting held December 7, 1910, two papers were presented for discussion, as follows: "Bond-Friction-Resistance in Reinforced Concrete," by William Fry Scott, and "Hydrography as an Aid to the Successful Operation of an Irrigation System," by J. C. Stevens. Mr. Scott's paper was printed in *Proceedings* for October, 1910, and Mr. Stevens' paper in the November *Proceedings*.

New York Railroad Club.

The fourth annual Christmas entertainment and social reunion of this club will be held at the building of the United Engineering Societies, 29 West Thirty-ninth street, New York, on Friday evening, December 16, after a brief business session. The programme will include a vaudeville entertainment and supper.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; next meeting, June 22, 1911; Niagara Falls, N. Y.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn., 1911.
- AMERICAN ASSOCIATION OF LOCAL FREIGHT AGENTS' ASSOCIATION.—G. W. Dennison, Pennsylvania Co., Toledo, Ohio.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew building, Cincinnati, Ohio.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Sept. 17-19, 1911; St. Louis, Mo.
- AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION.—E. H. Fritch, Monadnock building, Chicago; March 21-23, 1911, Chicago.
- AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; May 6, 1911; Detroit, Mich.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; June 14-16, 1911, Atlantic City, N. J.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.
- AMERICAN ROADBUILDERS' ASSOCIATION.—Dec. 6-9; Indianapolis, Ind.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wednesdays, except July and August; annual, Jan. 18-19, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Haner, 13 Park Row, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., New York.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; April 26, 1911; New Orleans, La.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; May, 1911; Montreal, Can.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Colegrove, I. C. R.R., Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston, Mass.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 24 Park Place, New York; Dec. 13-14, 1910, Chicago; June 20-21, 1911, Cape May City, N. J.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tuesday in month, except June, July and Aug.; Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays; Montreal, annual, last week January.

CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul; 2d Monday, except June, July and Aug.; St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday; annual, Jan. 17, 1911; Pittsburgh.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot R.R., Richmond, Va.; 20th annual, June 21, 1911; St. Paul, Minn.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—H. D. Judson, 209 East Adams St., Chicago; Wednesday preceding 3d Thursday; Chicago.

INDIANAPOLIS RAILWAY AND MECHANICAL CLUB.—B. S. Downey, C. & H. & D., Indianapolis, Ind.

INTERNATIONAL MASTERS' BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; next convention, Omaha, Neb.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; May 15-18, 1911; Chattanooga, Tenn.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.

INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels, 1915, Berlin.

IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; June 19-21, 1911, Atlantic City, N. J.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept.; Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.

NORTH-WEST RAILWAY CLUB.—T. W. Flannagan, Soo Line, Minn.; 1st Tues. after 2d Mon., except June, July, August; alternately at St. Paul and Minneapolis, Minn.

NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. & M. & St. P.; 4th Saturday; Duluth, Minn.

OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Bldg.; second Wed.

RAILWAY CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City; 3d Friday in month; Kansas City.

RAILWAY CLUB OF PITTSBURGH.—C. W. Alleman, P. & L. E., Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio; annual, May, 1911.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & U. Ry., Peoria, Ill.; Oct., 1911; St. Louis.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & CENTRAL RAILWAY CLUB.—A. J. Merrill, Prudential bldg., Atlanta, Ga.; 3d Thurs.; Jan., April, August and Nov.; Atlanta.

TOLEDO TRANSPORTATION CLUB.—L. G. Macomber, Woolson Spice Co., Toledo; 1st Sat.; annual, May 6, 1911; Toledo.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; 1st Sat. after 1st Wed.; annual, Dec. 13, 1910; Buffalo, N. Y.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.

TRAIN CLUB OF PITTSBURGH.—T. J. Walters, Oliver building, Pittsburgh, Pa.; monthly meeting, Pittsburgh.

TRAIN DISPATCHERS' ASSOCIATION OF AMERICA.—J. E. Mackie, 7042 Stewart Ave., Chicago; annual, June 30, 1911; Baltimore, Md.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevert, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August; Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WOOD PRESERVERS' ASSOCIATION.—F. L. Ayer, First National Bank bldg., Chicago; annual, Jan. 17-19, 1911; Chicago.

Traffic News.

In the federal court at Louisville, Ky., December 3, the Louisville, Henderson & St. Louis was fined \$3,000 for having given rebates to the American Tobacco Company and others. L. J. Irwin, president of the road, was exonerated. The prosecution of the American Tobacco Company for receiving rebates was continued to the next term of the court.

The railways of Indiana, making their computations on the same basis as that adopted in Illinois after an investigation and order by the State Railroad Commission, have made increases of seven cents a ton in the rates for the transportation of coal on the principal lines of the state, excepting, however, the rates to Indianapolis and other points near that city.

In the month of October, 12 steamers sailed from New York direct for Argentina, carrying full cargoes of manufactured goods. In November the steamer "Texan" sailed from New York for Montevideo flying the American flag, the first steamer to do this within the memory of "the oldest inhabitant." The "Texan" is a vessel of 15,000 tons and made the trip from New York to Montevideo in 20 days.

The Chicago, Peoria & St. Louis has filed with the Interstate Commerce Commission a tariff providing for the payment by it of switching rates to the Manufacturers' Railway of St. Louis on traffic originating at or destined to industries located on the Manufacturers' Railway's tracks. The Chicago, Peoria & St. Louis is one of the roads which withdrew these switching allowances a few months ago.

Officers of the Illinois lines are considering the question of bringing suit to test the constitutionality of the Illinois 2-cent fare law. Statistics are being compiled and after what they show has been ascertained it will be decided whether litigation will be resorted to. The Western roads have succeeded in getting favorable decisions in the United States Circuit Courts in every case which they have brought to test the constitutionality of the 2-cent fare laws, including the cases in Arkansas, Missouri, Minnesota, South Dakota and Oklahoma.

The Way-Bill, the official paper of the Traffic Club of Chicago, states that the club on November 30 had a membership of 743, and gives the following interesting list of the business connections of the members:

	Resident.	Non-resident.
Railways	222	96
Steamship companies	18	6
Fast freight lines	38	7
Express companies	10	1
Industrials	244	56
Railroad associations	16	6
Industrial associations	5	8
Commissions	1	3
Publications	3	1
Honorary	1	
Total	558	185

Army and Navy List, 31.

Chicago Transportation Association.

The annual meeting of the Chicago Transportation Association was held at the Wellington Hotel, Chicago, on December 5, and the following officers were elected for the ensuing year: President, J. A. Angel (St. Louis Southwestern); vice-president, Frank T. Scanlan (Goodrich Transit Company); recording secretary, L. H. Mann (Southern Railway); financial secretary, G. H. Brown (Grand Trunk); treasurer, J. W. Betts (New York Central); directors, Ira Bramwell, John Bickel and John A. Boak.

Reductions in Pullman Rates.

G. S. Fernald, general attorney of the Pullman Company, on December 1 submitted to Commissioners Lane and Clark of the Interstate Commerce Commission at Chicago a proposition for a general reduction of about 20 per cent. in the rates for upper berths in sleeping cars and for some reductions in the rates for long-distance journeys in lower berths. Commissioners Lane and Clark were in Chicago to conduct a rehearing of the case brought by George S. Loftus against the Pullman Company, in which the commission ordered reductions in rates between Chicago and St. Paul and between other points in the Northwest. The reductions offered by the Pullman Company of the specific

Pulman reads the law that "cleaning and waxing" amounts to nearly \$1,500,000 annually. Only 13 per cent. of the value of lost linen is collected from patrons, the other 27 per cent. being "expensed." The average porter's pay is \$4 a month. Conductors get \$85 or more. The vestibule patent expired five years ago and the Pulman Company now controls no live patents.

The New York Central, in its replies to the complaints of shippers and consignees, which have been made before the Public Service Commission at these hearings is carrying the war into Africa. C. H. Ewings, superintendent of freight transportation of the road, presented elaborate statements showing the actual time taken in the transportation of innumerable shipments which were carried for some of the firms and individuals which had complained of delays. For example, the Syracuse Dry Goods Company had 3,124 shipments in the year 1909, of which 77 per cent. were carried through in a day and a half, and 21 per cent.

Contracts with 125 systems vary in form, but Pullman takes few chances under any contract. The average term is 15 to 20 years, with a 6-months' clause permitting termination at any time. Usually a road is charged \$6,000 a year and if the car earns less a mileage of one cent per mile is assessed, but the railway has the option of making good the deficit on a cash basis. Mileage this year aggregated only \$500,000, whereas a few years ago it exceeded \$2,000,000. According to the company's system

REVENUES AND EXPENSES OF RAILWAYS.

Message operated on October 31, 1995: * 7,459 miles; † 4,477 miles; ‡ 7,618 miles; § 9,021 miles; || 1,511 miles; ¶ 1,400 miles; ¯ 7,037 miles; ¨ 4,398 miles; ˆ 4,017 miles; ˇ 3,323 miles; ˘ indicates Deficits, Losses and Decreases.

within less than three days, having only about 2 per cent. which had been kept on the road more than three days. In the case of Indian timber, when comprised of stacks of from three to six days in shipment, and from Port Huron to Port Eries, the records were that the average time was 1.7 days. Another shippers had declared that certain shipments took eleven, nine and five days respectively, but the road's records showed seven, four and four days. A series of analyses was conducted to show that while the time consumed by the railway in transportation averaged 1.2 days, the average time that the goods were held at destination for the consignee was 1.6 days. In the month of October the fruit shippers west of Rochester and Oswego called for 4,155 refrigerator and fruit cars; of these 96 per cent. were furnished on the same day, nearly 4 per cent. on the next day, and only three cars on

late as the third day. W. H. Elliott, signal engineer, testified that with the shortening of the block sections, now going on, the line of the New York Central from Albany to Buffalo would have its capacity increased 25 per cent.; and on the Hudson division this improvement will double the capacity of the line. The signal improvements, which are now planned between Croton and Buffalo, about 400 miles, will cost \$3,000,000. The average length of block sections will be reduced from nearly two miles to about one mile.

Car Surpluses and Shortages.

Article 114, statement of the comparative movements between railways of the American Railway Union, presenting statistical tables for the year 1910, giving a summary of car

CAR SURPLUSES AND SHORTAGES											
Date		No. of cars	Surplus				Short				Total
			Box	Flat and heavy	Coal	Other	Box	Flat and heavy	Coal	Other	
Jan. 1	1907	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Feb. 1	1907	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Mar. 1	1907	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Apr. 1	1907	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
May 1	1907	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Jun. 1	1907	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Jul. 1	1907	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Aug. 1	1907	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Sep. 1	1907	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Oct. 1	1907	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Nov. 1	1907	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Dec. 1	1907	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Jan. 1	1908	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Feb. 1	1908	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Mar. 1	1908	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Apr. 1	1908	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
May 1	1908	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Jun. 1	1908	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Jul. 1	1908	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Aug. 1	1908	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Sep. 1	1908	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Oct. 1	1908	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Nov. 1	1908	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Dec. 1	1908	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Jan. 1	1909	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Feb. 1	1909	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Mar. 1	1909	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Apr. 1	1909	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
May 1	1909	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Jun. 1	1909	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Jul. 1	1909	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Aug. 1	1909	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Sep. 1	1909	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Oct. 1	1909	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Nov. 1	1909	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Dec. 1	1909	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Jan. 1	1910	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Feb. 1	1910	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Mar. 1	1910	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Apr. 1	1910	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
May 1	1910	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Jun. 1	1910	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Jul. 1	1910	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Aug. 1	1910	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Sep. 1	1910	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Oct. 1	1910	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1	1	1	1	1
" 31	"	100	153	50	212	119	1	1	1	1	1
Nov. 1	1910	100	153	50	212	119	1	1	1	1	1
" 15	"	100	153	50	212	119	1</				

ages and surpluses by groups from July 21, 1909, to November 23, 1910, says:

"There is an increase of 8,485 cars, bringing the total to 43,066, which is 3,538 cars higher than the corresponding period in 1909. With the exception of an increase of 1,325 in flats, the increase is about evenly divided between box, coal and miscellaneous. The box car increase is largest in groups 2 (Eastern), and 3 (Middle), the latter group also contributing the largest item of the increase in coal car surplus, this being due chiefly to the close of lake navigation. The increase in miscellaneous cars is principally in stock cars in groups 3 (Middle), 6 (Northwestern), and 10 (Pacific).

"The shortage was reduced by 6,327 cars, leaving a total of 14,673 cars."

The accompanying table gives surpluses and shortages by groups for the latest period covered in the report and the charts show total surpluses and shortages in 1907, 1908, 1909 and 1910.

Coal Rates in Illinois.

As announced in our last issue, the Illinois railway commission has decided to authorize an advance in coal rates from Illinois mines. The accompanying table gives the results of the auditors' calculations as to cost of service on four of the principal coal-carrying roads, the Illinois Central, the Chicago & Eastern Illinois, the Chicago & Alton and the Cleveland, Cincinnati, Chicago & St. Louis. Some explanation of the figures may be necessary. Taking the figures for the Illinois Central, the commission found that the average rate on coal per ton per mile was 3.5 mills; that the average operating cost per ton per mile due to coal traffic was 2.822 mills; that the cost of operation plus taxes properly allocated to this business was 3.05 mills; that the cost of operation, taxes and charges and credits to income properly apportionable to this business amounted to 2.86 mills, and that the addition of a return of 6 per cent. on stock raised the total cost of handling the business, including all operating expenses, fixed charges, taxes and dividends, to 3.53 mills per ton per mile. It will be noted that on these four roads the average rate per ton per mile was 3.483 mills, and the total estimated cost of handling the business was 3.512 mills.

Counsel for the railways criticised the methods on which the computation was made, W. S. Horton of the Illinois Central

Howard, vice-president Commonwealth Steel Company; W. H. Danforth, president Ralston Purina Company; secretary-treasurer, A. F. Versen, assistant commissioner Traffic Bureau of Business Men's League of St. Louis.

Abolition of Trunk Line Differentials.

Beginning with January 15, the standard first-class fare between New York and Chicago, \$20, will be the price of tickets over the Pan-Handle and the Michigan Central lines, putting these lines on a parity with the Lake Shore & Michigan Southern and the Fort Wayne. The Michigan Central route has been improved by the abolition of the ferry at Detroit and the Pan-Handle route has been improved by the abolition of the ferry at New York; and the Erie, the Wabash and the Grand Trunk, holding that these changes removed the disability on account of which the Michigan Central and the Pan-Handle have hitherto enjoyed a differential, demanded some time ago that the differential be done away with; and after some delay it was announced, on Thursday last, that the stronger roads had agreed to this demand of the weaker. The adjustment makes the following changes:

Michigan Central.

Chicago to New York—Present rate, \$19 first class and \$17 second class; new rate, \$20 first class and \$18 second class.

Chicago to Buffalo—Present rate, \$11.50 first class and \$10.50 second class; new rate, \$12 first class and \$11 second class.

Pan-Handle.

Chicago to New York—Present rate, \$18 first class and \$16 second class; new rate, \$20 first class and \$18 second class.

INTERSTATE COMMERCE COMMISSION.

The Interstate Commerce Commission has ordered that not only must property to be transported be in the possession of the carrier issuing bill of lading therefor at the time of such issuance, but such bill of lading must be dated as of the day when the shipping instructions are fully given, and the carrier finally authorized to forward the property.

The commission will give a hearing in Chicago, December 21, to listen to the claimants who have asked reparation on freight

SUMMARY OF COST, TAXES, ETC., OF HANDLING COAL.

	Ton miles.	Revenue.	Rate per ton mile.	Op. cost.	Cost per ton mile.	Op. exp. and taxes.	Op. exp. and taxes per ton mile.	Op. exp., taxes and charges to income.	Op. exp., taxes and credits to income.
Illinois Central....	1,021,233,142	\$3,574,316	3.5 mills	\$2,881,732	2.822 mills	\$3,115,106	3.05 mills	\$2,926,699	2.86 mills
C. & E. I.....	311,099,147	2,992,628	3.592 "	2,072,149	2.488 "	2,136,187	2.56 "	2,200,465	2.65 "
Chicago & Alton....	553,928,935	1,905,886	3.44 "	1,283,284	2.317 "	1,348,652	2.43 "	1,341,844	2.42 "
C. C. C. & St. L....	424,874,618	1,393,588	3.28 "	829,126	1.95 "	856,763	2.06 "	932,533	2.19 "
Total.....	2,833,116,842	\$9,866,419	3.483 mills	\$7,066,292	2.494 mills	\$7,456,709	2.632 mills	\$7,417,544	2.618 mills

COMMISSIONER'S APPLICATION OF ABOVE TO RETURN UPON INVESTMENT.

Based on rate of 3.5 mills per cent. on stock and no railway tax.

Illinois Central....	3,604,833.81	3.53 mills per ton mile
C. & E. I.....	3,050,179.81	3.688 "
Chicago & Alton....	2,167,756.56	3.913 "
C. C. C. & St. L....	1,219,654.15	2.871 "
Total.....	9,942,126.43	3.512 mills per ton mile

claiming that if the computation had been correctly made the total cost to the Illinois Central of handling the business would have amounted to 3.88 mills instead of 3.5 mills. Mr. Horton and R. E. Cary, representing the Big Four, contended that even on the basis of the figures compiled for the commission the railways were entitled to the entire advance proposed, 10 cents a ton.

Officers of Traffic Club of St. Louis.

The following officers have been elected by the Traffic Club of St. Louis for the ensuing year: President, C. R. Gray, senior vice-president St. Louis & San Francisco; vice-presidents, George J. Lansey, president St. Louis Transfer Company; George W. Simmons, vice-president Simmons Hardware Company; C. S. Clarke, vice-president Missouri Pacific; George E.

shipments between the Mississippi and the Missouri rivers, which were made after the decision of the commission ordering a reduction and pending the appeal to the supreme court. It is said that claims amounting to more than \$100,000 have already been filed with the commission.

No Stop-Off Privilege on Wool.

Traugott Schmidt & Sons v. Michigan Central et al. Opinion by Commissioner Lane:

Present blanket any-quantity rate of 50 cents per 100 lbs. on wool "in the grease" applying from Chicago, Detroit and other points to Boston found not unduly discriminatory as applied to Detroit. Petition asking the commission to order establishment of a "stop-off" privilege on wool at Detroit denied. Complaint dismissed. (19 I. C. C., 535.)

Rates on Coal.

Sligo Iron Store Co. v. Union Pacific et al. Opinion by Commissioner Prouty:

Reparation awarded against the principal defendant for unreasonable rate on one carload of soft coal from Omaha, Neb., to

Ogden, Utah. The commission does not attempt to express an opinion on the reasonableness of the combination rate on soft coal from Thomas, W. Va., to Lonsdale, Ill., nor to establish a joint through rate. Without attempting to determine what would be a reasonable rate to apply to the transportation of bituminous coal generally between Cairo, Ill., and Texarkana, Ark., the commission is of the opinion that the rate charged in this case was not unreasonable. Amendment to complaint dismissed. (19 I. C. C., 527.)

Failure to Sell Round Trip Tickets.

Syllabus From a Southern Pacific Opinion by Commissioner Peck.

Elko is a station upon the line of the Southern Pacific from Ogden to San Francisco, situated east of Reno, Nev. Complainant desired to go from Elko to San Francisco and return, and applied to the station agent at Elko for a round-trip ticket. The agent had no such ticket; but told the complainant that there was in effect from Reno to San Francisco a round-trip rate, and suggested to the complainant that he should buy a round-trip ticket from Elko to Reno, and there purchase a round-trip ticket from Reno to San Francisco. The complainant attempted to carry out the suggestion of the ticket agent and purchased a ticket from Elko to Reno and return, but the train upon which he was riding did not stop long enough at Reno to permit him to purchase a round-trip ticket, and he was compelled to pay his fare to San Francisco and purchase tickets from San Francisco back to Reno. There is nothing upon this record as presented which shows such discrimination in the present case, and we have not felt called upon to further investigate this matter of our own motion. The complaint will therefore be dismissed. (19 I. C. C., 503.)

STATE COMMISSIONS.

The Railroad Commission of Louisiana has decided that the rates on rough oak staves or stave bolts should be the same as the rates on staves, and a former order giving the rough oak staves a lower rate than staves has been cancelled.

The Indiana railway commission has followed the example of the Illinois commission in permitting advances in coal rates. The advance allowed by the Indiana commission will be from 5 to 10 cents a ton from mines in Indiana to other points in the state and the roads will also make an increase of 10 cents a ton from Indiana points to Chicago.

The Railroad Commission of Louisiana has ordered in effect certain reduced party rates and has allowed one or more baggage cars to be charged for at the rate of seven and a half fares for each car for each party requiring exclusive use of passenger cars, and has allowed one baggage car free for each 20 adults not desiring the exclusive use of passenger cars.

The Railroad Commission of Louisiana has held that the Natchez Vidalia Rice Milling Company should not be charged for demurrage which accrued on shipments of heavy machinery held pending a completion of a track to their erecting plant. The railway company had agreed to build the track within a reasonable time, and on this assurance the complainant had ordered its machinery shipped, but was unable to unload until the track was finished.

COURT NEWS.

The Supreme Court of the United States has affirmed the decision of the Indiana supreme court in a suit brought against the city of Connersville, by the Cincinnati, Indianapolis & Western. The court held that the railway company must pay for a bridge, made necessary by a street extension ordered by the city. Just because a railway happens to be on the spot first is no reason why it should not build and maintain bridges at street crossings if a city should come along later and settle down on both sides of the road. In this case the city wishes to construct a street under the tracks. The Indiana court held that the city must pay for the land taken in cutting through the embankment on which the road runs and for the cost of removing the embankment, but refused to allow for the cost or for the maintenance of a bridge as an item of damage to the railway. This view the Supreme Court of the United States sustains.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

J. A. Strubel, receivers' secretary of the Detroit, Toledo & Ironton, has been appointed assistant to the receivers, with office at Detroit, Mich.

Henry W. Miller, assistant to first vice-president of the Southern Railway, at Raleigh, N. C., has been appointed assistant to the president, with office at Atlanta, Ga., succeeding J. S. Barbour Thompson, resigned to become president of the Atlantic Compress Company.

Operating Officers.

Fred Meyers, trainmaster on the Moberly division of the Wabash Railroad, at Stanberry, Mo., has been transferred to Moberly, Mo. W. H. Eckerd succeeds Mr. Meyers.

John Pickley, general road foreman of engines of the Lehigh Valley, at Sayre, Pa., has been appointed a trainmaster, with office at Sayre, and his former position has been abolished.

E. H. Daniel, trainmaster of the Central of Georgia, at Macon, Ga., has been appointed superintendent of the Macon and Chattanooga divisions, with office at Macon, succeeding H. D. Pollard, resigned.

E. E. Cain, trainmaster of the Pere Marquette at Detroit, Mich., has been appointed superintendent of the Cincinnati, Hamilton & Dayton, with office at Wellston, Ohio, succeeding J. W. Anderson, resigned.

Lawrence A. Downs, assistant engineer maintenance of way of the Illinois Central at Chicago, has been appointed a superintendent, with office at Fort Dodge, Iowa, succeeding George W. Berry, transferred.

H. O. Halsted, superintendent of terminals of the Pere Marquette at Chicago, has been appointed superintendent of transportation, with office at Detroit, Mich. M. J. Griffin, transportation director at Detroit, succeeds Mr. Halsted.

O. Nickerson, acting general manager of the New England Navigation Company, which operates the Fall River Line and other steamship lines of the New York, New Haven & Hartford, has been appointed general manager, with office at New York.

J. E. Stumpf, superintendent of the Moberly division of the Wabash Railroad, at Moberly, Mo., has been appointed superintendent of the Decatur division, with office at Decatur, Ill., succeeding L. J. Ferritor resigned to go to another company. T. J. Jones, trainmaster at Kansas City, Mo., succeeds Mr. Stumpf.

S. E. Canady, assistant superintendent on the Utah division of the Oregon Short Line and the Southern Pacific Lines east of Sparks, has been transferred to the Salt Lake division, with office at Imlay, Nev., succeeding A. E. Kane, assigned to other duties. M. A. Pond succeeds Mr. Canady, with office at Salt Lake City, Utah.

The Pennsylvania Tunnel & Terminal Railroad, from Manhattan transfer (Harrison, N. J.) to and under the Hudson river, the borough of Manhattan, and the East river and Sunnyside yard, 12 miles, including the Pennsylvania station in New York City, is now operated as the New York terminal division of the Pennsylvania Railroad. C. S. Krick is the superintendent, with office at New York.

The position of W. C. Park, superintendent of the New Orleans Great Northern, at Bogalusa, La., has been abolished and all correspondence heretofore handled through the superintendent's office will be handled through the general manager's office, except correspondence relating to claims, which will be handled by C. J. Wade, auditor. The trainmaster's office will handle correspondence with train employees.

O. H. Hobbs, superintendent of the Baltimore division of the Baltimore & Ohio, at Baltimore, Md., has been appointed superintendent of the Cumberland division, with office at Cumberland, Md., succeeding John J. Driscoll, assigned to other duties.

J. T. Olhausen, trainmaster at Baltimore, succeeds Mr. Hobbs, and C. A. Mewshaw, chief train despatcher, succeeds Mr. Olhausen. J. J. Swartzbach succeeds Mr. Mewshaw.

John B. Dickson, superintendent of the Rochester division of the Erie Railroad, at Rochester, N. Y., has been appointed general agent at Chicago, succeeding R. E. Woodruff, who succeeds Mr. Dickson as superintendent of the Rochester division. W. A. Baldwin, trainmaster at Galion, Ohio, has been appointed superintendent of the Chicago & Erie division, succeeding E. C. Allen, assigned to other duties.

Charles Ware, assistant general manager of the Union Pacific during the absence of A. L. Mohler, vice-president and general manager, will be in charge of the operation of the road. For a like period W. D. Lincoln, assistant general manager, will assume the duties heretofore devolving upon Mr. Ware, in the operating department, and W. R. Cahill, superintendent of the Nebraska division, with the title of acting assistant general manager, is temporarily assigned to the duties heretofore performed by Mr. Lincoln, all with offices at Omaha, Neb.

C. W. Bearden has been appointed assistant superintendent of the Chicago & Alton, with office at Bloomington, Ill. L. C. Badgley, superintendent of the Rutland, Toluca & Northern, at Toluca, has been appointed a trainmaster of the Alton, with office at Dwight, with jurisdiction over the line from Dwight to Peoria, including the R. T. & N. S. P. Henderson has been appointed a trainmaster, with office at Bloomington, succeeding J. M. Baths, resigned. C. L. Hinkle has been appointed assistant to the general manager of the Alton and the Toledo, St. Louis & Western, and X. H. Cornell has been appointed inspector of transportation of both, with offices at Chicago. J. M. Kelley has been appointed superintendent of terminals, with office at East St. Louis, succeeding P. L. McManus, resigned to go to another company.

Francis M. Benning, whose appointment as assistant superintendent of the Delaware, Lackawanna & Western, with office at Hoboken, N. J., has been announced in these columns, was born in 1865 at Hannibal, Mo. He was educated in the high school at Keokuk, Iowa, and began railway work in October, 1881, with the Wabash Railroad as telegraph operator and despatcher. Four years later he went to the Toledo, Peoria & Western as chief clerk. From 1889 to 1892 he was chief despatcher of the Chicago, Peoria & St. Louis and then went to the Chicago, Rock Island & Pacific as assistant chief despatcher and chief clerk, remaining in that position until 1899. He went to the Delaware, Lackawanna & Western in 1889 as chief despatcher and in 1907 he was appointed passenger trainmaster at Hoboken, N. J., which position he held at the time of his recent appointment as assistant superintendent.

Traffic Officers.

E. C. Arnold, contracting agent of the Louisville & Nashville at Cincinnati, Ohio, has been appointed a general agent, with office at Cincinnati.

G. A. Dobbin, industrial and colonization agent of the Gulf, Colorado & Santa Fe, with office at Galveston, Tex., has resigned to engage in other business.

E. S. Manchester has been appointed a traveling agent of the Lackawanna Line, with office at Binghamton, N. Y., succeeding W. A. Frey, resigned.

E. K. Fleming has been appointed general agent, freight department, of the Chicago, Burlington & Quincy, with office at Chicago, succeeding C. A. Johnson, deceased.

Kenneth C. Kerr has been appointed industrial agent of the Alaska Steamship Company and the Copper River & Northwestern Railway, with office at Seattle, Wash.

J. R. Rowland has been appointed traffic manager of the Atlanta, Birmingham & Albany, in charge of both the freight and passenger departments, with office at Atlanta, Ga.

F. T. Rennie, commercial agent of the Mallory Steamship Company at Dallas, Tex., has been appointed assistant general freight agent, with office at Galveston, Tex., a new position.

William Nicholson has been appointed industrial and immigration agent of the Kansas City Southern, with office at Kansas City, Mo., succeeding F. E. Roesler, appointed head of the publicity department.

C. K. Bothwell has been appointed district passenger agent of the Missouri Pacific-Iron Mountain system, with office at Joplin, Mo., succeeding C. C. Carson, resigned to accept service with another company.

H. S. Bradley, general agent of the Wheeling & Lake Erie at Canton, Ohio, has been appointed general freight agent of the Ann Arbor Railroad and Steamship Lines, with office at Toledo, Ohio, succeeding T. F. Butler, resigned to engage in other business.

J. E. Collins, traveling freight agent of the Pittsburgh, Cincinnati, Chicago & St. Louis at Richmond, Ind., has been appointed freight solicitor of the Cleveland, Akron & Columbus, with office at Columbus, Ohio, succeeding G. W. Koonce, promoted.

Alan W. Graves has been appointed a commercial agent of the Atlantic Coast-Savannah Line and the Central-Savannah Line, succeeding J. B. Andrews, deceased, and W. A. Herman has been appointed a traveling freight agent, both with offices at Baltimore, Md.

William G. Hutchinson has been appointed a contracting freight agent of the Illinois Central at Boston, Mass. H. P. Hewes has been appointed a traveling freight agent at New York, and C. J. Ryan has been appointed a traveling freight agent at Kankakee, Ill., succeeding L. L. Moseley.

G. E. Parker has been appointed a traveling freight agent of the St. Louis & San Francisco, the Chicago & Eastern Illinois and the Evansville & Terre Haute, with office at Pittsburgh, Pa., succeeding E. D. Forde, resigned to accept service with another company. C. E. Rose has been appointed a traveling passenger agent, with office at New Orleans, La., succeeding L. B. Washington, promoted.

G. E. White, general agent of the Rock Island Lines, at Chicago, has been appointed assistant general freight agent, with office at Chicago, succeeding T. A. Gantt, resigned to go into other business. C. H. Caswell, division freight agent at Davenport, Iowa, succeeds Mr. White, and E. L. Goff succeeds Mr. Caswell. R. D. Stanley has been appointed a traveling freight and passenger agent, with office at Salt Lake City, Utah, succeeding D. B. Eldredge, deceased.

Incident to the separation of the management of the Minneapolis & St. Louis and the Iowa Central from that of the Chicago & Alton and the Toledo, St. Louis & Western, the jurisdiction of C. A. King, freight traffic manager, and George J. Charlton, passenger traffic manager, has been withdrawn from the Minneapolis & St. Louis and the Iowa Central. S. G. Lutz, general freight agent of the four roads at Chicago, has been appointed traffic manager of the latter two roads, with office at Minneapolis, Minn.; and A. B. Cutts, assistant general passenger agent of the four roads at Minneapolis, has been appointed assistant traffic manager, with office at Minneapolis.

Engineering and Rolling Stock Officers.

D. L. Cullom has been appointed resident engineer of the New Orleans Great Northern, with supervision over the track department, and bridges and buildings department, with office at Bogalusa, La.

M. P. Cheney, road foreman of the Atchison, Topeka & Santa Fe Coast Lines, at San Bernardino, Cal., has been appointed master mechanic of the Arizona division, with office at Needles, Cal., succeeding L. A. Mattimore, transferred.

A. R. Manderson, master mechanic of the Maine Central, at Portland, Me., has been appointed assistant superintendent of motive power and H. A. Southworth, division foreman at Waterville, has been appointed master mechanic, with office at Portland.

J. T. McGrath, master mechanic in the locomotive shops of the Grand Trunk at Battle Creek, Mich., has been appointed superintendent of rolling stock, in charge of the Bloomington locomotive and car shops and terminals, of the Chicago & Alton, with office at Bloomington, Ill., succeeding Peter Maher, superintendent of motive power and equipment, resigned.

T. J. Cutler, master mechanic on the Rocky Mountain division of the Northern Pacific at Missoula, Mont., has been appointed master mechanic on the Idaho division, with office at Spokane,

Ward, succeeded F. B. Childs, and J. Edgar Ziegler, master mechanic of the St. Paul division at Minneapolis, Minn., succeeds Mr. Carter, and J. B. North succeeds Mr. Ziegler.

S. R. Richards, general manager of the New York, New Haven & Hartford, at New Haven, Conn., has been appointed superintendent of shops at New Haven, succeeding George D. Bailey, resigned. H. C. Orant, master mechanic of the Western division, at Waterbury, succeeds Mr. Richards, and C. J. Stewart, as previously announced in these columns, succeeds Mr. Orant.

C. F. Loweth, engineer and superintendent of bridges and buildings of the Chicago, Milwaukee & St. Paul at Chicago, and the Chicago, Milwaukee & Puget Sound, has been appointed chief engineer, with office at Chicago, succeeding D. J. Whitmore, assistant consulting engineer. Mr. Loweth was born March 3, 1857, at Cleveland, Ohio, and was educated at Oberlin College, Oberlin, Ohio. He began railway work in 1876 as a rodman on surveys with the Cleveland, Lorain & Wheeling, now part of the Baltimore & Ohio. He was afterward consecutively, draftsman with the Atchison, Topeka & Santa Fe; assistant chief engineer on the Des Moines and Northwestern; consulting engineer on bridge construction with the Northern Pacific; consulting engineer, successively, with the Minneapolis & St. Louis, the Minneapolis, St. Paul & Sault Ste. Marie and the St. Paul & Duluth, now part of the Northern Pacific; then engineer of the St. Paul Union Depot Company; chief engineer of the South St. Paul Belt Company; chief engineer of the Davenport, Rock Island & Northwestern. He has been engineer and superintendent of bridges and buildings of the Chicago, Milwaukee & St. Paul since March, 1901, and since March, 1906, has also held the same office on the Chicago, Milwaukee & Puget Sound.

Purchasing Officers.

H. F. Lowther, chief clerk in the purchasing department of the Delaware, Lackawanna & Western, at New York, has been appointed assistant purchasing agent, with office at New York.

OBITUARY.

Alexander Young Lindsay, formerly traveling passenger agent of the Grand Rapids & Indiana, and later connected with the office of the assistant general passenger agent of the Pennsylvania Lines, at Cincinnati, Ohio, died in that city December 3, at the age of 67 years.

William E. Powell, former immigration commissioner of the Chicago, Milwaukee & St. Paul, died at his home in Milwaukee, Wis., on December 1, at the age of 69 years, following an attack of heart disease. Mr. Powell was born in Bedd Gilbert, North Wales, and came to the United States in 1866. He was general immigration agent for the Milwaukee road, from 1868 to 1903, when he went into the land and colonization business.

L. V. Finkle, general agent of the Norfolk & Western, at Cincinnati, Ohio, died at his home in Norwood, December 1, at the age of 49 years. Mr. Finkle was a well known railway man in the central states. He was an active member of the Transportation Club of Cincinnati, and was formerly a director of the Chamber of Commerce. Mr. Finkle entered the service of the Adams Express Company when a young man, and a few years later went to the Cumberland Gap Despatch as soliciting freight agent, remaining in that position until March, 1902, when he was appointed general agent of the Norfolk & Western, which position he held at the time of his death.

Railway Construction.

New Incorporations, Surveys, Etc.

ALASKA SYSTEM.—The Alaska System of Railways, with \$500,000 capital, to build from Vancouver, B. C., northwest through the Yukon district, along the Mason, Tanana and Yukon rivers, via the cities of Kuyuk, Council City, Nome and Bering City, to Cape Prince of Wales (Tim City), Alaska, on Bering strait. The survey covers a distance between terminals, of 2,300 miles. A reconnaissance of the right-of-way and location maps have been made, which shows that the line can be built with easy curves. On the Seward Peninsula division, which is to be 395 miles long, the maximum grades for 5,200 ft. will be 1 per cent, and on the rest of the line will have 0.5 per cent. grades. The line will traverse large fields of coal deposits, as well as develop mining sections. A dock is to be built at Bering City, with the necessary warehouses, at a cost of about \$500,000. Harbor improvements are to be made at Port Clarence, Bering City, on the Seward Peninsula. C. Swenson, president, and P. Schmolck, secretary, 59 William street, New York.

ALLEGHENY & NORTHWESTERN.—A contract has been given to John Schaffner for grading 6.5 miles of line, it is said, between Evans City, Pa., and Mars. Additional grading contracts will be let soon. The plans call for a line from Evans City to Harmarville, 21 miles. J. G. McPherson, president, Philadelphia; H. B. Graves, engineer in charge of construction, Butler.

BANGOR & AROOSTOOK.—This company opened for traffic on November 28 the extension from Fort Kent, Me., to Grand Isle, 28 miles.

BEAUMONT & GREAT NORTHERN.—An extension has been projected from Weldon, Tex., to Waco, 103 miles.

CANADIAN NORTHERN.—A contract is said to have been given to McKenzie & Meery, to build from the Pembina river, Alb., to Yellow Head Pass.

CANADIAN PACIFIC.—An officer of the Esquimalt & Nanaimo writes that a contract has been given to Janse, McDonnell & Co., Port Alberni, B. C., for work from Cameron lake, on the island of Vancouver, to Port Alberni, 28 miles; also, from Duncans to Cowichan lake, 18 miles.

CAPITAL CIRCUIT TRACTION.—Financial arrangements have been made, it is said, for building about 170 miles of electric belt lines to connect Danville, Ind., Franklin, Shelbyville, Greenville, Noblesville and Lebanon. J. N. Crabb, president, Indianapolis.

CENTRAL ONTARIO.—This company is carrying out with its own men work on an extension from Mile 31 to Whitney, Ont., 11 miles.

DULUTH & NORTHERN MINNESOTA.—This company is building with its own forces an extension from mile post 55 to mile post 62, seven miles.

ESQUIMALT & NANAIMO.—See Canadian Pacific.

GULF COAST LINE.—See National Railways of Mexico.

HALITE & NORTHERN.—Incorporated in New York with \$100,000 capital, to build from Halite, N. Y., in Livingston county, on the Pennsylvania Railroad to a connection with the Genesee & Wyoming, 3.5 miles. W. A. Hazard, E. W. Brown and A. Bigelow, New York, are incorporators.

HA HA BAY.—An officer writes that a contract has been let to Boulton & Boulton, Chicoutimi, Que., for building from a point on the main line to LaFerriere village, eight miles. J. F. Green, chief engineer, Chicoutimi.

HUDSON BAY RAILWAY.—According to press reports, bids are to be asked for in January, 1911, to build the first section of 150 miles, from The Pass, Keewatin, to Split lake. (Dec. 2, p. 1096.)

MEXICO, SANTA FE & PERRY TRACTION.—A contract has been given to the Heinz-Young Construction Company, St. Louis, Mo., it is said, to build from Mexico, southwest to Hereford, 20 miles. It is expected to have this section finished about April 1, 1911. The line is eventually to be extended to Columbia, Fulton and Mokane. M. Crum, president, Mexico. (November 25, p. 1023.)



C. F. Loweth.

MICHIGAN CENTRAL.—An officer writes that the two additional tracks from Calumet Park, Ill., to a point near Gibson, Ind., which were built during 1908, were not connected up at that time and the company has only recently connected them with the main line at a point near Gibson. The old main tracks are now connected with freight leads to Gibson yard. (Nov. 18, p. 985.)

MORGANTOWN & SOUTHERN (Electric).—An officer writes that surveys have been made for an electric line from Morgantown, W. Va., to Fairmont, 27 miles. Work is now under way on five miles. E. Herd, secretary, Morgantown.

NATIONAL RAILWAYS OF MEXICO.—This company is planning to build under the name of the Short Line, from Mexico City, Mex., eastward via Beristain, Necoxa, Pantepec and Tamos to Tampico, 300 miles. The first section of about 100 miles from Mexico City to Beristain is a narrow gage line now in operation. This line will be made standard gage. The grading work will be very heavy, and there will be about six miles of tunnel work. Maximum grades will be 2 per cent. compensated, maximum curvature 12 degrees. Final location has been made from Beristain to a connection with the Gulf Coast Line at the foot of a 2 per cent. grade about 70 miles. Under the name of the Gulf Coast Line a line will be built from Matamoros, Mex., south via Tampico and Pantepec to Vera Cruz, about 550 miles. Engineers are now at work locating the line which is to form a link of the Pan-American Railway. On this line the grading will be average work; there will be many steel bridges, maximum grades will be 0.5 per cent., maximum curvature $4\frac{1}{2}$ degrees. James M. Reid, chief engineer, and H. M. Taylor, director of construction, Mexico City.

According to press reports the Inter-oceanic Railway expects to have work finished on a 26-mile cut-off from Metepec, Mex., east to San Lorenzo, about the middle of February, 1911.

NEVADA-CALIFORNIA-OREGON.—Work is now under way by the Hall Construction Company, Alturas, Cal., and Richardson & Nugent, Lakeview, Ore., between Alturas and Lakeview, 60 miles.

NEVADA COPPER BELT.—Work is now under way by P. J. Conway, Sweetwater, Cal., on an extension from Wilson, Nev., to Morning Star, 15 miles. (November 11, p. 941.)

NORTH COAST.—Work is under way by Tribble & Anderson, G. A. Carlson & Co., and Washtok & Chew, all of Spokane, Wash., on the section from Spokane, Wash., to Ayer station, 103.87 miles.

OREGON SHORT LINE.—Work is now under way by the Utah Construction Company, Ogden, Utah, on the Yellowstone Park railway, from Ashton, Idaho, to Driggs, 37.45 miles.

Work is under way by the Utah Construction Company on the Bear Lake branch, from Montpelier, Idaho, to Paris, 9.5 miles.

OREGON & WASHINGTON.—Work is under way on a branch from Cosmopolis, Wash., south to North river, 12 miles. Grant, Smith & Company, Cosmopolis, are the contractors. (October 28, p. 813.)

PENNSYLVANIA RAILROAD.—Work is now under way laying 11 miles of track in the yards at Austinburg, Ohio, which are to be used for storing cars, to relieve congestion at the Ashtabula yards. About seven miles of track has been laid. Most of the land used as a site for the yards was swampy ground; the company has carried out a large amount of work filling in cinders and cement.

QUEBEC RAILWAY, LIGHT & POWER COMPANY.—This company is making surveys for an extension from Beauport, Que., to Monmorency Falls, 3.5 miles.

RED RIVER VALLEY & TEXAS.—Financial arrangements are said to be made, and construction work is to be started within a few weeks. The projected route is from Ardmore, Okla., to Chilli-cothe, Texas. G. Kenfaver, chief engineer, Davidson, Okla. (May 6, p. 1184.)

ROCK ISLAND, TEXICO & GULF.—An officer writes that work is now under way by M. F. Calback & Co., Farwell, Texas, between that place and Center, in Bailey county, on 30 miles. It is expected to begin track laying in 30 days. The line is eventually to extend from Farwell to Knowles, N. M., 117 miles. M. J. Healy, president, Farwell. (October 28, p. 811.)

SHORT LINE.—See National Railways of Mexico.

SUPERIOR & SOUTHEASTERN.—An officer writes that a contract has been given to Balch & Co., Minneapolis, Minn., for building a five-mile line from Wisco, Wis.

SOUTHERN PACIFIC OF MEXICO.—Work is now under way by the Grant Brothers Construction Company, Los Angeles, Cal., from the mouth of the Santa Rosa river, Mex., to Tepic, 33 miles. The line has been located from Tepic to Magdalena, 102.5 miles. (November 18, p. 986.)

TEMISKAMING & NORTHERN ONTARIO.—According to press reports, this company will build a branch from Kelso, Ont., to Porcupine, 32 miles. It is estimated that it will cost about \$450,000 to build the line.

TEMPLE-NORTHWESTERN.—Work is now under way by D. J. Grigsby, Temple, Tex., from Messer to Gatesville, 32 miles. An extension is projected from Gatesville to Hico, 42 miles. W. E. Dozier, general manager, Temple. (September 23, p. 559.)

TRINITY VALLEY & NORTHERN.—Surveys are being made for an extension to Lamb, Tex., 7.5 miles.

UNION PACIFIC.—Work is under way by Kilpatrick Brothers, Beatrice, Neb., as follows: from Rock Springs, Wyo., to coal fields, 9.70 miles, also from Dent, Colo., to Fort Collins, 24.75 miles.

UNION RADIAL RAILWAY.—A grading contract has been given to Reagan, Lynch & Co., for work from a point two miles from Juniata, Pa., to Bitner, in Fayette county, two miles. The company's men is laying the track.

WESTERN PACIFIC.—Plans are said to have been approved for building from Oakland, Cal., through Santa Clara county, into the San Joaquin valley. Surveys have been made.

WINSTON-SALEM SOUTHBOUND.—According to press reports, track laying work is nearing completion, on this line which is being built from Winston-Salem, N. C., south to Wadesboro, 88 miles. The line will be used jointly by the Atlantic Coast Line and the Norfolk & Western. O. H. P. Cornell, chief engineer, Winston-Salem. (September 30, page 600.)

WOODVILLE RAILROAD.—This company has surveys under way for a line from Shaw, Fla., to Crawfordville, 11 miles. T. M. Hall, president and general manager, Woodville.

FOREIGN RAILWAY NOTES.

The terms of the contract have been approved for building a section of the Minas Western Railway of Brazil, between Henrique, Galvao, and Kilometer 45, on the Goyaz line.

The Danish Minister of Public Works has asked for a credit of about \$1,320,000, for the purpose of buying rolling stock for the State Railways. About one-third of this amount will be spent for the purchase of 23 locomotives, for which bids will be asked later.

Every province of Costa Rica is now reached by railways, with the exception of Guanacaste. There are now in actual operation in Costa Rica 405 miles of line, of which 69 miles are owned by the government and the remainder by private companies.

The newspapers of Asuncion, Paraguay, announce that the extension of the Paraguayan Central Railway from its present terminus at Yuty (157 miles) from the capital, to Villa Encarnacion, on the Alto Parana, is nearly completed.

The British minister to Argentina, who is also credited to Paraguay, traveled in October from Buenos Aires to Asuncion by the Entre Rios and Paraguayan Central lines. The distance between end of the railway on the former road and Posadas, on the Alto Parana, as well as that between Villa Encarnacion and the end of the line on the Paraguayan Central was covered on horseback. The whole journey occupied four days.

The present rolling stock of the Paraguayan Central has been bought by the Argentine government and will be transferred to its railway in Patagonia. New cars and engines, which replaced the old and which are of English manufacture, have begun to arrive, although the low water in the Parana river prevented their prompt delivery; 20 locomotives, 26 cars and 229 trucks are being put in operation.

Railway Financial News.

ATLANTIC SOUTH COAST.—Under the terms of the mortgage securing \$1,191,000 4 per cent. bonds, the property was sold to representatives of the reorganization committee.

BELT RAILROAD & STOCK YARDS COMPANY.—See Indianapolis Union.

BOSTON RAILROAD COMPANY, ETC.—A petition has been filed with the governor of state of Massachusetts asking for legislation to permit the state of Massachusetts to buy and hold stock or bonds of the Boston Railroad Holding Company, and to hold any stock of the Boston & Maine directly or indirectly controlled by the Holding company, and to buy one-half interest in the Boston & Albany, or one-half interest in the Boston, Revere Beach & Lynn. See also Boston under Railroad Structures.

BROOKLYN RAPID TRANSIT.—Justice Le Boeuf has reduced the valuation for 1905 of the State Board of Tax Commissioners of New York for special franchise taxes on the Brooklyn Rapid Transit from \$1,365,842 to \$334,538. The court allows a reduction in addition to ordinary wear and tear for "obsolescence for inadequacy of railway equipment not yet sustained, but capable of reasonable ascertainment for the future." The court says that wrecks of many public service corporations scattered throughout the state would not be seen to-day if this principle had been applied to their accounting.

CINCINNATI, HAMILTON & DAYTON.—The terms of the exchange offered to holders of the \$2,728,000 Dayton & Michigan consolidated first mortgage 5 per cent. bonds of January 1, 1881-January 1, 1911, are announced by J. P. Morgan & Co., New York, as follows: Holders who deposit their bonds before December 15, 1910, will receive \$5 in cash per \$1,000 bond, interest on their bonds to maturity and new bonds at par, having the same lien as the old bonds but bearing 4½ per cent. interest and maturing January 1, 1931.

DELAWARE, LACKAWANNA & WESTERN.—Options have been secured, it is said, on 1,700 acres of newly discovered coal lands lying about 10 miles from Wilkesbarre, Pa.

DETROIT, TOLEDO & IRONTON.—Principal and interest on the general mortgage 4 per cent. bonds has formally been declared due. This action is taken preliminary to foreclosure proceedings.

DETROIT & MACKINAC.—An initial dividend of 2½ per cent. has been declared on the \$2,000,000 common stock. The regular semi-annual dividend of 2½ per cent. has been declared, payable January 3, on the \$950,000 preferred stock.

ERIE.—An issue of \$5,000,000 short term notes, due December 1, has been extended, presumably for less than one year. The notes are secured by Erie & Jersey (Gumyard cut-off) bonds.

FLORIDA EAST COAST.—In listing on the New York Stock Exchange \$10,000,000 first mortgage 4½ per cent. bonds, the railway company says that \$10,000,000 bonds represents "less than one-third of the actual cash cost of the railway to date, the remainder of the cost having been met out of the proceeds of the company's common stock and general mortgage income bonds." There is \$20,000,000 income bonds and \$3,000,000 stock outstanding.

FORT SMITH & WESTERN.—The holders of the securities of the Fort Smith & Western and the Sans Bois Coal Company have been asked to deposit their securities with a protective committee which has been formed, consisting of W. L. Brown, A. W. Mellon, Colgate Hoyt, W. H. Canniff, W. G. Mather, J. J. Sullivan, George S. Russell, James H. Hoyt, S. H. Tolles, C. C. Bolton and A. C. Dustin. The road runs from Guthrie, Okla., to Fort Smith, Indian Territory—196 miles. There are \$6,240,000 first mortgage 4 per cent. bonds and \$452,408 equipment trust certificates outstanding. Interest on the bonds has been unpaid since October 1, 1907. The committee is given power to act in case of receivership.

ILLINOIS CENTRAL.—The United States Supreme Court has affirmed the decision of the court of appeals of Kentucky, holding that the franchise taxes for 1897 on the Chesapeake, Ohio & Southwestern (leased to the Illinois Central) are legal. The

constitution of the state says that the agreement made by the Kentucky tax commissioners to remit two years' franchise taxes if the Illinois Central would pay the 1900 taxes and succeeding years was beyond the powers of the tax commissioners.

INDIANAPOLIS UNION.—The circuit court has sustained the demurrer of the defendants in a suit brought by the Indiana prosecuting attorney to annul the charters of the Indianapolis Union and the Belt Railroad & Stock Yards Company, on the ground that the 999-year lease of the Belt railway to the Union railway violated the law of 1882.

LOUISVILLE & NASHVILLE.—Suit has been filed by the state of Kentucky against the Louisville & Nashville for \$640,000 franchise taxes on property alleged to have been fraudulently omitted by the road in its report to the auditor in the last five years.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—A complaint has been filed with the railway commission of Georgia claiming that the terms of the lease of the Western & Atlantic to the Nashville, Chattanooga & St. Louis were not being complied with, because the Nashville, Chattanooga & St. Louis applies southern classification rates between Georgia points and Chattanooga which are higher than the local rates fixed by the commission. The Western & Atlantic is owned by the state of Georgia.

NORFOLK SOUTHERN.—The United States Circuit Court has entered a decree at Norfolk, Va., confirming the sale of the road of the Norfolk & Southern on December 7 last and has directed the manner of applying the \$8,500,000 received from the new company, the Norfolk Southern, as the purchase price of the property. This distribution is in accordance with the reorganization plan.

NORTHERN CENTRAL.—Suit has been brought by the Waters minority committee to prevent the 999-year lease of the Northern Central to the Pennsylvania Railroad, on the ground that the Pennsylvania Railroad, the Northern Central, the Philadelphia, Wilmington & Baltimore and the Columbia & Port Deposit all operate parallel lines, and that the proposed lease would be in violation of the anti-trust law.

OREGON-WASHINGTON RAILROAD & NAVIGATION COMPANY.—See Oregon Railroad & Navigation.

OREGON RAILROAD & NAVIGATION.—Stockholders are to vote December 22 on the question of authorizing the sale of the property to the Oregon-Washington Railroad & Navigation Company and on the question of dissolving the Oregon Railroad & Navigation Company.

THIRD AVENUE RAILROAD.—The New York Public Service Commission has denied for the second time the application of the bondholders' committee for a releasing in regard to the reorganization plan which the committee has disapproved of.

FOREIGN RAILWAY NOTES.

The Assam Bengal Railway of India is asking tenders for rails and track fastenings for its betterment and extension work.

It is said that all the railway lines in Spain working in connection with the Portuguese railways have been affected by the strike of the employees of the latter, with the exception of the line to Caceres.

The Turkish government has opened public bids for the building and operation of a system of electric tramways in the city of Constantinople. The plans for building the last section of the Rosario-Cruz line, submitted by the Argentine Central Railway to the government, have been approved.

Bids are open for building a railway from Beeza, Spain, to Alcatraz, via Ubeda and Villaca Rillo. The railway is to be built principally for military reasons. It is to be single track, meter gage, and clearances, weight of rail, etc., must be of such a nature as to permit the transportation of artillery. The contract for building the line is open to Spanish firms only, but some of the materials required may have to be obtained outside of Spain.

Supply Trade Section.

The Isthmian Canal Commission will receive bids until December 27 for lumber and mechanical bond steel rods. (Cir. 613.)

John H. Barker, of the Haskell & Barker Car Company, Michigan City, Ind., died on December 2 of pneumonia, complicated with kidney trouble.

The McKeen Motor Car Company, Omaha, Neb., has completed a second 55-foot gasoline motor car for the Woodstock & Sycamore Traction Company, which will be put in service at once at Sycamore, Ill.

Edgar Allen & Co., Ltd., Sheffield, England, announce the appointment of Schrock & Squires, 291 Pearl street, New York, as eastern agents for the company's high grade tool steels, a large stock of which will be carried by them in their warehouse to insure prompt delivery.

The Chisholm & Moore Manufacturing Company, makers of the Cyclone chain hoist, which was described on page 1100 of December 2 issue of the *Railway Age Gazette*, are located at Lakeside avenue and East Forty-ninth street, Cleveland, Ohio, instead of at Chicago, as stated in the article.

The H. W. Johns-Manville Company, New York, announces the removal of its offices at 85 Shelden street, Houghton, Mich., to more commodious and convenient quarters at 96 Shelden street. S. T. Harris, who has been associated with the company for a number of years, will be in charge of the new offices.

F. S. Gassaway, manager of the New York branch office of the Willard Storage Battery Company, Cleveland, Ohio, has been transferred to the main office as general manager of sales. In addition to the New York office, this company maintains branches at Detroit, Chicago and Mexico City.

At the recent meeting of the directors of the American Steel Foundries, Chicago, W. D. Sargent and E. F. Goltra were re-elected directors. George E. Scott, third vice-president, was elected second vice-president, succeeding W. W. Butler, resigned. R. H. Ripley succeeds Mr. Scott as third vice-president.

A special meeting of the stockholders of the Union Switch & Signal Company will be held December 14, to vote on the question of increasing the capital stock of the company from \$2,500,000 to \$5,000,000. The proposal of the directors is that new stock may be issued at the discretion of the board, in payment of dividends or to the stockholders for cash.

The Vanadium Mines Company, of Pittsburgh, Pa., is building an extensive plant at Rankin, Pa., for the reduction of vanadium from ore mined in New Mexico. This is said to be the only deposit of vanadium as yet discovered in this country. The new plant will be placed in operation about February 15. The officers of the company are A. P. Bement, of Terre Haute, Ind., and W. A. Donitz, C. R. Miller and Thomas M. Benner, of Pittsburgh.

The Railway Specialty & Supply Company, Chicago, announces that, on December 1, its name was changed to the P. & M. Co. in order to eliminate the confusion arising from the number of similar names in the supply trade. This company manufactures and sells the P. & M. anti-rail-creeper, and in choosing a new name it was thought best to adopt one which would identify the company with its chief product. The offices of the company are in the Monadnock building, Chicago.

Thomas F. Downing, secretary and treasurer of the Chicago Car Heating Company, Chicago, died on Monday, December 5, from cerebral hemorrhage, resulting from a street car accident last June. Mr. Downing was 30 years old and had been connected with the company since its organization in 1903. His business career began on leaving high school at the age of 15 years, an office boy for Robert H. Gold, president of the company, with whom he has been associated ever since. Mr. Downing rose to the position of secretary and treasurer, was steady and rapid. He was a man of exceptional mind and of a cheerful disposition, and will be sorely missed by his many friends.

Julius E. French, chairman of the board of directors of the Railway Steel-Spring Company, New York, died at the home of his daughter in Cleveland, Ohio, December 2, following an



Julius E. French.

operation performed just four weeks before. With his death the company has lost, within less than four months, two of its founders. In fact, Mr. French and some of his associates have been looked upon as founders of the railway supply business, having been identified with it long before it was able to walk alone. Mr. French had a large acquaintance, and his loss will be felt. He was a most active and broad minded man, forceful, naturally a leader, and a sympathetic and generous friend. Mr. French was born on a farm near Perry, Ohio, 74 years ago. He attended country school and a

professional life. This, however, was not to his liking; and at the age of 18 he became a clerk in a general store at Willoughby, Ohio, which he later bought. His history as a railway supply man dates back to the early 'seventies, when with Wilson Dodge and R. K. Winslow, he formed the Winslow Car Roofing Company, of Cleveland. In 1882 he organized the Paige Car Wheel Company, which, in 1897, was consolidated with several other concerns into the Steel Tired Wheel Company, with Mr. French as president. Five years later the Railway Steel-Spring Company was organized, and Aaron French, who, incidentally, was in no way related to Julius E. French, was made chairman and Julius, or "Jules," as he was more frequently called, was elected president. In June of the same year, 1902, the Steel Tired Wheel Company became a part of the Railway Steel-Spring Company. Aaron French lived but a few months after the incorporation of the Railway Steel-Spring Company; but the office of chairman of the board of directors was not filled until March, 1906, when Julius E. French was elected. Mr. French at the time of his death was also a director and chairman of the executive committee of the Railway Steel-Spring Company, and a director in several other concerns, including the American Locomotive Company, and Chicago-Cleveland Car Roofing Company.

TRADE PUBLICATIONS.

Valves.—A folder from Jenkins Bros., New York, tells why they believe their valves are better than others.

Brill Cars.—A 92 page, 6 by 9 in., cloth bound catalogue has been published by The J. G. Brill Company of Philadelphia, Pa., which illustrates and gives general data for a large number of representative city and interurban cars and trucks that have been built within the past two years.

Treatment of Boiler Feed Waters.—A booklet on this subject from the Dearborn Drug & Chemical Works, of Chicago, discusses the effect on the boiler of different substances found in water, and explains the Dearborn methods of studying and treating the water to neutralize or overcome the injurious effects.

Signals.—Bulletin No. 4786 from the General Electric Company describes a simple and reliable motor signal having a signal mechanism suitable for either two or three position operation in either the upper or the lower quadrant. This standard mechanism is also applicable to either top or bottom mast operation with but slight modifications. The bulletin contains nearly

90 pages of description, including exterior and interior views of the signal and a detailed description of the signal and apparatus used in connection with its operation.

RAILWAY STRUCTURES.

ALBANY, N. Y.—Grounding has been made by the Pennsylvania Railroad and the American Railway Company to the plans prepared by recently deceased Mr. Albany for the new passenger station. Another conference will be held under a planning agreement the two railways and the city assume an equal share of station.

ELGIN, ILL.—A new station under Northwestern grade Road, with connection.

BOSTON, MASS.—A petition has been filed with the secretary of state at Massachusetts asking for permission to permit the state to build a double-track tunnel and equip it for railway operation from East Boston, near the harbor, to South Boston, thence to South Framingham.

DRYDEN, N. Y.—The New York Public Service Commission, Second district, has ordered the elimination of the highway grade crossing on the Dutch Valley near Varna station in the town of Dryden, Tompkins county. The highway is to be carried over the railway by an over grade crossing, the clearance to be not less than 22 ft. above the top of the rail.

GOWANDA, N. Y.—The New York Public Service Commission, Second district, has ordered the Erie Railroad to remove the existing passenger and freight station at Gowanda, and build a new passenger station on the site. The new station is to be 26 ft. wide and 72 ft. long. Work is to be started in the spring of 1911, and is expected to be finished by August.

HUTCHINSON, KAN.—The Atchison, Topeka & Santa Fe has prepared plans for a new roundhouse, car repair shops, coal chute and switching yards.

HUNTINGTON, N. Y.—The Public Service Commission, Second district, has ordered the elimination of the Comac and Crab Meadow road grade crossing on the Long Island Railroad, east of East Northport, in the town of Huntington. The highway is to be carried over the railway on an overhead highway bridge.

LAWTON, OKLA.—The St. Louis & San Francisco is to build a new four-stall roundhouse 40 ft. x 160 ft. The building will also contain a machine shop and blacksmith shop.

LAS VEGAS, NEV.—The Salt Lake, San Pedro & Los Angeles is reported to have prepared plans for a freight house, roundhouse and machine shop to be built at Las Vegas.

LE RAY, N. Y.—See Pamela, N. Y.

LIBERTY, N. Y.—The New York Public Service Commission, Second district, has ordered the elimination of the grade crossing on the New York, Ontario & Western near Youngs gap, in Liberty. The highway is to be carried over the railway tracks by an over grade crossing on a metal bridge.

LOS ANGELES, CAL.—Plans have been filed by the Southern Pacific and the Pacific Electric, for a drawbridge to be built over the channel between the turning basin and west basin in San Pedro harbor. The bridge is to be of the direct lifting type, with 180-ft. clear spans.

OGDEN, UTAH.—It is reported that the Denver & Rio Grande expects to build a \$50,000 freight house.

PAMELIA, N. Y.—The New York Public Service Commission, Second district, has ordered that the highways in the town of Pamela, on the new cut-off being built between Sanfords, N. Y., and Watertown by the Rome, Watertown & Ogdensburg, shall be carried under the grade of the railway in subways, and that the crossing on the dividing line between the towns of Pamela and Le Ray is to be carried over the railway. The highway in the town of Le Ray is to be carried under the railway in a subway.

WEST MINSTER, B. C.—The Canadian Pacific has bought a plot of ground at Coquitlam, it is said, which is to be used as a site for shops, roundhouses and freight sheds. It is understood that the company will make this place the mechanical headquarters for the Pacific division.

Late News.

The items in this column will be omitted after the published departmental news closes.

The Louisville & Nashville has purchased for the Pressed Steel Car Company, enough for steel car frames for 1,200 steel cars, under the rolling contract, a building in the South Louisville and New Decatur shops. The order involves approximately \$140,000.

A press dispatch from Washington says that Chairman Weeks of the house committee on post offices expects to report the post offices appropriation bill in the near future without any provision changing the rates of postage, an amendment of some class matter and without any provision for a parcels post. Mr. Weeks thinks that these provisions if made at the current session will have to be presented in a separate measure or measures.

The telegraph and telephone companies, with the exception of the independent telephone people in the West, at a hearing before the Interstate Commerce Commission December 7, claimed that they are not compelled by the new interstate commerce law to file tariffs of rates as is required of the railways, which are likewise subject to the same act. Section six of the new law sets forth, so they say that charges for transportation shall be placed on file only with the commission.

A general rehabilitation of the Boston & Maine system has been decided upon. The improvements will include strengthening of bridges, making equipment heavier, especially in locomotives, improving road bed, lowering of grades, and to some extent straightening curves. The changes will be made slowly, but systematically; improvements will be centered at points of the greatest need, including new tracking at Lynn, electrification of the Hoosac tunnel, betterment of rolling stock, and relaying rails.

The Interstate Commerce Commission in an opinion by Commissioner Prouty in the case of W. L. Douglas Shoe Co. et al. v. Adams Express Co., finds that after defendant had purchased the stock of a competing express company a lower rate via rail and water from Brockton and other points in Massachusetts to New York City was withdrawn and the route abolished. On petition of shippers asking that the rail-and-water rate and route be restored and praying for reparation, it is held that the commission has not sufficient knowledge to attempt to make an order with respect to all the localities involved, but suggests to defendant that the original route and rate be restored or that an equivalent rate be established by some other route; if defendant does not within 60 days file its tariff in obedience to this suggestion, the matter will be set down for further investigation, and a definite order will be made. Claim for reparation denied. The commission has no authority to order the rival company which sold out to defendant to restore this route and rate. If such authority resides anywhere, it is in the courts and not in the commission. (19 I. C. C., 539.)

The United States Circuit Court of Appeals has handed down a decision holding that it is unnecessary that complaints under the Sherman anti-trust law involving freight rates on railways should first be brought to the attention of the Interstate Commerce Commission before being taken to the federal courts. Henry E. Meeker, a coal operator in the anthracite regions of Pennsylvania, brought suit against the Lehigh Valley, charging that the defendant and other coal carriers conspired to increase the prices of anthracite coal at the mines and charges for the transportation of coal such a sum as to enable them to monopolize the trade and commerce in anthracite coal between Pennsylvania and New York, and by driving all independent shippers out of business to obtain exclusive control of such business. The Lehigh Valley demurred to the complaint on the ground that it did not state facts sufficient to constitute a cause of action under the Sherman law, in that no specific damages were asked for, and also that the controversy was a question of the adjustment of freight rates which should have been taken primarily to the Interstate Commerce Commission. "The nature of the injuries," says the court, "is fairly set forth, and the only inference possible from the allegations is that the damage arose as the direct consequence of the conspiracy charged."

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Chattanooga Southern expects to order some locomotive equipment shortly after the first of the year.

The Wichita Falls Route has ordered two consolidation and one eight-wheel locomotive from the Baldwin Locomotive Works.

The Lake Superior Terminal & Transfer has ordered two eight-coupled switch engines from the Baldwin Locomotive Works.

The Cincinnati, New Orleans & Texas Pacific has ordered from the Baldwin Locomotive Works 10 consolidation and five Pacific locomotives.

The Buffalo, Rochester & Pittsburg is preparing specifications for 10 locomotives, which will be submitted to the builders within the next few weeks.

CAR BUILDING.

The Swift Refrigerator Transportation Company will order 50 produce cars.

The Kanawha & Michigan is asking prices on 1,000 50-ton gondola cars.

The Atlanta & West Point is said to be in the market for passenger cars. This item is unconfirmed.

The Chattanooga Southern expects to order several hundred freight cars and a number of passenger cars shortly after the first of the year.

The Buffalo, Rochester & Pittsburg is preparing specifications for from 1,500 to 2,000 freight cars and 20 passenger cars. These will be submitted to manufacturers within the next few weeks.

The Cold Blast Transportation Company will order 25 all-steel tank cars shortly. These cars have been under consideration for some weeks, but no definite action has been taken as yet.

MACHINERY AND TOOLS.

The Pacific Electric Railway of Los Angeles, Cal., has made a contract with the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., for one 1,000-kw. and two 600-kw. motor generator sets, and three 475-kw. and six 300-kw. oil insulated self-cooled transformers.

IRON AND STEEL.

The Toledo, Peoria & Western has an inquiry out for 1,000 tons of rails.

The Grand Trunk is reported in the market for 5,000 tons of heavy section rails.

The Pennsylvania is said to be in the market for 1,500 tons of steel for a bridge on the New York division.

The Vicksburg, Shreveport & Pacific has ordered 500 tons of rails from the Tennessee Coal & Iron Company.

The Nashville, Chattanooga & St. Louis has ordered 24,000 tons of rails from the Tennessee Coal & Iron Company.

The Philadelphia & Reading is reported to have divided an order for 20,000 tons of rails between the Pennsylvania Steel Company and the Bethlehem Steel Company.

The Western Maryland, it is reported, will award a contract for 20,000 tons of rails within 60 days. The greater part of them will be used on the new Cumberland-Connellsville extension.

Hill Steel Tie Fastener.

The usual fastening for holding a rail to a steel tie is an ordinary clip bolted to the tie, the clip extending over the base of the rail far enough to hold it firmly. For ordinary work this method of fastening has been acceptable, although some trackmen offer an objection to it on account of its requiring additional tools to those ordinarily found in the track-men's kit.

There have been in use this year, at the Duquesne steel works of the Carnegie Steel Company, Pittsburgh, Pa., about 2,000 ties with the rail fastened thereon with a cut spike. The tie is the I-beam type, weighing 20 lb. per foot, top flange 4½ in., bottom flange 8 in., and depth 5½ in. For the ordinary fastening, two square holes are punched in the top flange and two in the bottom. The spike is driven through the hole in the top flange into a hollow malleable iron casting filled with wood. This casing has a short lug on the bottom, which goes through

the base of the tie and tends to hold the casting in place until the spike is driven. The hole in the lower flange is punched large enough so that if a spike breaks off it can be driven on through the tie. The malleable casting has a wall about ¼ in. thick, into which the wood core is driven. The spike can be drawn from the tie with this device with the ordinary claw-bar.

In pulling tests, with the spike driven through the tie, it was found that it required 4,900 lbs. to remove the spike. The



Hill Rail Fastening.

hole was then plugged with an ordinary tie-plug, and the spike re-driven, and it was found that it required 5,000 lbs. to pull the spike. The hole was again re-plugged and this time it required 5,500 lbs. to remove the spike. The fourth time the hole was plugged, the spike could not be driven into the tie without bending, and no further tests were made. Driving the plugs into the tie rapidly did not seem to affect the malleable iron casting.

Each casting weighs about one pound, and, with the expense of putting in the wooden core and the spikes, the entire expense of the fastening would not run over 25 cents per tie.

The photograph shows the track before it was ballasted. This track is on a 15-deg. curve, and since ties were installed the



Ties and Fastenings Before Ballasting.

outer rail was taken off and a new one placed thereon, with no more delay to traffic than would occur under ordinary wood tie conditions. This type of fastening should be particularly applicable to steel ties laid in concrete, as it is an easy matter to remove the rails without interfering whatever with the foundation.

The device is patented by W. H. Hill, a department superintendent of the plant where the ties are installed.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY EIGHT TIMES IN JUNE, BY
THE RAILROAD GAZETTE (INC.), 84 EDITION ST., NEW YORK.

CHICAGO: Plymouth Bldg. CLEVELAND: Williamson Bldg.
LONDON: Queen Anne's Chambers, Westminster.

W. H. BOARDMAN, President.
E. A. SIMMONS, Vice Pres. & Treas. HENRY LEE, Secretary.
The address of the company is the address of the officers.

EDITORS

W. H. BOARDMAN, Editor	REY V. WRIGHT	B. B. ADAMS
SAMUEL C. DENN,	G. L. FOWLER	W. E. HOOVER
<i>Western Edit. Mgr.</i>	WILLIAM FORSYTH	E. W. KRAEGER
BRADFORD BOARDMAN,	S. W. DUNNING	H. H. SIMMONS
<i>Eastern Edit. Mgr.</i>	CLARENCE DEMPING	

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada.....	6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies.....	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOLUME 49

DECEMBER 16, 1910.

NUMBER 25.

CONTENTS

EDITORIAL

Editorial Notes.....	1135
Interstate Commerce Appointments.....	1136
Railroad Attitude Toward Valuation of Railways.....	1137

ILLUSTRATED

Quality of Steam and Factor of Evaporation in Locomotive Tests....	1140
Automatic Block Signals on the Washington Water Power Com- pany's Railway.....	1142
Recent Mallet Articulated Locomotives.....	1144
Reinforced Concrete Work on the Northern Pacific.....	1147
Dominion Trunk Railways in Lower.....	1149
Five Years' Development of German Railways.....	1150

LETTERS TO THE EDITOR

Letters to the Editor.....	1138
----------------------------	------

MISCELLANEOUS

Earnings and Expenses of Twelve Western Lines.....	1144
Proposed Legislation Regarding Car Clearance.....	1149
Making Rates for a New Railway—An Object Lesson in Economics.....	1154
Growth of Population, Railway Earnings and Taxes.....	1156
Foreign Railway Notes.....	1141, 1156

GENERAL NEWS SECTION

General News Section.....	1157
---------------------------	------

SUPPLY TRADE SECTION

Supply Trade Section.....	1169
---------------------------	------

SOME new phases of the threatened Grand Trunk-New Haven warfare in New England have developed. Many months have passed since the Grand Trunk got its charter from the Rhode Island legislature for the extension of the system from Palmer, Mass., to Providence, R. I. A preliminary survey was made, followed by a new survey of the Palmer-Providence route, but thus far, apparently, not a spadeful of earth has been turned or other positive steps taken by the Grand Trunk. But on the other side there have been notes of warning. The New Haven is

to make authority of the Vermont legislature to come in build certain part of the line which will give its westernmost Boston & Maine front all dependence on the Grand Trunk for their traffic. The Boston & Maine have a history of some kind of dealing with the Grand Trunk system, and reported threats of deserting it, largely to the rail transshipment business, have been desisted by a former head of the system. This is the case from the land side of the border. On the Canadian side the subject is still intermixed with politics; the government is harassed at one extremity of its domain by the western farmers assailing the high tariff, and at the other by the maritime provinces opposing, as detrimental to their seaports, railway extension into New England. The New Haven railway authorities assert that it will cost the Grand Trunk \$10,000,000 to get to Providence with even minor terminal facilities. The Grand Trunk people say they can get there for half that amount, and they have succeeded in winning a case before the Massachusetts Railway Commission, from whom the New Haven sought permission to build a line obstructive, if not fatal, to the Grand Trunk project. Two outcomes now seem of about equal probability. One is the passing through, sooner or later, Canadian party politics allowing it, of the Grand Trunk enterprise, during a period of acute and indefinite war of two big railways. The other is that, after a spell of threats, there will be a treaty based on concessions by which the Grand Trunk surrenders the Providence invasion for new traffic privileges in New England, very likely reaching to New York. Incidentally, that old thorn in the New Haven side, the holding of the Central Vermont by the Grand Trunk, may be withdrawn.

WE published last week a statistical exhibit, prepared under the direction of the Interstate Commerce Commission, showing in full the commission's own estimate of the earnings and expenses of the New York Central & Hudson River during the past 10 years; and we published abstracts from similar statements for other roads. While differences of opinion in accounting theory are as sure to be found, as are creeds in religion, it appears that the method pursued by the Interstate Commerce Commission is, on the whole, fair. From the statements that have so far been completed, it seems to us that the contention of the roads in the rate cases is strikingly borne out by these figures compiled by the judges in the case. There have been two criticisms of the method used in preparing the figures—one well founded and the other not. The method of showing accumulated surplus has been criticised because accumulated surplus is not in the form of cash, but may be invested in road and equipment, or in other property. This is a fact; but, nevertheless, under the laws of the United States, and under the rulings of the Interstate Commerce Commission, this surplus is available for distribution. If it is invested in the property, it may be distributed in the form of stock dividends. There have been any number of instances where roads have capitalized their accumulated surplus, or have paid large extra dividends out of this surplus. It would seem, therefore, that in showing accumulated surplus as a profit and loss surplus available for distribution, the commission was well within sound accounting practice. In the New York Central figures, as in case of the other roads, the Interstate Commerce Commission showed "operating income from railway operation: per cent. on cost of road and equipment" for the 10 years, arriving at this figure by taking the ratio of operating income to cost of road and equipment, as shown on the company's balance sheet. Cost of road and equipment, of course, means road and equipment owned and does not include road and equipment leased. The New York Central & Hudson River owns only a little over 800 miles of road, while it operates over 3,500 miles. Operating income, therefore, is profit from the operation of 3,500 miles of road; and it has been pointed out that it is not fair to give a ratio of this profit applied to cost of road and equipment of but 800 miles. This ratio, which in the case of the New York Central was something over 9 per cent., is obviously misleading; but from the returns made by the roads it would probably be quite im-

possible to get at the actual cost of road and equipment of the 2,700 miles of line operated but not owned. What would appear a fair way to do would be to subtract net rentals from operating income and then to get the ratio of this net operating income to cost of road and equipment owned. If this is done in the case of the New York Central, it appears that the road earned 5.1 per cent., and not 9 per cent. on its cost of road and equipment. Even this figure is misleading, however, if it is not fully borne in mind that the earnings from the 800 miles of line would not be 5 per cent. on its cost, or anything like it, if the company did not operate the other 2,700 miles. This fact becomes all the more noticeable if the difference between the 5 per cent., as shown by our method of compilation, and that of the Interstate Commerce Commission, showing 9 per cent., is analyzed. It appears that the New York Central pays in rentals for the operation of 2,700 miles of line something like \$10,000,000. If the rentals, therefore, are all the returns that the owners of the 2,700 miles of line get on their property, this property obviously must have cost very much less than the New York Central's 800 miles, or else they are getting an entirely inadequate return on their investment. As a matter of fact, this discrepancy is probably caused by the manner in which returns are made.

SOME months ago, when the first census returns for the American cities came in, we had occasion to refer to the marked urban drift of population, and its relation to railway business. The publication of the census returns for the whole country by states now makes it possible to study the subject in a broader way. It is axiomatic that increased population spells increased travel and increased product, though they may be in diverse ratios; in one region, like the far West, they may mean railway extension; in another region, like the older Eastern states, they may mean increased business of old roads without much extension of lines, though with a good many costly improvements. The new census shows us three regions of great increment of population. There is an eastern factory group of states with much concentration in cities, thus supplying both travel and high-class freight products; a second group of high increment composed largely of the old slave states of the South—but with Oklahoma and two or three new states added—cotton growers mainly, but with stalwart factory centres growing fast, and, as a whole, a sure region of considerable new railway enterprise; a third group, in the central West, lowest in growth of population, where new railway business must depend chiefly on the product of manufacturing cities; and, finally, that vast region, with its extremely high population increment, made up of the far West, including the Pacific slope and a few states eastward, where the railway is now having, and will have for some years to come, a large field for expansion. Its most interesting fact is the growth in the double tier of states next to or near the Canadian border and west of Minnesota:

	Pop. 1910.	Pop. 1900.	P. C. increase.
Idaho	205,594	161,772	101.3
Montana	376,053	243,329	54.5
Oregon	672,765	413,536	62.7
North Dakota	577,056	319,146	80.8
South Dakota	583,888	401,570	45.4
Wyoming	154,145	92,531	57.0
Washington	1,141,990	513,103	120.4
Total	3,831,491	2,144,987	79.7

To the above, perhaps California, with its present population of 2,337,449, an increase of 70 per cent. may be added. On that northwest tier of states, growing rapidly, most of them states comparatively new, with great road railway lines on both sides of the border and also crossing it, we are certain during the next census decade to see much railway history made. Such population as the St. Paul, the Hill Bros., the Canadian Pacific and the Great Northern, the latter yet to come, lie in a region where we are likely to see not only great local, but others that are political and international.

INTERSTATE COMMERCE APPOINTMENTS.

PRESIDENT TAFT has made up the Commerce Court (as announced in our news column) by putting at the head of it Chairman Knapp, of the Interstate Commerce Commission and by appointing for the other four places federal judges, or men who have had experience as judges. Mr. Knapp is the only one of the five who has had extensive experience in transportation matters. This course of the President was almost compulsory, as he could not appoint two judges of the new court from the same judicial circuit, since after serving their terms the members become circuit court judges. Under that limitation he could hardly be expected to find many railway experts. The vacancy on the Interstate Commerce Commission, and one other vacancy there, are filled by the appointment of two men well known to railway officers. The new chairman of the commission will be selected by the members themselves. It is understood that Messrs. Prouty and Lane were offered places on the Commerce Court (Mr. Prouty for the five year term) and that they declined; and the declinations, it is said, were due largely or wholly to the importunities of shippers who insisted that these two remain on the commission to take part in deciding the important cases now pending there.

If Mr. Knapp had been given this promotion any time prior to November 22 the news of it would have been received with approval by all who have closely followed the work of the Interstate Commerce Commission. It happened, however, that the annual dinner of the Railway Business Association was held in New York on the date mentioned, that Mr. Knapp made a speech there; that in that speech he outlined the policy that he thought ought to be followed in the regulation of railways; and that the shippers and their lawyers who are engaged in trying to prevent advances in freight rates did not agree with what he said. As they did not agree with it, of course they said that Mr. Knapp was pro-railway, and, therefore, there has been some criticism of his promotion.

We are not surprised that Mr. Knapp has been criticised. For many years the Interstate Commerce Commission and its individual members have been seeking to secure extension of their jurisdiction over the railways. In order to support their demands they have had to criticise shortcomings of railway management; and some of them have voiced criticisms which have been regarded, at least by railway managers, as improper and unjust. This past attitude of the commission has created the impression in many minds that it is its business constantly to attack and harass the railways. So when Mr. Knapp got up and outlined a constructive policy, not for further extending the commission's regulatory authority, but for protecting the railways and fostering their development, the shippers, whose idea of the commission's duty appears to be that it ought always to decide cases in favor of the shippers unless the railways prove their case beyond a reasonable doubt, began to assail Mr. Knapp as unfair. His Railway Business Association speech was rather favorable to the railways, but if there was any impropriety in making it we can cite scores of instances where other members of the commission have been guilty of far greater improprieties. As a matter of fact, the commission is an administrative as well as a judicial body. As an administrative body, it is not only its right but its duty to consider not merely what is a constitutional policy of regulation of railways but also what policy is in the interest of the public welfare; and its members have as much right to have opinions on this phase of the subject and to express them as have members of Congress, from which body the commission derives its delegated administrative powers. The shippers are quite willing to have the commissioners remember that they are members of an administrative body when they think that railways ought to be denounced or prosecuted, but they want them to consider themselves members of only a judicial body when they are disposed to say anything favorable to the railways.

Mr. Knapp is the ranking member of the commission in point of service, having been appointed in 1891, while Commissioner Clements, who ranks next in point of service, was appointed the

next year. He has been a vigorous advocate of the various acts that have been passed to extend the regulating authority of the commission.

Of his great and peculiar qualifications for chief justice of the Commerce Court, there can be little question. He is a lawyer by profession. His public utterances show that he is not a mere case lawyer, but that he is a philosophical lawyer who honors the degree of LL.D. conferred on him by his Alma Mater in 1892. While the commission is an administrative body, it is also in a very important sense a judicial body. Its main function is the determination of reasonable rates, and the courts have held that this is distinctly a judicial function. The Interstate Commerce Commission, not only in regulating rates but in regulating other phases of the railway business, constantly runs close to, if it does not encounter, various constitutional limitations. In this fact is to be found the only justification for the commission having in the past been mainly composed of lawyers. But a knowledge of law without a knowledge of political science, political economy and practical railway affairs does not fit a man for a member of the Interstate Commerce Commission. He has to acquire these other kinds of knowledge if he is to be a fit commissioner. Mr. Knapp has acquired and possesses these various kinds of learning to a degree exceeding perhaps any other man in the United States. Now, these are the very kinds of knowledge that are requisite to equip for membership on the Commerce Court, for this court is to hear only appeals from the Interstate Commerce Commission. Besides the requisite equipment of knowledge acquired by such an experience, Mr. Knapp has to a marked degree the judicial temperament and the ability to write clear, forcible English.

Balthasar Henry Meyer, who succeeds Mr. Knapp as a member of the Interstate Commerce Commission, is one of the best equipped men for his duties ever appointed to the commission. Perhaps he is the best equipped. He was a profound student of and an interesting, learned and fair writer on railway economics and government regulation of railways for years before he was appointed in June, 1905, a member of the railway commission of Wisconsin. After serving two years on the commission he was appointed in 1907 to succeed John Barnes as its chairman. As a member and as chairman of the Wisconsin commission, he has done work which has merited and received the warmest praise from shippers, railway officers and the public.

A good many officers of the railways operating in Wisconsin differ from him in their theoretical opinions regarding the way that railway rates ought to be made and regulated. Mr. Meyer goes farther in advocating the cost of service theory of rate-making than they can follow him. But they recognize the fact that in him the state of Wisconsin has had a railway regulating official who, in the performance of his duties, has been influenced only by what as an economist and a statesman—for he deserves the name—he has believed to be lawful and in the interest of public policy; that he never put his ear to the ground before rendering a decision to find out if it would further his political ambitions, because he had no political ambitions; and that rather than render what he believed an unfair decision he would quit the commission. Recognizing him to be this sort of regulating official, and finding that whenever he wrote an opinion for the commission he always gave some sound and usually conclusive reasons for the decision at which he arrived, the railways generally have accepted decisions when he wrote the opinions, even though they considered them much too unfavorable to the roads. It is often said of the Interstate Commerce Commission, both by railway officers and shippers, that it is a political body. If this has been true in the past, it is apt to be less true so long in the future as Mr. Meyer belongs to it. While he has specialized on railway economics, he has an international reputation in the entire broad field of economic investigation and writing. The Interstate Commerce Commission heretofore has been composed almost entirely of lawyers. It will be refreshing and valuable to have in its membership a leading political economist.

C. C. McChord, who has been appointed an Interstate Com-

merce commissioner, succeeding Francis M. Cockrell, served for a number of years as chairman of the Kentucky Railroad Commission and was defeated for re-election to the commission in the fall of 1907. If one were to judge entirely from Mr. McChord's speeches during his campaign for election to the office of railway commissioner, he would get the impression of a radical, strongly antagonistic to railways; but, as a matter of fact, this is a quite erroneous impression. Mr. McChord's speeches were for political purposes. Without doubting the sincerity of the man, it is nevertheless true that his attacks on railways were all made in the heat of political controversy, while as a commissioner he was always honest and, on the whole, just. He is a man of strong opinions, with strong likes and dislikes. When once convinced of the rights in a given case he is apt to disregard further argument and to uphold what he believes under all circumstances. Mr. McChord is an able lawyer, but hardly a man of a judicial turn of mind. He is a practical man, with little of the student, but with a great deal of native shrewdness. While he was chairman of the Kentucky commission, the Kentucky legislature passed a long and short haul clause worded almost exactly like the amended long and short haul clause in the Interstate Commerce Act. The question of its enforcement was left to the discretion of the railway commission, and under Mr. McChord the commission decided to allow more to be charged for a short haul than a long haul in a multitude of cases where competition was effective at specified points, although in general the principle of the long and short haul prohibition was enforced. After Mr. McChord failed of re-election to the commission, he entered private practice, and his firm were attorneys for the railways in the cases in which the long and short haul clause was almost entirely nullified by the railway commission. The railways in Kentucky, while fighting Mr. McChord politically, felt that he was, on the whole, just, and aside from the question of his politics, an able man. He is familiar with the theory and practice of rate making, and his views have usually been held to be sound. When he was chairman of the Kentucky commission, the coal operators raised the price of coal to dealers by 25 cents a ton, and the railways, in an effort to stimulate the consumption of coal, reduced the freight rate by 80 cents a ton. The local dealers made no reduction in the retail price, and this fact was called to Chairman McChord's attention by the railway companies. He not only brought considerable pressure to bear on retail dealers to compel them to reduce their prices, but in his speeches through the state he gave full credit for the lower prices to the railway companies. Mr. McChord has been active in the National Association of Railway Commissioners and brings to his work on the Interstate Commerce Commission a fairly long and varied experience in dealing directly with railway regulation.

RAILWAY ATTITUDE TOWARD VALUATION OF RAILWAYS.

PRESIDENT TAFT renewed in his annual message his recommendation for an appropriation to enable the Interstate Commerce Commission to make a valuation of railways. There probably will be little or no opposition to this by most railway managers. They are not converts to the plan of using physical or any other kind of valuation as a basis for rate-making or regulation. They merely have decided that, in view of the state of public opinion and the attitude of railway regulating authorities, it will be better for the roads for their managers to cooperate in getting a valuation fairly made and fairly used than to oppose any kind of valuation at all, with the probable result of having one unfairly made and unfairly used.

If a mere physical valuation were made and there were an attempt to base all rates on cost of service, including proportionate parts of operating expenses, fixed charges and dividends, one of two things would result: The Supreme Court of the United States would hold the valuation worthless and the attempt to fix rates on it unconstitutional, or the business of the country, including that of the railways, would be demoralized. This is generally recognized now by those who have given special study to the subject. In their opinion a valuation could be used, not

as a measure of the reasonableness of specific rates, but merely as a measure of the reasonableness of the total return derived by a railway from its entire business. Railway men are confident that a fair valuation would show that the average return has been and is very much smaller in proportion to the actual value of the roads than is popularly supposed.

While railway managers probably will not oppose all valuation of railways, they ought to try to see that any legislation that may be passed is fairly and intelligently drafted. One of the just criticisms made against most of those whom the roads have sent to represent them at state capitals and at Washington has been that they usually have opposed any legislation affecting railways instead of furnishing to the lawmakers information and ideas that would enable them, if some legislation were going to be passed in any event, to make it fair and beneficial, or, at least, as nearly so as practicable. It is evident that some form of federal legislation for valuation of railways is practically inevitable sooner or later, and this affords the officers of the railways a chance for constructive work. In providing for a valuation Congress may decide to direct in more or less detail how it shall be made. If so, the lawmakers should be clearly shown that if they want an appraisal that will be worth anything they should not provide for a mere physical valuation. There has been a great deal of agitation for physical valuation; but there is no warrant for it in the decisions of the United States Supreme Court. In the case of *Smyth v. Ames* the court indicated beyond all peradventure that in ascertaining the "true value," which it said was the basis for all calculations as to the reasonableness of rates, consideration must be given to each and every factor that enters into the value of a railway as a going concern. It specifically mentioned not only the original cost of construction and of permanent improvements, and the cost of reproduction, but also the amount and market value of stocks and bonds outstanding, the probable earning capacity of the property under particular rates prescribed by statute, and the sum required to meet operating expenses. It added, "We do not say that there would not be other matters to be regarded in estimating the value of the property." Railway representatives should insist on consideration being given to all these factors; not because there is ground for fear that a mere physical valuation would be less than their capitalization—for we think most railway men believe a physical valuation would exceed the total net capitalization—but because less than this would be unfair and because the Supreme Court has indicated that it is the only way to get a legal basis for calculating the reasonableness of rates.

One of the questions that will arise, either when Congress is framing the valuation bill or when the Interstate Commerce Commission is making its plans for conducting the valuation, will be as to whether the railway is entitled to have considered the "unearned increment" in its right-of-way and terminals. The Minnesota commission, when it made its valuation, contended that the railway is not entitled to any return on its unearned increment. The Interstate Commerce Commission in at least one case referred to this as a doubtful matter. It is desirable to make clear to Congress and to the commission that it is not at all doubtful. The Supreme Court of the United States, in the case of *Wilcox v. Consolidated Gas Company* (212 U. S. 19), said:

"There must be a fair return on the reasonable value of the property at the time it is being used for the public. . . . And we come with the court below that the value of the property is to be determined at the time that the inquiry is being made regarding the rates. If the property instead of being used for the public, the company is entitled to the benefit of such increase."

The decisions of the court plainly indicate that if valuations of public utility corporations are made they must be made for the protection of the corporation as well as for the protection of the public. Indeed, the valuation theory was originated by the Supreme Court, not as a means of keeping the railway from earning more than a "fair return," but of protecting it from being restricted to less; and there has been no decision in which it has been held that rates otherwise reasonable may be reduced

because in the aggregate they yield more than the so-called fair return.

There are still many persons who think a valuation should take into account only the original cost of construction, or only the cost of physical reproduction, without any allowance for unearned increment, and that then all rates should be so fixed that each would cover operating expenses and a mathematical proportion of fixed charges and dividends, the total return on the valuation not to exceed 5 or 6 per cent. If public opinion demanded that a valuation be made and used in this way, past experience shows that it might get its will. If it did the valuation and the rates based on it sooner or later would be invalidated by the courts. But before this could be accomplished an enormous amount of harm could be done. Therefore, it is necessary to educate the public on the subject of valuation and its relation to rate-making, as well as the lawmakers and the commission.

Letters to the Editor.

LANTERN TESTS FOR COLOR PERCEPTION.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In your issue of November 18 there is an excellent paper by Dr. G. H. Taylor, of the New South Wales government railways, on tests for color vision in New South Wales. There is one statement in it, however, which needs correction. He says "owing to the disks moving in a regular sequence the colors in the Williams lantern could be learned by a person with defective color sense." This depends entirely on how the lantern is used.

There are eighteen colors in the disk, each numbered, and the disk can be rotated forward or backward as desired. It is not necessary to start the examination with number one, for the colors can be shown, beginning with any number. While covering the openings of the lantern with the hand the disk can be moved forward or backward, and when the colors are again shown, by removing the hand, the regular sequence is broken. In this way the lantern can be so used that the colors cannot be memorized.

The lantern which Dr. Taylor refers to as the "old Williams lantern" is the model of 1903, which is also used on a number of the railways in America. The last model, that of 1909, shows one, two or three lights at one time, but the colors and their numbers are the same as in the model of 1903. The intensity of the color varies with the different pieces of glass, or it can be changed by altering the intensity of the electric lights in the lantern by a rheostat in their base.

Experience has shown that it is essential in a proper test with lights for acuteness of the color sense to have a contrast of colors. This corresponds more closely to the conditions of actual service, for often a signal bridge will have several reds or greens showing at one time, and when an engineman comes into a large yard, at night, it is very necessary that his color sense should be good in order to pick out the signals governing his track from the many lights shown in the yard, and to recognize their color quickly and accurately. With the model of 1909 lantern 54 different combinations or single colors can be shown, as follows:

- | | | |
|--------------------|-----------------------|--------------------------|
| (1) Red | (17) Red and Red | (37) Red, Green, Red |
| (2) Green | (18) Green and Blue | (38) Green, White, Blue |
| (3) Red | (19) Red and Green | (39) Red, Red, Green |
| (4) Green | (20) Green and White | (40) Green, Green, White |
| (5) Red | (21) Red and Red | (41) Red, Red, Red |
| (6) Green | (22) Green and Green | (42) Green, Green, Green |
| (7) White | (23) White and Red | (43) White, Red, Red |
| (8) Red | (24) Red and Green | (44) Red, Red, Green |
| (9) Red | (25) Red and Red | (45) Red, White, Red |
| (10) Yellow | (26) Yellow and Green | (46) Yellow, Red, Green |
| (11) Green | (27) Green and White | (47) Green, Red, White |
| (12) Red or purple | (28) Red and Red | (48) Red, Yellow, Red |

(11) Blue	(11) Blue and Red	(12) Blue, Green, Red
(12) Red	(12) Red and Yellow	(13) Red, Red, Yellow
(13) Green	(13) Red and Green	(14) Red, Blue, Green
(14) Blue	(14) Blue and Red	(15) Blue, Red, Red
(15) Green	(15) Green and Blue	(16) Green, Red, Blue
(16) Yellow	(16) White and Red	(17) White, Blue, Red

In the lanterns, red, there are seven reds of different shades (the red at No. 1, No. 3, No. 8, etc., is not a repetition of the same red); also five greens of different shades, but not so marked as with the reds; two blues, one purple, one yellow, one smoky, and one uncolored glass. These colors and their numbers are the same as in the model of 1903, and many of the colors are glass cut from the roundels used in railway service, and, as before stated, the order in which the colors and their combinations can be shown can be varied at will.

Dr. Taylor's report of the results of his tests, giving the number of cases of defective color sense found in 12,000 examinations, is very interesting. He says "of these 4.92 per cent. were found to have defective color sense; classified as red blind 2.16 per cent.; green blind .12 per cent.; incomplete color blind 1.12 per cent.; and feeble color sense .41 per cent.; and 1.12 per cent. failed only in the lantern, the failures in the lantern being subsequently confirmed by Nagel's method."

If we add together the numbers in the first five items, in which apparently both the Holmgren worsteds and the Williams lantern were used, we have:

Red blind	2.16 per cent.
Green blind	.12 "
Incomplete color blind	1.12 "
Feeble color sense	.41 "
	<u>3.81</u> "

This gives us a total of 3.82 per cent. defective in their color sense, and this is a singularly complete confirmation of the figures which Holmgren published years ago, when he stated that as the result of the examination of 32,165 men he found 3.25 per cent. color blind. The other interesting fact which Dr. Taylor brings out is that 1.12 per cent. showed their defect only with the lantern test, and this figure added to the above 3.81 gives his figure of 4.92 per cent. of defectives.

In the last paragraph of his paper Dr. Taylor states that with the old lantern .42 per cent. were found defective in color perception who had not been discovered with the Holmgren test, and with the new form of lantern and greater care in using it this percentage was increased to .7 per cent.

The Holmgren worsted test, when properly used, gives us some information in regard to the color sense that we do not get with the lantern and its use should be continued, but in addition to the worsted test we need to use a lantern test in order to discover all the cases of dangerous defect in the color sense.

CHAS. H. WILLIAMS,
Consulting Oculist, Southern Railway,

ONE WAY TO FACILITATE THE FLOW OF TRAFFIC THROUGH TERMINALS.

November 28, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

When freight traffic is heavy its movement on railways has been likened to forcing a 3-in. stream through a 1-in. nozzle. During just such a period the Interstate Commerce Commission, after investigating transportation conditions as they existed in the Northwest, summed up the situation in these words:

"There is no diversion among railway men, so far as appears, as to the necessity for greatly increasing terminal facilities and for adopting new methods of handling freight at the larger terminals. The congestion of traffic arises not at point of origin but at points of destination or at terminals where freight is transferred from one line to another. This congestion has its effect upon all lines of railways reaching such terminals, for once a terminal contains more traffic than it can promptly handle and deliver it acts as a dam which floods a constantly increasing area behind it."

What was true in the Northwest obtained elsewhere. What obtained throughout the country in 1906 and 1907 will occur again; at least, there is no reason to doubt it, since no pronounced changes have been made either in facilities or methods. Within the last few months one of the foremost railway presidents has given expression to the belief that the terminal prob-

lem is perhaps the most important of the many problems that are waiting to be solved. It is essential, therefore, that railway men be on the alert to devise ways out of what is becoming an exceedingly serious situation.

It is a growing conviction that, as a means to facilitating the movement of cars, the M. C. B. defect card should be abolished. Even those who are wedded to the defect card system are willing to accept a change provided a better way is devised to safeguard the interests of the borrowers and the lenders of rolling stock. Post-mortems must be held daily over the bodies of the trucks of 250,000 vehicles of transportation. The defect card is the certificate which sets forth the verdict of the jury.

If a train or a car moves on a single railway for 1,000 miles inspections are made to insure safety, and for that alone. If the train or the car moves an equal distance over half a dozen lines it is inspected over and over again to protect the lender and borrower lines against each other. Little wonder, then, that the investigation made in 1906-07 brought out the statement that "the congestion of traffic arises at terminals where freight is transferred from one line to another." To overcome this difficulty we are begged to stop stopping cars in transit; or, if we must inspect for anything but safety, we are implored to conduct our "protection" inspection in a less important spot than the point of interchange.

The car owner says: "I am anxious to join in overcoming delays to cars and freight, but in doing so why should I assume responsibility for my car when the borrower wears it out?" And the thought is good. But the borrower does pay him, and because the owner does not know it he asks the borrower to pay him again. And the borrower does so without knowing that his obligation is already cancelled. This rental grew out of the fact that a distinguished body of five railway officers, acting under instructions from the American Railway Association, analyzed the cost of owning a freight car, to arrive at a figure which would be proper for rental purposes; and from the mass of figures gathered covering the years 1902 to 1907, inclusive, they deduced the following:

Item.	Cost in cents per day.	Cost per year.
Interest, 5 per cent.	9.12	\$33.28
Taxes	.61	2.25
Depreciation	5.71	20.84
Maintenance	14.42	52.61
Incidentals	4.56	16.64
Total	<u>34.42</u>	<u>\$125.62</u>

It is true these presidents did not agree respecting each item, but they did agree on one thing, namely, that through a per diem rental of 35 cents the borrower pays the owner interest, taxes, insurance, depreciation (they call it replacement) and repairs. It is this last item to which attention is specially directed, for whether the repairs are light or heavy, whether due to fair or unfair usage, without regard to when or how the damage may have taken place, whether by wreck or otherwise, the borrower, through the 35-cent per diem rate, pays the owner for all these things. After payment for all repairs, on what theory may a second payment be demanded?

Bills for repairs are rendered because M. C. B. rules permit it, and are paid because these rules require it. But what M. C. B. rules permit and require were determined before the framers knew that the car owner received through the rental rate pay for all repairs. They could not have known of this until recently, as the information was promulgated only last year—in November, 1909, to be exact. In further justification of M. C. B. rules, it should be remembered that at the time the information gathered by these five presidents, acting as a commission, was given out, the per diem rate was less than it is now.

Up to this time the per diem rate as a factor in framing M. C. B. rules has not even been considered; indeed, those who frame such rules have had no means of knowing exactly what elements do enter into the car rental. With the information now at hand, the situation changes.

Two of the five presidents urged in a minority report that the per diem rate should not include the amount which the borrower is required to pay through the M. C. B. rules. Perhaps they

thought it would be easier to omit it from the car rental rules than to remove it from the Master Car Builders' rules. It is not reported, however, that a removal from the M. B. C. rules was even contemplated. The remaining three urged in a majority report that the cost of repairs be included in the per diem rental. Perhaps they felt it would be proper to require the borrower to pay the same obligation twice; but is it not more likely that they realized a change in M. C. B. rules is on the way?

It is fortunate that the minority urged so strongly the complete injustice of a double charge. It is equally fortunate that the majority succeeded in including in the car rental rate the entire repair expense. The minority, by aiding in striking out of the M. C. B. rules this one requirement, will have won its point. And the majority, by aiding also in this direction, will have justified itself. Both will have aided in bringing about in a simple and inexpensive way an improvement of enormous magnitude.

In times past, when the borrower paid the owners scarcely enough to cover ordinary wear and tear, to say nothing of depreciation, taxes and interest on the investment, it was found absolutely necessary to increase the owner's responsibility for repairs. This was done to lessen the congestion in terminals which was being caused by extremely technical inspections when cars passed in interchange.

That such extensions of the car owner's responsibility greatly improved conditions, all agree. But, at the time, the idea was vigorously combated. If, then, the extension of owner's responsibility could be justified when the borrower did not completely remunerate the owner, either through M. C. B. rules or car rental rules, surely a further extension can also be justified, now that the borrower does remunerate the owner through the rental.

Even as the rules now stand, the owner pays, through M. C. B. rules, upward of 85 per cent. of the cost of repairs occurring on foreign lines, leaving the borrower only the remaining 15 per cent. to pay. And in order to fasten this 15 per cent. upon the borrower, all the money thus secured is and of necessity *must* always be expended to hire men to inspect cars for "protection"—not protection of human lives, but protection respecting repair bills.

The protection inspectors who swarm at points of interchange cannot earn their wages unless they delay traffic and congest terminals. Cars by the hundreds of thousands are suffered to be interfered with in their daily flow through terminals, not that their journey may be made safer, but that the borrower may be required to pay money through M. C. B. rules that he has already paid through per diem rules. Every defect card which a borrower puts on a car that he is sending home is equivalent to making the second payment of a discharged debt.

Can any thinking man justify the act of holding a train or a car in a crowded terminal—and all terminals are crowded—for an inspection respecting anything but safety? This practice of slowing up the movement of traffic, however unfortunate it may be, could not be complained of if there were not other ways of protecting the interests of the car owner and car borrower. But there is another way. The car owner is already protected, and that without interfering in the least with the flow of traffic.

The so-called "protection" inspection as now conducted at over 5,000 cities and towns in this country where cars are interchanged should be abolished and the M. C. B. defect card should be thrown away. The army of "protection" inspectors employed in these 5,000 cities and towns should be put to work inspecting for "safety" of human lives, under instructions to forward "safe" cars and to sleep "unsafe" ones.

If M. C. B. rules as at present framed surround the borrower and the lender with sufficient protection in car repair settlements amounting to \$25,000,000 each year, they are ample to cover the situation after the suggested change is made. If the strain on M. C. B. rules as at present drawn is too great, let real "protection" inspectors be employed and stationed not at the points of interchange where cars should move quickly, but at the points of repair, where they are of necessity at a standstill.

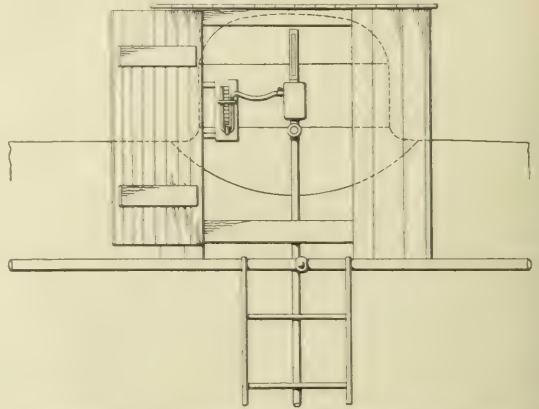
OPERATING MAN.

QUALITY OF STEAM AND FACTOR OF EVAPORATION IN LOCOMOTIVE TESTS.

BY J. E. GARDNER AND L. W. WILSON.

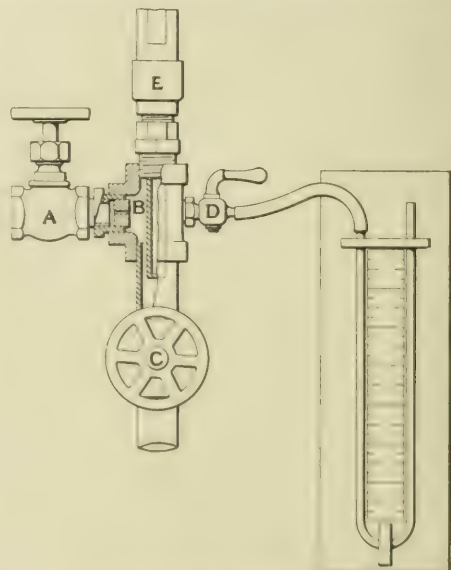
Chicago, Burlington & Quincy, Aurora, Ill., and West Burlington, Iowa.

To compare the performance of different locomotive boilers, or in fact of any boilers, it is necessary to compare the amount of heat that is actually utilized for turning the feed water into



Application of Throttling Calorimeter to Steam Dome.

steam at the boiler pressure. The most common way of expressing this is by determining in each case the equivalent evaporation from and at 212 deg. Fahr., that is, the pounds of dry steam per hour that would have been produced had the same amount of heat been used to turn feed water at 212 deg. into steam at atmospheric pressure. It is to simplify the calculation of this quantity that the accompanying curves have been worked out.



Throttling Calorimeter.

Were it not for the quality of the steam, the reduction of the actual number of pounds of steam evaporated in a given locomotive boiler to the equivalent evaporation from and at 212 deg. would depend on just two things, the temperature of the feed water and the boiler pressure. While the steam pressure may be read from the gage and the temperature of the feed water may be obtained from a thermometer in the tank, the determina-

tion of the quality of the steam is not such a simple matter and requires special apparatus.

Five number of locomotive and several experiments were made to determine the quality of the steam. The apparatus consisted of a throttling calorimeter made of pipe fittings, such as was originally designed by Professor R. C. Carpenter, of Cornell University, and shown in the accompanying drawing. Steam from the boiler enters the calorimeter through the valve A and a 1/16-in. hole in the plug at B and is then discharged to the atmosphere through the valve C. The pressure in the calorimeter is determined by a mercury manometer at D and the temperature by a thermometer in the thermometer cup E. The calorimeter was tapped into the steam dome of the locomotive at a point opposite the throttle valve in order to receive steam of the same quality as that which went to the cylinders. As this placed the calorimeter in a decidedly exposed position the utmost precautions were necessary to obtain correct results. In the first place the pipe leading from the boiler to the calorimeter was made as short as possible, and together with the calorimeter was carefully lagged. Even then the radiation loss was too great for accurate results. The next step was to build a wooden box

After comparing the results of a large series of tests made on the Chicago, Burlington & Quincy in 1901, 1906 it was found to be safe to assume a quality of steam of 98.5 per cent. In a small practice with a throttling calorimeter, after the same type boiler, hence the use of this valve in figuring the factors of evaporation shown on the accompanying diagram.

Following are the necessary formulæ for determining the quality of steam by the throttling calorimeter and also the factor of evaporation. Professor Cecil H. Peabody's steam tables were used and the symbols are the same as used with those tables. To determine the quality of steam by the throttling calorimeter:

Let X = the quality of steam in the boiler.

p = the pressure in the boiler, in pounds per square inch.

p' = the pressure in the calorimeter, in pounds per square inch.

t = the temperature of saturated steam at pressure p (from steam tables).

(This is the temperature in the calorimeter when the outlet C is open.)

p' = the manometer pressure reduced to pounds per square inch.

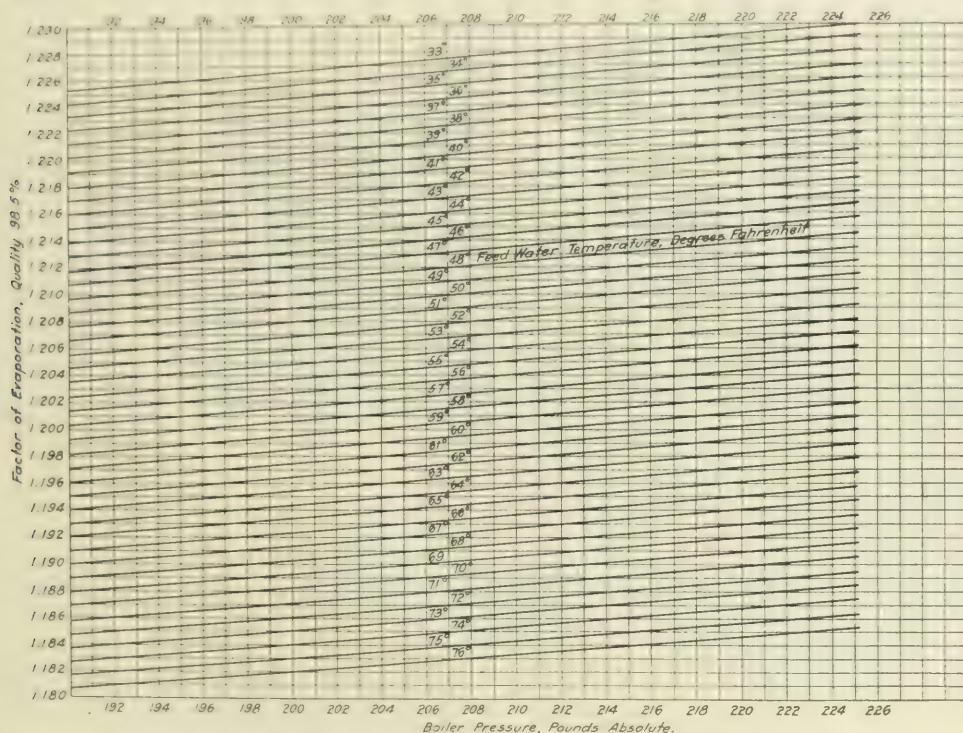
t' = the temperature of saturated steam at pressure p' (from steam tables).

q = "heat of the liquid" of steam at pressure p .

r = latent heat of steam at pressure p .

$$X = \frac{q + r - q'}{r}$$

The factor of evaporation, a number which if multiplied by



Factors of Evaporation Based on 98.5 per cent. Dry Steam.

around the calorimeter and the steam dome; the calorimeter was thus protected as well as it would be in a test of a stationary boiler.

In order to prevent any inaccuracy due to calculating the temperature of the steam in the boiler from the boiler pressure and to further correct any radiation loss in the calorimeter, the calibrated thermometer in the calorimeter was used for this purpose. With the outlet valve C and the cock D closed, the inlet valve A was left open, thus supplying steam to the calorimeter at boiler pressure. When the temperature has become constant, it was noted, and the valve C was opened and also the cock D. As soon as the temperature had become constant again the thermometer was read and also the manometer pressure. Between readings the valve A was left open in order to keep the calorimeter heated.

the actual evaporation of a boiler will give the equivalent evaporation from and at 212 degs. is determined as follows:

Let q = "heat of the liquid" of steam at the boiler pressure.

r = latent heat of steam at this pressure.

q_1 = "heat of the liquid" of the feed water.

x = quality of the steam, here equal to 0.985.

r' = latent heat of steam at 212 deg. Fahr. = 965.8.

$$\text{Factor of Evaporation} = \frac{q + xr - q_1}{r'}$$

$$= \frac{q + 0.985 r - q_1}{965.8}$$

About \$185,000 has been appropriated by the Brazilian government to pay for the building of the Itacurussa branch of the Central Railway of Brazil, and about \$365,000 has been appropriated for extensions and additions on the Western Railway of Minas.

AUTOMATIC BLOCK SIGNALS ON THE WASHINGTON WATER POWER COMPANY'S RAILWAY.

The Washington Water Power Company, of Spokane, Wash., operating high speed interurban electric railways, has equipped 20 miles of its lines, single track, with automatic block signals, controlled by track circuits, and arranged in accordance with the

tending between Spokane and the towns of Medical Lake and Cheney. Before contracting for the work Mr. Willson made a thorough investigation and he gave the contract to the General Railway Signal Co., of Rochester, N. Y. There are 25 home and 4 distant signals. The location plan, Fig. 1, shows the whole of the lines signaled, except about three miles at the east end.

In considering the signaling schemes usually adopted for elec-

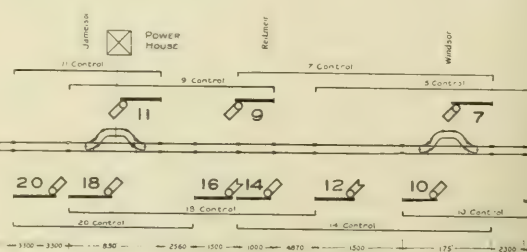
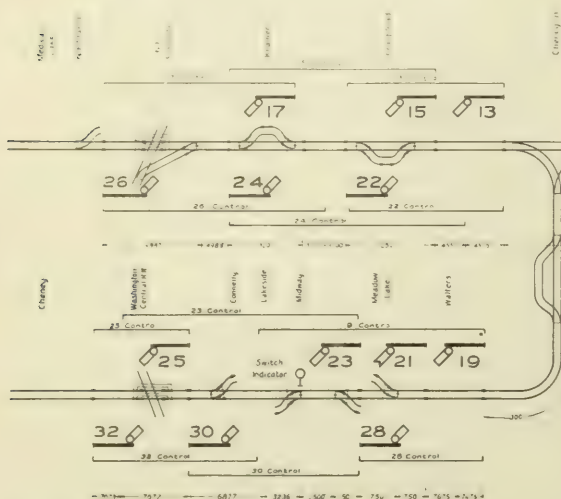


Fig. 1—Locations of Automatic Block Signals, Washington Water Power Company.

best modern practice; and in connection with the signals an automatic stop is provided—the first permanent automatic stop installation which has been made on a surface railway in America, if we except the stops of the Harrington system which have been in service for two or three years on the Northern Railroad of New Jersey, near New York City, which installation is in some sense experimental. In the Washington installation the signal arm is on the left of the post and moves in the upper quadrant. These arms are the regular form generally used in the upper quadrant signals, not pivoted at or near the centre as in the case of the signals on the New York, New Haven & Hartford, which are partly left-hand and partly right-hand. The automatic stop ap-

paratus, which is shown in Figs. 3 and 4, is very simple. It consists of a horizontal iron rod, connected to the fixed signal, and a vertical glass tube on the rod. If the rod strikes the tube, the glass is broken and by this means the air is exhausted from the brake pipe and the brakes of the cars are applied.

The following details of this installation were furnished by R. A. Willson, general superintendent of railways of the Washington Water Power Company:

The road equipped is about 20 miles long, single track, ex-

tric lines, Mr. Willson concluded that they were unsatisfactory, and that the additional cost of a complete installation, with track circuits, was warranted. The trolley contacting and car counting devices ordinarily used are incapable of protecting against a car accidentally moved afoul of the main line, and were found to be subject to annoying disarrangements in operation.

Overlaps are provided, as shown in the drawing, so that the control of all signals by a train is carried to a point beyond the next opposing signal, thus rendering it impossible for two trains approaching each other to meet without one of them receiving a stop signal at least one block away from the other, and providing two stop signals in the rear for the government of following movements.

The signaling equipment consists entirely of the General Railway Signal Company's standard apparatus, and includes the Model 2-A top-post mechanism, polyphase relays, and iron core reactance bonds. The cars are operated by 600 volt direct current, and alternating current is used for the signal track circuits.

The propulsion current is obtained from motor-generator sets supplied from a 60,000 volt, 60 cycle line.

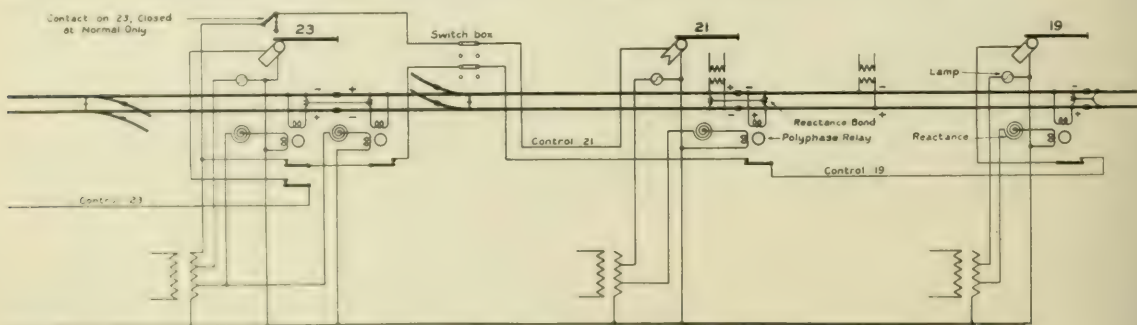


Fig. 2—Automatic Block Signals on Washington Water Power Company's Line; Typical Wiring Plan.

Provision for the location of distant signal 23. It should have been shown as running through the points of the track relay of the track section between Signals 21 and 23.

paratus, which is shown in Figs. 3 and 4, is very simple. It consists of a horizontal iron rod, connected to the fixed signal, and a vertical glass tube on the rod. If the rod strikes the tube, the glass is broken and by this means the air is exhausted from the brake pipe and the brakes of the cars are applied.

The following details of this installation were furnished by R. A. Willson, general superintendent of railways of the Washington Water Power Company:

The road equipped is about 20 miles long, single track, ex-

Current is available at the Jamieson sub-station in approximately the center of the district to be served, and is delivered to the bus bars of the signal switchboard at 2,200 volts, whence it is distributed to the signal transmission lines.

Transformers stepping from 2,200 volts to the various voltages required are placed at each signal and track feed location. High tension lightning arresters are installed at half-mile intervals for protection against electrical storms.

Oil cooled Model H transformers are used throughout. In-

dependent secondary windings are provided for each track circuit and for the signal operating, lighting, and relay local circuits. Grid resistances are provided for limiting the current flow to the track when the rails are short circuits.

The track secondary windings are provided with taps ranging from one to five and eight volts for the requirements of varying lengths of track sections. The signal secondaries provide 2.0 volt for signal operation with taps at fifty-five volts for signal lighting and of twenty-eight volts for the relay local windings; all of which taps are taken to a terminal board for convenient connection to the external circuits.

The polyphase relay used is a two-phase induction-motor, one

contact by means of a tumbler pinion engaging with a segmented gear mounted on a shaft, which latter is connected to the contact bar by a cord. Friction is reduced to a minimum by the use of ball bearings for all rotating parts. The contacts rub through the last 1/16 inch of their travel, being thus self-cleaning.

Two-rail track circuits are used, arranged so that both rails are available for the returning propulsion current. Sixty pound A. S. C. E. steel rails are used for the tracks, which are divided into block sections of from 175 feet to 15,150 feet.

The signal mechanisms are clamped to the posts and are arranged for 45 degree travel of the arm in the upper left-hand quadrant.



Figs. 3 and 4—Automatic Block Signals, Upper Left-hand Quadrant, with Automatic Train-Stop.

phase of which is energized from a transformer located at the relay, and the other through the track circuit, which is energized by a transformer located at a distance. The efficiency of these relays is shown by the fact that, in this installation, they are operating on continuous track sections, that is, track circuits without cut sections, over 15,000 feet long, and the conditions

The mechanism, Fig. 5, is operated by a series wound commutating alternating current motor, designed so that it gives a sparkless operation. The current consumption is low. It will be seen by Fig. 2 that the transformer from which the signal receives its power is located one block in advance, a distance varying from 175 feet to over 15,000 feet, and that the signal is operated directly over this line without the use of a line relay. In one case, the control is about seven miles away, No. 10 copper being used for both control and common wires—that is, the signal is operating successfully through a total line resistance closely approximating 74 ohms.

A centrifugal governor is provided on the end of the armature shaft for controlling the speed of the motor and preventing the signal from over-running its position; the contacts are in series with the motor and are shunted during a portion of the movement, so that the speed control does not become effective until just before the signal arm reaches the proceed position.

The motor is geared directly to the semaphore shaft and holds the signal in the clear position through the medium of a reactance which is switched into series with the motor by the action of the circuit breaker at the end of the clearing movement. The signal returns to the stop position by gravity. The direct gearing of the motor to the semaphore shaft, and the holding of the signal in the clear position by the motor, render the use of a slot or a dash pot unnecessary and thereby eliminate these troublesome features.

The circuit breaker is a complete unit. It is connected directly to the semaphore shaft by means of segmental gears, and is pro-

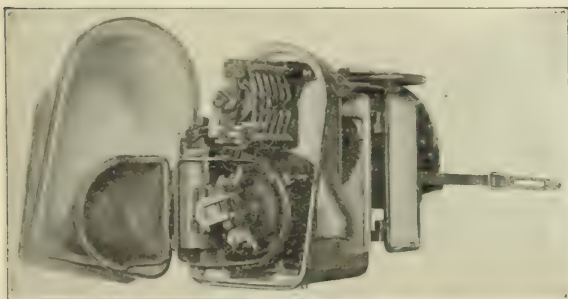


Fig. 5—Semaphore Signal Mechanism, Model 2 A, Made by the General Railway Signal Company.

as to ballast and track leakage are not the best. This length of continuous track section has never before been equalled, or even approached, in the signaling art.

In these relays motion is transmitted from the rotor to the

vided with individually adjustable contacts for the control of 12 circuits, including the local control of the signal.

AUTOMATIC STOP.

All of the motor cars of the system are provided with three glass tubes, mounted, in a vertical position, as shown in Figs. 3 and 4, wherein we have retouched the negative so as to more plainly indicate the position of the tube. Each signal is provided with an auxiliary arm which is connected to, and operated in unison with, the signal arm, and is set at such a height that when the signal is in the stop position the tube on any car passing will strike against and be broken by the arm. The breaking of the tube results in a semiservice application of the brakes; and the brakes cannot be released until the broken tube is replaced. The trainmen have to make a strict accounting for tubes used, and this forms an effective check on the observance of signals.

Means are provided on each signal post whereby in the event of any disarrangement of the signal system the stop arm may be raised by hand for the passage of a car; this can be accomplished only by the insertion of a key in a lock provided for the purpose, which key cannot be removed until the arm has been restored to the normal position.

EARNINGS AND EXPENSES OF TWELVE WESTERN LINES.

The accompanying very interesting table giving the gross earnings, net earnings, maintenance charges and transportation expenses of 12 western railways for the five-year period ending with 1905 compared with the five-year period ending with 1910 was prepared by T. A. Polleys, tax commissioner of the Chicago, St. Paul, Minneapolis & Omaha, St. Paul, Minn. The 12 roads mentioned in the table are the Chicago & North Western, the Chicago, St. Paul, Minneapolis & Omaha, the Chicago, Milwaukee & St. Paul, the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Chicago Great Western, the Wisconsin Central, the Minneapolis, St. Paul & Sault Ste. Marie, the Great Northern system, the Northern Pacific, the Union Pacific system and the Illinois Central.

A glance at column 4 shows that the gross earnings of each of these railways during the last five years were substantially greater than during the five years ending with the fiscal year 1905, the greatest increase being that of the Northern Pacific, which amounted to 52 per cent., and the average increase for all of the railways in the list being 25 per cent.

Theoretically, the railway business is a business of increasing returns; that is, each increase in gross earnings should be accompanied by a larger increase in net earnings, because as traffic increases the cost of handling each unit of traffic decreases. How far theory and fact are apart as to the railways in this

list will appear from a comparison of the figures in column 4 and column 7. Such a comparison shows that the percentage of increase in net earnings was less than the percentage of increase in gross earnings on every railway in the list except the Wisconsin Central and the Union Pacific system, and that while the average increase in gross earnings for all the roads was 25 per cent. the average increase in net earnings for all the roads was but 17 per cent. Of course, the explanation of the fact that net earnings increased so much less in proportion than gross earnings is to be found in the figures relating to operating expenses. The increase in the cost of maintenance of equipment per mile was particularly great, averaging on all the railways in the list 54 per cent. This increase, of course, was due both to the fact that the unit costs of materials and labor increased and to the fact that the number of cars per mile increased.

It is interesting to note that the ratio of operating expenses to gross earnings increased on every road in the list except the Wisconsin Central. Even the operating ratio of the Union Pacific, which has been the wonder of Wall Street, was but 51.51 in the five years ending 1905 and was 51.63 in the five years ending 1910.

The greater part of the labor cost involved in the operation of a railway appears in the expenses of conducting transportation, and it has been mainly with the aim of reducing this item of expense that grades have been revised, larger equipment put into service, etc. The efforts to reduce the cost of conducting transportation have been nullified by the increased cost of labor. How completely they have been nullified is shown by the fact that the cost of conducting transportation was a greater percentage of total operating expenses during the last five years than during the preceding five years on every road in this list, excepting the Illinois Central, and that for all of the roads the percentage of the cost of conducting transportation to the total operating expenses increased from 33.56 per cent. in the five years ending with 1905 to 36.04 per cent. during the last five years.

RECENT MALLET ARTICULATED LOCOMOTIVES.

St. Louis & San Francisco.—Seven Mallet articulated compound locomotives were recently built for the St. Louis & San Francisco by the American Locomotive Company. They are intended for pusher service and are designed to handle 1,950 tons on a 1½ per cent. grade at a speed of five miles per hour, and 1,600 tons on the same grade at 10 miles per hour. The maximum grade on which they will operate is 2.3 per cent., and on this grade they are expected to haul 1,230 tons at a speed of five miles per hour, or to have a speed of 10 miles per hour on the same grade with 1,000 tons.

The most interesting feature of the design lies in the new arrangement of steam pipes to the high pressure cylinders. These pipes are in two sections, one being located inside of the

COMPANY EARNINGS, NET EARNINGS, MAINTENANCE CHARGES AND TRANSPORTATION EXPENSES.

Company.	Gross Earnings per mile.		Net Earnings per mile.		Maintenance of Way and Structures per mile.		Maintenance of Equipment per mile.		Ratio of Operating Expenses to Gross Earnings.									
	1905.		1910.		1905.		1910.		Total Operating Expenses.		Cond. Trans. and Traffic Expenses.		Maint. of Way and Structures.		Maint. of Equipment.			
	end.	end.	end.	end.	end.	end.	end.	end.	end.	end.	end.	end.	end.	end.	end.	end.	end.	end.
	1905.	1910.	1905.	1910.	1905.	1910.	1905.	1910.	1905.	1910.	1905.	1910.	1905.	1910.	1905.	1910.	1905.	1910.
Ch. & N. W.	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110
Ch. & M. & St. P.	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110
Ch. & B. & Q.	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110
Ch. & R. I. & P.	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110
Ch. G. W.	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110
W. C.	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110
M. & St. P. & M.	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110
G. N. & S. M.	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110
N. P.	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110
U. P.	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110
I. C.	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110
Groups	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110	100	110

Continued.

header and connecting to a T head, which in turn is connected to the throttle pipe. The application of this arrangement was possible because of the use of a combination chamber which allows space for the introduction of the pipes between the tubes and the shell of the boiler. The outside section of the high

downward extending arm in the center of the main pressure shaft by a universal joint. Data and general dimensions for these locomotives are given on the accompanying table.

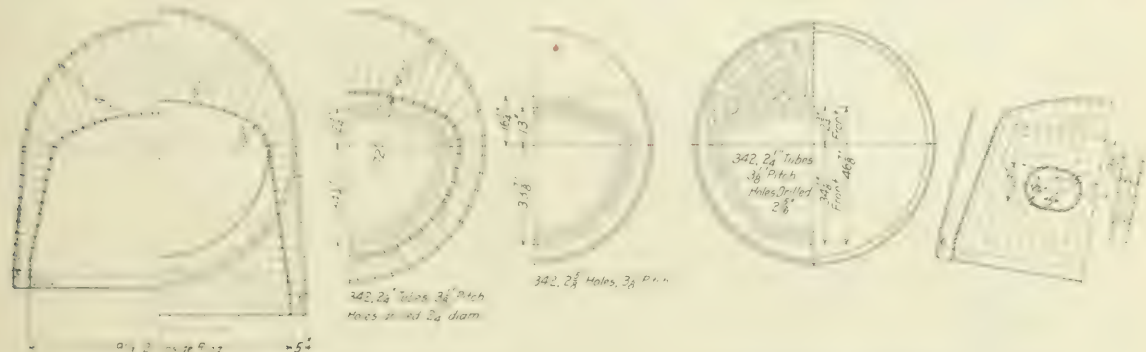
Chesapeake & Ohio. This road recently placed an order for 24 Mallet locomotives of the 2-6-6-2 type with the American



Mallet Articulated Locomotive for the Chesapeake & Ohio.

pressure steam pipe consists of a copper pipe fitted with an elbow at either end and with a ball joint connection with the lower end of the inside pipe and also with the cylinders. The construction is such that the outside section can be removed without in any way disturbing the inside pipe. This arrange-

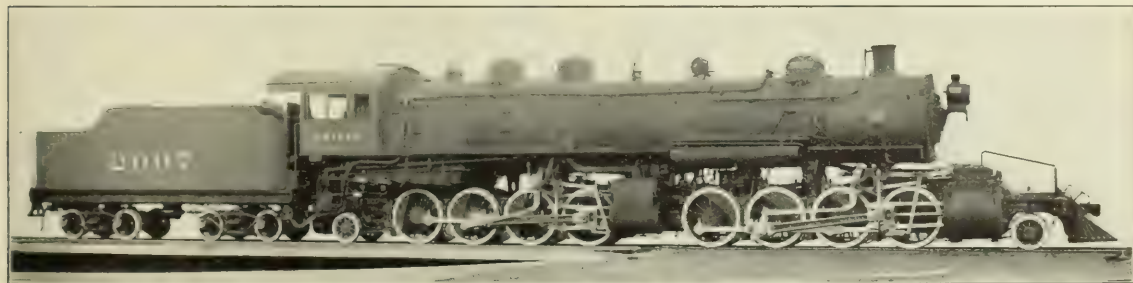
ment has several important advantages. It simplifies the construction by obviating the necessity for using the special design of cast steel dome employed in previous engines of the Mallet type, where the high pressure steam pipes are on the outside of the boiler. Being located inside of the boiler the



Cross-Sections and End Elevations of Boiler for St. Louis & San Francisco Mallet Articulated Locomotive.

ment has several important advantages. It simplifies the construction by obviating the necessity for using the special design of cast steel dome employed in previous engines of the Mallet type, where the high pressure steam pipes are on the outside of the boiler. Being located inside of the boiler the

The trial locomotive was put in service on the division between Handley and Allegheny. From the former place to Roncerverte, a distance of 106 miles, is a continuous easy up-grade varying from a minimum of $2\frac{1}{4}$ ft. to the mile to a maximum of 21 ft., the average grade from Thurmond, 38 miles east of Handley, to



Mallet Articulated Locomotive for the St. Louis & San Francisco.

steam pipes do not interfere with the engineer's view ahead.

One engine of the order is equipped with the Street locomotive stoker. Following the practice pursued in a number of recent engines of the Mallet type built by the American Locomotive Company, the reach rod to the valve gear of the forward engine is located on the center line of the engine and is connected to a

Roncerverte, being 19 ft. to the mile. From this last point to Allegheny, the summit of the division, there is a 13 mile grade, 30 ft. to the mile.

Prior to the advent of the Mallet a consolidation locomotive having a total weight of 190,300 lbs., weight on driving wheels of 169,600 lbs., cylinders 22 in. x 28 in., and a theoretical maxi-

top of the bent allows for movement due to expansion. Either fine crushed rock or clean gravel is used for ballast.

The concrete plant for manufacturing piles, slabs and also reinforced concrete pipe is at Glendive, Mont. The general arrangement is shown in Figs. 3, 4 and 5.

The sand and gravel are loaded into ballast dump cars by a

is discharged down a series of inclined screens which remove stones too large for concrete, and separate the stone from the sand, depositing them in separate bins, the excess sand and stone

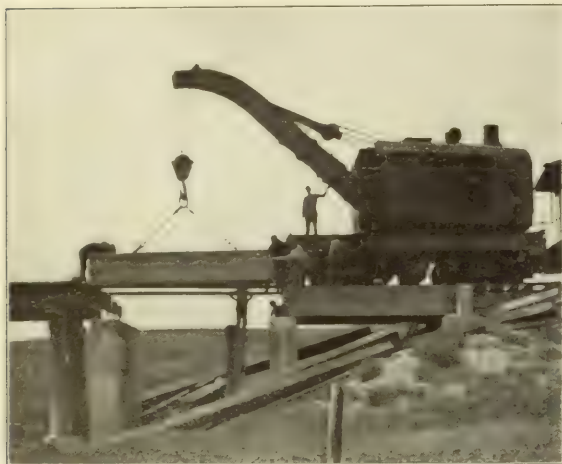


Fig. 2.—Wrecking Crane Placing a Reinforced Concrete Bridge Slab.

steam shovel at the pit; the cars are hauled to the plant, pushed up on the elevated storage trestle and dumped. The storage capacity of the trestle is approximately 50 cars. From the dump the gravel is automatically fed on to a 16-in. rubber belt conveyor, which carries it to the top of the mixing tower, where it



Fig. 4.—Side View of Concrete Plant.

being discharged by a separate chute into a waste car alongside the tower.

Below the storage bins are the charging hoppers, arranged so that sand and stone can be measured and cement added. From



Fig. 3.—Front View of Concrete Plant, Northern Pacific.

the charging hoppers the aggregate is fed into a mixer of 1 cu. yd. capacity, water being supplied by a main from the railway company's water tank.

Concrete is dumped from the mixer into a bottom dump concrete car, which in turn runs on a gantry car. This gantry car spans either the slab or pile platform, and runs the full length of them, the gantry being operated by a cable and grip, at a speed of about eight miles an hour.

The two main platforms are parallel, 18 ft. wide, 400 ft. long and spaced 8 ft. apart, the mixing tower being located centrally at the east. This arrangement permits depositing concrete very quickly at any point on either platform, the dump of the car being arranged so that flow of concrete can be controlled at all times.

On the outside of the platforms are standard gage tracks for loading and handling all manufactured products. As soon as piles and slabs are set up sufficiently to permit handling, they are removed from the platforms and stored on a sand bed outside these tracks.

The slab form is simply a square box with light partition di-

All reinforcement for pipe forms is raised and wired in place, due to more proper use and shape, the forms being complete before it is placed in the form.

The plant is now closed for the winter, but it is expected that operations will be started again early in the spring, as in manufacturing concrete products of this kind it is of very great advantage to keep the supply well ahead of the demand in order to give them proper time for seasoning.

For the foregoing we are indebted to H. E. Stevens, bridge engineer, St. Paul, Minn.

PROPOSED LEGISLATION REGARDING CAR CLEARANCE.

Estimates made by 109 operating railways, representing about 40 per cent. of the total tonnage transported, that to comply with the bill introduced in congress by Representative Martin of Colorado on June 1, 1910 (H. R. 2427), regulating the clearance of cars and locomotives would cost these companies \$444,000,000. The proposed legislation becomes of special interest at this time because of references recently made to it by President Taft. In a speech on October 1 in Ken-



Fig. 5.—Rear View of Concrete Plant, Northern Pacific.

viding the slab into halves, the sides of the box being braced to the platform. Piles are octagonal in shape, 16 in. in least diameter and 16 ft. to 30 ft. long. The pile form is made in two sections, which set over a bottom strip permanently fastened to the platform. A stopper is used in the forms for varying the length of pile.

All reinforcement is of deformed bars, shipped in as straight rods, and bent in special machines to the shape required. The pile reinforcement is assembled complete before being placed in the forms, and is held in proper position by a positive arrangement in the reinforcement itself. The reinforcement for the slabs is supported the proper distance from the bottom by small beveled concrete blocks, all reinforcement being wired together to insure retaining its position during the depositing of concrete.

The pipe section of the plant is located at right angles to the platform, and at the end next to the mixing tower. This section is covered with a crane derrick, having a 60-ft. boom. Pipe forms are set up on the arc of a circle to simplify the movements of the derrick. Concrete is conveyed to the forms in a special bucket, having an adjustable dump. The bucket is picked up by the derrick and swung over the forms, the positive control of the dump enabling the operator to deposit the concrete as needed.

York the President said: "There is badly needed legislation for additional safety appliances," and added that he referred among other things to the elimination by government direction of danger to railway employees from overhead and side-way projections. The bill introduced by Mr. Martin provides as follows:

Maximum width of all locomotives in service to be 10 ft. 6 in. over all, after January 1, 1911.

Maximum width of all cars to be 10 ft. 6 in.; maximum height of all cars to be 14 ft. 2 in. to top of running board, after January 1, 1912.

No structure of any kind, including tunnels, rock cuts, etc., to be closer to any track than 6 ft. 11 in. from center to nearest track.

Exception: Platforms not exceeding 3 ft. 11 in. in height from top of rail. Overhead clearances to be 20 ft. from top of rail in all cases, effective January 1, 1912. Report to be made to the Interstate Commerce Commission by January 1, 1911, showing all existing structures which do not conform to these clearances.

The Interstate Commerce Commission may, upon investigation, exempt from these provisions any tunnel, retaining wall, embankment or permanent overhead structure, if removal is impracticable.

Track centers must be 12 ft. 6 in. apart in all cases.

Space between yard tracks must be kept clear of obstruction.

Penalty, \$500 for each day a car, engine or structure is used in violation.

President Taft evidently had got additional information on the subject before he wrote his annual message, for in his message he said:

"The entire removal of outside clearances would be attended by such enormous expense that some other remedy must be adopted. By the act

of May 6, 1910, the Interstate Commerce Commission is authorized and directed to investigate accidents, to report their causes and its recommendations. I suggest that the commission be requested to make a special report as to injuries from outside clearances and the best method of reducing them."

Of the amount that the 109 operating companies estimated they would have to spend to comply with the terms of the Martin bill, \$7,500,000 would be for bringing the equipment within the limits, and the rest, or \$436,500,000, to remove or enlarge structures, tunnels, etc. Of course, the estimate given is only approximate, as a number of railways have failed to give an estimate on certain of the items on the ground that the cost of complying with the provisions in which these items appear would be so enormous that it would be practically impossible to conform with them.

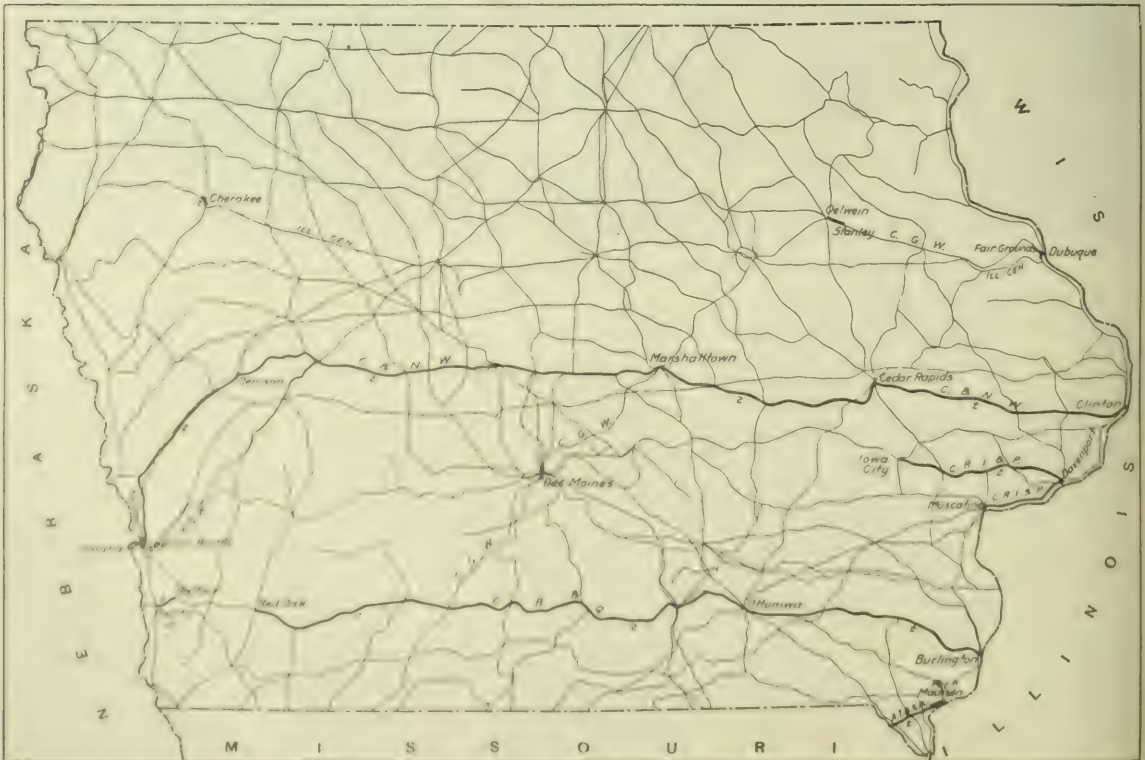
A movement has been started to have each railway investigate on its own line the situation with regard to the location of mail cranes, standpipes and cattle chutes, to see whether they actually are placed at the distance from the center of the nearest track prescribed by the standard on each road. The roads will also make an investigation of the accidents that occurred in the year ended June 30, 1910, for the purpose of ascertaining the following points:

1. The actual clearance from the center of the nearest track at the point of accident.
2. The dimensions of the car or locomotive involved in the accident.
3. Whether the clearance required in the proposed legislation would have prevented the accident.

DOUBLE TRACK RAILWAYS IN IOWA.

The railway map of Iowa, given herewith, shows, by the heavy lines, all sections of railway in the state on which there are two main tracks. The termini of the sections are as follows:

IOWA.	
Atchison, Topeka & Santa Fe.	No.
Ft. Madison-Dumas, Mo.....	Miles.
	20



Double Track Railways in Iowa.

<i>Chicago, Burlington & Quincy.</i>	
Burlington-Red Oak	237
Balfour-Pacific Jct.	8
<i>Chicago Great Western.</i>	
Delwein-Starley	7
Fair Grounds, Ia.-Rice, Ill.....	20
At Des Moines	3
<i>Chicago & North Western.</i>	
Clinton-Council Bluffs	347
<i>Chicago, Rock Island & Pacific.</i>	
Davenport-Iowa City	54
Davenport-Muscatine	28
<i>Illinois Central.</i>	
At Dubuque	1
At Cherokee	1
At Council Bluffs.....	2
<i>Union Pacific.</i>	
Council Bluffs-Omaha, Neb.....	3

FIVE YEARS' DEVELOPMENT OF GERMAN RAILWAYS.

BY DR. W. PETERS.

Ministry of Public Works, Berlin.

I.

ORGANIZATION.

By far the greater part of the German railways are state railways, that is to say, the larger German federal states own and work their lines. First in order of importance come the Prussian state railways, which represent almost two-thirds of all the standard gage lines of Germany. The Prussian lines are followed, at a great distance, by the Bavarian, Saxon and Wurtemberg lines, then by the lines in Alsace-Lorraine, which are owned and worked by the German Empire, and finally by the Baden, Mecklenburg and Oldenburg state railways. As the acquisition on the part of the state of most of the large railways in Germany has been completed for some time, there was but relatively little left to do in this direction during the space of the last five years. Nevertheless, the proportion of private lines

composing the standard gage railways of Germany, which at the beginning of 1905 only amounted to 7.7 per cent, has now sunk to 6 per cent. This diminution is due for by far the greater part, to the purchase, at the beginning of the year 1909, on the part of Bavaria by the Palatinate Railways (506 miles) in that part of Bavaria situated on the left bank of the Rhine. The most important private railways now left are the Lübeck-Büchen Railway, a trunk line in the district of the free Hanseatic town of Lübeck and in the Southern part of the Prussian province of Schleswig-Holstein, about 86 miles long, and the Westphalian Provincial Railway, a secondary line about 166 miles long, in the Prussian province of Westphalia. The tendency which is becoming even more pronounced throughout the whole of Germany is to leave in private hands only such railways as by reason of their merely local character are of no importance so far as the national welfare is concerned. In the case of nar-

rowed out in isolated cases during the last five years. In Prussia the new arrangements of the state railway administration effected in the year 1895, whereby the administration and working of the sections placed under their direct control was entrusted to the railway managements—the service offices being done away with—has continued to work satisfactorily. The need of a central authority for a number of services, which were previously under the charge of the various administrative departments, led to creation, on April 1, 1907, of the *Bisenbahn-Zentralamt* (Central Railway Bureau) in Berlin, which is on a co-ordinate footing with the railway managements. On this bureau devolve, amongst other duties, the provision of the permanent way, safety appliances, and locomotives, cars and important material, as well as the preparation of central administrative and service orders and construction schemes. On it devolves likewise the entire daily disposal of the freight rolling stock, a duty



Prussian-Hessian State Railways.

row gage railways purely local interest plays by far the greater part, and to this fact is due the slight increase in the proportion of private lines (from 55.5 per cent. to 56 per cent.) of this kind. This point of view is likewise of deciding influence as regards the question as to whether the construction and operation of high-speed electric lines between neighboring towns can be left to private enterprise. There will, however, be no scruples against the adoption of this course, when such lines, as regards both construction and operation because, let us say, they are to be worked in connection with the tramway system of one or both places—are intended to serve, primarily, the purposes of traffic between such neighboring towns. As an example of this may be cited the projected interurban line from Cologne to Düsseldorf, which it is intended to leave in private hands.

Systematic alterations in the administrative organization of the more important German railway managements have only been

the importance of which has been further heightened since the creation of the German *Staatsbahnwagenverband* (state railway car union) on April 1, 1909. The supervision of 21 railway divisional managements and the railway central office devolves on the department of the minister of public works.

Contemporaneously with this change in Prussia a new arrangement has been carried out on the Bavarian state railways, and that in the direction of a decentralization of the services. The former central general management, which had charge of the services, subject to the supervision of the government, was done away with on April 1, 1907. Its duties have, for the greater part, been transferred to five newly created railway managements, while another part has been entrusted to the department of the minister of ways and communications, to which several offices were directly affiliated with a view to the management of a number of services. The organization of the administration shows

thus a certain similarity to the Prussian system. A movement is likewise on foot for a new arrangement of the administration on the Saxon state railways, which will in all probability take a somewhat similar course.

DEVELOPMENT OF THE RAILWAY SYSTEM.

The extension of the railway system has in no wise suffered from the effects of the fluctuations in the economic development as evidenced during the last few years. At the end of 1904 the standard gage lines represented a total length of 32,000 miles and at the end of 1908*, 35,700 miles. According to the latest account as issued by the imperial railway office the increase in the financial year 1909 (until March 31, 1910) amounted to 580 miles, so that the total length would work out at 36,280 miles. This signifies an increase of 6.1 per cent. up to the end of 1908, and of 7.9 per cent. up to the end of 1909. The increase corresponding to five years attains almost the length of the Saxon and Baden state railways taken together. (At the end of 1908: Saxony 1,750 miles, Baden 1,050 miles.) These figures assume special significance from the fact that the railway extension outpaced even the considerable increase in the population of Germany (from 59½ to 63 million inhabitants in 1908), although the difference is not very great. At the end of 1904 there were 5.63 miles to every 10,000 inhabitants, while at the end of 1908, the number was 5.64 miles. The increase in the length of railway in proportion to the area is naturally much more significant. The length of standard gage track per 100 square miles was, at the end of 1904, 16 miles, and at the end of 1908, 17 miles. Very significant is the fact that of the new standard gage lines more than three-quarters are secondary lines, a proof of the solicitude, engendered by the principle of state ownership, for the opening up of new regions by small railways which yield for the greater part but low profits. The narrow gage lines show a corresponding increase; their length has increased to 1,300 miles since 1905, i.e., by 6.1 per cent. in four years. On the other hand, those light secondary railways which are exclusively given over to local passenger and good traffic, and to the service of those districts, in which the traffic demands are not extensive enough to justify the construction of main lines, show a much greater increase in length. At the end of 1904 they represented a total length of 5,200 miles, a figure which by the end of 1908 had risen to 6,000 miles, being an increase of 14.4 per cent. This is, comparatively speaking, more than double that of the other lines. The increasing importance of such light railways which, taken as a whole, represent a thoroughly healthy financial development, can only be welcomed. They constitute, as feeders of the trunk lines, a most welcome complement, which is all the more necessary in that the further extension of the trunk line system presupposes the existence of a more pressing need for traffic than is required for the construction of a light railway. When it is remembered that Germany possesses, alongside of Belgium, Great Britain and Switzerland, the densest network of railways, considered from the point of view of extent, and that, excepting a few countries with a much smaller population† in proportion to the density of the population, it possesses, in common with Belgium and Switzerland, the most developed system, it will be easily understood that large new trade routes, in so far as they do not arise from other already in existence, will but seldom be constructed; that the opening up of new regions for means of transport is not a pressing need to be entered on at random; and that frequently precedence is cheerfully yielded to light railways which can be worked with a far smaller outlay of capital when necessary with the financial aid of the state. As a further complement to the trunk-line system, motor car lines, partly single-tracked, have succeeded in gaining a footing in cer-

tain districts of Germany. The smaller working capital required pointed to their being employed instead of light railways, especially in the mountainous part of Bavaria as well as on the wide, sparsely peopled plains of Mecklenburg. In Mecklenburg, however, their adoption has been attended with somewhat doubtful success. There are as yet no statistics respecting these lines, so that it is difficult to form any estimate as to their importance as viewed from the point of view of general traffic. If, now, standard gage lines, narrow gage lines and secondary light railways be taken collectively, and the increase of the last two types for the financial year 1909 be taken as equal to the average of the years 1905-08, it will be found that the railway network shows, at the beginning of the year 1910, a total length of 43,700 miles, in round numbers, as against the 4,000 miles of the beginning of 1905. According to this computation there would be, at the present moment, about 21 to 22 miles of railway to every 100 sq. miles (area of Germany 208,000 sq. miles). If now, on the basis of a provisional estimate in accordance with the previous rate of increase in population, the number of inhabitants in Germany be taken at about 64,400,000 at the beginning of 1910, this would mean from 6.7 to 6.8 miles of railway to every 10,000 inhabitants.

The additions to main line mileage represent, however, but a part of the completion of the network. The development of the length of the track must complete the picture. The increase of main tracks amounts to 3,800 miles on standard gage lines (1904, 46,000 miles; 1908, 49,800 miles). Only slightly more than a tenth part, namely 350 miles, corresponds to single-track lines. The greater part of a track length of 3,200 miles is for double-track lines, while the remainder is divided between 30 miles for three-track lines, and 170 miles on four-track sections. Most striking in this connection is the increasing importance of the double-track lines, the length of which has increased by 1,500 miles. More than one track represented at the end of 1904 35.4 per cent. of the German standard gage lines, while at the end of 1908 the percentage had risen to 38.

The strengthening of the permanent way has at the same time made rapid strides. At the end of 1904, 81 per cent. of the main tracks of the standard gage lines still had rails of a weight of 80 lbs. and less to the yard, whereas, by the end of 1908, the percentage had fallen to 65. Rails of a weight of 80-90 lbs. increased from 18 to 30 per cent., and heavier ones from 1 to 5 per cent. The increasing stress to which the tracks are exposed, owing to the increase of the trains, the greater weight of the rolling stock and the higher speeds prevailing, is the cause of this. These circumstances have not, however, led to any material alteration of the numerical proportion between wooden and metal ties. Wooden ties are still more used in Germany, and have also given satisfaction as regards durability. The proportion of metal ties rose only from about 27 per cent. at the end of 1904 to 28 by the end of 1908.

Special attention has been paid to the structural installations ensuring the safety of the service. Signaling appliances, arrangement of stations to ensure a comprehensive view of the whole track layout, avoidance of steep grades and sharp curves, elimination of level crossings, etc., have had the greatest attention everywhere. A few figures will suffice to show this. Grade crossings on the open line decreased from 59 at the end of 1904 to 39 at the end of 1908. Over-line and under-line bridges increased from 17,478 to 19,883, i.e., almost 14 per cent., while the main line mileage only increased by about 6 per cent., as noted above. Highway crossings on a level with the rails show a corresponding decrease. In 1904 there was a level crossing to every 600 yards, while in 1908 there was only one to every 680 yards, undoubtedly a great success in a country so thickly populated and rich in roads and so intersected with railways as Germany. The number of signal post signals, including advance signals, have increased from about 65,000 to more than 72,000 (21 per cent.) while that of the locking-frames for switches and signals has risen from 12,900 to about 15,500 (20 per cent.). Special

*The domestic railway statistics for the German empire for the year 1908 are not yet complete. The data concerning the railways, are taken from the *Statistik des Reichs*, which is the official publication of the imperial railway office.

†The figures for the United States and Austria, Canada, Mexico, Belgium, France, Great Britain, Italy, etc., are taken from the *Statistik des Reichs* and *Statistik der Bevölkerung* for the year 1908. The population figures are taken from the *Statistik des Reichs* for the year 1908. The railway figures are taken from the *Statistik des Reichs* for the year 1908.

attention has been devoted to the extension of electric traction on single-track lines. The length of the line thus equipped has increased from 7,400 to 10,400 miles per cent. At the end of 1908, therefore, 29.1 per cent. (at the end of 1904 2.3 per cent.) of all the trunk lines, and even 69 per cent. of the double and multiple track lines were equipped with this installation. In the case of the Prussian-Hessian state railways still later figures are available. Almost 92 per cent. of their double and multiple track lines are now equipped with alternating current blocking appliances, and the remainder will be similarly equipped in the course of about a year. This system will likewise be carried out in the course of a few years on the more important single-track lines, of which 950 are already worked by sections blocking.

The success of all these new installations has been that not only has a complete balance been established as against the increase of the possibilities of accident, which, as a consequence of the ever increasing masses of passengers and merchandise as well as the more crowded train schedule and higher speeds obtaining, is unavoidable, but the safety of the service has more-over been increased to no inconsiderable extent. Even in the year 1904, to each million train miles there were in Germany only 3.33 (on the Prussian state railways only 5) cases of accidents causing death and injury, and this figure comprises every kind of service accident, such as collisions, derailment, running down vehicles and boiler explosions, as well as every class of persons, such as passengers, railway employees, and outsiders, no matter whether the accident was caused by their own fault or not. For 1908, this figure shows a diminution to 5.06 (on the Prussian state railways 4.69).

Of the more important new lines we will mention here, in the East, the new branch linking up the Russian railway system at Skalmierzec-Kalisch, in the South, the Donauwörth-Treuchtlingen line (1906), of great importance as connecting Augsburg with central and northern Germany, and the Mühldorf-Freilassing line in Bavaria (1908), which provides access to the South, and especially to Triest, and in the west the Pfalzfeld-Boppard line in the Rhineland and the roundabout line near Hanover (1909). Special mention must also be made of the Sassnitz-Trelleborg ferry line inaugurated in the year 1909, which is served by ferryboats of hitherto unequalled size and capacity and establishes communication between Germany, Sweden and the other northern countries.

Of the larger new station buildings carried out, only the most important will be mentioned: Hamburg, Nuremberg, Wiesbaden (1906), Metz, Lübeck (1908), Mülheim (Rhine) (1909), the switching stations in Mannheim, Vohwinkel (1907), Kalk-Nord near Cologne, and Wustermark near Berlin (1909). The stations in course of re-construction are those of Leipzig, Chemnitz, Dortmund, Stuttgart, Karlsruhe, Elberfeld and Hanover. Mention must likewise be made of the great railway bridge constructions over the Rhine near Cologne and over the Vistula near Marienwerder.

The first plan for traversing the Vosges and opening up a fresh line of communication between France and Germany were formulated at this time. They attracted widespread attention, less owing to the practical importance of such a line of communication from the traffic point of view, which in the main could only be of a local character, than because of the political hopes and military apprehensions associated with the idea.

Electric traction was, at the beginning of the period here under discussion, generally speaking, confined to passenger traffic, moderate train weights and speeds and limited sections of line in particular metropolitan, suburban and municipal lines, as the system was still under the domination of the low voltage continuous current. For long distance railways and freight traffic it was, under these conditions of operation, too expensive. Its field of application was, it is true, to a certain extent widened by the introduction of the three-phase current. It is only in the course of the last few years that, under the instigation and with the constant co-operation of the Prussian-Hessian state railways,

a new system of electric traction has been developed, namely traction in the most compact and simple the requirements of railway service. The current here employed is the single-phase alternating current, whereby it is possible to transmit the electric energy at a very high voltage and consequently in almost unlimited quantity, to a great distance, and to supply it to the rail motor vehicles by means of a small overhead line. The adoption of this system makes it possible to turn to account the advantages which electric traction offers, both from the economical and service point of view.

Preliminary work has already been carried out in Germany for several years, with a view to the introduction of electric traction (in Prussia, the Berlin-Grosslichterfelde and the Niederschöne-weide-Johannistal-Spindlersfeld suburban lines). The preliminary work of the Prussian state railways may be looked on as completed, now that a large enterprise, the Blankenese-Ohlsdorf Metropolitan and Suburban Line, has demonstrated the service-ability of the single-phase alternating current.

Although, from what has been said above, there is no obstacle of either a technical or economical nature to stand in the way of the immediate adoption on a large scale of electricity, considerations of national defence counsel forbearance in this respect. It will only be after long experience that a clear idea can be formed as to how far this new system answers military requirements. Until then it will have to be confined to sections which are not of decisive importance for the purposes of national defence, though even here it must always be possible to fall back on steam locomotives for military purposes. The section selected for the first trial of an electric traction plant on a large scale, in Prussia, was the Magdeburg-Bitterfeld-Leipzig-Halle line.

The first section from Dessau to Bitterfeld will, in all probability, be opened to traffic before the end of this year. The principal difficulty in the way of an economical production of electric current has been solved by the construction of a power station in the immediate vicinity of favorably situated and productive coalfields. This installation is intended to form the point of departure for further efforts in this direction. The next plan is the electrification of the Königszell-Hirschberg-Lauban line near the Riesengebirge, in the Prussian province of Silesia; the preliminary work for this line is now finished. In Bavaria and Baden the possibility is afforded of utilizing, in a profitable manner, the water power of the country for the production of electricity. The electrification of large sections will, apparently, make rapid progress there also. Preparations are in full swing both in Bavaria, on the Salzburg-Reichenhall-Berchtesgaden Line, in particular, and in Baden on the Wiesental Line.

ROLLING STOCK.

If it be desired to express in a couple of words the success which has attended the exertions of the leading German railway managements in the matter of rolling stock equipment in the course of the last five years, it will suffice to say that the former scarcity, repeatedly in evidence, has given place to a compromise between the necessities of traffic and the number and capacity of the means of exploitation. New acquisitions of rolling stock contributed at the same time, to a certain extent, by holding open for the industries concerned a remunerative field of activity, even during the years of prevailing decline, 1907 and 1908, to a slackening of the retrograde movement. The exertions of the railway administrations not to slacken down in the acquisition of fresh material during bad times were inspired also by the knowledge that a systematic increase of the means of transport, uninfluenced by the fluctuations of the economic situation, pays in the long run, and that the example of faith in the future, thus shown, has a quickening effect on other industries.

The outlay incurred in the acquisition of rolling stock amounted for the period comprised between the end of 1904 and the end of 1908 to more than \$230,000,000. Of this sum, \$79,000,000 and \$78,000,000 were spent in these retrograde years of 1907 and 1908, respectively; that is to say, as much was spent in each of these years as in 1905 and 1906 together. The value of the whole of

the rolling stock in use increased, during these four years, by about one-third, as against an increase in the number of vehicles—losses taken into account—of a little over one-fifth (from 501,581 to 615,219). The considerable excess of the value as compared with the numerical amount is mainly to be attributed to the fact that locomotives and cars have become larger and heavier. The average dead weight of the locomotives employed has increased from 46 to almost 50 tons, the average number of axles of passenger cars from 2.50 to 2.66, their dead weight per axle from 5.81 to 6.21 tons, the number of axles of freight and baggage cars from 2.04 to 2.05, and their dead weight per axle from 3.69 to 3.87 tons. These are very important alterations in weight. They are to be recommended in the interests of traffic, though they were only obtained at a sacrifice.

The dead load of the trains exceeded, during the years in question, three-quarters of the whole weight of the train (1904, 74.1 per cent.; 1908, 75.2 per cent.).

By far the greater part of the new freight locomotives have four coupled axles, and the greater part of the new passenger locomotives three. At the end of 1908 two-axle passenger cars, which in 1904 represented three-fifths of the total, formed less than a half. They have, for the greater part, been replaced by three-axle cars, which formerly represented less than one-third of the total, whereas their number now equals two-fifths of the whole number of passenger cars. The 8 and 12-wheel passenger coaches are, as far as numbers go, left in the background, although they really represent the most considerable percentage increase. If we consider the increase in seating accommodation according to classes, we find that the fourth-class seats have increased by considerably more than a half, the third-class ones by about one-fifth, the second-class ones by from one-sixth to one-seventh, and the first-class by barely one-tenth. The increasing demand for the lower classes justifies these differences. In the case of freight cars the increase in the number of covered cars is fairly even with that of the open vehicles; that is to say, about one-fifth. In the years 1909 and 1910, however, there was, according to all accounts, a greater increase in covered cars, to meet the requirements of shippers, as demonstrated on frequent occasions.

The newly formed German *Staatsbahnwagenverband* had also exercised a quickening influence as regards the acquisition of rolling stock, since the year 1909. The separate railway administrations have undertaken to increase their rolling stock in accordance with a fixed plan, and in such a way as to ensure its corresponding, as far as possible, with their own share in the total traffic at any given moment. The scarcity of high-capacity cars, frequently in evidence during former years, has in recent years been remedied with thorough success. Whereas, at the end of 1904 the average tonnage was 12.9 tons, in 1908 it was 13.6. The creation of the *Staatsbahnwagenverband* rendered necessary a unit specification, applicable to the whole of Germany, of those goods which would require cars of a higher capacity. It is natural that, in this respect, it was found impossible to comply everywhere with all the wishes of the shippers. The increase in the number of cars has, however, since made further progress, so that the *Verband* has been enabled to meet extensive requirements.

To enable the parties concerned to co-operate in the determination of the goods to be assigned to the high-capacity cars, it was decided at the beginning of 1910, that the list of such goods should be specified by the standing tariff committee of the German railways, to which is attached a committee of those interested in traffic matters, with a deliberative voice.

A further important improvement of the rolling stock is to be found in the comprehensive increase of braking appliances. In the case of passenger cars, the number of braking appliances was, in 1904, 82.61 per cent., and in 1908, 85.13 per cent. of the whole number of axles. In the case of freight and baggage cars the percentage was 34.77 in 1904 and 35.97 in 1908. The equipment with continuous brakes has likewise been considerably

extended. Locomotives so equipped represented, in 1904, 58 per cent. of the total number, a percentage which in 1908 had risen to 62 per cent. The number of passenger coach axles equipped for continuous brakes, although representing, in 1904, 90.5 per cent. of the total number, had increased by the end of 1908 to 91.2 per cent. The corresponding figures for freight car axles are 4.3 and 4.9 per cent. The freight cars thus equipped are primarily employed for fast freight trains.

These exertions with a view to the construction of still larger and more efficient locomotives and cars in order to increase speed and safety and cope with traffic on a large scale, were accompanied by a parallel movement for the utilization, for traffic of less intensity, of locomotives and cars which were not unnecessarily heavy, the object being to obtain a more frequent sequence of trains by employing lighter rolling stock. This led, especially on the Prussian state railways, to the introduction of self-contained motor cars for passenger traffic. This form of traffic has grown rapidly during the course of the last five years. At the end of 1908 there were 225 motors owned by the German lines, as against 54 at the end of 1904. In Prussia they are almost exclusively driven by electricity, partly by means of an overhead line and on secondary lines with accumulators. Outside of Prussia—certain private lines excepted—they are only used to any appreciable extent on the Bavarian and Wurtemberg state railways, being on the latter exclusively driven by steam. The success expected from the use of these cars has up to quite recently led to a constant increase in their number.

Only a passing reference will here be made to further details of the technical improvement of the rolling stock:—

It was found possible to increase considerably the capacity of the locomotives by the adoption of superheated steam, following the lead given by the Prussian state railways. Lighting has been improved, mainly owing to the introduction of the hanging type of incandescent gas light. A certain amount of success has been obtained with new loading and unloading appliances on freight cars, while trials carried out with a number of other appliances, such as, for example, automatic couplers, the Knorr freight train continuous brake on steep grades, and appliances to prevent trains from running past stop signals, etc., have, in spite of the fact that they have not as yet been brought to a conclusion, been attended with valuable results.

[The next installment of Dr. Peters' paper will take up traffic conditions.]

MAKING RATES FOR A NEW RAILWAY—AN OBJECT LESSON IN ECONOMICS.

There are still some young railways in the West. Howbeit, owing to the policy of our Uncle Sam, most of them are the children of older systems, for a railway orphan in this era of regulation is, of all orphans, the most forlorn and neglected.

Down the deep canyon, torn through the mountains between Idaho and Oregon by the mighty Snake river, runs the newly constructed "Northwest Line," a branch of the Oregon Short Line, itself a part of the Harriman system. For a distance of 58 miles from Blakes, Ore., its junction with the parent line, the rails follow the Oregon bank of the great stream: sometimes in a narrow valley between the foot hills and the river; sometimes in a box canyon, where the road had to be blasted through solid rock; sometimes through tunnels or across long trestles, which afforded the only path for the rails. The Homestead mine, a large copper property, formed the objective. The low price of iron ore has brought operations to a standstill there, but later they will probably be resumed. There are other smaller mining properties at varying distances from the new railway; there is some fruit and grain and hay in the adjacent valleys; there is a limited quantity of livestock and wool; perhaps a little lumber, with some inbound merchandise and a light passenger traffic.

On the completion of the line the vice-president and general

manager took an inspection party over it, consisting of some of the construction, operating and traffic officers. Everywhere along the track gangs of men were still at work, cleaning out cuts where rock and clay had fallen into them under the action of the elements, leveling up the track where it was still settling, constructing sidings and turnouts, erecting necessary buildings, etc. Much of this cleaning and leveling and refinishing must be done over and over again while the line is new. During the lulls in the discussion of these activities among the operating officers the head of the road asked questions of the traffic men as to what the revenue was to come to make the new road a paying concern.

"Here is the railway," he said; "how is traffic to be developed and what rates are to be made on the business to be handled here, considering that this construction was very expensive? These ties, for instance," he remarked, "cost us over eighty cents apiece. The rails cost much more now than formerly. The labor is higher. These great rock cuts and tunnels and trestles cost us here cost thousands and thousands of dollars, and the cars and engines which we will use, and the men who will run them, all cost the company more than ever. The problem is now, how are we going to get a return on such an investment?"

"This business," commented one of the engineers, "which we will move here, should pay accordingly; and you traffic men, I suppose, will bear in mind the expense of constructing and operating this line in making up your freight tariffs."

The general freight agent was contemplating the fierce rapids of the Snake, beside which the train was moving. He had asked many questions of the people at various stops along the line. Where was the fruit? What was it? Apples? Pears? Peaches? Prunes? How many acres in orchard? How many bearing? What valleys produced the grain and hay? How much was there? Of what varieties? Wheat? Oats? Barley? Alfalfa? Timothy? Where was it marketed? What price did it command? Any flour mills? Where did the stock range? What kinds? Sheep? Cattle? Horses? How many? How much wool? Where was the timber? How much? What sorts? Any sawmills? What did the mines produce? Gold? Silver? Lead? Copper? Ores free, milling or refractory? High or low grade? What volume? How much wagon haul? What towns were there? How many people? How far from the railway? How many acres under cultivation? How many in meadow? etc. There wasn't much in the canyon itself and one couldn't see out of it over into the adjacent valleys, so one had to ask. The general freight agent questioned over and over again, checking each man's answer against the others and striking an average. He was curious—a regular interrogation point on these matters—and he made many notes; but, strange as it may seem, did not question the general manager or the operating or construction officials about the cost of the road or inquire about the stock or bonds or taxes or cost of operation, maintenance or administration. Seeing that he was the one who would have to make the rates, one kept wondering when he would get around to these important matters; but, curious as he was about some things regarding which he questioned the people where the train stopped, between stations he puffed his cigar, listened to the operating talk in a nonchalant sort of fashion and watched the whirlpools in the water or the feathery wreaths of cloud that hung along the mountain sides on the Idaho shore. It's a magnificent canyon, this canyon of the Snake, and will be better known some day.

"Well! how about it?" said one of the division superintendents at last. "Are you going to make it pay or not? It seems to be up to your freight department now. There's no passenger business here. Is she going to be a payer or a loser?"

"It will all depend," answered the freight man, "on what traffic we can develop. I suppose there were estimates before the line was built, but only actual experience will show how near they were right."

"Well," said one of the engineers, "you can easily find out how much fruit and grain and hay and livestock and ore and lumber there is to move, can't you, and then ascertain the cost

of maintaining and operating the property, including fixed charges and taxes, and add a fair profit and make your rates accordingly?"

"That's the way we ought to be able to do it, I suppose, according to some theories I hear," said the general freight agent. "It's a pity we can't get some of these fellows here and let them try their hand at it where there are no rates yet made to embarrass them. It sounds very simple, certainly, but suppose, when I have figured it all out according to that simple plan and apportion a part of that charge to each class of business, some of the business won't move? What then?"

"Won't move?" queried the chief engineer. "Why, it would have to move, wouldn't it? There is no other way for it to go. Why wouldn't it move?"

"Well," said the general freight agent, "suppose the rates made in that way were too high to move it? Now, let us take one thing at a time and let me illustrate. Suppose we take fruit: we know it has to go to market. Some of it, possibly, will move to local points on class rates, but the larger quantity must seek common markets where it must be sold at a price against fruit grown in other sections. Our rate, then, must be such that the orchardist can pay it and have left a profit which proves attractive to him, or he won't raise fruit, will he? These people are not going to swap dollars for our benefit. Even those who have orchards already in bearing will allow the fruit to rot or feed it to hogs rather than ship it unless it is worth while. Certainly no new orchards will be set out. As to fruit, then, you see our rates have to be made practically the same as if we had another railway here in the canyon. We haven't any, of course, and it is not direct railway competition we have to meet, but market competition or competition of commodity in this instance fixes the rate for us. When I come to make rates on this fruit here I will have to make them with that in view and make them so they will move the traffic, not alone in prosperous years, but in all years, the least favorable conditions eventually setting our measure, because when I put the rates down to meet those conditions it will be next to impossible to get them back up again. It is the same with the other commodities. Take ore, for instance. Some of this ore here of the higher grades may move under the ordinary distance tariff, but on much of it which is of lower value we will have to apply very low rates so that the mines can afford to produce it at all. On some of it a team haul to the railway must be considered. It won't matter what our expenses are, great or small, or what our capitalization or interest charges or taxes are. It will be take it or leave it. I will have to make rates according to the conditions surrounding the traffic or there will be no traffic, or at least very little. Of course, I won't make any rates lower than the actual cost of moving the business, but I will have to make many which will yield only a little bit over that, because that is all the traffic will stand. You can't get any fixed charges or maintenance charges out of those lower kinds of business. You can only get the moving cost and some little besides."

"In other words," said one of the listeners, "all the traffic will bear?"

"No," replied the general freight agent, "not that at all. Not all the traffic will bear, for your business will never grow under such a policy, but what each variety of traffic is reasonably able to bear (which is sometimes very little, indeed) and make the business so profitable to the producer that it thrives and grows and yields a volume that finally will make our property a paying property. In other words, we have to make other people's business prosperous to make our own pay. You will find it the same with all these other commodities; hay, grain, livestock, lumber, etc.; we have got to develop that business here, and while you gentlemen's conversation about cost of construction, etc., is interesting, it doesn't help me in making rates. From the whole volume of the traffic I must try in some way to pay these expenses, fixed charges, taxes and all, if I can, plus a profit, too, if I can get any. Maybe I can, and maybe not. I will do my best, but my rate making is circumscribed by conditions I cannot

control. It is all right to theorize about it in generalities, but dealing with it in detail, which is the only way I am able to deal with it, I have to be governed by the circumstances of the particular case. It has little connection with your cost of doing business. You make that as low as you can. I'll develop all the traffic and get all the revenue I can, and we'll hope for the best."

"How about your inbound business?" asked the general superintendent. "I haven't heard that mentioned here."

"It will largely take care of itself," responded the freight man. "It's the outbound business we have to think of first. That is the business we have to look out for to develop traffic. There can be no inbound business until there is outbound business, because the people must produce something at a profit themselves before they can buy other people's goods and ship them in here."

"But you have to have rates, don't you?"

"Oh, yes; we'll begin with our regular scale of class rates, the same as we have on other parts of the line, making through rates by adding locals on Blakes. To these we will gradually have to add through commodity rates under the representations of producers elsewhere who want to get their commodities into this market. Coal will have to have a commodity rate, for instance, or the people here will continue to burn wood the same as they did before the railway was built. Then there will be machinery for the mines and mills and brick and building material, etc. We will feel our way along gradually and build our tariff a little at a time as occasion requires. It's all a very

Oregon Short Line behind the baby here, I suppose we need not fear that, but you needn't be surprised if the O. S. L. has to dip down in its pocket to pay this kid's way for some time to come. It needn't happen if rates could be made as some of our college professors and politicians tell us is or should be done, but the trouble is they can't, theories to the contrary notwithstanding. Hello! here we are back at Blakes at last. Come on; let's get ready for supper."

GROWTH OF POPULATION, RAILWAY EARNINGS AND TAXES.

The accompanying table makes an interesting comparison between the growths of the population, gross freight and passenger earnings, railway taxes, and customs and internal revenue collections of the United States since 1871.

The per capita figures show that there has been a very substantial decrease since 1871 in the amount paid per capita in customs and internal revenue duties. Meantime, railway freight and passenger earnings and railway taxes per capita have very substantially increased. Increases in railway earnings per capita are particularly significant in view of the fact that, as is well known, the average rate per ton per mile and the average rate per passenger per mile have very substantially decreased. Not longer ago than 1890 the average rate per ton per mile was 9.41 mills, while in 1909 it was but 7.63 mills, a decrease of almost 19 per cent. Meantime, gross freight earnings increased from

POPULATION, GROSS FREIGHT AND PASSENGER EARNINGS AND TAXES OF RAILWAYS, AND CUSTOMS AND INTERNAL REVENUE OF THE UNITED STATES.

Year.	Population.	Totals.		Railway Taxes.	U. S. Revenue-Collections—	
		Gross Freight.	Gross Passenger.		Customs.	Internal.
1871.....	39,718,112*	\$294,430,832	\$108,898,886	.....	\$197,063,404	\$146,145,173
1880.....	50,155,783	468,797,838	154,448,612	.....	174,502,640	125,982,918
1890.....	67,962,439	717,729,439	273,494,706	\$31,207,469	213,913,334	139,488,483
1900.....	75,568,686	1,033,535,351	331,733,643	88,832,273	216,379,716	263,745,303
1909.....	88,267,446†	1,796,256,314‡	601,722,959‡	89,026,226	300,711,934	246,212,644
Per Capita.						
1871.....	.....	\$7.413	\$2.742	.....	\$4.962	\$3.679
1880.....	.....	9.347	3.079	.....	3.479	2.512
1890.....	.....	11.461	4.367	\$0.498	3.411	2.228
1900.....	.....	13.677	4.390	0.640	2.863	3.490
1909.....	.....	20.363	6.817	1.009	3.420	2.790

* Estimated. † Fiscal year. ‡ Calendar year.

Note.—With exception of 1909, the U. S. revenue statistics are taken from an average of the five years of which the year given is the center year. This is also true of the railway earnings for the years 1890 and 1900, but for 1880 an average of only the years 1879-1881 was taken, and for 1871 and 1909 just the earnings for those years. The earnings for 1871 and 1880 include miscellaneous, which was not reported separately at that time, but this item has been eliminated from the reports for the following years.

practical matter, based on experience and the conditions we find. I can't give you any theoretical rule for it, because there isn't any, any more than for other people's price making."

"Meantime, then, you don't care very much what it costs to build the line or what it costs to run it?" observed the chief engineer.

"Well, certainly, I care a great deal," said the general freight agent, "but those things don't give me any standard for making the rates, because in practical business it can't be done that way. I have to consider the maintenance cost as possible and try to build up a large traffic, so as to meet not only that but maintenance charges, interest and taxes; then, if possible, to earn a little surplus for betterments and to tide over bad years which are sure to come and come they, we hope, also, dividends; but I can't fix in my mind what I want to earn and then say arbitrarily that I will get it out of this traffic. People who think it can be done that way don't understand it, that's all. Some day, perhaps we'll have a through line along the grand old canon and the passenger department can do something to help us realize your expectations."

But in the meantime, queried the general manager, "we'll have to take our chances. Is that it?"

In the meantime, then, said what you'll have to do, and run the risk, not only of no dividend, but of no surplus to keep the road up in shape, perhaps not even fixed charges, and so at last get a receiver, as other roads have done. Having the big, strong

\$11.46 per capita to \$20.36 per capita, or 77 per cent. Similarly, while the average rate per passenger per mile was declining from 2.17 cents in 1890 to 1.93 cents in 1909, passenger earnings per capita of population increased from \$4.36 to \$6.82, or 56 per cent.

It is significant that the increase in railway taxes per capita was from practically 50 cents to practically \$1, or 100 per cent., while freight earnings per capita were increasing 77 per cent. and passenger earnings per capita 56 per cent.

According to press reports the concession for the construction and operation of a railway between Asuncion, Paraguay, and the mouth of the Yguassu river on the Alto Parana, Brazil, which was granted to Signor Andres R. Fary on June 1, 1909, has been transferred, with the Paraguayan Government's sanction, to the San Paolo-Rio Grande Co., of Brazil. The new concessionaries will also build a connecting line from the port of San Francisco, in the state of Santa Catharina, Brazil, to the mouth of the Yguassu river. The Paraguayan and Brazilian sections together will afford a shorter outlet to the sea for Paraguayan products than any which has previously existed, and will increase facilities of communication between Paraguay and Brazil. Under the terms of this concession the company agrees to finish a 93-mile section of the main line within two years, approximately as far as Ajos, and within four years after beginning the work the entire line must be finished.

General News Section.

At Pau, France, December 9 Mr. Legerous, in a Blériot monoplane, rose to a height of 10,000 ft., but came down half broken.

The Hadley Commission, investigating the question of governmental regulation of railway securities, meet in New York, on today, December 16.

E. D. Underwood, president of the Erie Railroad, has given \$10,000 at Washington, W. D., to the town, to be used as a public park and a model school.

Boston & Maine passenger cars which came into the road's small shops in New Hampshire are being in some cases repainted and repaired. New York, New Haven & Hartford.

The Southern Railway and the Mobile & Ohio have discontinued the employment of train auditors on a number of passenger trains, and it is reported that all train auditors will be taken off next month.

W. J. Cunningham, statistician in the office of Assistant General Manager Hustis of the Boston & Albany, at Boston, has been appointed assistant professor of economics at Harvard University. He retains his position with the railway.

The Texas state commissioner of labor has entered suit against the Missouri, Kansas & Texas to punish it for the crime of having three locomotives repaired at shops outside of Texas. To have locomotives owned in Texas repaired in other states, is contrary to law.

The work on the Cape Cod ship canal has progressed so far that the excavation at one end is being used as a harbor by fishing vessels, and the canal company is planning to build a dock 1,200 ft. long at Sandwich. A great deal of work has been done on the breakwater at Sandwich.

At Shelbyville, Ill., recently, the porter of a Pullman car sold intoxicating liquors; and as Shelbyville is a "dry" town, the railway company, the Cleveland, Cincinnati, Chicago & St. Louis, was called into court, and has paid a fine of \$200 and costs. A suit filed against the Pullman company was dismissed.

At Los Angeles, Cal., a man who was formerly a station agent of the Atchison, Topeka & Santa Fe, at Visalia, has been arrested by the federal authorities for misuse of a pass. He obtained a pass for his wife from Albuquerque to Visalia and then allowed it to be used by another woman, a friend of the family.

The Lewis Institute, Chicago, announces the opening of the winter quarter on January 3. The enrollment in the Institute is the largest in its history, day and night students together totaling 2,700. Of the 550 men in attendance in the day school, the majority are taking engineering, there being 21 candidates for the degree in mechanical engineering.

The Pennsylvania Railroad, which has discontinued its ferry from Twenty-third street, New York, to the Pennsylvania Station, Jersey City, has applied for the renewal of the lease of the piers at Twenty-third and Twenty-fourth streets, to be used for a freight station. The Anchor Line (steamships) has made application for a part of the same property.

There is a bill before congress to appropriate money for the construction or improvement of a harbor at Montauk Point, near the east end of Long Island; and Messrs. J. Pierpont Morgan and James McCrea, who visited the White House last week, are said to have advocated the establishment of a deep water landing at that place with a view to shortening the time of transit for passengers and mails between New York and Europe. Montauk Point is about 120 miles east of New York.

The American Red Cross Society proposes to give instruction in first aid to the injured throughout the country, the society having been presented by the Pullman company with a car, which it is expected the railways will haul from city to city without charge. The car will be fitted up with a "rescue station," by means of which object lessons will be given. The car will be sent not only to railway centers but also into mining districts. It will be in charge of Dr. M. W. Glasgow, of Birmingham, Ala.

The German Reichstag has passed the second reading of the bill establishing labor chambers composed equally of representatives of the employers and of the laborers to settle labor questions and to fix regulations for employers and labor organizations according to the industry and district in which it is located. The Reichstag voted an amendment making the secretaries of labor unions eligible for membership in the chambers, but Herr Brüning, Minister of the Interior, declared that the government would refuse to accept the bill in this form.

The constitutional convention in Arizona has adjourned. It has adopted, for reference to the people February 9, a constitution which is declared by its friends to be the most progressive ever framed and by the minority as the most socialistic. All sorts of new and little-known schemes are included in it. The sections regulating corporations are rigid, and there is a clause providing for the physical valuation of railways "as a basis for the control of rates." The corporation commission is to have extensive powers. The fellow-servant doctrine is abrogated.

Representatives of employees of the Boston & Maine have voted against receiving pensions from the company, and are said to be in favor of sticking to the Boston & Maine plan, which was formulated a year or two ago, but which was never put in force. President Mellen, speaking to the committee, told them that the New Haven road had voluntarily put in force "the Pennsylvania plan"; and he proposed apparently to do the same for the Boston & Maine; but the employees preferred their own plan, under which the employees would contribute to the pension fund; this on the ground that the pensions paid by the company would not alone be large enough to satisfy the men. The Boston & Maine plan, which was described in the *Railway Age Gazette* of July 9, 1909, was made the subject of a special act by the Massachusetts legislature; and to be valid, it would have to be adopted by a two-thirds vote of all of the employees.

Negotiations between the committee of railway officers headed by W. B. Scott, assistant director of maintenance and operation of the Harriman lines, and representatives of the Brotherhood of Locomotive Engineers, were renewed in Chicago on December 13. The railway officers renewed their offer of advances in wages averaging 9½ per cent., and suggested that if the employees did not want to accept this the entire matter should be submitted to mediation by the government mediators, the Chairman of the Interstate Commerce Commission and the Labor Commissioner. The renewal of the negotiations followed the canvass on December 10 of the vote of engineers on 60 western railways on the question of whether the officers of the Brotherhood should be authorized to declare a strike. That is, it is understood that this was the proposition put to the employees. The officers of the Brotherhood refuse to state just exactly what the vote meant. Whatever it did mean, the vote was practically unanimous in giving to the officers of the Brotherhood the authority for which they asked.

Cost of Transportation in New York City.

The question is asked, how it is, with subways and a five-cent fare all over the city, the surface roads can claim that a five-cent fare all over a single borough on the surface cars is ruinous. The answer is simple. The subways have only a nominal accident account, as the whole line is unobstructed. The surface roads have paid as much as \$2,250,000 of accident claims in one year, which is equal to 45,000,000 fares.—*New York Tribune*.

The Upper Berths.

The papers are cheering rather loudly about the great victory over the Pullman company; but it happens that there are experienced travelers who ask for the upper when they journey; it has its advantages. But the meanest thing is the order that when a passenger buys a lower berth the porter who makes it up for him must at the same time drag down and make up the upper unsold and undesired. It is the same in principle as if the railway required the brakeman to dump a bag of potatoes beside every passenger in the ordinary coach who had a seat all to himself, the bag to be left there until somebody came along who

needed the place, unless the passenger could produce two tickets. The only defense that has been attempted for this extortion is that otherwise porters will for a bribe leave the uppers up and discourage those who would buy them. But the idea of kicking at the public giving money to Pullman porters; it's the way those fellows get their pay and the company knows it.—*Hartford Courant*.

The Inventors' Guild.

This is the name of an association incorporated in New York City, the object of which is to advance the application of the useful arts and sciences, to further the interests and secure full acknowledgment and protection for the rights of inventors and to foster social relations among those who have made notable advances in the application of the useful arts and sciences. The members propose to improve the conditions of inventors by attacking the causes of delays in the patent office and the ineffectiveness of its work; the expense and tardiness of litigation, and the possibility under which a rich corporation may, by prolonging a suit, increase the expenses to a point which makes such suits prohibitive for a poor inventor, and other things. The membership of the Inventors' Guild is limited to fifty and admission is carefully guarded.

The officers are Ralph D. Merston, 60 Wall street, president; Charles W. Hunt, first vice-president; Charles S. Bradley, second vice-president; Thomas Robins, 13 Park row, secretary. The governors are Ralph D. Merston, Leo H. Baekeland, Charles W. Hunt, Charles S. Bradley, Michael I. Pupin, Peter Cooper Hewitt. Among the 29 members are Bion J. Arnold, Thomas A. Edison, Stephen D. Field and James Gayley.

Trial of the Perry-Prentice Automatic Stop on the Canadian Pacific.

The Perry-Prentice wireless apparatus for operating a cab signal and for applying the brakes, has been fitted to locomotive No. 798 of the Canadian Pacific; and the apparatus was successfully tried, with a train of twelve freight cars, near Toronto on December 8. In this apparatus a coherer on the locomotive is actuated by Hertzian waves from a current flowing through a wire which is strung along the line of the road. In the Canadian Pacific experiments, this wire is laid in trunking on the ties between the rails, and the antenna connecting with the coherer is suspended beneath the engine, so as to be carried along about 6-in. above the trunking. The line of the Canadian Pacific between North Parkdale and West Toronto has been equipped with six block sections, each about half a mile long, and the circuit (alternating current) in the wire in the trunking and which is used for actuating the stop is controlled by the track relays of the block sections in a manner similar to that used to control distant signals. The wire in the trunking extends throughout the length of the road signaled, and is arranged to normally hold the cab apparatus in the proceed position; and the stop or caution indication is produced by opening the circuit. The apparatus in the cab is arranged so that the first effect of a caution signal is to sound a whistle; and the automatic application of the brakes does not take place until three seconds after the sound of the whistle. This apparatus was described in the *Signal Engineer* of February, 1909.

New York City Railways.

The New York State Public Service Commission, first district, appears to have finally approved the proposal of the Interborough Rapid Transit Company to build third tracks on its Second, Third and Ninth avenue elevated lines in Manhattan. At any rate, the commission has adopted a form of certificate, and a public hearing is to be held on December 23. Any such addition to the elevated lines would require the approval of the Board of Estimate and Apportionment of the city. The Interborough's plans also contemplate the extension of the Ninth avenue line northward to the north limit of the city (Woodlawn); and of the Third avenue line to the same extent. These extensions are a part of the recent proposal of the Interborough to operate the new subway, which it is expected the city will build, but apparently the action here outlined contemplates the construction of these elevated additions and extensions whether the subway is or is not constructed.

The Board of Estimate and Apportionment has agreed with

the Public Service Commission in approving the plan proposed by the Interborough for the operation of the Steinway tunnel. This tunnel extends from Forty-second street and Madison avenue, Manhattan (Grand Central Terminal) under the East river to Astoria in the borough of Queens. The plan involves the expenditure of \$1,500,000 for putting the tunnel into condition for operation, which expenditure will have to be borne by the city.

Employees' Demands on Legislators.

One of the worst moves ever made on the part of the railways was getting out of politics. The men who brought this about are now dead and unfortunately cannot know the full ill effects of the work they accomplished. Since the railways have abstained from the political game more legislation adverse to them has been passed than in a period of fifty years previously. The employees in the recent election appointed committees composed of Brotherhood members in each election district to quiz the various candidates for election to Congress and state legislatures concerning their stand on labor legislation. Upon receiving replies the committee advised the members of the various orders for whom they should cast their votes. These questions related to the Boiler Inspection Bill; to the Obstruction or Clearance Bill; the proposed bills prescribing the minimum number of experienced employees that shall constitute a train crew and limiting injunctions; also an amendment to the Federal Liability Law, eliminating the question of contributory negligence and amending the law so that it will make the employer liable for all casualties received while in service except for such as are caused by the serious or willful misconduct of the employee. Candidates were also asked whether they would lend assistance to the defense of any of the measures enacted for the protection of employees if attempts are made to abrogate or amend such laws to the disadvantage of the employees. Here is a menace to the railways. No candidate can afford to ignore the labor vote, nor can he afford to ignore his pledges after election. *** The opposition to compulsory arbitration on the part of the employees is logically wrong. If the railway is a public servant, so also are its employees. Can they be permitted to be a law unto themselves? Should they be permitted to tie up the operations of a railway at will?—A "Prominent President," in the *Wall Street Journal*.

Losses Due to Railway Strike in France.

L'Officiel recently published a statement of the losses in receipts sustained by the state and other railway companies in the recent strike in France.

It had previously reported that for the forty-first week of 1910, when the strike was broken, there was a deficit of 3,379,000 francs (\$675,400) in the receipts of the six great companies. The loss was still more during the forty-second week. The following table shows the amount and percentage by which the receipts for the period were less than for the corresponding period of 1909:

Western-State	1,130,000 fr.	(\$226,000)	or 26.5 per cent.
Northern	2,002,000 fr.	(\$400,400)	" 35.7 "
Paris, Lyons & M.....	670,000 fr.	(\$134,000)	" 5.5 "
Eastern	620,000 fr.	(\$124,000)	" 12.6 "
Orleans	577,000 fr.	(\$115,400)	" 9.8 "
Southern	463,000 fr.	(\$92,600)	" 18.2 "
State (total)	88,500 fr.	(\$17,700)	" 6.9 "

The second week of the strike caused a loss to the state and the companies of more than 5½ millions. Then, in addition to this total, the strike cost the state 9,000,000 francs (\$1,800,000) either directly or indirectly in interest guaranteed for the other companies, and that without taking into account the losses of commerce, manufactures and agriculture, because of the suspension of the facilities of transportation.

Railway Appliances Association.

The Railway Appliance Association will hold its annual exhibition of railway appliances used in the construction and maintenance of railways at the Coliseum, Chicago, March 20 to 25, inclusive, 1911. The exhibition will occupy the entire main floor, annex and balcony. Of the 49,000 sq. ft. devoted to exhibits, about 40,000 sq. ft. have been already secured by the different exhibitors, leaving only 9,000 sq. ft. yet to be sold.

Among the extra attractions which have been secured and

Following is a list of the children who have scored spot

[illegible]

The annual meeting of this society, held at New York, Dec. 10 to 13, 1906, proved to be one of the most successful in the history of the society. George Westinghouse presented his presidential address at the opening session. After briefly referring to the principal events of the society during the past year he called attention to certain misunderstandings which appeared to exist concerning the paper on the standardization of electric railway equipment which he had presented at the joint meeting of the A. S. M. E. and the British Institution of Mechanical Engineers in England. He did not intend to recommend the adoption of one particular system and repeated his specific recommendation to demonstrate this. The remainder and the greater part of his address consisted of a most interesting account of the invention and development of the air brake.

The following officers were elected: Col. E. D. Meier, president; H. H. Vaughan, E. M. Herr and George M. Brill, vice-presidents; D. F. Crawford, E. B. Katte and Stanley G. Flagg, Jr., managers, and Wm. H. Wiley, treasurer. The professional sessions were carried out substantially as outlined in the *Railway Age Gazette* of December 2. On Friday, the 9th, a number of excursions were conducted to various points of interest, one of the most largely attended being that to the works of the Niles-Bement-Pond Company at Plainfield, N. J., where a number of Pond planers driven by reversible motors were in operation.

The annual soaker and Christmas entertainment of the St. Louis Railway Club was held on Friday evening, December 9, in the grand dining room of the Southern Hotel. The speaker was L. O. Armstrong, colonization and industrial agent of the Canadian Pacific, who described points of interest along his line, illustrating them with stereopticon and motion pictures. After Mr. Armstrong's address, lunch was served, this being followed by a vaudeville entertainment.

The first noon-day meeting of the Traffic Club of St. Louis was held at the Planters' Hotel on December 14. O. F. Richards, general manager of the Simmons Hardware Company, spoke on the "Parcels Post."

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
 AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; next meeting, June 22, 1911; Niagara Falls, N. Y.
 AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn., 1911.
 AMERICAN ASSOCIATION OF LOCAL FREIGHT AGENTS' ASSOCIATION.—G. W. Harrison, 200 E. Myrtle St., Co., Toledo, Ohio.
 AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carey building, Cincinnati, Ohio.
 AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
 AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York.
 AMERICAN RAILROAD BRIDGE AND BUILDING ASSOCIATION.—A. C. Lichty, C. & N. W. Chicago; Sept. 17-19, 1911; St. Louis, Mo.
 AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION.—E. H. Fritch, Monadnock building, Chicago; March 21-23, 1911, Chicago.
 AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. R. Co., St. Louis, Mo.; May 6, 1911; Detroit, Mich.
 AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; June 14-16, 1911, Atlantic City, N. J.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Harroun, Bloomington, Ill.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wednesdays; except July and August; annual, Jan. 18-19, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Haner, 13 Park Row, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., New York.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago; April 26, 1911; New Orleans, La.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago; May, 1911; Montreal, Can.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Colegrove, I. C. R.R., Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston, Mass.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conant, 4 Park Place, New York; June 20-21, 1911; Cape May City, N. J.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tuesday in month, except June, July and Aug.; Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays; Montreal, annual, last week January.

CAR FOREMAN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. F. Jurgensen, 116 Winter St., St. Paul, Minn.; 1st Monday, except June, July and Aug.; St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday; annual, Jan. 17, 1911; Pittsburgh.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot R.R., Richmond, Va.; 20th annual, June 21, 1911; St. Paul, Minn.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—H. D. Judson, 209 East Adams St., Chicago; Wednesday preceding 3d Thursday; Chicago.

INDIANAPOLIS RAILWAY AND MECHANICAL CLUB.—B. S. Downey, C. & H. & D., Indianapolis, Ind.

INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; next convention, Omaha, Neb.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; May 15-18, 1911; Chattanooga, Tenn.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.

INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.

IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; June 19-21, 1911, Atlantic City, N. J.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION, OF UNITED STATES AND CANADA.—A. P. Dane, R. & M., Reading, Mass.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept.; Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.

NORTH-WEST RAILWAY CLUB.—T. W. Flannagan, Soo Line, Minn.; 1st Tues after 2d Mon., except June, July, August; alternately at St. Paul and Minneapolis, Minn.

NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. & M. & St. P.; 4th Saturday; Duluth, Minn.

OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Bldg.; second Wed. Kansas City Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City; 3d Friday in month; Kansas City.

RAILWAY CLUB OF PITTSBURGH.—C. W. Allen, P. & L. E., Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.

RAILWAY SINKERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Conn.; annual, May 1911, Milford, Conn.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except July and August.

ROADMASTERS' AND MECHANICAL WAY ASSOCIATION.—Walter E. Emery, P. & P. E. Ry., Toledo, Ill., Oct. 1911, St. Louis.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Prudential Bldg., Atlanta, Ga.; 3d Thurs., Dec., April, August and Nov.; Atlanta.

TOLEDO TRANSPORTATION CLUB.—L. G. Mischner, Woodson Spice Co., Toledo, Ind.; 1st Sat., 2d Wed., May 6, 1911; Toledo.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; 1st Sat after 1st Wed.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.

TRAFFIC CLUB OF PITTSBURGH.—J. I. Whiting, Oliver building, Pittsburgh, Pa.; monthly meetings; Pittsburgh.

TRAIN DISPATCHERS' ASSOCIATION OF AMERICA.—J. F. Muckle, 7042 Stewart Ave., Chicago; annual, Jan. 30, 1911, Baltimore, Md.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

WESTERN CANADIAN RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 3d Monday, except June, July and August; Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 4th Tuesday of each month, except June, July and August.

WOOD PRESERVERS' ASSOCIATION.—F. J. Angelo, First National Bank Bldg., Chicago; annual, Dec. 17-19, 1911, Chicago.

Traffic News.

The Southern Pacific proposes to spend \$200,000 during the coming year in advertising the advantages of Texas as a suitable place for people desiring to settle in a new country.

W. D. Williams, member of the Texas railway commission, will seek to get the commission to order a reduction in both upper and lower berths in sleeping cars, and establish differentials of about 20 per cent. between the rates.

The State Railroad Commission of Pennsylvania has rejected an application for a recommendation that an additional passenger train be run by the Philadelphia & Reading between Harrisburg and Reading after six o'clock in the evening.

The trunk lines have abandoned their purpose to issue new tariffs, January 1, abolishing numerous allowances on through freight rates to short terminal lines. It is said that the opposition of the Wheeling & Lake Erie and the roads owned by the United States Steel Corporation was what led to this action.

It is reported in Pittsburgh that the Pennsylvania and the Baltimore & Ohio have agreed with the principal shippers of the city on uniform and reduced rates for switching freight from one road to the other. Freight loaded at a store or factory on one line to be shipped over the other, will be transferred at the rate of five cents per 100 lbs. for first class and second class freight, and at two cents for the lower classes.

The Joliet & Southern Traction Company, an Illinois inter-urban line, has begun a proceeding before the Illinois railway commission to compel the Chicago & Alton, the Wabash, the Rock Island, the Illinois Central and the Santa Fe to interchange traffic and make joint rates in connection with it. The case was argued in Chicago on December 8. The railways contended that the state commission had no jurisdiction. The commission took the case under advisement.

The St. Louis Southwestern, the Chicago, Peoria & St. Louis, the St. Louis & San Francisco, the Missouri, Kansas & Texas, the Chicago & Eastern Illinois and the Chicago, Rock Island & Pacific have renewed through traffic arrangements and made through rates in connection with the Manufacturers' Railway of St. Louis. Under the arrangements entered into, they are to pay the Manufacturers' Railway \$4.50 for each car that it switches between industries located on its tracks and the trunk lines. The switching allowance was withdrawn about a year ago on the ground that the Manufacturers' Railway was a "tap" line. The question of its status is now pending before the Interstate Commerce commission; and the action here noted has already been nullified by an order from the Commission suspending the tariffs.

Hearing Regarding "Tap Line" Allowances.

Commissioner Harlan of the Interstate Commerce Commission began at New Orleans, La., on December 9, hearings on the reasonableness of divisions of through rates made by trunk lines in connection with "tap line" railways. The case of the Butler County Railroad, a 28-mile line in Butler county, Missouri, was the first heard. W. N. Barron, vice-president, said the road was organized under the laws of Missouri in September, 1905, to haul a large amount of hard wood timber along it. This timber is being cut and made into barrels for the American Sugar Refining Company and the Brooklyn Cooperage Company. The road has made it possible for three villages to spring up, he said. The line has a contract for carrying mails. An officer of the Crittenden Railroad, a 27-mile "tap line" in Arkansas, said this road is controlled by the Crittenden Lumber Company. He said that between 35 and 40 per cent. of its business comes from the Crittenden Lumber Company, but that the road does not favor this company in the distribution of cars.

Crop Conditions.

The department of agriculture estimates the crop conditions as follows:

WINTER WHEAT. Area sown this fall 25 per cent. more than the revised estimated area sown in fall of 1909, equivalent to an increase of 828,000 acres, the indicated total area being 31,485,000.

area. The condition on December 1 was 87.5, against 94.6 and 88.4 on December 1, 1909 and 1908, respectively, and a ten-year average of 91.5.

Rain Area shows that fall 1910 per cent less than the previous estimated area shown in fall of 1909, equivalent to a decrease of 25,000 acres, the indicated total area being 3,135,000 acres. Comparison on December 1 was 92.6 against 94.1 and 87.6 on December 1, 1909 and 1908, respectively, and a ten-year average of 93.

Details by states follow:

States	1910		1909		1908		10 Year Average	
	Area, 1000 a/c.	Per cent	Area, 1000 a/c.	Per cent	Area, 1000 a/c.	Per cent	Area, 1000 a/c.	Per cent
Alabama	141	100	141	100	141	100	141	100
Arizona	134	100	134	100	134	100	134	100
California	1,225	100	1,225	100	1,225	100	1,225	100
Delaware	125	99	124	75	88	91		
Florida	803	100	819	100	80	60		
Georgia	840	100	840	81	81	98		
Idaho	141	100	141	84	84	82		
Illinois	91	100	96	83	89	90		
Indiana	108	100	111	87	97	93		
Iowa	77	95	67	88	90	94		
Kansas	2,036	104	2,117	91	95	85		
Kentucky	2,765	101	2,793	84	98	89		
Louisiana	10	100	10	87	87	89		
Maine	930	105	966	94	94	87		
Michigan	70	108	76	96	97	94		
Minnesota	239	113	270	92	98	95		
Missouri	2,207	102	2,251	83	98	92		
Montana	2,767	103	2,850	90	98	96		
Nebraska	6,300	102	6,436	73	98	93		
Nevada	800	99	792	83	97	89		
New Hampshire	99	99	965	80	95	90		
New Jersey	140	108	151	89	95	94		
New Mexico	5	100	10	90	94	92		
New York	1,295	103	1,334	71	95	93		
North Carolina	1,604	103	1,652	58	98	92		
Ohio	200	112	224	82	93	89		
Oklahoma	530	131	387	97	93	90		
Oregon	45	130	34	100	95	95		
Pennsylvania	146	118	137	90	93	91		
Rhode Island	160	109	174	87	97	97		
South Carolina	15	115	17	100	97	97		
Tennessee	350	112	393	95	100	97		
Texas	730	103	752	96	93	91		
Vermont	497	111	552	98	94	95		
Washington	1,100	90	990	90	100	95		
West Virginia	33,657	102.5	34,485	82.5	95.8	91.3		
Wisconsin	140	108	151	89	95	94		
Wyoming	5	100	10	90	94	92		

The total production of cotton in the United States for the season of 1910-11 will amount to 5,464,597,000 lbs. (not including linters), equivalent to 11,426,000 bales of 500 lbs., gross weight.

The estimated production, with comparisons, by states, follow:

States	1910.		1909.		1908.	
	Pounds	Bales	Pounds	Bales	Pounds	Bales
Alabama	6,200,000	13,000	10,095			
Arizona	321,840,000	675,000	600,606			
California	532,667,000	1,116,000	1,099,955			
Florida	836,150,000	1,750,000	1,805,014			
Georgia	27,927,000	58,000	54,011			
Idaho	561,172,000	1,174,000	1,024,350			
Illinois	554,828,000	1,160,000	1,083,215			
Indiana	124,280,000	260,000	253,412			
Iowa	1,504,060,000	3,140,000	2,522,811			
Kansas	390,141,000	815,000	713,463			
Kentucky	145,973,000	305,000	246,630			
Louisiana	22,973,000	48,000	45,141			
Maine	430,650,000	900,000	544,954			
Michigan	5,736,000	12,000				
Minnesota	5,464,597,000	11,426,000	10,004,949			

Freight Car Balance and Performance.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association in presenting statistical bulletin No. 86, covering car balance and performance for August, 1910, says:

"Traffic conditions during August were apparently improved and the performance averages compared favorably with those for corresponding months in previous years. In many ways conditions generally during the month were quite similar to those existing in August, 1907. There were a few more idle cars this year than three years ago; there were a few more cars in shop, and there was also some increase in the number of cars owned per mile of road. The cars on their home lines averaged higher this year than three years ago, when the per cent. of loaded mileage was about the same, the difference, which was in favor of 1907, being .5 in the per cent.

"The gross earnings per mile of road, as reported by the Inter-

CAR BALANCE AND PERFORMANCE IN AUGUST, 1910.

States	Owned	Idle	Shop	Per cent. owned	Per cent. idle	Per cent. shop
Alabama	175,410	101,984	52,462	154,446	88	65
Arizona	101,984	101,984	52,462	154,446	88	65
California	1,225	1,225	1,225	1,225	100	100
Delaware	125	125	125	125	100	100
Florida	803	803	803	803	100	100
Georgia	840	840	840	840	100	100
Idaho	141	141	141	141	100	100
Illinois	91	91	91	91	100	100
Indiana	108	108	108	108	100	100
Iowa	77	77	77	77	100	100
Kansas	2,036	2,036	2,036	2,036	100	100
Kentucky	2,765	2,765	2,765	2,765	100	100
Louisiana	10	10	10	10	100	100
Maine	930	930	930	930	100	100
Michigan	70	70	70	70	100	100
Minnesota	239	239	239	239	100	100
Missouri	2,207	2,207	2,207	2,207	100	100
Montana	2,767	2,767	2,767	2,767	100	100
Nebraska	6,300	6,300	6,300	6,300	100	100
Nevada	800	800	800	800	100	100
New Hampshire	99	99	99	99	100	100
New Jersey	140	140	140	140	100	100
New Mexico	5	5	5	5	100	100
New York	1,295	1,295	1,295	1,295	100	100
North Carolina	1,604	1,604	1,604	1,604	100	100
Ohio	200	200	200	200	100	100
Oklahoma	530	530	530	530	100	100
Oregon	45	45	45	45	100	100
Pennsylvania	146	146	146	146	100	100
Rhode Island	160	160	160	160	100	100
South Carolina	15	15	15	15	100	100
Tennessee	350	350	350	350	100	100
Texas	730	730	730	730	100	100
Vermont	497	497	497	497	100	100
Washington	1,100	1,100	1,100	1,100	100	100
West Virginia	33,657	33,657	33,657	33,657	100	100
Wisconsin	140	140	140	140	100	100
Wyoming	5	5	5	5	100	100

States	Owned	Idle	Shop	Per cent. owned	Per cent. idle	Per cent. shop
Alabama	175,410	101,984	52,462	154,446	88	65
Arizona	101,984	101,984	52,462	154,446	88	65
California	1,225	1,225	1,225	1,225	100	100
Delaware	125	125	125	125	100	100
Florida	803	803	803	803	100	100
Georgia	840	840	840	840	100	100
Idaho	141	141	141	141	100	100
Illinois	91	91	91	91	100	100
Indiana	108	108	108	108	100	100
Iowa	77	77	77	77	100	100
Kansas	2,036	2,036	2,036	2,036	100	100
Kentucky	2,765	2,765	2,765	2,765	100	100
Louisiana	10	10	10	10	100	100
Maine	930	930	930	930	100	100
Michigan	70	70	70	70	100	100
Minnesota	239	239	239	239	100	100
Missouri	2,207	2,207	2,207	2,207	100	100
Montana	2,767	2,767	2,767	2,767	100	100
Nebraska	6,300	6,300	6,300	6,300	100	100
Nevada	800	800	800	800	100	100
New Hampshire	99	99	99	99	100	100
New Jersey	140	140	140	140	100	100
New Mexico	5	5	5	5	100	100
New York	1,295	1,295	1,295	1,295	100	100
North Carolina	1,604	1,604	1,604	1,604	100	100
Ohio	200	200	200	200	100	100
Oklahoma	530	530	530	530	100	100
Oregon	45	45	45	45	100	100
Pennsylvania	146	146	146	146	100	100
Rhode Island	160	160	160	160	100	100
South Carolina	15	15	15	15	100	100
Tennessee	350	350	350	350	100	100
Texas	730	730	730	730	100	100
Vermont	497	497	497	497	100	100
Washington	1,100	1,100	1,100	1,100	100	100
West Virginia	33,657	33,657	33,657	33,657	100	100
Wisconsin	140	140	140	140	100	100
Wyoming	5	5	5	5	100	100

States	Owned	Idle	Shop	Per cent. owned	Per cent. idle	Per cent. shop
Alabama	175,410	101,984	52,462	154,446	88	65
Arizona	101,984	101,984	52,462	154,446	88	65
California	1,225	1,225	1,225	1,225	100	100
Delaware	125	125	125	125	100	100
Florida	803	803	803	803	100	100
Georgia	840	840	840	840	100	100
Idaho	141	141	141	141	100	100
Illinois	91	91	91	91	100	100
Indiana	108	108	108	108	100	100
Iowa	77	77	77	77	100	100
Kansas	2,036	2,036	2,036	2,036	100	100
Kentucky	2,765	2,765	2,765	2,765	100	100
Louisiana	10	10	10	10	100	100
Maine	930	930	930	930	100	100
Michigan	70	70	70	70	100	100
Minnesota	239	239	239	239	100	100
Missouri	2,207	2,207	2,207	2,207	100	100
Montana	2,767	2,767	2,767	2,767	100	100
Nebraska	6,300	6,300	6,300	6,300	100	100
Nevada	800	800	800	800	100	100
New Hampshire	99	99	99	99	100	100
New Jersey	140	140	140	140	100	100
New Mexico	5	5	5	5	100	100
New York	1,295	1,295	1,295	1,295	100	100
North Carolina	1,604	1,604	1,604	1,604	100	100
Ohio	200	200	200	200	100	100
Oklahoma	530	530	530	530	100	100
Oregon	45	45	45	45	100	100
Pennsylvania	146	146	146	146	100	100
Rhode Island	160	160	160	160	100	100
South Carolina	15	15	15	15	100	100
Tennessee	350	350	350	350	100	100
Texas	730	730	730	730	100	100
Vermont	497	497	497	497	100	100
Washington	1,100	1,100	1,100	1,100	100	100
West Virginia	33,657	33,657	33,657	33,657	100	100
Wisconsin	140	140	140	140	100	100
Wyoming	5	5	5	5	100	100

States	Owned	Idle	Shop	Per cent. owned
--------	-------	------	------	-----------------

state Commerce Commission, averaged \$1,065 as against \$1,067 in August, 1907. The operating ratio was 64.76 per cent, as compared with 65.06 per cent. That the car performance was better than in 1907 is indicated by the increase in the tons per loaded car and the ton miles per car per day, these two items averaging 22.0 and 358 (active cars 382), as against 20.8 and 351 (active cars 364) in August, 1907.

"The earnings per car on line were slightly lower than in 1907. Assuming that the rates were stationary, this result, taken in connection with an increased ton miles per car per day, indicates that there was a large amount of the lower class commodities handled, and that the movement was so good that the traffic did not entirely utilize the increase in efficiency and number of cars. Compared with July, 1910, the principal averages all show increases. Miles per car per day increased from 22.8 to 23.2; tons per loaded car from 21.6 to 22.0; tons miles per car per day from 323 to 358, and earnings per car on line from \$2.18 per day to \$2.40. The per cent. of loaded mileage increased from 68.5 in July to 70.3 in August."

The accompanying table gives car balance and performance in August, 1910.

INTERSTATE COMMERCE COMMISSION.

The commission has suspended until April 10 certain livestock tariffs, which have been issued by the Chicago & Northwestern and other roads, between the Missouri and Mississippi rivers.

The Commerce Court.

President Taft sent to the senate on Monday last the following nominations for the Court of Commerce. This court was provided for by the Mann-Elkins law of last June, and is to be opened for business within 30 days after the judges have been designated (confirmed). The nominations are: Martin A. Knapp, now chairman of the Interstate Commerce Commission, for a term of five years; Robert W. Archibald, now United States district judge for the middle district of Pennsylvania, term of four years; William H. Hunt, now a judge of the Court of Customs Appeals, formerly United States district judge of the district of Montana, term of three years; John Emmett Carland, of South Dakota, term of two years; Julian W. Mack, now judge in the Appellate Circuit Court of the first Illinois district, term of one year.

On the same day the President nominated B. H. Meyer, of Wisconsin, and C. C. McChord, of Kentucky, to be members of the Interstate Commerce Commission, taking the place of Mr. Knapp, promoted to the Commerce Court, and Mr. Cockrell, whose term expires at the end of this month. With this change the members of the Interstate Commerce Commission, in the order of their seniority, will be: Messrs Clements, Prouty, Lane, Clark, Harlan, Meyer and McChord.

Reparation to Cover Marine Insurance.

Wyman, Partridge & Company et al. v. Boston & Maine Railroad et al. Opinion by Commissioner Prouty:

This is a supplemental petition asking reparation. The so-called Harter Act provides that water carriers may by contract exempt themselves from liability for perils of the sea, and most bills of lading covering water-borne traffic do, in point of fact, contain such an exemption. To secure protection against loss from perils of the sea, shippers upon the Great Lakes by these lake and rail lines had been accustomed, previous to 1907, to take out marine insurance covering their individual shipments. The tariffs by which these advanced rates were established in the spring of 1907 stated that insurance against perils of the sea, while the traffic was water-borne upon the Great Lakes, would be provided by the carriers for the benefit of shippers, and the carriers claimed that the purpose of these advances was to cover the cost of this marine insurance which they, for the first time, furnished as a part of the rate.

During the season of 1907 great uncertainty prevailed among shippers as to the character and extent of the protection afforded by the insurance which the carriers professed to have effected. Wyman, Partridge & Company, who are large shippers, not being satisfied, after inquiry, that they had any adequate protection, proceeded to insure their shipments during the season of 1907, exactly as they had done during previous seasons. This petition seeks to recover by way of reparation the amounts paid by that company for this insurance.

The serious question is whether damages of this kind can be awarded. The commission held in *Joynes v. P. R. R. Co.*, 17 I. C. C. Rep., 361, that it had no jurisdiction to give general damages, but could only award rate damages. Are these damages rate damages within the meaning of that case?

The commission found that the rates prescribed by the defendants were unreasonable, for the reason and to the extent that the carrier failed to provide protection against loss from perils of the sea. Had the defendants by their tariffs and bills of lading or by some adequate form of insurance provided this protection the rates would have been reasonable. In the opinion of the commission, no such protection was provided either by the tariff or by the bills of lading or by the insurance which was effected. It was plainly the right therefore of Wyman, Partridge & Company to take out themselves marine insurance, and thereby to secure the protection to which they were entitled and which the defendants had not supplied. (19 I. C. C., 551.)

COURT NEWS.

The federal government has brought suit at Los Angeles, Cal., attacking the title of the Southern Pacific to 6,100 acres of oil lands in Kern county, which are valued, according to the complaint, at \$10,000,000. It is alleged that the company patented the lands with the full knowledge that they were mineral-bearing, and, therefore, could not be properly patented under the laws of the United States. The suit is said to be the first of a number that will be brought to reclaim oil lands from the Southern Pacific in Kern, Kings and Fresno counties, California.

Decision in Suit Against Anthracite Carriers.

In the United States circuit court at Philadelphia December 8, a decision was handed down in the long pending suits of the government against the anthracite coal roads, charging conspiracy in restraint of trade. The decision holds that the Temple Iron Company, owned by the coal carrying roads, is an unlawful combination, in that it violates the anti-trust law, but all the other contentions of the government are rejected. The decision was by judges Gray, Buffington and Lanning. The points here given are the only ones on which a majority of the judges agree. The prevailing opinion was by Judge Gray. Judge Buffington agrees with him, except that he holds that the railways violated the law in their 65 per cent. contract with the independent coal operators. Judge Lanning would have decided all points against the government. The suit was filed in June, 1907. Judge Gray in his opinion says:

"We are compelled to conclude that the direct evidence relied upon by the government to show that the defendants have long been parties to a general combination and conspiracy, commencing presumably in 1896 and continuing down to the filing of the petition, which stifles competition and obstructs trade and commerce among the states in anthracite coal, fails to establish that charge." The form of decree to be issued in the case of the Temple Iron Company will be taken up later by the court. The case will probably be taken to the Supreme Court of the United States.

The decision was regarded as a victory for the railways and the stocks of the roads affected rose in the stock market. Railway attorneys held that one of the most important features of the decision, from the point of view of the interpretation of the Sherman anti-trust law, was the sustaining of the position of the Reading in its ownership of a majority of the stock of the Central of New Jersey, and of the Erie in its control of the New York, Susquehanna & Western.

George F. Baer, president of the Reading said:

"The decision is a great victory for the anthracite industry of Pennsylvania. It decided that there is no combination to regulate the price, sale and production of coal. It holds the 65 per cent. purchase contracts to be legal. It affirms the legality of the purchase of the Jersey Central stock by the Reading. The only point decided against us was that there was a combination organized as the Temple Iron Company, which defeated the construction of a railway and that they violated the Sherman anti-trust act to the extent that an injunction might be granted to prevent in the future a continuing violation of the anti-trust act. Judge Lanning points out, as to the government's allegation, that the construction of the proposed railway has already been defeated and that the court cannot restrain a past violation of the act. He says 'nor does it appear, if the prayer for an injunction should be granted, the new railway would be built.'"

REVENUES AND EXPENSES OF RAILWAYS.

MONTHLY REVENUES AND EXPENSES FOR THE MONTH ENDING OCTOBER 31, 1910.

Name of road.	Operating revenues.		Maintenance of way and equipment.		Total.	
	Freight.	Passenger.	Way and equipment.	Other.	Freight.	Passenger.
Atlanta, Birmingham & Atlantic.	\$174,952.	\$11,760.	\$28,641.	\$40,000.	\$244,353.	\$51,760.
Bangor & Aroostook.	67,480.	67,480.	88,188.	193,229.	268,668.	260,660.
Buffalo, Rochester & Pittsburgh.	237,362.	90,132.	88,848.	193,229.	515,532.	253,911.
Central of Georgia.	331,424.	306,142.	1,344,300.	1,466,544.	2,982,266.	2,073,997.
Chesapeake & Ohio.	2,184,134.	480,091.	2,268,688.	54,717.	4,442,850.	534,808.
Chicago, Indianapolis & Louisville.	339,533.	137,335.	341,475.	75,439.	756,823.	212,774.
Colorado & Southern.	70,144.	119,063.	94,431.	179,181.	273,678.	298,254.
Delaware & Hudson Co.	1,643,200.	271,324.	1,998,039.	233,973.	3,841,212.	505,247.
Denver & Rio Grande.	1,691,875.	501,052.	2,284,437.	286,076.	4,477,430.	787,128.
Elgin, Joliet & Eastern Co.	708,300.	81,069.	294,277.	113,216.	1,396,852.	194,501.
Florida East Coast.	117,297.	65,444.	46,534.	40,085.	269,360.	105,524.
Fort Worth & Denver City.	352,640.	158,618.	32,850.	73,117.	517,225.	232,585.
Galveston, Houston & San Antonio.	731,154.	213,238.	1,009,835.	157,163.	2,051,390.	370,401.
Grand Rapids & Indiana.	275,362.	136,286.	446,106.	54,649.	852,363.	190,249.
Houston & Texas Central.	477,158.	66,875.	70,847.	72,899.	685,779.	139,746.
Illinois & Michigan Central.	1,098,754.	456,728.	1,255,215.	195,109.	2,911,806.	650,963.
Missouri, Kansas & Texas.	847,859.	386,259.	1,305,574.	104,424.	2,544,116.	490,783.
Mobile & Ohio.	677,262.	115,364.	99,795.	155,464.	1,048,881.	261,002.
Nashville, Chattanooga & St. Louis.	213,549.	248,129.	150,500.	196,639.	608,817.	304,243.
New York, Chicago & St. Louis.	916,296.	139,885.	1,093,571.	125,634.	2,135,386.	264,922.
New York, Ontario & Western.	1,075,000.	197,000.	1,272,000.	1,127,000.	3,674,000.	2,404,000.
Norfolk Southern.	1,034,445.	97,000.	248,036.	17,441.	1,396,922.	104,441.
Oregon R. R. & Nav. Co.	963,486.	391,446.	1,453,742.	195,407.	2,804,681.	586,853.
Oregon Short Line.	1,430,197.	470,703.	2,044,071.	195,603.	3,140,574.	476,331.
St. Louis & San Francisco.	2,536,169.	1,005,689.	3,541,857.	528,782.	7,612,507.	1,535,112.
St. Louis Southwestern.	500,480.	123,297.	697,506.	113,147.	1,241,430.	236,401.
St. Louis Northwestern of Texas.	477,734.	14,442.	472,308.	37,821.	964,305.	152,352.
Seaboard Air Line.	3,289,549.	371,714.	3,661,263.	375,437.	7,701,963.	417,789.
Texas & Pacific.	1,104,460.	402,728.	1,645,111.	137,468.	2,289,767.	241,331.
Texas & New Orleans.	1,184,222.	55,245.	500,823.	69,401.	1,809,691.	62,646.
Toledo & Ohio Central.	474.	21,016.	322,882.	35,382.	354,684.	49,893.
Virginian.	286,345.	21,016.	322,882.	35,382.	354,684.	49,893.
West Jersey & Seaboard.	167,435.	247,671.	451,603.	89,337.	956,046.	137,233.
Wheeling & Lake Erie.	520,238.	55,675.	612,580.	126,468.	1,196,961.	175,159.

MONTHLY REVENUES AND EXPENSES FOR THE MONTH ENDING OCTOBER 31, 1910.

Operating revenues.		Maintenance of way and equipment.		Total.		
Freight.	Passenger.	Way and equipment.	Other.	Freight.	Passenger.	
Atlanta, Birmingham & Atlantic.	\$174,952.	\$11,760.	\$28,641.	\$40,000.	\$244,353.	\$51,760.
Bangor & Aroostook.	67,480.	67,480.	88,188.	193,229.	268,668.	260,660.
Buffalo, Rochester & Pittsburgh.	237,362.	90,132.	88,848.	193,229.	515,532.	253,911.
Central of Georgia.	331,424.	306,142.	1,344,300.	1,466,544.	2,982,266.	2,073,997.
Chesapeake & Ohio.	2,184,134.	480,091.	2,268,688.	54,717.	4,442,850.	534,808.
Chicago, Indianapolis & Louisville.	339,533.	137,335.	341,475.	75,439.	756,823.	212,774.
Colorado & Southern.	70,144.	119,063.	94,431.	179,181.	273,678.	298,254.
Delaware & Hudson Co.	1,643,200.	271,324.	1,998,039.	233,973.	3,841,212.	505,247.
Denver & Rio Grande.	1,691,875.	501,052.	2,284,437.	286,076.	4,477,430.	787,128.
Elgin, Joliet & Western Co.	708,300.	81,069.	294,277.	113,216.	1,396,852.	194,501.
Florida East Coast.	117,297.	65,444.	46,534.	40,085.	269,360.	105,524.
Fort Worth & Denver City.	352,640.	158,618.	32,850.	73,117.	517,225.	232,585.
Galveston, Houston & San Antonio.	731,154.	213,238.	1,009,835.	157,163.	2,051,390.	370,401.
Grand Rapids & Indiana.	275,362.	136,286.	446,106.	54,649.	852,363.	190,249.
Houston & Texas Central.	477,158.	66,875.	70,847.	72,899.	685,779.	139,746.
Illinois & Michigan Central.	1,098,754.	456,728.	1,255,215.	195,109.	2,911,806.	650,963.
Missouri, Kansas & Texas.	847,859.	386,259.	1,305,574.	104,424.	2,544,116.	490,783.
Mobile & Ohio.	677,262.	115,364.	99,795.	155,464.	1,048,881.	261,002.
Nashville, Chattanooga & St. Louis.	213,549.	248,129.	150,500.	196,639.	608,817.	304,243.
New York, Chicago & St. Louis.	916,296.	139,885.	1,093,571.	125,634.	2,135,386.	264,922.
New York, Ontario & Western.	1,075,000.	197,000.	1,272,000.	1,127,000.	3,674,000.	2,404,000.
Norfolk Southern.	1,034,445.	97,000.	248,036.	17,441.	1,396,922.	104,441.
Oregon R. R. & Nav. Co.	963,486.	391,446.	1,453,742.	195,407.	2,804,681.	586,853.
Oregon Short Line.	1,430,197.	470,703.	2,044,071.	195,603.	3,140,574.	476,331.
St. Louis & San Francisco.	2,536,169.	1,005,689.	3,541,857.	528,782.	7,612,507.	1,535,112.
St. Louis Southwestern.	500,480.	123,297.	697,506.	113,147.	1,241,430.	236,401.
St. Louis Northwestern of Texas.	477,734.	14,442.	472,308.	37,821.	964,305.	152,352.
Seaboard Air Line.	3,289,549.	371,714.	3,661,263.	375,437.	7,701,963.	417,789.
Texas & Pacific.	1,104,460.	402,728.	1,645,111.	137,468.	2,289,767.	241,331.
Texas & New Orleans.	1,184,222.	55,245.	500,823.	69,401.	1,809,691.	62,646.
Toledo & Ohio Central.	474.	21,016.	322,882.	35,382.	354,684.	49,893.
Virginian.	286,345.	21,016.	322,882.	35,382.	354,684.	49,893.
West Jersey & Seaboard.	167,435.	247,671.	451,603.	89,337.	956,046.	137,233.
Wheeling & Lake Erie.	520,238.	55,675.	612,580.	126,468.	1,196,961.	175,159.

MONTHLY REVENUES AND EXPENSES FOR THE MONTH ENDING OCTOBER 31, 1910.

Operating revenues.		Maintenance of way and equipment.		Total.		
Freight.	Passenger.	Way and equipment.	Other.	Freight.	Passenger.	
Atlanta, Birmingham & Atlantic.	\$174,952.	\$11,760.	\$28,641.	\$40,000.	\$244,353.	\$51,760.
Bangor & Aroostook.	67,480.	67,480.	88,188.	193,229.	268,668.	260,660.
Buffalo, Rochester & Pittsburgh.	237,362.	90,132.	88,848.	193,229.	515,532.	253,911.
Central of Georgia.	331,424.	306,142.	1,344,300.	1,466,544.	2,982,266.	2,073,997.
Chesapeake & Ohio.	2,184,134.	480,091.	2,268,688.	54,717.	4,442,850.	534,808.
Chicago, Indianapolis & Louisville.	339,533.	137,335.	341,475.	75,439.	756,823.	212,774.
Colorado & Southern.	70,144.	119,063.	94,431.	179,181.	273,678.	298,254.
Delaware & Hudson Co.	1,643,200.	271,324.	1,998,039.	233,973.	3,841,212.	505,247.
Denver & Rio Grande.	1,691,875.	501,052.	2,284,437.	286,076.	4,477,430.	787,128.
Elgin, Joliet & Eastern Co.	708,300.	81,069.	294,277.	113,216.	1,396,852.	194,501.
Florida East Coast.	117,297.	65,444.	46,534.	40,085.	269,360.	105,524.
Fort Worth & Denver City.	352,640.	158,618.	32,850.	73,117.	517,225.	232,585.
Galveston, Houston & San Antonio.	731,154.	213,238.	1,009,835.	157,163.	2,051,390.	370,401.
Grand Rapids & Indiana.	275,362.	136,286.	446,106.	54,649.	852,363.	190,249.
Houston & Texas Central.	477,158.	66,875.	70,847.	72,899.	685,779.	139,746.
Illinois & Michigan Central.	1,098,754.	456,728.	1,255,215.	195,109.	2,911,806.	650,963.
Missouri, Kansas & Texas.	847,859.	386,259.	1,305,574.	104,424.	2,544,116.	490,783.
Mobile & Ohio.	677,262.	115,364.	99,795.	155,464.	1,048,881.	261,002.
Nashville, Chattanooga & St. Louis.	213,549.	248,129.	150,500.	196,639.	608,817.	304,243.
New York, Chicago & St. Louis.	916,296.	139,885.	1,093,571.	125,634.	2,135,386.	264,922.
New York, Ontario & Western.	1,075,000.	197,000.	1,272,000.	1,127,000.	3,674,000.	2,404,000.
Norfolk Southern.	1,034,445.	97,000.	248,036.	17,441.	1,396,922.	104,441.
Oregon R. R. & Nav. Co.	963,486.	391,446.	1,453,742.	195,407.	2,804,681.	586,853.
Oregon Short Line.	1,430,197.	470,703.	2,044,071.	195,603.	3,140,574.	476,331.
St. Louis & San Francisco.	2,536,169.	1,005,689.	3,541,857.	528,782.	7,612,507.	1,535,112.
St. Louis Southwestern.	500,480.	123,297.	697,506.	113,147.	1,241,430.	236,401.
St. Louis Northwestern of Texas.	477,734.	14,442.	472,308.	37,821.	964,305.	152,352.
Seaboard Air Line.	3,289,549.	371,714.	3,661,263.	375,437.	7,701,963.	417,789.
Texas & Pacific.	1,104,460.	402,728.	1,645,111.	137,468.	2,289,767.	241,331.
Texas & New Orleans.	1,184,222.	55,245.	500,823.	69,401.	1,809,691.	62,646.
Toledo & Ohio Central.	474.	21,016.	322,882.	35,382.	354,684.	49,893.
Virginian.	286,345.	21,016.	322,882.	35,382.	354,684.	49,893.
West Jersey & Seaboard.	167,435.	247,671.	451,603.	89,337.	956,046.	137,233.
Wheeling & Lake Erie.	520,238.	55,675.	612,580.	126,468.	1,196,961.	175,159.

MONTHLY REVENUES AND EXPENSES FOR THE MONTH ENDING OCTOBER 31, 1910.

Operating revenues.		Maintenance of way and equipment.		Total.		
Freight.	Passenger.	Way and equipment.	Other.	Freight.	Passenger.	
Atlanta, Birmingham & Atlantic.	\$174,952.	\$11,760.	\$28,641.	\$40,000.	\$244,353.	\$51,760.
Bangor & Aroostook.	67,480.	67,480.	88,188.	193,229.	268,668.	260,660.
Buffalo, Rochester & Pittsburgh.	237,362.	90,132.	88,848.	193,229.	515,532.	253,911.
Central of Georgia.	331,424.	306,142.	1,344,300.	1,466,544.	2,982,266.	2,073,997.
Chesapeake & Ohio.	2,184,134.	480,091.	2,268,688.	54,717.	4,442,850.	534,808.
Chicago, Indianapolis & Louisville.	339,533.	137,335.	341,475.	75,439.	756,823.	212,774.
Colorado & Southern.	70,144.	119,063.	94,431.	179,181.	273,678.	298,254.
Delaware & Hudson Co.	1,643,200.	271,324.	1,998,039.	233,973.	3,841,212.	505,247.
Denver & Rio Grande.	1,691,875.	501,052.	2,284,437.	286,076.	4,477,430.	787,128.
Elgin, Joliet & Eastern Co.	708,300.	81,069.	294,277.	113,216.	1,396,852.	194,501.
Florida East Coast.	117,297.	65,444.	46,534.	40,085.	269,360.	105,524.
Fort Worth & Denver City.	352,640.	158,618.	32,850.	73,117.	517,225.	232,585.
Galveston, Houston & San Antonio.	731,154.	213,238.	1,009,835.	157,163.	2,051,390.	370,401.
Grand Rapids & Indiana.	275,362.	136,286.	446,106.	54,649.	852,363.	190,249.
Houston & Texas Central.	477,158.	66,875.	70,847.	72,899.	685,779.	139,746.
Illinois & Michigan Central.	1,098,754.	456,728.	1,255,215.	195,109.	2,911,806.	650,963.
Missouri, Kansas & Texas.	847,859.	386,259.	1,305,574.	104,424.	2,544,116.	490,783.
Mobile & Ohio.	677,262.	115,364.	99,795.	155,464.	1,048,881.	261,002.
Nashville, Chattanooga & St. Louis.	213,549.	248,129.	150,500.	196,639.	608,817.	304,243.
New York, Chicago & St. Louis.	916,296.	139,885.	1,093,571.	125,634.	2,135,386.	264,922.
New York, Ontario & Western.	1,075,000.	197,000.	1,272,000.	1,127,000.	3,674,000.	2,404,000.
Norfolk Southern.	1,034,445.	97,000.	248,036.	17,441.	1,396,922.	104,441.
Oregon R. R. & Nav. Co.	963,486.	391,446.	1,453,742.	195,407.	2,804,681.	586,853.
Oregon Short Line.	1,430,197.	470,703.	2,044,071.	195,603.	3,140,574.	476,331.
St. Louis & San Francisco.	2,536,169.	1,005,689.	3,541,857.	528,7		

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

George L. Potter, third vice-president of the Baltimore & Ohio, with office at Baltimore, Md., has resigned.

W. L. Mattoon, assistant engineer of the Hocking Valley at Columbus, Ohio, has been appointed real estate agent in charge of taxes, with office at Columbus.

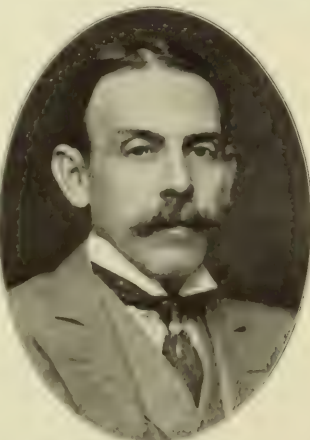
Carl Nyquist, chief clerk to the vice-president, secretary and treasurer of the Chicago, Rock Island & Pacific at Chicago, has been appointed assistant secretary, with office at Chicago.

J. N. Tittmore, formerly freight traffic manager of the Iowa Central and the Minneapolis & St. Louis, and during part of 1909 general traffic manager of the Pere Marquette, has been appointed assistant to the president of the St. Paul & Des Moines, with office at Des Moines, Iowa.

J. W. Kendrick, vice-president in charge of operation of the Atchison, Topeka & Santa Fe, with office at Chicago, has been granted a six-month's leave of absence, during which time he will take a trip around the world. W. B. Storey, vice-president in charge of construction, will assume Mr. Kendrick's duties temporarily.

Daniel Crombie, whose appointment as assistant to first vice-president of the Grand Trunk, at Montreal, Que., has been announced in these columns, was born May 13, 1864, at Hamilton, Ont. He was educated in the public schools and began railway work in 1882 as a telegraph operator on the Grand Trunk, and was later agent and train despatcher. In 1894 he was appointed car service agent of the Flint & Pere Marquette, now a part of the Pere Marquette, and four years later was made superintendent of car service on the same road. In 1900 he was appointed superintendent of transportation of the Pere Marquette, at Detroit, Mich., and three years later resigned from that position to go into other business. Mr. Crombie returned to railway work in February, 1907, when he became master of transportation of the Grand Trunk, at London, Ont., and in October of the same year he was appointed assistant to the general transportation manager at Montreal, which position he held at the time of his recent appointment as assistant to first vice-president.

Henry W. Miller, assistant to first vice-president, A. B. Andrews of the Southern Railway, at Raleigh, N. C., who was recently appointed assistant to the president with office at Atlanta, Ga., as previously announced in these columns, has been in the service of the Southern Railway and its predecessor, the Richmond & Danville, for 25 years. For several years past Mr. Miller has been engaged in looking after the interests of the Southern Railway and affiliated companies in all matters relating to taxes, and this work he will continue in his new position. He was born at Raleigh, N. C., August 8, 1868, and was educated in the public and private schools of his native city. In October, 1885, he entered the service of the Richmond & Danville as loading clerk at the Raleigh freight house and as relief telegraph operator. He was advanced to billing clerk and then chief clerk at the station, and later became rate clerk in the division freight office. Leaving the traffic department he became chief clerk and secretary to the third vice-president of the same road, becoming secretary to the



H. W. Miller

second vice-president on the organization of the Southern Railway Company, and later secretary to the first vice-president. In December, 1901, he was appointed assistant to the first vice-president. He is also president of the Durham, N. C., Union Station Company and secretary of a number of small lines affiliated with the Southern Railway.

Operating Officers.

E. B. Eppes, general manager of the Gainesville Midland, at Gainesville, Ga., has resigned.

O. H. McCarty has been appointed superintendent of the St. Louis & San Francisco, with office at Sapulpa, Okla., succeeding H. F. Clark, resigned.

G. D. Wright, trainmaster of the Southern Pacific at Oakland Pier, Cal., has been appointed an assistant superintendent, with office at Stockton, Cal.

George W. Berry, superintendent of the Illinois Central at Ft. Dodge, Iowa, has been appointed superintendent, with office at Freeport, Ill., succeeding Eugene Dailey, resigned.

F. M. Barker, trainmaster of the Lehigh Valley at Auburn, N. Y., has been appointed inspector of transportation, with office at South Bethlehem, Pa. C. N. Page succeeds Mr. Barker.

H. A. Oldham, general yardmaster of the St. Louis & San Francisco at Birmingham, Ala., has been appointed trainmaster of terminals, with office at Birmingham, succeeding F. J. Lee, resigned.

J. Berlingett, general manager of the St. Joseph & Grand Island, has been appointed vice-president and general manager of the Virginian Railway, with office at Norfolk, Va., effective January 1.

H. G. Ganson has been appointed superintendent of sleeping, dining and parlor cars and of news service on the British Columbia division of the Canadian Pacific, with office at Vancouver, B. C., succeeding A. W. Porter, transferred.

H. D. Pollard, whose resignation as superintendent of the Central of Georgia, was recently announced in these columns, has been appointed superintendent, in charge of the Sorocabana division of the Brazil Railway, with office at Sao Paulo, Brazil.

G. O. Perkins, superintendent of telegraph of the National Railways of Mexico at Mexico City, has been appointed superintendent of telegraph of the Chicago Great Western, with office at Chicago, succeeding A. T. Hollenbeck, assigned to other duties.

C. M. Andrews, superintendent of the Natchez division of the St. Louis, Iron Mountain & Southern at Ferriday, La., has had his jurisdiction extended over the Arkansas Southwestern division, succeeding J. J. Kress, resigned to engage in other business.

J. C. Morris has been appointed trainmaster of the Cincinnati division of the Erie Railroad, with office at Marion, Ohio, succeeding W. G. Baldwin, whose appointment as superintendent of the Chicago & Erie division has already been announced in these columns.

W. H. Blake has been appointed superintendent, in charge of the operating department, of the Tampa Northern, with office at Tampa, Fla. Captain W. B. Denham, general manager at Tampa, has resigned to go to another company, and his former position has been abolished.

A. W. Thompson, chief engineer of the Baltimore & Ohio System, at Baltimore, Md., has been appointed general manager, with office at Baltimore. A portrait of Mr. Thompson and a sketch of his railway life was published in the *Railway Age Gazette* of April 15, 1910, page 1013.

J. P. Atkins, car service agent of the Pere Marquette, with office at Detroit, Mich., having resigned to accept service elsewhere, that office has been abolished, and H. O. Halsted, whose appointment as superintendent of transportation has been announced in these columns, will assume the duties of the car service agent. W. A. Carruthers, yardmaster at Detroit, has been appointed trainmaster, with office at Detroit, succeeding E. E. Cain, resigned to accept service elsewhere.

Samuel S. Stone, who was recently appointed acting superintendent of the Morris & Essex division of the Delaware, Lackawanna & Western, with office at Hoboken, N. J., was born May 29, 1873, at Hawley, Pa. He was educated in the public schools and began railway work in 1892 with the Erie & Wyoming Valley, was a part of the Erie Railroad. From 1899 to 1900 he was an operator and train dispatcher on the Erie Railroad and then went to the Delaware, Lackawanna & Western as train dispatcher, remaining in that position until 1905, when he was appointed chief train dispatcher. In 1908 he was appointed assistant superintendent of the Morris & Essex division, which position he held at the time of his recent appointment as acting superintendent of that division.

Traffic Officers.

A. D. Hagaman has been appointed a commercial agent of the Southern Pacific, with office at San Diego, Cal.

C. R. Strickler has been appointed agent of the Lackawanna, with office at Des Moines, Iowa, a new agency.

V. C. Hooks has been appointed a soliciting freight agent of the St. Louis Southwestern, with office at Dallas, Tex.

George W. De Lano has been appointed traffic manager of the Texas City Steamship Company, with office at New York.

J. H. Daymont has been appointed a traveling freight agent of the Atlantic Coast Line, with office at St. Louis, Mo.

C. C. Harvey, soliciting freight agent of the Mobile & Ohio, with office at Kansas City, Mo., has resigned to engage in other business.

C. W. Minch has been appointed a traveling passenger agent of the Missouri Pacific, with office at St. Louis, Mo., succeeding Daniel Delaney, resigned.

W. G. Trufant, traveling freight agent of the International & Great Northern at New York, N. Y., has been appointed commercial agent, with office in New York.

W. R. Barnett has been appointed assistant general passenger agent of the New York Central & Hudson River, the West Shore and the Boston & Albany, with office at New York.

W. H. Phillips has been appointed a traveling freight agent of the Pittsburgh, Cincinnati, Chicago & St. Louis, with office at Richmond, Ind., succeeding J. E. Collins, promoted.

J. B. Gibson, traveling freight agent of the St. Louis & San Francisco at Houston, Tex., has been appointed commercial agent of the Houston East & West Texas, with offices at Houston, succeeding H. St. John Waggaman, resigned.

F. E. Landmeier, district passenger agent of the Chesapeake & Ohio of Indiana at Chicago, has been appointed a traveling passenger agent of the Chesapeake & Ohio, with office at Kansas City, Mo. This is a new office and the appointment will go into effect January 1.

Wm. Fitzgerald, Jr., has been appointed an assistant general freight agent of the Hocking Valley, with office at Chicago. H. M. Hall has been appointed a general agent at Chicago; and A. H. Heckendorf has been appointed a commercial agent, with office at Milwaukee, Wis.

Ralph S. Stubbs, assistant general freight and passenger agent of the Southern Pacific, at Tucson, Ariz., has been appointed general eastern freight agent of the Southern Pacific, and general freight agent of the Atlantic Steamship Lines of the Southern Pacific, with office at New York, succeeding L. J. Spence, promoted.

Owen Durham, Florida passenger agent of the Illinois Central, at Jacksonville, Fla., has been appointed a traveling passenger agent of the Illinois Central and the Yazoo & Mississippi Valley, with office at Memphis, Tenn., succeeding H. C. Cantwell, who succeeds Mr. Durham, as Florida passenger agent of the Illinois Central.

George H. Leggett has been appointed a general agent of the Wheeling & Lake Erie, with office at Canton, Ohio, succeeding H. S. Bradley, resigned to accept service with another company. Mr. Leggett will have jurisdiction over Canton and stations on the Carrollton division. Matters relating to freight traffic on

the Toledo division (M. Williams, Ohio, to Canton), strictly under the jurisdiction of the general agent at Canton, will be handled by the traffic department at Cleveland. R. F. Smith has been appointed a traveling agent, with office at Cleveland.

Lewis J. Spence, whose appointment as assistant director of traffic of the Union Pacific and Southern Pacific has been announced in these columns was born September 16, 1880, at



Lewis J. Spence

Wilmington, Del. He received a public school education and began railway work in October, 1898, as a steamfitter in the office of Edwin Hawley, then general eastern agent of the Southern Pacific at New York. He was later appointed chief clerk to the assistant general traffic manager, and from 1896 to 1902 was Eastern freight agent; he was then appointed general Eastern freight agent, and in 1906 was made also general freight agent of the Atlantic Steamship Lines of the Southern Pacific. His appointment as assistant director of traffic of the Union Pacific and the Southern Pacific, with office at Chicago, will become effective January 1, 1911.

Engineering and Rolling Stock Officers.

F. T. Slayton has been appointed superintendent of motive power of the Virginian Railway, with office at Princeton, W. Va., succeeding L. B. Rhodes, resigned.

F. W. Peterson, master mechanic of the Chicago & North Western, at Green Bay, Wis., has been appointed master mechanic of the Wisconsin division, with office at Chicago. Ernest Becker succeeds Mr. Peterson.

Willard Kells, whose appointment as assistant to the general superintendent of motive power of the Atlantic Coast Line, with office at Wilmington, N. C., has been announced in these



Willard Kells

columns, was born February 4, 1868, at Dennison, Ohio. He received his education in the grammar school and at the Cleveland high school, and began railway work March 1, 1888, as machinist's apprentice on the Erie Railroad at Susquehanna, Pa. Four years later he was appointed gang foreman, and in October of the following year was made general foreman, at Meadville. He was appointed master mechanic January 6, 1896, at Cleveland, Ohio, and was later transferred to Huntington, Ind., and then to Meadville. In April, 1903, he left the service of the Erie to become assistant master car builder, Union Tank Line, with office at New York, and the following month was appointed master mechanic of the Pennsylvania & Auburn division of the Lehigh Valley, at Sayre, Pa. In July, 1906, he was transferred to Buffalo as master mechanic of the Buffalo division, which position he held at the time of his recent appointment as assistant

to general superintendent of motive power of the Atlantic Coast Line. Mr. Kells for the past two years has been also third vice-president of the Central Railway Club.

Edward J. Snell, whose appointment as master mechanic of the New York Central & Hudson River, with office at Corning, N. Y., has been announced in these columns was born Jan. 3, 1875, in England. Mr. Snell was educated in the common schools and took a two-year course in a mechanical drawing school. He began railway work in April 1888, with the New York Central & Hudson River as boilermaker's apprentice and three years later was made a machine shop apprentice. From 1897 to 1903 he was a locomotive fireman. He was appointed roundhouse foreman in 1903, which position he held at the time of his recent appointment as master mechanic.

Alfred E. Calkins, who was recently appointed assistant superintendent of rolling stock of the New York Central & Hudson River, with office at New York, as previously announced in these columns, was born February 13, 1873, at Jersey City, N. J. He received his education in the high schools and at business college. Mr. Calkins began railway work January 7, 1892, in the operating department of the New York Central & Hudson River, at Utica, N. Y. The following May he was transferred to the general office of the rolling stock department, and in February, 1898, he was appointed chief clerk at the East Rochester car shop. In September of the following year he returned to the general office of the rolling stock department, and in September, 1901, he was appointed chief clerk to the superintendent of rolling stock at New York, which position he held at the time of his recent appointment as assistant to superintendent of rolling stock.

Don Juan Whittemore, chief engineer of the Chicago, Milwaukee & St. Paul, and of the Chicago, Milwaukee & Puget Sound lines east of Butte, with office at Chicago, having been with the St. Paul and its predecessors continuously for 57 years, has resigned from that office and has been appointed consulting engineer, an honorary position created in recognition of the high character and unusual length of his service. Mr. Whittemore was born at Milton, Vt., in 1830. He was educated at the Bakersfield Academy, Vermont, and began railway work in 1847 with an engineering corps on the Vermont & Canada, now part of the Central Vermont. Two years later he was appointed assistant to the chief engineer in charge of construction between Swanton, Vt., and Rouses Point, N. Y., and then went with the Great Western of Canada, where he remained until 1852. He was also for a time with the Central Ohio when that road was building from Zanesville, Ohio, to Wheeling, W. Va. He was made assistant to the chief engineer of the La Crosse & Milwaukee, now part of the Chicago, Milwaukee & St. Paul in 1853, and for three years, from 1860 he was chief assistant to the chief engineer. From 1857 to 1859 he was also chief engineer and director of the Southern Minnesota (land grant) Railroad, and for two years from 1858 chief assistant engineer on the Ferrocarril Del Oeste in Cuba. When the La Crosse & Milwaukee was merged with the Chicago, Milwaukee & St. Paul in 1863, he was appointed chief engineer, which position he held continuously until his resignation on December 6. Since March, 1906, he has been chief engineer also of the Chicago, Milwaukee & Puget Sound. He is a member of the American Society of Civil Engineers, of the American Society of Mechanical Engineers and of the Institution of Civil Engineers of Great



D. J. Whittemore

Britain. He received the degree of Doctor of Laws from the University of Wisconsin and of Civil Engineering from the University of Vermont.

Thomas Henry Malican, whose appointment as master mechanic of the Lehigh Valley, at Hazleton, Pa., has been announced in these columns, was born March 15, 1864, in Ireland. He was educated in the public and parochial schools and began railway work in July, 1876, as call boy on the New York Central & Hudson River, at Rochester, N. Y. From April, 1878, to November, 1882, he was machinist's apprentice at the East Buffalo shops, and was then machinist on general work until January, 1893, when he was appointed assistant roundhouse foreman, remaining in that position about three months. From April, 1893, to December, 1899, he was successively motion work, erecting shop and machine shop foreman, at Depew, and from January, 1900, to March of the following year he was machine shop foreman at West Albany. He was then transferred to East Rochester as roundhouse foreman, remaining in that position from March, 1901, to April, 1905, when he resigned on account of ill health. In May, 1905, he went to the Lehigh Valley as gang foreman and two months later was promoted to general foreman at Manchester. In January, 1906, he was promoted to general foreman at East Buffalo, and in November, 1908, he was appointed general foreman at the Sayre, Pa., roundhouse, which position he held at the time of his recent appointment as master mechanic of the Mahanoy & Hazleton division of the Lehigh Valley.

OBITUARY.

John F. Hennessey, special claim agent of the Vandalia, with office at Indianapolis, Ind., died in Indianapolis on December 6.

John Rogers Maxwell, chairman of the executive committee of the Central Railroad of New Jersey, died at his home in Brooklyn, N. Y., on December 11. Mr. Maxwell was a member of the board of managers of the Delaware, Lackawanna & Western, a director of the Durango Central and the Lehigh & Hudson River, and was connected with other railways and with many industrial corporations, including the Atlas Portland Cement Company, the North American Portland Cement Company, the American Cotton Oil Company, the N. K. Fairbank Company, Manning, Maxwell & Moore, the Lehigh & Wilkesbarre Coal Company, the Mexican Mining & Smelting Company, and the Durango Development Company. He was formerly a member of the firm of Maxwell & Graves, bankers. In 1881 this firm had a part, with Austin Corbin, in the purchase of the Long Island Railroad, and Mr. Maxwell was vice-president of the road.

Edward V. W. Rossiter, a vice-president of the New York Central & Hudson River, died at his home in Flushing, N. Y., December 11, after an illness of several months. Mr. Rossiter was born July 13, 1844, at St. Louis, Mo., and for over 50 years had been connected with lines now forming part of the New York Central system. He began railway work in September, 1859, as clerk to the president of the Hudson River Railroad, and the following year was appointed a clerk in the treasurer's office of the same company. He was appointed cashier of the New York & Harlem in 1867. Ten years later he was made treasurer of the same road, and was chosen vice-president in January, 1901. In June, 1883, he was appointed treasurer of the New York Central & Hudson River, and since November, 1900, had been vice-president in charge of the financial department. In June, 1904, he was elected also vice-president of the Lake Shore & Michigan Southern and the Michigan Central, and the following January was elected also vice-president of the Cleveland, Cincinnati, Chicago & St. Louis. Mr. Rossiter was a member of the New York Chamber of Commerce, the New England Society, the Union League, and the Transportation Club, in New York.

Mr. Rossiter was closely connected, as executor and otherwise, with the administration of the Vanderbilt estate, and was generally credited with knowing more about the Vanderbilt family fortunes and the Vanderbilt railways than any other man. Until his last illness he invariably represented the New York Central companies in negotiations with bankers, having thus handled the flotation of many hundreds of million dollars' worth of securities. Personally, Mr. Rossiter was known for his fine, old-fashioned courtesy, with which was combined in a marked degree a direct and exact manner of speaking.

Railway Construction.

ALONGS CENTRAL & HUDSON RAY.—Work is now under way by the O'Connell Brothers Construction Co., Ltd., Saint John, Maine, U.S.A., from Hara Lake Junction to Hallowell, 30.0 miles, and from Magpie Junction to Magpie mine, 9.5 miles. The company has estimated work on about 30 miles, and surveys are being run for 110 miles.

ANDOVER & NEWTON BRIDGE.—This road is now in operation for passenger and freight traffic from Kellsy, Texas, eastward to Newton, 19.9 miles.

ARIZONA RAILROAD.—H. H. Brown, Phoenix, Ariz., is said to be back after having been in Europe for some time from Phoenix, east to Mesa, 18 miles.

ATLANTIC COAST LINE.—See Winston-Salem Southbound.

BALTIMORE & MAINE.—An officer writes that work is now actively under way on the electrification of the Hoosac tunnel, and that it is expected to have this improvement finished during the summer of 1911. The work at Lynn includes provision for four tracks. (December 9, p. 1133.)

BIRMINGHAM CREEK & GADSDEN.—This company has projected an extension from Widen, W. Va., to Huttonsville, 90 miles.

CAROLINA, CLINCHFIELD & OHIO.—See Elkhorn Southern.

CINCINNATI UNION DEPOT & TERMINAL COMPANY.—This company has accepted the ordinance passed last summer for the proposed station to be built between Third and Pearl streets in Cincinnati. The building is to be 200 ft. x 400 ft., on the north side of Third street, with train sheds, 309 ft. wide, to the south side of Pearl street. The plan calls for 14 through tracks. A large office building is to be built over the station for the various railways interested and in addition a separate building is to be put up to accommodate the electric interurban railways. The franchise provides that within 21 months the company must have \$2,000,000 of assets, and within five years the station and terminals must be completed. A. S. White, president, and John E. Bleekman, vice-president, Cincinnati.

CROSBYTON-SOUTH PLAINS.—Surveys are being made for an extension from Crosbyton, Tex., to Spur, 35 miles. John A. Knox, chief engineer, Lubbock. (Oct. 21, p. 759.)

DURHAM & CHARLOTTE.—This company has bought the Raleigh & Western and is making surveys for an extension from Colon, N. C., to Sanford, three miles.

ELKHORN SOUTHERN.—This line, which has been leased to the Carolina, Clinchfield & Ohio, is making surveys for an extension from Elkhorn City, Ky., to Laurel Branch Junction, 33 miles.

FLORIDA EAST COAST.—An officer writes that work is under way by the Kissimmee Construction Company, Jacksonville, Fla., from Maytown, Volusia county, to Lake Okeechobee, 125 miles, and work is under way by the company's men from Night's Key to Key West, 40 miles.

GRAND TRUNK PACIFIC.—An officer writes that work is under way as follows: From Mile 25 to Prince Albert, Sask., 87 miles; Mile 48 to Regina, 48 miles; Oban to Battleford, 48 miles; Regina, southeast towards the international boundary, 90 miles; Regina to Moose Jaw, 45 miles; Prairie Creek, Alb., to Copper river, Alaska, 665 miles; Red Deer river, Alb., to Calgary, and from Bickerdike, southwesterly 59 miles. Surveys are now being made on the section from Mile 90 to the international boundary, 52 miles.

This company will complete about 437 miles of new main track on the eastern section during 1910. Work is now under way between Moncton, N. B., and Winnipeg, Man., on 807 miles.

GULF, COLORADO & SANTA FE.—Work is now under way from the Colorado river to Brady, Tex., on 53 miles, and from Whiteland to Egan, 21 miles. The contractors are Levy & Owens, Galveston. The C. H. Sharpe Contracting Company, Kansas City, Mo., and Morey & Faulhaber, St. Louis. Part of the bridge work is being carried out by the Union Bridge & Construction Company, Kansas City.

KANSAS CITY, MEXICO & ORIENT.—An officer writes that work is now under way by Roach & Stansell, Memphis, Tenn., on the section from Mertzon, Tex., to Fort Stockton, 130 miles;

and on the Del Rio section between an Abilene and Del Rio on 100 miles. (July 15, p. 1123.)

LAKE MINNIE & TONTON.—Work is now under way by Oak Creek, Norway, Minn., on an extension from North Lake Minn., to Tonton, 27 miles.

MONTANA VALLEY TRAIL.—This company has issued questions at Billings, Mont., in order to have raised money, the proceeds of which are to be used for building a 60-mile line in Whatcom county.

NORTHERN CALIFORNIA TRAIL.—Work is now under way by Willert & Burr, and the Utah Construction Company, both of San Francisco, Cal., between Willits and Shively, 46.9 miles. A line has been projected between Healdsburg and Christine, 62 miles, of which 51.5 miles has been surveyed.

NORFOLK & WESTERN.—See Winston-Salem Southbound.

OREGON RAILROAD & NAVIGATION COMPANY.—Surveys have been made for a cut-off from Coyote, Ore., to Stanfield, 24.1 miles. Work is now under way on a line from Maegley Junction, Ore., to Troutdale, 14.86 miles. Twoby Brothers, Portland, are the contractors.

The Oregon & Washington is building from Mocks Bottom, Ore., to North Portland Junction, 1.7 miles, including a tunnel of 5,430 ft. Robert Wakefield and the Pacific Bridge Company have contracts for the work.

Work is now under way on the Oregon Eastern, from Natron, Ore., southeast to Klamath Falls, 142.6 miles.

OREGON & WASHINGTON.—See Oregon Railroad & Navigation Company.

OREGON EASTERN.—See Oregon Railroad & Navigation Company.

PELHAM & HAVANA.—This company has projected an extension from Cairo, Ga., to Pelham, 20 miles.

PORT BOLIVAR IRON ORE.—This company proposes to build from Longview, Tex., northward to iron ore fields in Cass county. Engineers have been at work for some time locating the line and construction work is to be started at once. L. P. Featherstone, president; W. D. Myers, vice-president; W. C. Brothers, treasurer, Galveston, and L. L. Featherstone, secretary, Beaumont.

RALEIGH & WESTERN.—See Durham & Charlotte.

SHREVEPORT & MEMPHIS.—Incorporated in Louisiana to build from Eldorado, Ark., southwest via Homer, La., to Minden, 45 miles. The intention is to extend the line eventually on the south to Shreveport and on the north to Memphis, Tenn. Surveys are said to be made between Eldorado and Minden. C. O. Ferguson and A. R. Johnson, Homer, are interested.

TEXAS ROADS.—A company is being organized to carry out an old project to build a line from San Antonio, Texas, to a point in the lower Rio Grande valley, about 260 miles. Residents of San Antonio are said to be back of the project.

UTAH & GRAND CANYON.—Incorporated in Utah with \$150,000 capital, to build from Lund, Iron county, Utah, south to St. George, Washington county, 85 miles; also, to build from Marysville south to Panguitch, 55 miles. F. A. Dudley, president, Niagara Falls, N. Y.; F. H. Reed, New York, and F. Harris, Chicago, vice-presidents; R. B. Merchant, secretary and treasurer, New York; S. L. Seldon and T. C. Gillespie, New York, and V. E. Huntsacker, Salt Lake City, are directors.

WESTERN ALLEGHENY.—An officer writes that the company has projected an extension of 14 miles, from Dewey (Bradys Bend), Pa., to Reidsburg, in Clarion county, and another extension from a point 12 miles from Dewey to a point on the Allegheny river north of Masgrove, where connection is to be made with the Pittsburg, Shawmut & Northern.

WINSTON-SALEM SOUTHBOUND.—An officer writes that this line, which was built jointly by the Norfolk & Western and the Atlantic Coast Line, from Winston-Salem, N. C., south to Wadesboro, 89 miles, has been completed, but not fully ballasted, the last spike having been driven on November 23. The first train was run over the entire line on November 24. Regular passenger service from Winston-Salem, south to Whitney, 49 miles, was established December 15, and regular service over the entire line will be started about January 1. (December 9, p. 1130.)

Railway Financial News.

CHICAGO, ROCK ISLAND & PACIFIC.—Speyer & Co. have purchased from the company \$3,750,000 first and refunding mortgage 4 per cent. bonds, due 1934, issued for improvements and other corporate purposes, and have privately resold the entire amount.

CHICAGO & NORTH WESTERN.—The entire \$15,000,000 general mortgage 4 per cent. bonds recently purchased from the railway by Kuhn, Loeb & Co., have been privately sold.

DULUTH, WINNIPEG & PACIFIC.—The London Stock Exchange has listed \$950,000 (\$4,750,000) first mortgage 4 per cent. debenture stock.

INTEROCEANIC OF MEXICO.—The returns for the Interoceanic of Mexico, which is leased to the National Railways of Mexico, and whose figures are not given in our table of monthly earnings and expenses of railways, show the company earned \$2,860,196 gross in the first four months of the current fiscal year, comparing with \$2,669,020 gross in the corresponding period last year. Operating expenses amounted to \$1,798,636 in the current year, comparing with \$1,814,983 last year. Net earnings were \$1,061,560 in the current year, an increase of 24 per cent. over the corresponding period last year.

MISSOURI, KANSAS & TEXAS.—This company is advertising in Texas papers its intention to apply to the legislature for the enactment of a special law giving it authority to take over and operate as a part of its Texas system of railway the Texas Central. Several weeks ago the Missouri, Kansas & Texas informally asked the railway commission for authority to lease the Texas Central for five years. A majority of the members of the commission, including O. B. Colquitt, governor-elect, objected to any consolidation of the two roads, and even to a lease. Mr. Colquitt's position in the matter is important since he will have the veto, even should a bill be passed by the legislature at the coming session which convenes in January. The Texas Central was bought by the Missouri, Kansas & Texas a few months ago. It is still being operated as a separate independent property.

NATIONAL RAILWAYS OF MEXICO.—The directors have adopted the suggestion made by the vice-chairman at the annual meeting that additional dividends of 1 per cent. be paid from earnings for the fiscal year ended June 30, 1910, on the first preferred stock. There was, therefore, paid from earnings for the fiscal year the full 4 per cent. on the first preferred stock.

The returns for the National Railways of Mexico (not shown in our table of monthly earnings and expenses as sent to the Interstate Commerce Commission) show that the company had gross earnings for the first four months of the present fiscal year of \$21,325,339. This is an increase of 17 per cent. over the corresponding period of last year. Operating expenses in the current four months totaled \$12,518,621, an increase of 10 per cent. over 1910; and net earnings amounted to \$8,806,718 this year, as compared with \$6,917,937. This is an increase in the current year of 27 per cent.

ST. LOUIS SOUTHWESTERN.—A semi-annual dividend of 2 per cent. has been declared on the \$19,893,650 5 per cent. non-cumulative preferred stock, payable January 15. This compares with 2½ per cent. paid in July and January, 1910, and 2 per cent. in July, 1909. A statement issued by the company after the annual meeting says that the gross earnings are satisfactory but expenses have increased disproportionately.

SEABOARD AIR LINE.—The syndicate headed by Blair & Co., New York, which last year underwrote the \$18,000,000 40-year adjustment income 5 per cent. bonds of the Seaboard Air Line, was dissolved on December 15, all of the bonds having been sold.

The second semi-annual 2½ per cent. interest coupon on the outstanding \$24,979,500 adjustment income bonds is to be paid in full. This makes the full 3 per cent. paid on these income bonds for the year in which they have been outstanding. Of these income bonds \$7,900,000 was authorized, of which \$6,979,700 were issued to represent general mortgage bonds and \$18,000,000 were underwritten by the Blair syndicate at 70, less commission.

Late News.

The items in this column were received after the classified departments were closed.

The Clarion & East Brady Electric has ordered 1,500 tons of rails from the Carnegie Steel Company.

William Cleburne, who surveyed a part of the original route for the Union Pacific died December 14, in Newport, Ky., aged 86.

The Wabash-Pittsburgh Terminal will be in the market shortly for 2,000 coal cars. Receiver's certificates to pay for them have been authorized.

The Nashville, Chattanooga & St. Louis has ordered 10,000 tons of rails and not 24,000 tons of rail as was incorrectly stated in our issue of December 9.

H. K. McEvoy has been appointed general agent, passenger department of the Chicago & Alton, with office at Chicago, succeeding C. R. Davidson, assistant general passenger agent, resigned.

The Massachusetts Railroad Commission has approved the issue of \$10,663,700 new common stock by the Boston & Maine at \$110 per share, proceeds to be used for additions to equipment, permanent improvements and abolishing grade crossings.

Nearly 25 banks in the districts of Minnesota and the Dakotas, where farmers are holding back grain in expectation of higher prices in the spring, are now refusing to make new loans on that basis, being actuated by a desire to avoid congestion on the railways.

The supreme court of Georgia has handed down an opinion affirming the decision of the master, that the full 5 per cent. interest on the second and third income bonds of the Central of Georgia was payable out of the earnings of the company for the fiscal year ended June 30, 1907. It is the understanding that inasmuch as no constitutional questions are involved, this opinion will end the long drawn out litigation between the income bondholders and the railway company.

Judge Noyes in the United States Circuit Court has signed an order in the suit of W. O. Johnson against Archibald S. White for \$25,000 claimed for professional services in the sale of the Indiana Southern Railroad Company to the Illinois Central Railway Company to the effect that the complainant must file an amended complaint. The complainant alleges that he was engaged by White in 1903 or 1904 to effect a sale of the Indiana Southern to the Illinois Central, and that he brought about the deal whereby the Illinois Central Railway took over the Indiana Southern Railroad.

The union telegraphers have asked the Philadelphia & Reading to reinstate two men who were members of grievance committees, and who, it is alleged, were dismissed because of their activity in the union. Besides the demand for reinstatement of the discharged men, the union asks for seniority rights, pass privileges, and equalization of pay in certain classes of work. The railway company has strung telephone lines to all its offices on the New York and Philadelphia divisions. In the event of the men leaving their stations, competent persons will report the movement of trains by telephone. No trouble is expected along the Schuylkill valley because here few of the telegraphers belong to the union.

In the case of Henry A. Klyce Co. v. Illinois Central et al., the Interstate Commerce Commission in an opinion by Commissioner Clark found that when bankruptcy proceedings discontinued operation of a milling plant that was using a transit privilege, there were on hand large numbers of inbound expense bills and practically no corresponding tonnage of grain or grain products entitled to transit rates, it is held that such old expense bills were worthless for reshipping purposes in connection with tonnage that moved into the plant after complainant had resumed business at the same plant, first as a lessee, and later as a corporation. Complainant is entitled to use for transit purposes inbound expense bills representing grain moved into the plant subsequent to resumption of business under lease, and to reparation on certain shipments in connection with which confusion as to the proper manner of surrender of expense bills was contributed to by both defendant and complainant. (19 L. C. C. 567.)

Supply Trade Section.

W. L. Rooper has been elected secretary of the F. H. Manning Co., Baltimore, Md.

On the locomotive recently ordered by the New York Central, and to be fitted with a booster at the Locomotive Superheater Company, New York.

It is understood that Argentina has agreed to standardize the couplings on all the freight cars in use on its railways, which will involve an expenditure of \$2,500,000.

The Pittsburgh Spring & Steel Company, Pittsburgh, Pa., has moved its New York office to suite 2038, Grand Central Terminal. The office is in charge of J. N. Brownrigg, eastern sales agent.

The Isthmian Canal Commission will receive bids until December 28 for miscellaneous supplies, including varnish, granulated cork, pipe fittings and valves, gages, hardware and electric fans. (Circular No. 613 B.)

T. H. Price, lately connected with the Horace L. Winslow Company, Chicago, demonstrating the Clark blow-off system, has gone to the Indian Refining Company, Cincinnati, Ohio, as a representative in the railway lubrication department.

W. B. K. O. Fly, a director of the Pressed Steel Car Company, Pittsburgh, Pa., died on the afternoon of December 12. Mr. Fly has been identified with the railway supply business for many years. He was a brother of T. N. Ely, chief of motive power on the Pennsylvania Railroad.

The Globe Seamless Steel Tubes Company, Milwaukee, Wis., has completed its new plant and is now taking orders for cold-drawn seamless steel boiler flues and mechanical tubing. The mill is of modern construction throughout and is thoroughly equipped to handle an output of 2,000 tons a month.

Charles J. Nash, chief mechanical engineer of the W. H. Miner Co., Chicago, and for 14 years mechanical engineer of the Pullman Company at the Chicago works, was on December 1 appointed a representative of the Westinghouse Air Brake Company, Pittsburgh, Pa., with headquarters in the Railway Exchange Building, Chicago.

Walter L. Pierce, general manager and director of the Lidgerwood Manufacturing Company, New York, died suddenly of heart disease on the night of December 9. Mr. Pierce was also vice-president of the Gorton & Lidgerwood Company, and treasurer of the Hayward Company. He was a member of the Lawyers' and Engineers' Clubs.

The Western Electric Company, Chicago, has declared an extra dividend of 2 per cent. for the fiscal year ending December 31 next. This, with the regular 8 per cent. dividend, makes 10 per cent. for the year. Due to the change in date of the fiscal year from November 30 to December 31, the company has declared a dividend of 1 1-3 per cent., payable December 31, covering the months of November and December. The \$5,000,000 4 1/2 per cent. two-year notes have been called for payment January 1 next at 100%, and \$15,000,000 5 per cent. bonds have been sold partly to provide funds for the redemption of these notes. The company will have no debt except this \$15,000 issue after the notes have been paid off.

TRADE PUBLICATIONS.

Southern Pacific.—This company has published an attractive booklet on the agricultural possibilities and the development of Sherman county, Ore.

Canadian Pacific.—The 1911 calendar sent out by this company shows a view of its combined fleet of Atlantic, Pacific Great Lakes, and British Columbia lake, river and coast steamships.

Northern Pacific.—The passenger department has published a 32-page booklet called "On the Wings of the Wind." It describes the luxurious accommodations on its trains and gives illustrations of the scenic beauty along its lines.

Inspection.—Robert W. Hunt & Co., Chicago, have issued a booklet descriptive of their inspection service for rails, cars, track appliances and electrical equipment. The booklet includes full specifications for steel rails and other valuable data.

Arc Lamps.—Bulletin No. 5500 of the Western Electric Company, Chicago, takes up the Hawthorn direct and alternating current enclosed arc lamps. The bulletin replaces bulletin No. 5500 of October, 1909. It has 20 pages and is fully illustrated.

Electric Semaphore Signals.—Bulletin No. 50 of the Union Switch & Signal Company, Swissvale, Pa., is devoted to the Union style T electric semaphore signal. This pamphlet has 14 pages of diagrams and detailed information about the working of the signal.

Centrifugal Pumps.—The American Well Works, Aurora, Ill., has published its catalogue No. 117 on centrifugal pumps. This catalogue contains over 125 pages, is completely illustrated and gives detailed information and advantages of the various centrifugal pumps. Many instructive tables are also included.

Power Presses.—Joseph T. Ryerson & Son, Chicago, are distributing a catalogue describing the company's punch presses, pendulum foot presses, bench presses, inclinable presses, power punching presses, wiring presses and toggle presses. The booklet is 8 1/2 in. x 11 in., contains 21 pages and is well illustrated.

Skylights.—Catalogue No. 5 of the David Lupton's Sons Co., Philadelphia, Pa., describes the Lupton steel sash for side walls; the Lupton rolled-steel skylights for all buildings; the Lupton hollow metal fireproof window; Waldmire louvers; Pond continuous sash, and the Pond operating device for all types of windows. The catalogue gives many illustrations and diagrams showing the advantages of the Lupton products.

San Pedro, Los Angeles & Salt Lake.—The souvenir menu card for Thanksgiving used on the dining cars of the San Pedro, Los Angeles & Salt Lake had a neat white cover with an inset. The cover bore a painting suggestive of the season, which was well reproduced in color. Copies of the menu ready for mailing were furnished the patrons, on request, by the dining car conductors.

1911 Diary.—A diary published by the Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa., describes briefly Westinghouse progress in a number of products, such as Cooper Hewitt electric lamps, gas and steam engines, electric locomotives, electric lamps. Useful data are given on these subjects, including tables on the resistance of wires, the heating value of some American coals, etc. The diary also contains miscellaneous information, such as the population of cities and the best hotels.

Blueprints.—The C. F. Pease Co., Chicago, has published a complete catalogue of blueprint machinery and drafting room supplies. Special attention is devoted to the advantages of the Pease whiteprint as compared with a blueprint. The prints are made directly from the tracing and the lines are blue on a white background. It is claimed that these prints are clearer and more durable, and that the process is simpler and just as rapid as the blueprint process. The catalogue is about 100 pages long, fully illustrated, and gives detailed information about automatic blue and whiteprint machinery.

Magneto Telephone Sets and Accessories.—The Western Electric Company, New York, has issued bulletin, No. 1116, describing magneto telephone sets and accessories. Several pages are devoted to the design and construction of wall and desk sets, and the No. 1317 type wall set is fully described. This is the telephone set on which \$10,000 was spent in designing before the first model was approved, and it is this set which has gained the enviable record of a quarter-million of sales in twenty months. It has been made the standard for service on thousands of rural lines and in the circuits of mines and railways, both steam and electric.

Tungsten Lamps.—The General Electric Company, Schenectady, N. Y., has published its bulletin No. 4769 on train lighting with General Electric Mazda and tantalum lamps. Both these

lamps have tungsten filaments. It is claimed that they are cheaper to install than the carbon lamps; that they require less equipment; that they consume less power; that they last twice as long, and that they keep a more even brilliancy throughout their lives. The characteristics of both lamps are given in detail, with illustrations. Three systems of supplying current are briefly described: the head-end, the straight storage and the axle generator. The bulletin ends with a well illustrated article on illumination and methods of arranging the lamps.

Chicago, Rock Island & Pacific.—The passenger department of the Rock Island Lines has issued three new publications on California and the Rock Island's Golden State Limited service. A 50-page booklet describes the scenery, cities, fruit growing industries and historical points reached by the Rock Island Lines and a 57-page vest pocket booklet gives a great deal of useful information for tourists desiring to see these points. In it are outlined three short trips, one requiring seven days, one fourteen days and one thirty-nine days. The important points to see and the facilities for seeing them are well described. A folder calls attention to the service afforded by the Rock Island's Golden State Limited, which is called the "Limited Train of Limitless Luxuries."

Foundry Equipment.—The Whiting Foundry Equipment Company, Harvey, Ill., has issued catalogues Nos. 45, 51, 52, 55, 58, 59, 77, 78 and 80. No. 45 contains 150 pages of descriptions and illustrations of the various types of electric and hand cranes. It contains a great number of illustrations of plants where these cranes have been recently installed which show well the possibilities of such installations for many industries. The other catalogues are in pamphlet form and in the order named deal with the following subjects: Air hoists, brass foundry equipment, power sand sifters, ladles, elevators, cranes, trucks and turntables and tumblers. All of these publications are attractively prepared and are of standard 6 in. x 9 in. size with holes punched in the margin for filing.

1911 Calendar.—The Kennicott Company, Chicago Heights, Ill., is distributing an advertising calendar which will not be likely to find its way into the waste basket. It bears every evidence of being made for practical use and long service, as it is mounted on a special metal preparation called "enameloid." The hanger is 9½ in. x 17½ in. and carries a 365-day calendar pad 7 in. square, which makes it of a desirable size for office use. The hanger is colored dark blue, with gilt trimmings, and the instructions say that when soiled the brilliancy of the metal surface can be restored completely by the use of a damp cloth. The advertisement on the upper half of the hanger calls attention to the power plant equipment furnished by the Kennicott Company—water tanks, water softeners, heaters, water weighers, boilers and stacks. In addition to these, the company designs and builds steel tank cars and underframes. Although featuring a number of products at present, the Kennicott Company has never ceased its activity in its original line, water softeners. It has recently developed a new type of softener known as type K. A wall hanger, illustrating in colors the operation of this machine, is ready for distribution on request.

RAILWAY STRUCTURES.

MINNEN, WASH.—According to local press reports, the Northern Pacific and Union Pacific will build a new union passenger station on the site of the present Northern Pacific station.

BUFFALO, N. Y.—The Delaware, Lackawanna & Western has filed preliminary plans with the New York Public Service Commission, Second district, for a passenger station to be built in Buffalo.

CARBONDALE, PA.—A conference has been held between the city officials, the Delaware & Hudson and the Scranton Traction Company to arrange for building a subway at Eighth avenue in Carbondale.

CHICAGO, ILL.—Various reports have been printed in the Chicago newspapers about plans for the new Union station. The recent developments can be very briefly stated. The roads using the present Union station, as has been previously stated in these columns, have definitely decided to build a new station. They

have also commissioned Architect D. H. Burnham of Chicago to consult with the roads directly interested and make tentative plans. No plans have been adopted or even definitely submitted.

COLORADO SPRINGS, COLO.—The Denver & Rio Grande and the Chicago, Rock Island & Pacific, will build a new union passenger station.

COLUMBUS, OHIO.—The Toledo & Ohio Central passenger station in West Broad street, was burned on November 23. The building was fully insured, the greatest loss being that of the company's records. The building was valued at \$50,000.

CORDOVA, ALASKA.—Some months ago the Copper River & Northwest completed work on a large steel bridge over the Copper river, between the Miles and Childs glaciers in Alaska. The same company is now engaged in putting up a steel cantilever bridge over the Kushalina river at mile post 149 from Cordova. Work is to be pushed all winter on the structure, which is to have a total length of 800 ft., and is to be 250 ft. above water level. This bridge is being built on an extension of the line to Kennecott, 200 miles from Cordova.

CORONA, CAL.—The Pacific Electric is said to have selected a site for a new station to be built at Corona.

EAST ST. LOUIS, ILL.—The freight station and warehouse of the Louisville & Nashville was burned on December 7. The loss is estimated at \$25,000.

GREELEY, COLO.—The Denver, Laramie & Northwestern contemplates improvements to its present freight offices and depot.

JANESVILLE, WIS.—The Janesville Traction Company has given a contract to Shearer, Ford & Brothers, it is said, for putting up a brick and steel car barn at Janesville.

MINNEAPOLIS, MINN.—The Minneapolis, St. Paul & Sault Ste. Marie has received a building permit for a one-story brick and steel foundry to be built at 29th avenue S. E. and Quincy street, to cost about \$18,000.

OAKHURST, CAL.—See Winkler, Cal.

OGDEN, UTAH.—The Denver & Rio Grande has prepared plans for a \$50,000 passenger station.

PIEDRA, CAL.—See Winkler, Cal.

PORTLAND, ORE.—The Southern Pacific, according to local press reports, will build a new roundhouse on the west side of the river, and a new roundhouse and repair shop on the east side, at total cost of \$1,000,000.

PUNXSUTAWNEY, PA.—The officials of Punxsutawney and the Pennsylvania Railroad will jointly build a bridge, it is said, over the tracks of the railway at South Penn street.

SHREVEPORT, LA.—The new passenger station at the terminal of the Louisiana & Arkansas in the business section of Shreveport, La., is to be completed on or before January 1 next. It will also be used by other railways, including the St. Louis Southwestern.

SOMERVILLE, TEX.—The Gulf, Colorado & Santa Fe will build a brick machine shop as an addition to its 10-stall roundhouse.

ST. LOUIS, MO.—The Illinois Traction System has started condemnation proceedings to secure certain property necessary to complete the site for its new terminal station at Twelfth and Linden streets.

WICHITA, KAN.—The Atchison, Topeka & Santa Fe will build a large freight depot, to be used jointly with the St. Louis & San Francisco and the Kansas City, Mexico & Orient.

WINKLER, CAL.—The Santa Fe will build new stations, it is said, at Winkler, at Oakhurst and at Piedra.

The extension of the Paraguayan Central from its present terminus at Yuty, 157 miles from the capital, to Villa Encarnacion, on the Alto Parana, is said to be nearly completed. The present rolling stock of the Paraguay Central has been bought by the Argentine government and will be transferred to its railway in Patagonia. New cars and engines of English manufacture have begun to arrive, including 20 locomotives, 26 passenger cars and 229 freight cars.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The *Green Bay & Western* has ordered two model locomotives from the American Locomotive Company. The cylinders are 19 in. x 26 in., the driving wheels 36 in., and the total weight in working order 13,000 lbs.

The *San Antonio & San Antonio* has ordered one consolidation locomotive from the American Locomotive Company. The cylinders are 16 in. x 24 in., the driving wheels 46 in., and the total weight in working order 27,000 lbs.

The *Atlanta & West Point* has ordered one ten-wheel freight locomotive from the American Locomotive Company. The cylinders are 21 in. x 28 in., the driving wheels 61 in., and it will weigh 188,000 lbs. in working order.

The *Chicago & Alton* has purchased three consolidation locomotives from the American Locomotive Company. These locomotives were in stock in the company's plant and are now in service.

CAR BUILDING.

The *Gulf Lumber Company* is in the market for 10 logging cars.

The *Wichita Falls & Northwestern* is in the market for 100 box cars.

The *Chesapeake & Ohio* is said to be in the market for 200 40-ton flat cars.

The *St. Louis Southwestern* is in the market for 1,500 box cars and 500 flat cars.

The *Seaboard Air Line* will build 200 steel underframe flat cars at its shops.

The *Pittsburg Railways* have ordered 50 cars from the Pressed Steel Car Company.

The *Boston Elevated* has ordered 50 steel underframe surface cars from the Laconia Car Company.

The *Nashville, Chattanooga & St. Louis* has ordered 100 box cars from the American Car & Foundry Company.

The *Consolidate & Nashville* will build 600 hopper and 600 gondola cars at its shop. The steel underframes of these cars, as mentioned last week, were ordered from the Pressed Steel Car Company.

The *Jamison Coal & Coke Company*, reported in the *Railway Age Gazette* of November 11 as being in the market for 400 50-ton hopper cars, has ordered this equipment from the Standard Steel Car Company.

IRON AND STEEL.

The *Duluth & Iron Range* has ordered 9,300 tons of structural steel from the American Bridge Company, for use in an ore dock at Two Harbors, Minn.

The *Boston Elevated* has ordered 4,500 tons of structural steel from the American Bridge Company.

The *New York Central* will need about 150,000 tons of rails for renewals. Special specifications for this order are being prepared. The United States Steel Corporation and the Lackawanna Steel Company will make experimental rollings of 10,000 tons each, subject to the tests required by the railway, so that they will be able to name the price at which they can furnish the rails.

The *Pennsylvania Railroad* order for 150,000 tons of rails is still under dispute. Representatives of the steel companies interested in the order met at the Railroad Club in the Hudson

terminal building on December 12 to discuss the matter. It was said to be several days ago that a book had been sent to the terms of the contract, and on the 12th it was stated that the trouble lay rather in the physical tests required by the Pennsylvania Railroad than in the chemical analytical tests of the rails. After the meeting it was said that the matter would probably be discussed further. The manufacturers, it is understood, are objected to the prospective additional cost entailed because of the rigid requirements of the road.

General Conditions in Steel.—There has been a sharp falling off in mill operations and shipments. The unfilled orders reported on November 30 are the smallest in the history of the United States Steel Corporation. By the basis of compiling unfilled orders used two years ago, the present orders would appear more favorable. It is admitted that not even a reduction in prices would induce consumers to enter the present market. An upward tendency of bookings is anticipated after the first of the year.

SIGNALING.

The plans of the signal department for the Coast lines of the Atchison, Topeka & Santa Fe for 1911 include the installation of automatic block signals on 45 miles of line. These will be upper-quadrant semaphores, three-position, normal clear, with alternating currents for track circuits. It is proposed to install mechanical interlockings at Suwanee, N. M., Dennison, Ariz., and Cottonwood, Cal., where meeting points are to be arranged with lap sidings. In these plants the switches will be mechanically operated; but the signals will be worked by electric motors, drawing current from primary batteries. Electric interlocking plants will be put in at Richfield, Cal., and Rio Puerco, N. M., 24 levers each. Electric interlocking plants of 36 levers each are now being built at Daggett and Fullerton, Cal. The signals at all of these plants will be upper-quadrant three-position.

The Breakage of Staybolts.

BY B. E. D. STAFFORD.

The alternating stresses to which a staybolt is subjected in locomotive firebox service, demand a material with a tough fibrous structure. A good grade of charcoal iron, puddled, refined, reworked, and developed to the wrought bar under various methods of piling to obtain a strong center structure, produces a material which is the safest and most reliable for staybolt purposes. Staybolt breakage, however, is not a question of material so much as of construction. When rigidly stayed, the locomotive firebox affords but slight provision, if any, for the difference in the amount of expansion that naturally exists between the firebox and the wrapper, or outer sheet, of the boiler under varying temperatures of furnace operation. While the thin fire sheets, by distorting, bending, and buckling, accommodate to a certain extent the added stress due to the difference in the amount of expansion when rigidly stayed, the inevitable consequence is that the staybolt gives way under excessive stress, regardless of the material used, and the sheets gradually deteriorate, due to the continual bending and distortion.

The most important feature that has been demonstrated in connection with the method of staying the locomotive firebox, was recently brought to the notice of the railway world in a paper read before the New York Railway Club on May 20 of this year by D. R. MacBain on the subject of Inequality of Expansion in Locomotive Boilers and the Possibilities of Eliminating the Bad Effects Therefrom. For the purpose of practically demonstrating the theories on which earlier experiments were based with partial flexible and rigid staybolt installations, a high pressure locomotive was selected whose firebox was completely stayed with flexible staybolts. It was placed in heavy passenger service, and the records and data which were obtained show clearly the advisability of giving careful attention not only to the use of the flexible stay, but also to the method of its application to render the firebox less liable to the effects of expansion. From the practical experiments made, it was found by tramping the inside of the firebox sidesheet and the outer sheet when the boiler was cold, and com-

paring the measurements when the boiler was hot, that the difference of expansion of both sheets was too significant to be ignored.

To compensate for the difference in the amount of sheet expansion, adjustments were made in the application of the flexible staybolts by turning back the bolt head from its sleeve seat certain parts of a turn, before riveting over the firebox end of bolt. This was done in the outer rows of the side sheets, back head and throat sheet, the amount of release being varied according to the size of the firebox and the relative showing in the difference of sheet expansion. By so doing, it enabled the firebox and outer shell to expand under less restraint, and the staybolts to assume the load with less liability of being strained than under former practice of no adjustment. The results obtained proved satisfactory, the experiment and practice extending over a sufficient number of years to obtain comparative data and form reasonable conclusions, not only as to the life of the staybolts, but as to the condition of seams, rivets, side and flue sheets, all of which showed no perceptible indication of strain or distortion.

Further investigation by others not connected with but interested in the aforementioned experiment, disclosed the fact that when flexible staybolts were adjusted, especially in the throat sheets, to compensate for the longitudinal extension of the wrapper sheet over the firebox sheets, in instances where this method was applied to old fireboxes, when the staybolts were removed for firebox renewals it was discovered, by nicking and bending the iron in the bolt proper, that the material was as fibrous and as strong as when first incorporated. The bolt head showed a distinct bearing surface at the sleeve seat, demonstrating that under the adjustments made, it served its purpose as a stay, resisting the load due to pressure without becoming strained, and that the difference in the relative sheet expansion is largely compensated for by the adjustment which the flexible stay affords. Expansion of all heat absorbing parts in a locomotive firebox, if restricted, will effect the entire assemblage and prove disastrous to the weaker part of the construction.

The value of the difference in the amount of expansion between the firebox sheets and the roof or wrapper sheet has never been seriously considered to any extent until quite recently. It was supposed that most of the expansion was confined to the firebox proper, while the relative amount of expansion between the wrapper and the firebox sheets, and the resultant effect therefrom on the complete construction was overlooked in most instances, as a vital point to consider in dealing with methods of staying.

The distortion of sheets has more or less lengthened the life of the rigid stay, while the sheets deteriorated by reason of continual bending. While the relative expansion of the outer shell and the firebox varies with each type of boiler, and is largely influenced by methods of firebox and boiler operation, the difference in the amount of expansion is at times so great as to throw an excess stress on staybolts in the throat, back head and rigid corners of the side sheets. Regardless of sheet distortion, the bolts then assume a load too severe to withstand and are gradually rendered weak, and break.

The flexible staybolt has had much to contend with on points of cost compared with the rigid stay, and not until the question of economy of maintenance was earnestly considered, where ultimate costs determined the true value of a product based on service rendered, could we point to any great advance in the use of the flexible stay, or the methods of staying. Flexible staybolts found but little favor until within the last six years. The early designs were either too large or ungainly, or too weak in sections to cope with firebox conditions. The two-piece bolt of the Johnston type made great headway as a simple and strong device to serve the purpose of a water space stay, but was soon declared obsolete by reason of the fact that inspection was impossible without removing the entire bolt. Incrustation in bad water sections rendered the connection rigid, cementing both the plug and the bolt intimately together.

The principle of the three-piece design for a flexible stay, was recognized as the most acceptable on which to base improvements and modifications soon led to shapes and sections involving the round head bolt. This affords greater shearing strength, and more readily releases itself under conditions of incrustation, than similar designs of the flat or sloping heads. The line of demarcation between serviceable and non-serviceable staybolts of the flexible type is determined largely on the merits which enable the bolt to operate under conditions of incrustation. The flaring mouth on the end of the sleeve of the round head bolt

extending toward the water space serves to loosen and throw out all deposits which collect within the water space in adjusting itself to accommodate the relative sheet expansion under various temperatures.

The round head bolt design with its strong sections of bolt area, capped over with sufficient clearance between the cap and the bolt head to allow for suitable adjustment to the difference of sheet expansion, affording a ready means of inspection, with its several sizes of sleeves to suit the various angles and sheet contours of boiler design, adapted to take several diameters of bolt and affording interchangeability of parts, simple and economic in its application, forms an assemblage which readily establishes itself as an acceptable article of economic merit and serviceable value, and is fast proving the fact that flexible connections in firebox construction are absolutely needed.

The demand for flexible staybolts is due to the effort to curtail not only the resultant expense of staybolt renewals, but more largely to reduce the number of shoppings of engines for the purpose of renewing broken staybolts and repairing cracked fire sheets, which not only deprives the service of power, but contracts the earning value of each engine in direct proportion to the maintenance cost and the service rendered.

Essential to the economic solution of overcoming cost of maintenance in firebox repairs is the step that will first favor the construction of parts to more readily resist the stress of expansion without the strain of distortion, heretofore found so disastrous to all materials involved, and provide sufficient means to allow all heat absorbing surfaces to act under less restraint than that afforded by the complete system of rigid staying. Until locomotive boilers are measured to obtain the true amount of the difference of expansion from the cold to the hot state, and provisions are made to accommodate the relative amount of expansion between the wrapper sheet and firebox, the cause of staybolt breakage, fire sheet and flue sheet cracking, will remain an issue of misleading conclusions, if as in the past, quality of material forms the basis of solution, and the destructive forces due to the inequalities of expansion are ignored.

The flexible or adjustable staybolt so far has favored the theories of those who are mindful of the fact that steam boilers must breathe or expand under less restraint than that allowable with rigid staying. In the experiments and practical demonstrations made in the application and adjustment of the flexible staybolt to high pressure locomotives, covering, in many instances, years of constant service without staybolt breakage, side seams leaking, and sheets cracking, and obtaining a great reduction of breakages in most cases, the value of the service rendered compared to the cost of repairs is a unit of economic comparison, which not only credits the flexible staybolt as being superior to the rigid stay in localities of greatest sheet expansion, but also points conclusively to the advantage gained in the judicious use of the flexible or adjustable staybolt as a compensating medium of great utility in affording sufficient flexibility to the firebox construction, enabling such to more safely cope with the alternating stresses due to expansion.

The general recognition given to the flexible staybolt in late years, as an article of economic use and of practical utility, and to the methods of its application and adjustments necessary in the rigid localities of greatest sheet expansion to relieve the bolt of excess tension; the judicious layout in the effort to fully cover the breaking zone according to each type of firebox, and to minimize the effects of the alternating stresses so disastrous to staybolts—all features of vital importance—have to the extent of the consideration given and the practice followed, accomplished much to advance the general proposition of eliminating staybolt breakage and fire sheets cracking, inasmuch as the cause of breakage is traced to its true source.

President Gomez has signed a decree contracting with the Cuban Central Railways, Limited, for the construction of new railways and granting the subsidy prescribed by the law of July 5, 1906. The railway lines concerned are those from Sagua la Grande to Corralillo, by way of Rancho Veloz, and from Cifuentes to La Esperanza, by way of San Diego del Vallo. A bill was introduced in the Chamber of Representatives under date of November 16 to authorize the executive to contract for building a railway from Guantanamo to Baracoa, with application of the subsidy law.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY EIGHT TIMES IN JUNE, BY THE RAILROAD GAZETTE (INC.), 81 FULTON ST., NEW YORK.

CHICAGO: Plymouth Bldg. (CLEVELAND): Williamson Bldg.
LONDON: Queen Anne's Chambers, Westminster.

W. H. BOARDMAN, President.

E. A. SIMMONS, Vice-Pres. & Treas. HENRY LEE, Secretary.
The address of the company is the address of the offices.

EDITORS:

W. H. BOARDMAN, Editor.	ROY V. WRIGHT	B. B. ADAMS
SAMUEL O. DUNN,	G. L. FOWLER	W. E. HOOPER
Western Ed. Mgr.	WILLIAM FORSYTH	F. W. KRAEGER
BRADFORD BOARDMAN,	S. W. DUNNING	H. H. SIMMONS
Eastern Ed. Mgr.	CLARENCE DEMING	

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada.....	6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies.....	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOL. 49. DECEMBER 23, 1910. NUMBER 26.

CONTENTS

EDITORIAL:

Editorial Notes.....	1173
More Misrepresentations from the Illinois Manufacturers' Association.....	1174
Southern Pacific.....	1175, 1211
LETTERS TO THE EDITOR.....	1178
ILLUSTRATED:	
Vice-Hon. Finsley Sparks, Attorney.....	1181
James T. Harahan.....	1186
Balanced Compound Locomotives; Atchison, Topeka & Santa Fe.....	1189

MISCELLANEOUS:

Recent Developments in Signaling.....	1179
Transportation and Car Accounting Officers.....	1187
John M. Forbes and the Michigan Central.....	1188
Train Accidents in November.....	1192
Foreign Railway Notes.....	1185, 1187, 1192
GENERAL NEWS SECTION.....	1193
SUPPLY TRADE SECTION.....	1207

THE vice-president and general manager of the Interborough Rapid Transit in New York city has made a polite as well as frank statement to the public, detailing his undertakings to supply and use more cars, and to equip all express trains with center and side-door cars, which have been shown to facilitate passenger movement at the platforms, shorten the station stops, quicken the schedule and increase the capacity of the subway. It is a pity that this performance of public duty did not come voluntarily, but waited on years of public agitation, orders from the Public Service Commission, and finally the certainty of a suit for penalties instituted by the commission. It is a pity, too, that the lesson to the ordinary citizen is that decent treatment

from a corporation need to be sought for. There has been time to equip every subway car and company by these means. More corporate hostility can be aroused by one authority, whereas others than can be aroused or controlled by tradition, courtesy and initiative in improvement of the service by many tardily needed officers. In this case the officer took no action in the overcrowding since in making and assumed a hostile attitude at the commission inquiries. The commission employed Bion J. Arnold, who recommended the improvements now being tardily made. His experiments with side doors met with no cordial or information-seeking reception from the officer in charge; on the contrary, he publicly jeered at slight detentions and failures in those successful experiments. Now, all seems to be changed. The transportation facilities are to be increased by 325 new cars, 469 reconstructed cars, longer platforms and improved signals and brakes, which will largely relieve the congestion—and increase the earnings. The grace of the act is lost in that it is compulsory, nevertheless it is now politely announced, for the general manager "respectfully invites the aid of the Public Service Commission." In re-establishing reasonable, businesslike relations between railways and their customers, politeness is a factor, and this because it is in form the logical and necessary result of a proper regard for the opinions and the feelings of others.

THE Canadian Northern Ontario Railway Company.

CLEVELAND, NOV. 27. *The Journal and State Journal.* The Editor of the *Railway Age Gazette*, in commenting on an article entitled Good Passenger Service, says: "Trainmen and station men who use the term lady, in the place of madam, ought to be fined a day's wages." This is quoted to show how strongly some people feel about this matter. However, I desire to put it on record that the use of lady in addressing our patrons of the gender sex is incorrect, and heretofore all employees are requested to use the term madam.—A. J. HILLS, Superintendent.

In this way and in many others dignity and good manners are being taught on American railways, and it will have a part, an essential part, in establishing a right relation between the carriers and the carried. In Italy there is a league known as "Pro Gentilezza," and its counterpart has been organized in Berlin with a title which may be translated, "League of Politeness." It begins with a charter membership of 2,500, and its founder, Fraulein Meyer, proposes like organizations for America, England and France. The members are pledged to wear a badge which is a reminder to the wearer always to be polite, and to indicate to persons who see it that they are dealing with a courteous individual. It is hoped that trainmen will recognize these badges and, in turn, cause their own uniforms to convey a like intimation. The position of General Manager can, of itself, be made to bear a similar message to the public.

IF the figures of the new Yale catalogue of living graduates of the university are a broad test, the alumni of our universities and colleges are not going into transportation as a life work. The whole number of Yale graduates alive is 15,958 and the increase during the last six years is 26 per cent., while the number of living Yale men in transportation is but 198 and the increase during six years considerably less than 4 per cent. A closer test may be applied to the Sheffield Scientific School, the technical department of the university, with its present roll of 1,322 students under instruction and 1,004 regular undergraduate students. Its living graduates, numbering 4,019, show an increase of 40 per cent. during the last six years; yet it has but 76 graduates in transportation, an increase during the six years of 17 per cent., while the academic department (the college) with 8,266 living graduates, and an increase of nearly 18 per cent., shows a decrease of 121 to 109 of its graduates in transportation during six years and a loss of 10 during the last two years. There are, obviously, some modifying facts. Probably a certain probation of the civil, mechanical and electrical engineers employed by the railway and other transportation companies between themselves as in "Engineering" rather than in "Transportation," and there are industries allied to transportation that do not carry that name in the Yale vocation returns. But on the

other hand, one would think, with the strong drift in these days of the college man into business, that a vocation so nearly connected with business as transportation is, in many of its branches, would draw a large ratio of the graduates of the big universities.

AS being typical, probably, of situations at other ports with railway terminals, we give place, in another column, to President Dowe's final word on the situation at New Haven, Bridgeport and New London. A fresh examination of the federal engineers' chart shows at East Bridgeport 2,200 ft. of water frontage, almost immediately below the drawbridge, very little improved besides the dredged Johnson's Creek channel of 1,300 ft.; and it is further disclosed by engineering testimony that a large part of the federal grants were made on the theory of construction on the harbor's west side by the railway company of the local landings to cost \$400,000, which the controversy with the city later drove away. The railway company says that its coal business by water is larger than its all-rail coal business, notwithstanding that the latter is increased by the demands of the inland consignees who prefer all-rail coal—there being less breakage and also less delay, as well as avoidance of the difficulty of receiving whole cargoes owing to lack of storage room. The railway company declares itself hospitable to spur tracks to private piers—though, doubtless, not so hospitable to competitors any more than a merchant would welcome to a corner of his store a rival in his own line of trade. We confess surprise at Mr. Dowe's statement that "New London has no dock connection with the New Haven road" when the local map shows the road's direct connection with its boat line wharf and other connection with wharf properties not quite so direct. The company says that the Eastern Shipbuilding Company probably was sold because the corporation had no use for it—that fact surely militating seriously against Mr. Dowe's theories of the road's holding fast its water fronts from the monopolistic motive. Finally, attention may be called again to the federal harbor expenditure of \$3,776,000 at the three ports and on the river Thames; to the great private water frontage at the three ports corresponding to that big federal outlay; and to the more comprehensive fact, not limited to the three ports, of railway energy at water terminals as contrasted with private inertia, though it may be that the inertia is often due less to the individual than to basic conditions of an economic nature.

MORE MISREPRESENTATIONS FROM THE ILLINOIS MANUFACTURERS' ASSOCIATION

IN its annual report the Illinois Manufacturers' Association resumes its campaign of misrepresentation of railways. One of its assertions is that the advances in freight rates proposed by the Burlington alone would amount to \$1 per year apiece for every one of the 7,300,000 men, women and children located in the counties that it traverses. President Miller of the Burlington has issued a reply showing that according to the sworn testimony of the witnesses of this road the advances proposed by it, and which are now under investigation by the Interstate Commerce Commission, would amount to only \$237,200 per year, or but \$2.40 per year per person in the counties through which the Burlington runs. To those who have not followed the past career of the Illinois Manufacturers' Association, a statement which amounts to 70 1/2 per cent. misstatement, and 3 1/4 per cent. (less) misstatement added. But, for it, this is pretty good. Ordinarily, as the saying is, it does not contain so much truth.

In other parts of its statement the association strikes its normal gait. For example, it says: "We think it is little short of criminal for the consumers of railway supplies (that is, the railways) to allow the producers (that is, the supply men) into leading a campaign that has in view the swelling of their (the railways') already swollen coffers." The implication that the railways are "whipped" the producers of railway supplies

into "leading a campaign" for the retorsion of railway prosperity is 100 per cent. false. The movement which resulted in the organization of the Railway Business Association, and the campaign for fair regulation of railways, which since has been carried on by it, originated entirely with the railway supply concerns, and the railways have never had anything to do with it. Once in a while, it is true, some tactless railway purchasing agent has tried to tell the supply men how they ought to go about their work, but he has always been informed politely but firmly that the supply men are paddling their own canoe, that they are paddling it for their own benefit, and that when they want advice from railway men they will ask for it. The reason why the supply men have taken a prominent part in the discussion of the railway question is indicated by the fact that in the three years ending December 31, 1907, the total number of freight cars ordered was 803,341, an average of 267,780 a year; while in 1908 the orders were but 62,669, and in 1909 but 189,360; and this year they probably will be no larger than they were in 1909. The railway supply men have been amply justified, as a measure of self-preservation, in opposing further unfair regulation of railways, for it has hurt and is hurting them more than it is the railways.

Continuing, the Illinois Manufacturers' Association says: "In your business and in mine we are forced by our competition to make up the losses of bad management and theft from our surplus, if we are so fortunate as to have one, or dig into our pockets for more capital. We cannot meet such exigencies by advancing prices to our customers." The following is from the Bulletin of the Bureau of Labor for March, 1910: "Wholesale prices in March, 1910, were higher than at any time in the preceding 20 years, being 7.5 per cent. higher than in March, 1909; 10.2 per cent. higher than in August, 1908; 21.1 per cent. higher than the average yearly price of 1900; 33.8 per cent. higher than the average price for the ten years 1890 to 1899; and 49.2 per cent. higher than the average yearly price of 1897." It is perfectly well-known and indisputable that the manufacturers of Illinois did their full share in making these advances in prices. Compare the foregoing with the following regarding railway rates for the same years, except for 1910, the official figure for which is not yet available: The average rate per ton per mile in the year ended June 30, 1909, was 7.63 mills, or 1.19 per cent. higher than in 1908; 4.66 per cent. higher than in 1900; 9 per cent. lower than the average rate for ten years, 1890 to 1899; and 4.38 per cent. lower than the average rate of 1897. Isn't it a shame how the manufacturers are prevented from raising their prices, while the railways are ruthlessly raising their rates!

In another place the Illinois Manufacturers' Association says: "We are not disposed to give advice or to criticise"; and then it proves it by adding, "but we do feel that if the methods which are employed by the manufacturers of this state in the management of their plants were applied to the railways the savings would be so great that the stockholders would be simply overwhelmed." No one will question that the manufacturers of Illinois are supermen. However, it is worth noting that Harrington Emerson, whose testimony in the rate advance hearings at Washington in criticism of the management of American railways has been so widely quoted, said, in reply to a question as to how much difference there is between the efficiency of the management of railways and other industries: "The railways are fully up to, if not ahead of, the average ability." There is one respect in which the figures we have given show that the managements of the railways are utterly inefficient as compared with those of the manufacturing of Illinois and other states. While the manufacturers and jobbers, between them, were boosting wholesale prices 49.2 per cent., the railways were reducing their rates 4.38 per cent. If the managements of the railways were as efficient in raising rates as the managements of manufacturing concerns are in raising prices, we have no doubt that the stockholders of the railways would be "simply overwhelmed."

In another part of its report the Illinois Manufacturers' Association says, referring to the frauds in the car department of the Illinois Central: "It is not just to say that because such practices are common among the officials and employees of one road the same is true as to all, but how many of us are there who can relieve our minds entirely of that suspicion?" The large meat packing concerns of Chicago all belong to the Illinois Manufacturers' Association. They and their individual officers are under indictment for having entered into a conspiracy and combination in restraint of trade in violation of the Sherman act. At least two of the car repair concerns that are charged with having been in collusion with officers of the Illinois Central in defrauding that road are, or were at the time, members of the Illinois Manufacturers' Association. Now, in view of these facts, let us paraphrase the foregoing statements of the Illinois Manufacturers' Association: "It is not just to say that because some members of the Illinois Manufacturers' Association have been guilty of such criminal and dishonest practices, the same is true as to all, but how many of us are there who can relieve our minds entirely of that suspicion?" It would be libelous for us to reason and speak thus about all the members of the Illinois Manufacturers' Association. And it is just as libelous for this association to imply in a public statement that because the vice-president, general manager, general superintendent, superintendent of the car department and general storekeeper of one road have been, as is alleged, guilty of frauds against that road, the vice-president, general manager, general superintendent, superintendent of the car department and general storekeeper of every other railway in the country are open to the suspicion of having been guilty of similar practices.

The statement regarding railways and railway management which we have been analyzing is typical of those which have been emanating from the same source for years. It seems that no falsehood regarding railway management is too glaring; no misrepresentation too injurious; no slander too outrageous, for it to father and publish to the world. How much longer will the railway supply manufacturers of Illinois continue to contribute to the support of an organization which takes their money and uses it to injure their patrons and themselves? How long will the public continue to read and believe its reckless misrepresentations? And, finally, how much longer will the self-respecting manufacturers in general continue to permit the machinery of their organization to be prostituted to such uses?

SOUTHERN PACIFIC

THERE are only three railway companies in the United States earning more than \$100,000,000 gross. The Pennsylvania Railroad is one and the Southern Pacific Company and the Atchison, Topeka & Santa Fe are the others. The Pennsylvania Railroad's development has been intensive; the Southern Pacific's and the Atchison's development have been extensive. Operating through Louisiana, Texas, New Mexico, Arizona, California, Oregon, Nevada and Utah, the Southern Pacific carries a more diversified tonnage than any other large railway. It is almost unique, for instance, among large railways, in that of the total tonnage carried but 291 per cent. is bituminous coal. Notwithstanding this characteristic of being an agricultural road as contrasted with a manufacturing road, the tonnage of products of agriculture amount to 19.83 per cent. of the total tonnage, while products of manufactures amount to 17.17 per cent.

The plant itself, originally a collection of more or less cheaply built scattering lines, has been brought up to modern standards through expenditures for maintenance and additions and betterments, made largely from income. About 63 per cent. of the main line is laid with 90, 80 and 75-lb. rails.

The fiscal year ended June 30, 1910, was the culmination of one period in the development of the property. For three years previous, month after month the earnings statement given out by the management came as a fresh cause of wonder to investors

and railway men who were not closely in touch with the work of the Southern Pacific management. With few exceptions, each month showed an increase in gross over the corresponding month of the year before, and, counter to established precedent, net increased in greater proportion than gross. Since June 30, 1910, there has been a falling off in gross earnings, without a corresponding decrease in operating expenses. A second glance at the names of the states through which the road runs is sufficient explanation of the rapid increases in gross. The total increase in population of the eight states during the census decade from 1900 to 1910 was 2,600,000, an increase of 38 per cent. over 1900; and it is safe to say that in California, and in some of the other states, the territory tributary to the Southern Pacific has developed more rapidly than the average for the rest of the states.

In the year ended June 30, 1910, total operating revenues of the Southern Pacific amounted to \$124,500,000, an increase of \$13,700,000 over 1909. Operating expenses amounted to \$73,500,000, an increase of \$6,300,000. After the payment of fixed and other charges, the company had a surplus of \$35,500,000 available for dividends. This is at the rate of over 13 per cent. on its outstanding \$272,700,000 stock. It should be noted here that there is one source from which the company derived extraordinary revenue in 1910. Through the declaration of an extra dividend on the Wells-Fargo stock owned, which brought the Southern Pacific a little less than \$5,000,000, the surplus mentioned above was increased to an extraordinary degree by "other income." Subtracting this \$5,000,000 the company earned over 11 per cent. on its stock.

In making an analysis of the operations of a railway company to determine the value of the common stock, it is customary to show a normal maintenance per mile of line and per unit of equipment, and to credit the excess spent by a given company as an equity enjoyed by the common stock. These equities, which are very large indeed in the case of the Southern Pacific, are probably the cause when taken in connection with the unusually efficient operating organization that has been developed, of the ability of the Southern Pacific to save a good part of its increases in gross for net. Stated differently, the fact that the Southern Pacific spends on an average \$3,000 per locomotive for repairs, \$900 to \$1,000 for passenger-train cars and over \$100 for freight-train cars, and has spent sums almost as large in each of the past few years, does not mean that next year or the following year the equipment will be in such good shape that it will be necessary to spend only \$2,000 for repairs of locomotives, etc.; but what is actually the case is that the roadbed and the equipment of the Southern Pacific are kept in such high state of efficiency that transportation expenses can be kept well in hand, even in the face of heavy increases in business handled. This statement is borne out by an examination of the details of operating expenses. In 1910 expenses for "maintenance," which include maintenance of way and maintenance of equipment, increased \$2,990,000, or 10.36 per cent.; while expenses for "operation," which include transportation expenses, traffic expenses and general expenses, increased 8.70 per cent. An increase in the cost of labor and of materials affects both the cost of operation and the cost of maintenance, and in fairly equal degree. Increases in ton mileage and passenger mileage, unaccompanied by greater efficiency in operation, increase the cost of "operation" out of all proportion to the increase in cost of maintenance. This is obvious if an extreme example is taken by way of illustration. If the freight density on a given mile of road were doubled, the cost of maintenance of way of that mile might conceivably increase 20 to 25 per cent., but would certainly not increase 50 per cent. To handle twice as much traffic, even when applying the law of decrease in cost, would necessitate 80 to 85 per cent. more car mileage and train mileage, with corresponding increase in the cost of train crew and fuel.

To take a concrete example of the economics that may be

effected through efficiencies of operation and perfection of road-bed and equipment from the 1910 report of the Southern Pacific: Revenue passengers carried one mile increased by 250,000,000 over 1909. This is an increase of 17.17 per cent. The mileage of cars in passenger service increased 16,400,000, an increase of 12.32 per cent. over 1909. Tons of revenue and company freight carried one mile increased 758,000,000, an increase of 10.51 per cent. over 1909. Locomotive mileage, with freight and mixed trains, increased 1,400,000, or 7.16 per cent., over 1909. It is this potential saving in operating costs that is the real equity created by the expenditures of more than "sufficient" sums for maintenance.

The following table shows the unit costs of maintenance in 1910 compared with 1909:

	1910.*	1909.
*Maintenance of way and structures per mile.....	\$1,612	\$1,474
Repairs per locomotive.....	8,343	2,973
" " passenger-train car.....	1,032	910
" " freight-train car.....	109	104

* Per mile of all main tracks, excluding siding and switch tracks.

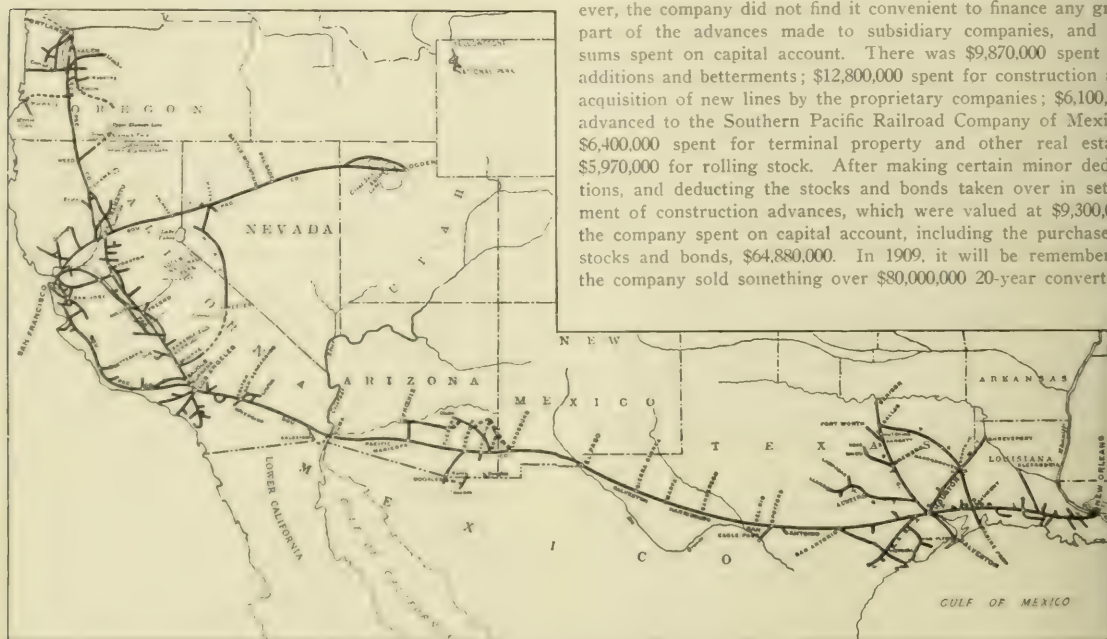
† This is for repairs only, and does not include renewals, depreciation or superintendence charges.

A larger proportion of total revenue is derived from passenger-traffic on the Southern Pacific than is the case with most large

The high ton-mile rate is accounted for by the comparatively small amount of low grade traffic, and by the comparatively large proportion of perishable and other classes of freight which move on a fast time schedule and in consequence take a high rate.

In 1910, of the total 25,692,704 tons of revenue freight carried, 27.68 per cent. was products of mines; 21.12 per cent. was products of forests; 19.83 per cent. was products of agriculture; 17.17 per cent. was manufactures; 10.18 per cent. was merchandise and miscellaneous; and 4.02 per cent. was live stock and animal products. In 1910, 1,900,000 tons of fruit and vegetables were carried. This is 7.37 per cent. of the total tonnage carried and is an increase of 219,000 tons, or nearly 13 per cent., over the tonnage in 1909. There is a notable increase in the tonnage of manufactures. In 1910 this tonnage totaled 4,460,000, an increase of 781,000 tons over 1909. A good indication of the industrial activity in the territory served by the Southern Pacific is shown by the fact that the railway carried 1,569,000 tons of cement, brick and lime, an increase of 345,000 tons, or 28 per cent. over 1909; and the tonnage of stone, sand and like articles totaled 1,140,000 tons, an increase of 856,000 tons, or about 67 per cent.

To finance its extensive improvements and new lines, the Southern Pacific is necessarily a heavy borrower. In 1910, however, the company did not find it convenient to finance any great part of the advances made to subsidiary companies, and the sums spent on capital account. There was \$9,870,000 spent for additions and betterments; \$12,800,000 spent for construction and acquisition of new lines by the proprietary companies; \$6,100,000 advanced to the Southern Pacific Railroad Company of Mexico; \$6,400,000 spent for terminal property and other real estate; \$5,970,000 for rolling stock. After making certain minor deductions, and deducting the stocks and bonds taken over in settlement of construction advances, which were valued at \$9,300,000, the company spent on capital account, including the purchase of stocks and bonds, \$64,880,000. In 1909, it will be remembered, the company sold something over \$80,000,000 20-year convertible



Southern Pacific.

roads. In 1910 the company earned \$40,200,000 from passengers. This is an increase of \$5,900,000 over 1909. The revenue passengers carried one mile totaled 1,806,000,000. The average revenue per passenger per mile was 2.188 cents in 1910 and 2.185 cents in 1909. The average distance each passenger was carried was 44.93 miles last year as compared with 39.18 miles the year before.

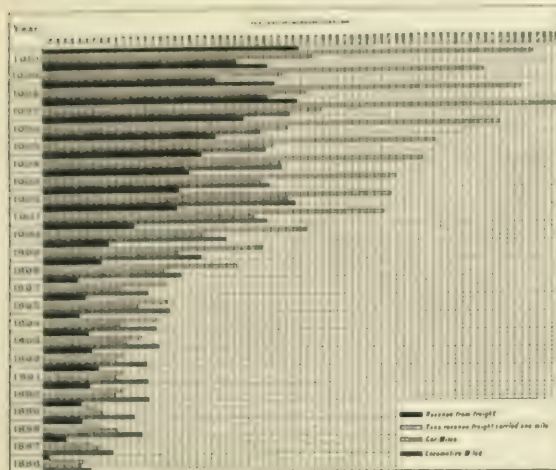
Revenue from freight amounted to \$77,000,000 in 1910, an increase of \$7,100,000 over 1909. The tons of revenue freight carried one mile totaled 6,679,000,000, an increase of \$72,800,000 tons. The average revenue per ton per mile amounted to 1.162 cents last year and to 1.144 cents the year before. The average length of haul was 243.42 miles in 1910 and 236.52 miles in the year 1909. This is a long average haul, with a high average ton-mile rate.

4 per cent. bonds. The proceeds from all but \$1,000,000 of these bonds were received before the beginning of the last fiscal year. The company began 1910, therefore, with a large amount of cash on hand. During the 1910 fiscal year the preferred stock was called for redemption, and holders were given the option of receiving cash at the rate of 115 per cent. or of exchanging at par their preferred for common stock; and the annual report shows that almost the entire amount of preferred stock was converted into common stock, so that the total amount of stock outstanding was nearly the same at the end of the year as at the beginning. The company sold \$25,000,000 San Francisco terminal first mortgage 4 per cent. bonds, but only \$15,000,000 of these bonds are taken in the 1910 account. On June 1, 1910, \$7,253,000 2-5 year 4 per cent. mortgage bonds were paid. The net increase, after the issue of various amounts of bonds for

refunding the bonds issued during the year was \$11,400,000. The same effect about this same situation in a different form, current assets amounted to \$19,600,000 in 1910, which included \$10,000,000 cash. In 1909 current assets amounted to \$20,900,000, \$10,000,000 included \$11,400,000 cash. The book value of these are listed at proprietary and other companies' unpaid, of Wells Fargo & Co. Express stock. After the payment of the extraordinary dividend mentioned, the Southern Pacific found a feasible opportunity for the sale of its express company stock, and also sold its holdings of the Mexican International Railroad to the Ferrocarril Mexicano. The profit on these two sales amounted to over \$7,000,000.

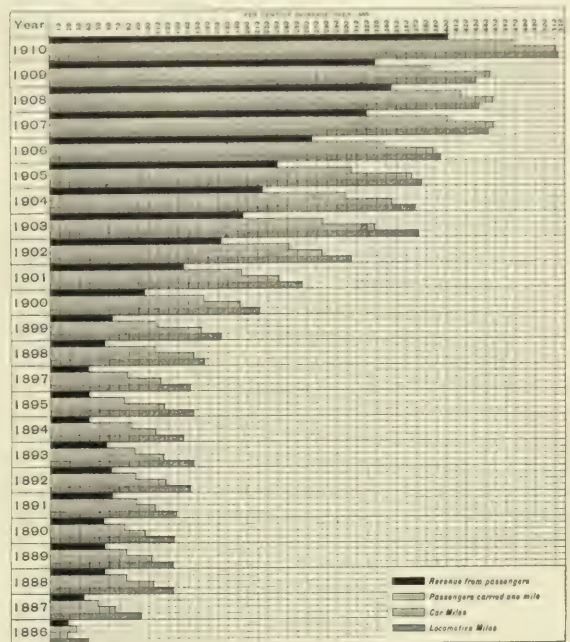
The construction work that is under way by subsidiary companies of the Southern Pacific is described in our General News columns.

If we could apply the principles of rhetoric to the criticisms of an annual report, it would be proper to say that the Southern Pacific's report has unity, mass and coherence to an unusual degree. Not only is the report comprehensive—and when it is said of a statistical statement of such great operations as are carried on by the Southern Pacific that it is comprehensive, it is high praise—but the report has an arrangement and a structure that one might expect to find in a well written essay. To illustrate by a single detail: The table showing transportation operations is a complete exhibit in itself. In order, the mileage operated, the revenue, the expenses, the volume of business and



Increase in Freight Service.

and advances to construction and other companies, all show large increases in 1910 as compared with 1909. While current assets decreased by \$11,400,000, current liabilities increased by \$12,900,000, and amounted in 1910 to \$36,000,000. These current liabilities include \$10,900,000 borrowed from the Union Pacific. Since the accounts for 1910 were closed, the Southern Pacific has presumably received the remaining \$10,000,000 on the \$25,000,000 San Francisco terminal first mortgage bonds; but \$10,000,000 does not go far with a company dealing in such large sums as the Southern Pacific, and with needs for financing construction

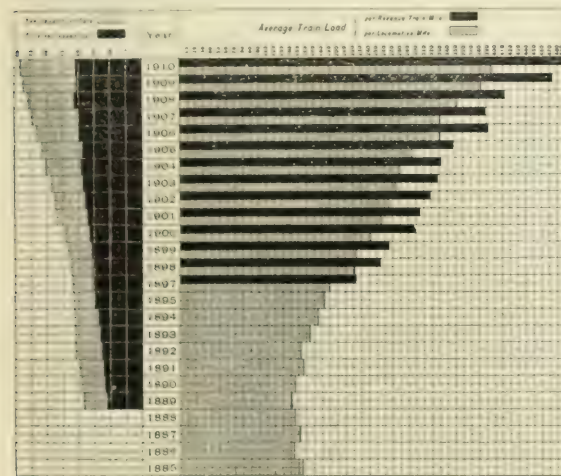


Increase in Passenger Service.

the essential unit figures for volume of business are set forth logically in a simple form.

The following table shows the operations of the Southern Pacific Company and proprietary and non-proprietary companies given in the form usually followed in these comments on annual reports:

	1910.	1909.
Average mileage operated	9,752	9,626
Freight revenue	\$77,018,554	\$69,878,880
Passenger revenue	40,244,856	34,345,339
Total operating revenues (rail lines)	124,523,905	110,846,404
Maint. of way and structures	16,098,705	14,533,135
Maint. of equipment	15,808,391	14,379,762
Traffic	2,481,186	2,069,940
Transportation	35,658,046	32,846,193
Total operating expenses (rail lines)	73,514,034	67,191,875
Taxes	4,519,374	3,785,242
Operating income	47,238,385	40,937,534
Gross corporate income	57,947,565	46,135,256
Net corporate income	35,463,218	36,879,402
Dividends	17,238,347	17,336,974
Surplus	18,178,549	9,477,966



Average Train Load 1885 to 1910.

on such a large scale, as is being done in Mexico. It would appear, therefore, that under favorable conditions the Southern Pacific will probably do considerable financing in the near future.

The Southern Pacific had on June 30 a credit of \$54,760,000 to profit and loss. One considerable source of profit during the past year was the sale of the Southern Pacific's minority holdings

Letters to the Editor.

RAILWAY CAPITALIZATION.

December 20, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The articles by Prof. Ripley on railway capitalization are very valuable as showing an appreciation of the facts concealed by the misleading form in which the statistician of the Interstate Commerce Commission casts his statistics; but they are marred by the prevailing bias against the railways and seemingly reflect a personal rancor against the personality of the late Mr. Harriman.

In his discussion in your issue of October 28, 1910, Prof. Ripley says:

"Yet a bald comparison of expenditures for maintenance of way and equipment per mile of line would be unfair. The need for such outlay varies, more or less, in proportion to the load of utilization. Maintenance, if compared, should be given in terms of density of traffic. Thus, in 1907, the Union Pacific expended \$3,175 per mile of line for maintenance of way; the North Western expended only \$2,333. But the density of traffic of the Union Pacific road is 60 per cent. greater. Maintenance of way expenditure in terms of 100,000 ton miles of freight density are only \$268 for the Union Pacific, against \$324 for the North Western, per mile of line. Despite appearances, due regard being paid to density of traffic, the North Western is pursuing the more conservative policy of the two."

First. It has been sixty years since Lardner pointed out that something like one-half the cost of track maintenance was due to the effects of time and the weather. The Union Pacific lies, for the most part, in the semi-arid region and the C. & N. W. in a region of heavy rainfall. Is one to assume that this is not reflected in costs?

Or, take such an item as material. The Union Pacific is very heavily ballasted with the so-called Sherman gravel, a disintegrated granite, possibly the finest material for the purpose in the United States and ridiculously cheap. The C. & N. W. is rather lightly ballasted with sand and gravel recovered from the creek beds, burnt clay and broken stone of an inferior quality, is also used the poor and costly resources of a region of inhospitable geology. Should not one look to see this condition reflected in costs?

Second. The Union Pacific lies upon the smooth floor of the Platte valley, rising by gentle inclination to the foot of the Rockies; the North Western climbs out of the Missouri valley 1,500 ft. to an elevated plateau, which is badly broken up by deep water courses, to fall off again into the valley of the Mississippi.

If Prof. Ripley will examine two hundred miles of the New York Central between Albany and Buffalo and compare it with two hundred miles of the Pennsylvania or Baltimore & Ohio, between Philadelphia and Pittsburgh, and will study the effects of these locations to the country side on the cost of track maintenance, he will appreciate such differences. A line built across Boston Common and one from Boston to Springfield do not present so great a contrast as do the two which he puts on an equal footing.

Third. Since Mr. Woodlock began the use of certain units of comparison in his discussion of the annual reports of railways in the *Wall Street Journal*, they have been used in many ways he must have been far from contemplating. One of the most common errors of his imitators is to assume that, if Line A spends \$1,000 per mile in maintenance, and Line B \$1,200 per mile, Line A has been starved, or this may be varied by assuming that Line B is being improved by a diversion of earnings and that a hidden equity is being created. Now, the fact may be that all that is indicated is the difference between, on the one hand, a slovenly housekeeping and, on the other, a painstaking, saving housekeeping. The effect of such unintelligent criticism must eventually tend to discourage good effort and promote incompetence.

Now, in the comparisons of the expense of maintenance of way, the effect of such considerations as the above, and others

that might be enumerated, which, moreover, may in some cases be cumulative, are so great as to account in themselves for very wide spreads and to warrant a call for supporting facts when sweeping criticisms are brought forward by people of responsibility.

I have recently been over the line of the Union Pacific and of the Chicago & North Western. There is no question at all of the superior condition of the Union Pacific track. I do not want to be understood as disparaging the track of the Chicago & North Western; it is very good indeed, but, to bring it up to the condition of the Union Pacific, if, indeed, under the circumstances, that be possible, would be economic waste.

I must conclude that the opinion of Prof. Ripley, "Despite appearances, due regard being paid to density of traffic, the North Western in pursuing the more conservative policy of the two," is the careless dictum of the "closet philosopher" and, in view of other expressions in his article, wonder whether it owes its genesis to a desire to reflect on Mr. Harriman. PRESIDENT.

RAILWAY "MONOPOLY" AT CONNECTICUT PORTS.

New Haven, Conn., Dec. 15, 1910.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I thank you for consideration given to my previous letter. The privilege of making one or two corrections of your comment is requested. It was not my purpose to enlarge on the fact that independent boat lines on the Great Lakes are inefficient, though I had no desire to hide the fact; but, rather, desired to show what grand results can be brought about when railway interests and water traffic affiliate. The absorption of the different railway lines as well as boat lines running to and from Connecticut ports by one company would not be objectionable if the acquisition of additional harbor properties were made for the purpose (as you say) "of extension, new trackage and general addition to the terminal plant"; but unfortunately for the ports this is not true. You say further on, "Sometimes the property has been improved, sometimes not, according to the exigencies of the controlling railway corporations."

New Haven's condition shows an improvement on 1,200 ft. of dock property by the railway company, and the practical abandonment (you inadvertently substituted the word "abundant" for "abandoned" in my previous letter) by the railway company of more dock property formerly used than all that is now used, both by the railway company and private interests combined.

In calling attention to the large amount of harbor frontage in New Haven you lose sight of the fact that consignees will pay demurrage on cargoes of lumber which have to be hauled in order to place their cargoes when the shortest possible distance has to be covered. This being true, the improvement of other property than that owned by the railway company would be a useless waste of money.

The whole subject can be covered in a few words. The railway company has by arrangement of rates diverted coal and lumber from water to all-rail routes (and at an admitted loss), so that greater terminal facilities are not required; and the disposal of any portion of this unused railway property to private parties would indeed be an innovation.

In reference to Bridgeport your statement that the "New Haven company owned 4,440 ft. on the outside below the railway drawbridge" is true; and that 4,440 ft. would be worth more to Bridgeport proper than all the rest of the dock property now used. Dock property is one thing, but dock property, properly located, is quite another proposition.

New London has no dock connection with the New Haven road. An excellent dock built by the Eastern Shipbuilding Company, bought by the railway, could have been used for terminal purposes, but it was deliberately disposed of. Why?

R. S. DOWE,

President, New Haven Towing Company.

RECENT DEVELOPMENTS IN SIGNALING.

BY A. H. HILL, C. E.*

In the past five years electric traction has been rapidly developed, telephones have been substituted for telegraph in many sections, locomotives of higher power and cars of larger capacity and increased strength built, air brake efficiency improved, greater attention than ever before given to the manufacture of rails, the improvement of fastenings, preservation of ties, and the general betterment of the permanent way, but in no branch of railway engineering and operation, except in government regulations, has such a revolution been accomplished and such progress made as in the signaling of the trunk lines of America.

The development of the motor signal operating at low voltages, and particularly of the top post mechanism applying the power directly at the point required, has enabled us to place our distant signals at a sufficient distance to give proper advance warning to approaching fast trains, while removing the danger of maladjustment inherent in the old wire-connected signals; while electric back locks insure against dangerous complications in the rare event of false clear failures. Approach locking insures against errors of practice, in the event of an attempt on the part of a signal operator to change a route after clear signals have been displayed. In the automatic field improved apparatus has reduced failures, and, notably, the development of alternating current apparatus has practically eliminated that class of false clear indications, due to stray currents closing the track relays (which are the basis of operation of all improved automatic work), at the same time providing more rugged mechanism, as near as we can estimate, probably cutting down operating expenses considerably, if the same energy is used to operate and light signals, dispensing as it does with the care of oil lamps and storage or primary batteries.

The development of manual controlled block systems has enabled us to operate entirely by signal, without the use of train orders, on single track, with practically the same safety as is insured by the employment of the staff, or staff and tablet system, but without the delays made necessary by these cumbersome methods, thereby greatly increasing our facility of movement.

The perfecting of electric and electro-pneumatic interlocking has made possible the control of signals and switches a mile or more from the center of operation, and this has required in turn the development of electric route locking, so that not only are switches prevented from moving immediately under trains, but are locked by the approach of a train throughout its entire route to the next signal, and are released in turn immediately on its passage, and this is accomplished by a simple method, in either direction, depending upon the direction of movement of the train—that is, if a signal is cleared for an eastbound train, the entrance of such a train upon such a route will hold all switches in front of it and release them as it passes, and the clearing of a signal for a westbound train will lock all switches in the route, and the train will release them in reverse order on its passage. This development has added tremendously to the safety of our large terminals, and, incidentally, as the track circuits are installed, they have been utilized to introduce the semi-automatic feature in terminal stations, by which all signals are restored to the normal position by the passage of the train, a still further safeguard, utterly out of all question ten years ago, and attempted with trepidation first, I believe, on the Pennsylvania Railroad some four years ago.

It is not my intention, however, to enlarge upon the engineering features of the profession this evening, which require that a well-equipped signal engineer shall be a good mechanical and a good electrical engineer in one, but it is rather my aim to set forth a few of the problems involved in the indications to be given and the aspects to be displayed to the engineman, the mastery of which makes it requisite that a signal engineer should

also be a mighty good transportation man, and, finally, a considerable able a psychologist.

The disk signal, requiring very little space for its operation, was the first type of automatic signal. Originally, it consisted of two kinds, the simple magnet and the disk wheel. The well-known Hall disk was the simplest probably ever designed, consisting of a magnet and a rotating armature. A number of roads, pioneers in automatic signaling, being equipped with such signals before the motor signal was perfected, have continued the installation of such types, but the general trend on most roads is to supplant them by semaphore signals. * * * The fact is recognized that the semaphore is a favorite to such an extent that any scheme for a system to be universally adopted must be founded upon it as a basis.

About 12 years ago the yellow light was developed for the night caution indication, and since then almost half the mileage of the United States and Canada has adopted green for the night clear indication in fixed signals, and all but two or three roads comprising this mileage are using yellow for caution.

The upper-quadrant arm has only been strongly advocated during the past five years, and on February 1, 1910 (the last date at which I compiled the information), out of 255,357 miles of roads in the United States and Canada, I found as follows:

	MILES
Lines of road on which it was adopted for the first time in 1909 and renewals	69,634
Lines on which it was used in part	16,152
Total	85,786

while lines of only 65,520 miles advised they contemplated no change, leaving 12,000 odd considering the change and 92,000 miles not reporting. Since then the movement has advanced rapidly, and it is safe to say that nearly half the total mileage referred to will instal the upper quadrant for new work and renewals in the next year or two. Without question, this common-sense arrangement will eventually be universally adopted.

Closely connected with the movement for the use of the upper-quadrant is the adoption of what is known as three-position signaling.

At interlocking our practice is, I believe without exception (at least in the United States), to have the top arm govern the main running track, and the second, and sometimes the third, fourth, and fifth arms, to govern to diverging tracks, while on thick lines where automatic signals are used the home block signal is the top arm and the distant for the next home signal is mounted below it, so that at interlockings one arm governs the straight track, and at the block signal two arms must be observed together. Further, at interlockings where advance signals are used, it is the practice, if the advance signal is at stop, to show caution at the distant and clear at the home, which has led to disaster. Both these confusions in practice are remedied by the use of three-position signaling. Only one arm is used on the automatic signal, except when it is also used as a distant for an interlocking, and arms are only added where divergences occur, as at interlockings. All lights except the governing ones are red, so that two lights do not give conflicting information concerning the movement to be made. The arm at horizontal (red light) indicates stop; inclined upward 45 degrees (yellow light) indicates next signal at stop; and upward 90 degrees (green light) proceed, next signal at caution or proceed; in this way governing trains by the position of the arm rather than by its shape, a decided improvement over the present practice, in which a fish-tail arm horizontal means caution and a square end arm stop, the shape being difficult to distinguish at high speeds.

So far, we have regarded a single arm as the entire signal, as does the standard code, which provides no indications or aspects for "diverge from the main track." Obviously, therefore, it is incomplete.

In practice, of course, as previously stated, we have a multiplicity of arms. Many roads attempt to signal routes; others cover all diverging routes by the use of one additional arm. This carries with it a reduction of speed, and while not so stated

* Signal engineer, Pennsylvania Railroad. From a paper read before the Canadian Railway Club, Montreal, November, 1910.

in orders, etc., we have really for years been using at interlockings what is known as speed signaling—that is, top arm for main track (high speed), second arm for diverge (low speed), for it is obvious that with such an arrangement it is only safe to permit a speed which will be safe and proper by the most unfavorable route. When such a signal governs to main running passenger tracks and also against the normal current of traffic, or into sidings, and is habitually used by high-speed trains, the habit gradually forms of running at higher than the authorized speed, and if sometime a different route is set, serious results may ensue. This is particularly the case when long cross-overs or turn-outs are installed, over which a movement at 40 to 50 miles an hour is permissible, hence the practice is rapidly developing of using, at points where the routes may be changed, as at interlockings, three arms, the top one for the through high-speed route, the second for the medium-speed route (that is, over Nos. 15 to 20 cross-overs and turn-outs), and the third arm for low-speed routes, giving it clear if the route is set over a short turn-out to a main running track, with next signal in the route at proceed, if within braking distance, and in the caution position if the train may only proceed through the interlocking limits. An additional function is also given to this arm in the caution position, namely, that of admitting trains to an occupied track within the interlocking limits, using it in lieu of the hand signal required by present practice, if the signals are semi-automatic, and thus assuring the runner that the switches are properly set and locked. It has been the general practice to space the upper arms about 6 ft. apart, and the lower arm about twice that distance below the second arm. It is now recommended by a committee of the Railway Signal Association to have the spacing approximately equal, in which case it will probably be advisable to make the lower light of a color other than red for greater distinction.

A general rule requires that a train must stop if a signal is improperly displayed, or if a signal is not displayed where one should be shown, but this rule is difficult of enforcement. For instance, if one, two, three, or perhaps four lights should be displayed, and one is extinguished, an engineman must think quickly to keep out of trouble. He may mistake a four-light signal, with the top light out and the second light clear, as a clear main track signal, etc. Again, if it is a one-light signal, and that light extinguished, the particular spot of darkness at which the train should stop is not easily located. In the present satisfactory development of signal lamps, cases of extinguished lights are rare; but they do occur, and it is generally felt that an engineer should have two chances, as the extinguishing of both lights in any one signal is very unusual, unless electric lights are used. Again, it is felt that if the same number of lights were displayed on every signal, the absence of any of the lights would be instantly detected. The ideal for economy would be one light on each signal, but obviously this is impracticable. The ideal for safety would be so many lights that at least one would always be burning. On the other hand, the cost of equipping each switch target with two or three lights would be prohibitive. As a compromise, the following has been suggested and put into effect more or less completely on a number of roads, with the hope that eventually the various practices may develop into a uniform system:

Facing switches on high-speed tracks to be equipped with high distant switch signals having two lights.

The switch stands themselves to be short and equipped with one light.

All high signals to have two lights of long range, the low-speed line to be equipped with a short range light.

This will, in effect, result in two lights on all high signals governing high-speed trains, and one light on all low signals governing low-speed trains.

Taking advantage of this principle, the signals are divided into three classes: "stop and stay," "stop and proceed," and "stop and investigate." Under "stop and stay" are classified all man-

ual block and interlocking signals, the two lights being placed one above the other and the arms square-ended. Under "stop and proceed" are classified distant signals of all kinds (which require no stop) and all automatic signals, at which the train must stop and if the way is seen to be clear may then proceed, the two lights being placed in a diagonal line, and the arms having ends pointed. Under "stop and investigate" are the switch targets and similar signals or signs. In order to differentiate between a red switch light, which may be passed after stopping, and a light at a dwarf signal or a derail which is open, which may not be so passed, it is proposed to make these latter purple for the stop indication. By the use of this color also dwarf signals will not be mistaken for train tail lights or flagmen.

It is further proposed to make the siding and yard switches lunar white when set for ladder or straight track, and yellow for the reversed position, retaining the red and green for main line indications. There remains still to be provided a permissive signal and a block office closed sign. Several roads, notably the Pennsylvania, give a permissive signal in manual block territory, which permits their heavy freights to enter an occupied block without entirely stopping. At present this is given by the home or advance signal in the caution position, but it is felt that such diverse information all conveyed by one aspect is confusing, and that some other means should be adopted. It is proposed to use, instead of the yellow light alone, a reflecting lamp showing yellow and lunar white in a horizontal line about 1 ft. apart on centers, with a circular disk attached to the blade.

There are in use several schemes for designating "block office closed." Arms are cleared and lights extinguished, or arms are cleared and lights left burning, or arms are left at stop and lights extinguished, and when permissive block is operated, confusion is avoided only by the use of established rules. In order to carry out the idea of having the signal itself indicate the conditions, it has been proposed to use removable arms, and, when the office is closed at night, to display two lunar white lights on a horizontal plane, about 2 ft. apart, on the signal mast.

It will be seen from the foregoing that the aspect of the signal has been considered in its entirety, as presented to the engineman, rather than in its component parts, as treated in the Standard Code, and much thought has been given to the problem of so arranging it that two separate signals located close together may not be read as one signal, giving different information.

For the past five years Committee No. 10 of the American Railway Engineering and Maintenance of Way Association has been working on this subject of aspects, and until a year or so ago was most harmonious. Since then some of the members operating their railways have felt that, while the system outlined was applicable to the trunk lines east of Chicago, it was too elaborate and expensive for their own requirements. They differ from the majority of the committee substantially in only two fundamentals. First, they believe there should be only four indications: "stop and stay," "stop and proceed," "caution," and "proceed," caution covering "train in block," "diverge from main track," "next signal at stop," "bad track ahead," or any other condition where caution is required. This would mean that any train receiving a caution signal must reduce speed at once and proceed at low speed, looking out for some danger or stop signal ahead, and be absolutely restricted as to speed until the next signal was reached, regardless of what the conditions actually might be. For instance, even if the route was set over a long cross-over with the next signal clear (a route which could safely be taken at 45 to 50 miles an hour), the train must crawl along because the same signal at the same place might, next time, indicate the train was headed into a siding or an occupied main track.

In the minds of the majority, this practice would restrict train movement, while our desire is to facilitate it as much as possible by the use of signals, and not to tell an engineman to use caution when it is not required; for it is human nature, if we are told day after day to run cautiously, and find no reason for such re-

struction to take it for granted that the conditions are as stated, and "let her up" only to find the contrary notwithstanding.

Our object is to arrange the signals that they meet ahead with the train to such an extent as to make the observation of the latter almost instinctive, rather than requiring an effort of memory under varying conditions.

The second fundamental [of these west-of-Chicago men] is that an "on" signal means only so far ahead, and that, in a distant signal shows that the engineer must therefore find that it is safe to proceed, next signal at proceed, but rather that it may be at stop. The logical result of this is that a distant signal at caution would mean "reduce speed at once and look out for immediate trouble," and a distant signal at clear, "proceed, prepared to stop at the home signal, which may be against you." That is, of course, if the road is operated on a conservative and safe basis. With one-mile blocks and trains scheduled at 60 miles an hour, how many would make time?

The fact that several roads have adopted the principal aspects suggested by the committee and that they are operating successfully, having the testimony of their engineers that former confusion is eliminated, and that the new system is easier to learn and remember than the old, is sufficient refutation of the plea that it is so complicated that no one can learn it, and the conclusion of a majority of the committee is that the new scheme is applicable to lines of either heavy or thin traffic; tells the engineer the truth, relieves him of the tension of continually guessing what "caution" means at each particular place, and, finally, not only safeguards traffic to a greater extent than formerly, but also expedites it to a degree before unknown.

The impression is abroad that the Pennsylvania and New York Central lines are great four-track trunks, rich and powerful, and that they can afford systems which would bankrupt the thin lines. I can speak for the Pennsylvania alone, and I can assure you that money for signaling is not easy to get, and that we have quite a mileage of other than four-track lines.

Let me read you a few statistics compiled within the past year:

Pennsylvania Railroad, including P. B. & W., N. C. and W. J. & S.)
Miles of Road Equipped with Block System.

	Miles of Road.	Automatic.	Non-Automatic.	Total.	Total Non-Block.
Single track	3,497	1,698	1,698	1,798	36
Double track	1,230	156	1,037	1,193	49
Three track	109	7	52	60	23
Four track	456	206	226	432	
Total	5,294	370	3,014	3,385	1,908

Single Track Lines on which Block System Is Used, and Average Number of Train Movements Daily.

From	To	Miles.	Average daily movements one way.
Reading	Pottsville	36.0	15
Vail	Lock Haven	54.2	18
Vail	Osceola Junc.	19.2	8-11
Lewisburg	Belleville	58.4	3-4
Columbia	Frederick	68.2	3-9
Lewistown Junc.	Schuylkill Junc.	44.6	8
Sodus Point	Stanley	34.0	11-18
Williamsport	Elmira	73.3	10-11
Hindsdale	Rochester	98.6	15-16
Oil City	Clear	113.6	9-13
Buffalo	Oil City	136.6	7-15
Redwood	Red Bank	119.0	42-9
Perryville	Columbia	42.9	9
Wawa	Oxford	31.0	9
Johnsburg	Clermont	19.8	9
Ridgway	Falls Creek	27.2	9

It will be seen, therefore, that our conditions are not so different from those of other roads.

The points in dispute have been submitted for decision to the Committee on Transportation of the American Railway Association. It is expected it will reach a decision in the near future. If this is done, the report of the committees on Signaling of the Railway Signal Association and the American Railway Engineering and Maintenance of Way Association will doubtless be recast along the lines laid down by the Committee on Transportation, and it is to be devoutly hoped that the committee may get together and evolve a system which can be recommended by all three associations for adoption; and can be put in use on all the railways of the American continent, to the end that we may not

only have uniformity and interchangeability of material with all men because of economy and quick delivery but that some men will have the narrow track, a shift from one road to another, without the assistance of those experienced in some cases, mistakenly interpreted perhaps, by sudden mental reversion to the old system, or without meaning words which they had been accustomed to operate.

Answering a question in English.

We have an installation of about 14 miles on the Western division, running west from Williamsport to Erie, of single-track manual controlled signaling. We have had it in service for some three years. We use the permissive block for following trains. While we could build a second track, the present location is not favorable, and the construction of a new double-track line would be very expensive. The system is so arranged that, if a train enters a block, no signal may be given in the opposite direction until the train clears the block, either by passing through or by entering a passing siding, and then only when the train is in to clear and the switch locked, but a permissive signal may be given for a following freight, absolute block being used for passenger trains. After a train is locked in on a siding it cannot get out until a following train has passed the switch, and the switch is unlocked by the operator, or until an opposing train has passed the meeting point. It is not, however, necessarily held on the siding until the trains referred to have passed entirely out of the block. It is practically the same thing that we are using between Broad street station and the Schuylkill river, Philadelphia, where we operate eight tracks in either direction. It seems to me it is a great development, and I do not believe our people would think of putting in a staff in place of this lock and block system.

VAN HORN-ENDSLEY SPARK ARRESTER.

In the self-cleaning smokebox the flow necessary to carry the cinders from the tubes and through the screen is created by contracting the passageway under the diaphragm, thus producing a high velocity. Of the so-called force created by the vacuum in the smokebox, practically one-third is used in drawing the combustion gases and cinders through the tubes, one-third is used in drawing them under the diaphragm plate, leaving but one-third to act as a combustion force in the firebox. The objections to present conditions in the smokeboxes of locomotives are a restricted flow of air through the firebox due to the obstruction of the diaphragm and screen; the uneven draft whenever the screen becomes clogged through the nature of coal burned or moisture from a leaky flue; the escape of live cinders or sparks from the stack which are taken *prima-facie* evidence for large claims for fire losses which occur; the annoyance to passengers and the heavy wear upon the car seat and floor covering from the flying cinders.

The remedy for the troubles enumerated is almost entirely a question of a more direct, freer draft without plates and screens to obstruct it, but at the same time collecting the cinders so that none will be discharged from the stack.

The Van Horn-Endsley spark arrester is the final result of numerous tests using the centrifugal principle. The device was perfected in a dummy boiler at Purdue University, at Lafayette, Ind., and then through the courtesy of Robert Quayle, general superintendent of motive power of the Chicago & North Western, was placed on locomotive No. 395. This locomotive was taken to Purdue University and a series of runs made on the testing plant in July and September, 1910.

Numerous spark arresters have been invented and patented in the effort to kill the live spark or lengthen the path of travel to break up and deaden the cinder. The objection to them has been in the use of plates, screens and other obstructions to the draft which interfere with the steaming of the locomotive. The Van Horn-Endsley spark arrester has an open passageway for

in front of the saddle, requiring a 24 in. extension of the top of the front end and a goose-neck form for the nose. This would be the condition in most cases of remodeling.

The tests were made on a Chicago & North Western locomotive

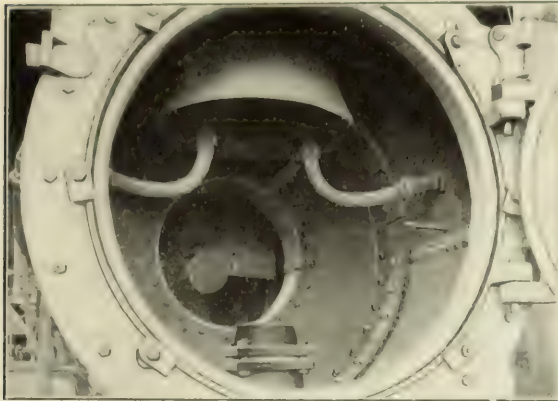


Fig. 4—Front View of the Smoke-box of Locomotive No. 395,
Chicago & North Western.

of the American type, No. A395. The dimensions of the locomotive were as follows:

Weight on drivers.....	51,355 lb.
Total weight of locomotive.....	5,400 lb.
Number of tubes.....	140
Diameter of tubes.....	2 in.
Length of tubes.....	144 in.
Heating surface of tubes.....	800 sq. ft.
Heating surface of firebox.....	115 sq. ft.
Total heating surface.....	995.9 sq. ft.
Length of firebox.....	66 in.
Width of firebox.....	35.5 in.
Gate area.....	16.27 sq. ft.
Average diameter of pistons.....	59.9 in.
Diameter of cylinder.....	17 in.
Length of stroke.....	14 in.

The front end consists of what might be called three chambers. As shown in the drawing, Fig. 3, these are designated by the letters A, B and C. Chamber A takes up 38 in. of the front end. In its center is located the stack, which is made up of two parts, the ordinary cast iron outside stack being 4 ft. high, into which is riveted an inside stack which projects 12 in. into

the backbones of aliopteris A. The bottom of this funnel was a well-shaped and a 24 in. in diameter. The source of heating is made under the stack and the exhaust steam is carried from under the saddle by means of two passages as shown. The lower line of the saddle is 19 in. In some models the saddle and stack were moved 61 in. forward of their ordinary positions and the opening in the oil-rail was less or more in a plane with

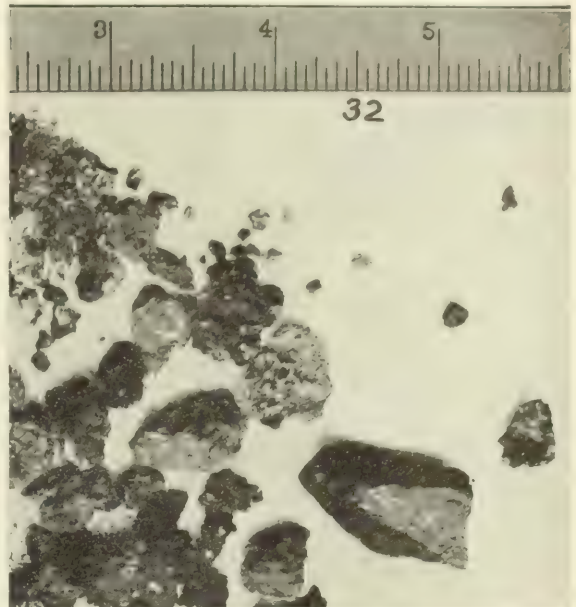


Fig. 5—Youghiogheny Coal. Cinders Caught in Hopper.
Run No. 32.

openings being made into the exhaust passage under the saddle. From this point the steam was carried to the new position of the nozzle. The size of the nozzle tip was 4 1/16 in.

Separating chamber A from chamber B is a large circular plate EE in the center of which is an opening 22 in. in diameter, and

TABLE N° 1.

NUMBER OF TEST	DATE OF TEST	LENGTH OF TEST IN MINUTES	KIND OF COAL	STEAM PRESSURE IN POUNDS PER SQUARE INCH	SPEED IN FEET PER MINUTE	DYN. ROLL	DYN. BACK	PRESS. IN POUNDS	VOLUME OF WATER IN GALLONS	VOLUME OF STEAM IN CUBIC FEET	COAL BURNED IN LBS.	WATER USED IN LBS.	LBS OF WATER PER LBS OF COAL	CHIMNEY DRAFT IN INCHES	BOILER EFFICIENCY IN PERCENT	TOTAL CHIMNEY DRAFT IN INCHES	PERCENT OF COAL ASHES	PERCENT OF COAL CINDERS	REMARKS
1	7-19-10	30	TV	1.60	1612	5800	2.0	2.30	3.60	210	1304	12708	935	60.00	4.98	72.98	3.57	6.85	
2	7-19-10	30	TV	1.30	1735	5525	2.1	2.20	3.60	210	1070	10682	985	72.00	4.63	76.65	7.07	6.02	NO COAL & WATER MEAS.
3	7-19-10	30	TV	1.30	1735	5525	2.1	2.20	3.60	210	1070	10682	985	72.00	4.63	76.65	7.07	6.02	WATER NOT REQUIRED
4	7-19-10	15	TV	1.170	2600	5960	4.09	6.30	7.50	330	2244			37.00	4.42	305.40	17.10	1.97	
5	7-20-10	30	TV	1.174	1735	5776	2.06	3.80	3.30	230	1584	3440	648	74.00	5.32	80.32	5.61	7.87	
6	7-20-10	30	TV	1.300	1735	5373	2.15	2.26	3.78	236	1244	10302	1018	88.00	3.98	97.58	7.13	3.98	
7	7-20-10	60	TV	1.248	1735	5283	2.11	2.10	3.0	202	1074	9634	319	72.00	2.92	74.92	7.30	3.90	
8	7-20-10	60	LINTON	1.226	1735	5196	2.08	2.00	3.26	190	2323	8712	374	96.00	6.76	99.60			CHIMNEY DRAFT IN INCHES
9	7-20-10	60	LINTON	1.087										30.00	6.92	99.60			CHIMNEY DRAFT IN INCHES
10	7-20-10	53	LINTON	1.270	3510	5259	2.42	3.87	219	1073	8180	436	1335	1205	148.50	7.78	8.28		CHIMNEY DRAFT IN INCHES
11	7-21-10	63	LINTON	1.030	1630	4244	1.84	1.94	2.87	184	1069	6075	446	1141					CHIMNEY DRAFT IN INCHES
12	7-21-10	30	LINTON	1.180	1735	5794	1.93	2.08	3.1	218	1386	3578	685	12.00	12.58	138.50	993	9.04	
13	7-22-10	60	LINTON	1.240	1735	5337	2.13	2.85	3.13	190	1365	6359	621	37.00	4.42	305.40	7.73	4.58	
14	7-22-10	30	LINTON											15.00	3.88	52.45			WATER NOT REQUIRED
15	7-22-10	40	LINTON	1.307	1735	5380	2.12	2.10	3.59	202	1844	8760	374	10.95	9.04	118.58	12.15	7.63	
16	7-22-10	24	LINTON	1.274							1897			245.0	8.60	233.60	12.70	3.40	CHIMNEY DRAFT IN INCHES
17	7-22-10	45	COKE	1.149	2880	5036	2.26	3.60	5.07	3.68	1515	7020	464	62.50	3.46	63.74	4.44	4.33	
18	7-22-10	30	COKE																WATER & COAL NOT MEAS.
19	7-22-10	30	COKE																WATER & COAL NOT MEAS.
20	7-23-10	36	LIGNITE	1.270	1735	4630	1.93	1.90	3.32	198	1860			12.50	13.45	208.45	11.20	6.44	
21	7-23-10	40	LIGNITE	1.225	3280	4408	3.81	1.90	3.32	6.55				26.40	17.80	371.80		4.79	WATER NOT MEAS.
22	7-23-10	40	LIGNITE	1.050	3535	3938	1.91	1.40	3.10	2209				10.00		10.00	8.50	9.52	40
23	7-23-10	84	LIGNITE	1.250	1735	5010	2.09	1.68	3.30	170				24.00	12.71	225.00		2.08	WATER & COAL NOT MEASURED
24	7-23-10	80	LIGNITE	1.022	3535	4490	1.79	1.64	2.88	190	1305	7468	510	32.00	13.60	372.00	25.00	2.63	
25	7-23-10	30	WATER MEAS.	1.170	1735	5380	2.14	2.10	3.60	230	1466	7468	510	32.00	13.60	105.50	7.20	12.80	
26	7-23-10	30	WATER MEAS.	1.18	1735	5408	1.92	1.86	3.50	220	1404	7962	528	88.00	3.44	91.44	6.01	3.77	
27	7-23-10	25	LIGNITE	1.150	1735	5180	1.80	1.80	3.60	210	1737	7347	413	15.00	12.58	170.30	9.00	11.00	
28	7-23-10	13	LIGNITE	1.066	1735	3825	1.83	1.42	3.17	243	1408			10.90	13.35	15.40	7.19	9.93	WATER NOT MEASURED
29	7-23-10	10	LIGNITE	1.10	4666	237													WATER & COAL NOT MEASURED
30	7-23-10	80	LIGNITE	1.072	1735	3033	1.53	1.30	2.60	190	1065			81.00	3.35	89.55	7.95	4.18	WATER NOT MEASURED
31	7-24-10	80	LINTON	1.20	1735	466	1.86	1.75	3.37	230	1422	6295	436	12.00	12.58	88.50	8.12	6.90	
32	7-24-10	80	WATER MEAS.	1.24	2170	4198	2.42	2.39	2.60	352	476	9334	668	81.70	5.83	185.31	10.1	7.71	
33	9-22-10	55	TV	37.8	1735	5647	2.62	2.30	3.73	277	1214	6457	713	95.40	14.29	103.80	9.05	12.90	
34	9-22-10	55	TV																
35	9-22-10		LIGNITE																
36	9-23-10	40	LINTON	1.380	1735	5792	2.67	2.13	3.93	247	1344	6676	439	11.70	10.88	127.20	9.47	8.08	
37	9-23-10	40	LINTON	1.734	1735	6604	2.80	1.90	2.80	239	443	8318	638	12.16	10.88	127.20	9.47	7.78	

projecting out from this opening into chamber B is a collar 10 in. long having the same diameter as the opening in plate E E. This opening is the only connection between chamber A and chamber B. At the bottom of chamber B is located a hopper which projects

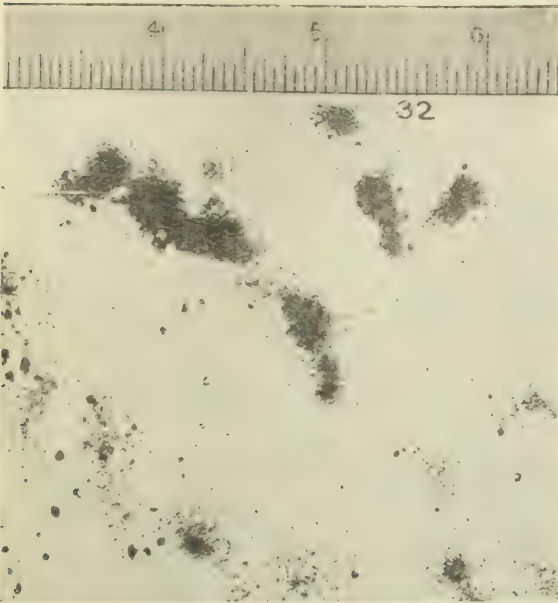


Fig. 6—Youghiogheny Coal Loss Through Stack.
Run No. 32.

24 in. down from the smokebox and has a slide in the bottom for opening and cleaning out. At the back of chamber B is located a spiral diaphragm of one revolution which diaphragm separates chamber B from chamber C, chamber C being that part

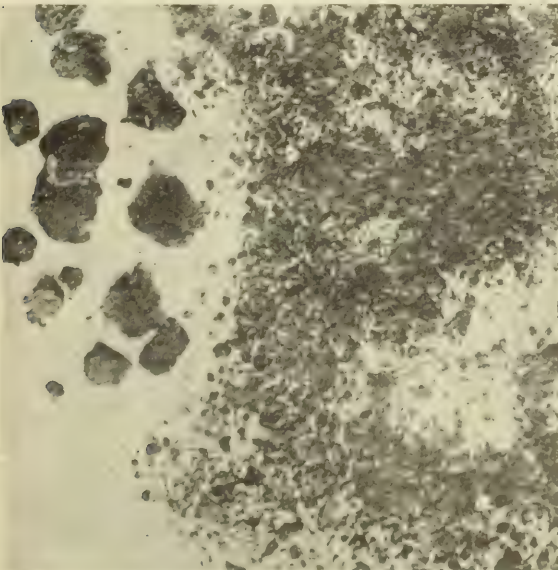


Fig. 7—Lignite (Wyoming) Coal Cinders Caught in Hopper.
Run No. 30.

of the smokebox, part in front of the tube sheet G. This diaphragm consists of a spiral plate, the periphery of which follows the inside wall of the smokebox and advances during one revolution an amount which is equal to 30 in. The inside edge of this

spiral diaphragm follows the outside wall of a 5-in. tube in the center of the smokebox and advances the same amount as the outside edge of the spiral diaphragm. In the lowest part of the spiral is located an opening 6 x 6 in.

The claim made for this form of front end is that the gases coming through the tube sheet are diverted by means of the spiral diaphragm from chamber C into chamber B and are given a rotary motion around the outside wall of the smokebox, which motion throws all heavy particles such as cinders to the outside wall and carries them forward over the hopper, in which they are deposited. The gases are carried out through the opening in the collar into chamber A and from there out of the stack. The claim is also made that this form of front-end does not interfere with the steaming of the locomotive. Fig. 4 is a view looking in the front end. The collar and the end of the spiral diaphragm may be plainly seen.

TESTS.

Method of Testing.—After the locomotive had been mounted on the testing plant, and all adjustments made, tests were run at different speeds, the following observations being made: Speed, drawbar pull, steam pressure, vacuum in chamber A or in the front part of the smokebox, vacuum in chamber C or just in

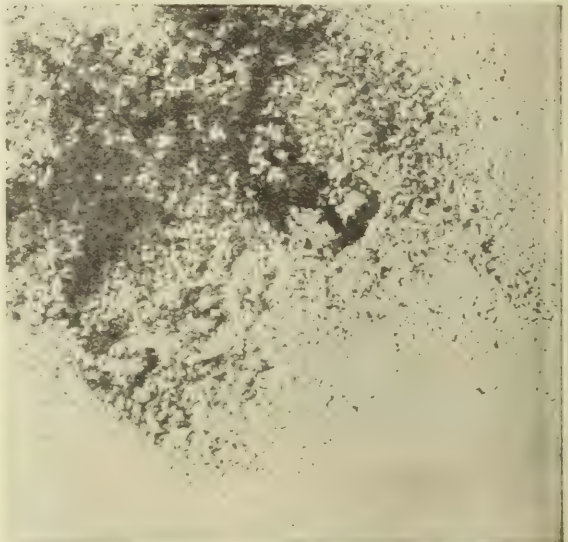


Fig. 8—Lignite (Wyoming) Coal Loss Through Stack.
Run No. 30.

front of the tube sheet, exhaust steam pressure, referred to as back pressure; weight of cinders collected in the hopper, and approximate weight of cinders going out of the stack. The speed was obtained by means of a Boyer speed recorder, the drawbar pull was read from the Emery dynamometer, the vacuum in chamber A and chamber C was read in inches of water in an ordinary open manometer and the exhaust steam pressure was read by a mercury pressure gage. This gage is the one used in all stack work at Purdue University and reported to the Master Mechanics' Association in 1905. A full description of it will be found in the proceedings of the Master Mechanics' Association in 1906. It is accurate to one-twentieth of a pound. Cinders collected in the hopper were weighed after each run. The weight of soot and cinders passing out of the stack was obtained by a sampling tube above the stack. By means of a suitable curved tube, it is possible to explore the exhaust from the stack and to entrap all solid matter which comes within the area covered by the end of the exploring tube. From data thus secured, the approximate amount of soot and cinders can be obtained.

Discussion of Tests.—Some 37 different tests were run, 13 with Linton coal, 12 with Youghiogheny coal, 10 with lignite coal

JAMES T. HARAHAN.

James T. Harahan has resigned from the presidency of the Illinois Central, effective January 12, and Charles H. Markham, formerly vice-president and general manager of the Southern Pacific, has been elected to succeed him.

Mr. Harahan came to the Illinois Central as second vice-president 20 years ago. He had an excellent record already as a railway operating officer, but the work which was to give him high rank among railway operating men was yet to be done. This consisted of making and carrying out plans for handling the enormous World's Fair traffic of the Illinois Central between the up-town district of Chicago and the exposition grounds at Jackson Park. The way the crowds were handled greatly enhanced the reputation of the road and of its second vice-president. This really marked the beginning of Mr. Harahan's career on the Illinois Central.

Stuyvesant Fish, while president of the road, had his office in New York, and Mr. Harahan, whose jurisdiction included both the traffic and the operating departments, was the real executive of the road from 1890 to 1906. During this period the Illinois Central increased its mileage from 2,799 miles to 4,374 miles, not counting the Yazoo & Mississippi Valley, with its 1,210 miles. The property was well operated, its handling of its large suburban business in Chicago being especially excellent.

In 1906 came the famous struggle between E. H. Harriman and Stuyvesant Fish for control of the Illinois Central. Mr. Fish had brought Mr. Harahan to the road, and when the latter cast his vote as a director to oust the former president, he was denounced by Mr. Fish as ungrateful. Mr. Harahan himself was elected president to succeed Mr. Fish.

The most important event connected with the development of the property during Mr. Harahan's administration was the acquisition of control of the Central of Georgia in 1908, the deal being put through by Mr. Harriman. Mr. Harahan's administration of the property has been along conservative lines. It has continued to be well operated, and its stock has continued to be an attractive investment. One exception must be made to the statement that it has been well operated. During this year the discovery was made that the highest officers in the operating department had been for a long time practicing frauds on the road by paying excessive amounts for the repair of cars and dividing the proceeds with the car repair concerns to which the excessive payments were made. Mr. Harahan himself started the investigation which resulted in the detection of the frauds, and evidence brought out in the criminal trials of the former officers showed that he had suspected the existence of the conditions, and had directed the former vice-president of the road to make an investigation, which had been sidetracked. However disagreeable it may be to Mr. Harahan to have his administration of the

property end at a time when the parties accused of these frauds are on trial, it is, no doubt, a satisfaction to him to know that the record shows that if he at all failed in his duty it was merely in trusting too implicitly to the honesty of subordinates who, as a matter of fact, stood extremely high in the railway world.

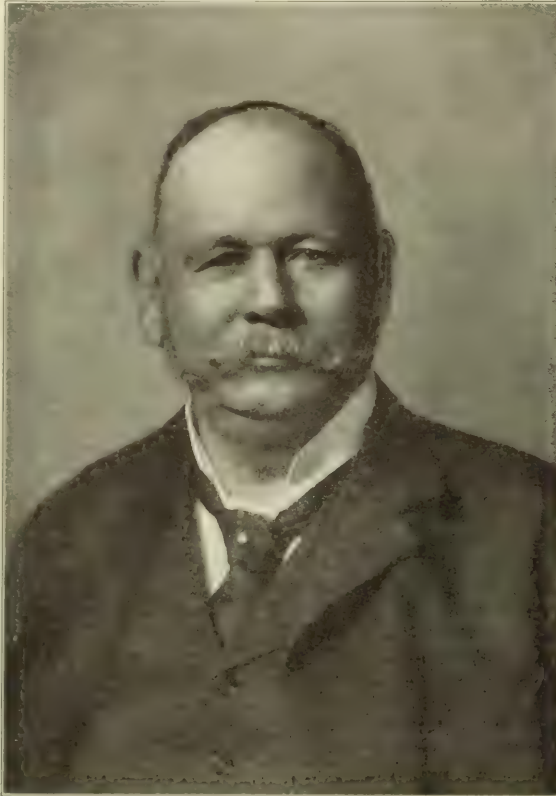
Mr. Harahan was born in 1843 at Lowell, Mass. He began railway work in 1864 with the Orange & Alexandria in Virginia, and was then, consecutively, with the Nashville & Decatur at Nashville, Tenn.; the Louisville & Nashville and the Shelby Railroad. For seven years from 1872 he was roadmaster of the Nashville & Decatur, going with the Louisville & Nashville in 1879, first as superintendent of the Memphis division, and then of the New Orleans division. He was made general superintendent in 1883 and general manager in 1884. In January, 1885, he was made general superintendent of the Pittsburgh division of

the Baltimore & Ohio returning to the Louisville & Nashville as assistant general manager in April of the same year. He held that position until 1888, when he went to the Lake Shore & Michigan Southern as assistant general manager. He was later appointed general manager of the Chesapeake & Ohio, and afterwards held the same office on the Louisville, New Orleans & Texas. He was elected second vice-president of the Illinois Central in November, 1890, and in November, 1906, he was elected president of that road, the Indianapolis Southern and the Omaha Bridge & Terminal Railway.

Mr. Harahan has been thorough and persistent in his study of the art of railroading. He has always read all the current literature he could get hold of. While still a division superintendent he set out to learn the work of the traffic department. He did this by reading and by following it up on the road. He never got so immersed in the operation of the division as to lose sight of the fact that the object of the road was to carry out contracts made by the traffic department, and that efficiency in operation meant doing this quickly and cheaply. In other words, he

worked in harmony with the traffic people and did not let himself be carried away by enthusiasm for running trains in such a way as to save coal but lose freight.

He spends a lot of time on the road. The Illinois Central's geographical position is peculiar in that it cuts across so many east and west routes, by whose through rates they must be governed. This makes its traffic arrangements complicated, and these conditions and meeting the wants of its local shippers are things with which Mr. Harahan keeps in close touch. Similarly, he goes out to the Pacific coast often to drop in on his agencies there. These things do not mean that he is in danger of getting swamped with detail. Such inspections are more in the nature of surprise tests. As a matter of fact, he has a nice judgment as to the point beyond which the details of work should be handled by subordinates. He goes into many details because of his progressive attitude which demands that he do not adopt a method



James T. Harahan.

simply because it has been successful on another road or on the same road by a predecessor, he wants the proposition proved over again with regard to local present day conditions so as to make sure that it is still the best.

He cannot keep his finger on such details and at the same time keep up his work as railway president, which requires broad vision and a grasp of situations in the large, without putting all his time and energy to it, so he does no outside work. He holds office only in companies subsidiary to the Illinois Central, except that he is a director in one bank. Whether at his office or not, he lives in the Illinois Central atmosphere and works for it.

TRANSPORTATION AND CAR ACCOUNTING OFFICERS.

The fourteenth semi-annual meeting of the Association of Transportation and Car Accounting Officers was held at Chicago, December 13 and 14, with 118 members present, and M. B. Casey, President, in the chair. W. L. Park, Vice-President and General Manager of the Illinois Central, addressed the Association briefly, and in connection with his address the members were urged to take under consideration the advisability of presenting a recommendation covering a continuous home route card, to accompany car. Such a card would make available at all times all necessary information to permit of the proper return of the car.

Resolutions were adopted in connection with the deaths of S. C. Annable, of Pomona, Cal., and Ashley J. Elliott, manager of the Illinois and Iowa Demurrage Bureau. Announcement was made of the appointment of John E. Harley as assistant secretary.

The Association concurred in the report of the Committee on Car Service recommending that no action be taken in connection with the method proposed at the Colorado Springs meeting of penalizing roads for refusal to comply with owner's demands for the return of equipment which has been away from the home road for a specified period, believing that a strict observance of Rules 1 to 4, Code of Car Service Rules, of the American Railway Association, would accomplish the desired result. The recommendation of the Committee with regard to the formation of a car pool for the handling of automobile box cars was adopted for submission to the American Railway Association; but, it was also decided to recommend the inclusion of furniture cars, as well as automobile cars, in such a pool. The Committee reported designating letters assigned by the Master Car Builders' Association to indicate the different kinds of cars and recommend that the symbols provided be inserted in all equipment lists, opposite each particular series of numbers to which each particular symbol applies. The recommendation was adopted. A supplementary report was presented by the Committee and adopted by the Association, submitting to the American Railway Association the recommendation that Rule 6, Code of Switching Reclaim Rules, be eliminated, and that new Rule 18, Code of Per Diem Rules, be substituted therefore, with the addition that a footnote reference be added to proposed Rule 6 as follows: "Two or more roads in local territory may agree to disregard Rule 14 as applicable to cars in switching service, but such agreement shall not be binding upon a dissenting minority."

The Committee on Office Methods and Accounting made a report of progress in connection with the subject of assignment of reporting marks to cars of railway and private ownership. The Association adopted its recommendation that where practicable the typewriter be used in the preparation of junction reports. The Association concurred in its recommendation that it is unnecessary to provide a separate form for use by the reporting road in making corrections to junction cards previously rendered by it, believing that such corrections may be satisfactorily made on the prescribed form "D". Under Subject No. O. M. 14, respecting methods for reducing claims for unreported Per Diem, the Association adopted the committee's recommendation for submission to the American Railway Association, as an amendment to Per Diem Rule No. 1, as follows: "Where per diem is

not reported by car owner within four months from the last day of the month in which it is earned, the rate shall be increased five cents per car per day for each four months so fraction thereof; that report of such per diem is thereafter withheld, provided that the increase in the rate shall not exceed thirty-five cents per car per day; and provided, further, that it shall not apply to business under Rules 5, 14 and 15." The Association adopted the recommendation of the committee for submission to the American Railway Association that proposed form "D" (junction report) be printed on a good quality of bond paper of a base of not less than 20 pounds to the ream of five hundred sheets of the size 14 in. x 22 in., and that the skeleton address be omitted from the reverse side.

The report of the Committee on Handling Railroad Business Mail was adopted. The Committee advised that the American Railway Association had adopted the circular covering the handling of railroad business mail, which was submitted to it by this Association at its last meeting.

The Association adopted the recommendation of the Committee on Conducting Freight Transportation that the Transportation Department immediately investigate all cases of over, short and damage freight as they develop, preliminary to their settlement by the regular claim department, and that it also maintain an efficient oversight to prevent the placing in service of defective cars, and that a sufficient force be provided to obtain proper seal records.

Report of the Committee was adopted recommending to the American Railway Association that it take under consideration the question of the application to each car of a device that will enable roads to have cars re-weighed and re-stencilled more expeditiously, such device to conform to M. C. B. Standards with reference to opening in holder and letters and numerals used therein. It is recommended that this apply only to cars of railway ownership.

A report of progress was offered in connection with the subject of rules for the handling of perishable freight.

The Association adopted the report of the Committee for submission to the American Railway Association, recommending that the latter body take under consideration the question of recommending to the Master Car Builders' Association a standard location for hasps on the doors of enclosed cars approximately sixty inches above the rail, in order to facilitate the rapid and correct reading of seals.

The recommendation of the Committee on Conducting Passenger Transportation with regard to proposed change in Rule 7, Code of Car Service Rules, was adopted for submission to the American Railway Association. The rule as proposed recommends that rates on passenger train cars, when used in joint service and when loaned on a per diem basis, be made according to seating capacity and length of car. The Association adopted the recommendation of the Committee, for submission to the American Railway Association, with reference to proposed change in Rule 8, Code of Car Service Rules, so that when it is necessary to haul cars empty over roads owning them, or intermediate roads, for delivery to borrowing roads, mileage shall be applied for hauling the cars from the point where they left service to the point of connection with the borrowing roads and return to a point satisfactory to the loaning road. It was also decided to request the American Railway Association to take such action as will establish tariff rates of not less than ten cents a mile for the hauling of passenger train cars.

A report of progress was received from the Committee on Joint Interchange and Inspection Bureaus, indicating an encouraging condition of the experiment in effect at the Union Stock Yards, Chicago.

At the close of 1909 there were in operation in Argentina 15,849 miles of railway, an increase of 1,098 miles over 1908. The number of passengers carried totaled 50,810,000, and the freight carried amounted to 31,955,000 tons.

JOHN M. FORBES AND THE MICHIGAN CENTRAL.*

BY HENRY G. PEARSON.

II.

THE RACE TO CHICAGO.

The older railways in the East yielded every six months a wreckage of embarrassments and disasters, all of them being due to the mental or moral incompetence of the men who undertook to guide them through the uncharted waters of railway finance. To find and to keep the channel under such circumstances required a remarkable measure of alertness, faith, and courage. Railroadng is pre-eminently an enterprise in which men must think in terms of decades and scores of years; yet at this time the oldest road in Massachusetts had been running barely fifteen years. So it was that, in these hobble-de-hoy days, the Michigan Central owed no little of its brilliant success to the fact that its financial affairs were guided by a man so sound and resolute as John M. Forbes.

In the first three years of Forbes' presidency more than \$6,000,000 was required for the purchase, construction, and equipment of the road. It was his business to secure this money, and the limits within which he could work were narrow enough. With Baring Brothers and with bankers in Europe, it is true, he was in close touch through his ventures in the China trade, and to such men he was constantly expressing the hope that the high rates of interest prevailing in the United States might prove more tempting than the 3 or 4 per cent. that they could get at home. The continuing decline of the China trade and the whaling industries in New England was an opportunity which Forbes made the most of. By his persistent and persuasive application to his friends, and by the action of the directors in applying to construction the 8 per cent. dividend of \$176,000 earned in 1848, and issuing a dividend of stock, the cash needed to complete the road was raised. Thus, thanks to the faith and works of Brooks and Forbes, when, in the spring of 1849, the line was opened from lake to lake, the stockholders had every reason to be satisfied with their investment. Within a year, however, these illusions of security were dispelled. A group of New York capitalists bought the Michigan Southern, a struggling zigzag bit of line, once the property of the state, snapped up its Indiana charter, which the Michigan Central had rejected, and prepared to build a cheap railway from Toledo to Chicago. At the same time it became apparent to the most conservative minds that the construction of a railway along the southern shore of Lake Erie was only a few years distant. If the Michigan Central were not to become an isolated piece of road, picking up what business it could between its two lake terminals, it must extend its influence both east and west. Its owners must, in fact, double their investment if they were to save what they had already put in. To build in Indiana, the Michigan Central put money into the New Albany & Salem, a local affair which had 35 miles of track in the southern part of the state and a charter conveniently vague and which in return for the grateful inflow of Eastern capital consented to begin building at once a "branch" around Lake Michigan, in the northwestern corner of the state. The "Southrons" [Michigan Southern people] protested, and persistently sought injunctions; the Michigan Central men, to prove their good faith, had to put their hands deeper into their pockets, with the result that the New Albany & Salem achieved the glory of becoming the first line to connect Lake Michigan and the Ohio river.

In building the 20 miles of track in Illinois between the state line and Chicago even greater difficulties were in the way. Partly from proper reasons of economy, but chiefly because it had no charter, and the legislature would not meet for a year and a half, the Michigan Central desired to build and use a

track in common with the Illinois Central's Chicago branch; and a secret agreement was made between the two companies by which the Illinois road was to deflect its track some half a dozen miles to the east, touching the Indiana boundary at the point where the Michigan Central stopped. In return for this favor the Illinois Central, as yet barely organized, acquired the universal desideratum, Eastern capital, and could begin to build at once.

At the mere suspicion of such plans, Chicago burst into wrath. Hitherto its isolation had greatly retarded its growth. Access to it by water from the East was by a long and roundabout route; from the land, being islanded in wet prairie and Illinois mud, it was practically inaccessible. Only a few years earlier the long delayed Illinois and Michigan Canal had been opened. Thus in 1850, though it had increased by 10,000 in the preceding decade, its population was still under 30,000, a pitiable showing when compared with the great river cities of Cincinnati, with 115,000, and St. Louis, with 78,000. Through railways it hoped for salvation; and yet even here there was danger. Lying 15 miles to the north of the southern end of Lake Michigan, it had fears lest the main line of traffic to the West and Southwest might pass it by altogether; and it shuddered at the prospect of becoming a mere way-station, and on a branch at that. Therefore, when in the spring of 1851 three railway companies were making plans for coming into Chicago, the city assumed an attitude of aggressive sensitiveness—perhaps not unknown since—and sought to dictate terms. Newspapers, city officials, and business men insisted that no through passengers or freight should be transferred at any junction-point outside the city, but that all should be brought within its gates for tribute. Furthermore, the hackdrivers and teamsters, fearing that their prospective trade might be nothing but a Tantalus glimpse, raised a cry that each railway must enter the city on its own tracks and have its own stations. These matters all came to a head in July, 1851, when two "railway conventions" were held at Chicago, at which the plans of the roads for reaching the city were made known to the public. The commotion, it is true, never reached the intensity of the "Erie War," that famous contest for a break in gage in order that the piemen of Erie, Pa., might sell their wares to passengers changing cars; but it is amusingly characteristic of this period in railway building. Indeed, for a season the luster of even great Judge Douglas was dimmed in Chicago by reason of his attitude on the railway question.

The Michigan Southern smoothed its way diplomatically. Having secured the charter of a plank road company which was alleged to have railway privileges, it proposed to come into the city on its own track, thus making sure of a gracious reception by the Chicagoans and of a generous subscription from them to its stock. The Illinois Central and the Michigan Central, for proposing to come together, were looked upon with disfavor. The directors of the Illinois road accordingly did not dare to carry out their agreement to swing their track eastward to the Indiana line, and there connect with the Michigan road. The nearest that they would consent to come left a gap of six and a half miles, over which Brooks and Joy proposed to build without a charter, trusting to the next legislature to legalize their action. Forbes protested. "Going without a charter a quarter-section is as bad as the Atlantic would be." Unused prairie though the land was, he argued, their enemies would be sure to build a highway across their proposed line to block them. Nevertheless, as the months went on this unsatisfactory scheme proved to be the only basis on which it was possible to go ahead.

Meanwhile, in Indiana, each line was racing to get its road completed first. The Michigan Southern men had the advantage of a good start, and were not retarded by scruples as to building solidly, but the seasons in their courses fought against them. The rails for the last section of their track reached Dunkirk, on Lake Erie, after the lake was closed to navigation, and, as luck would have it, in the following spring the lake was not clear until

* From a forthcoming biography of John M. Forbes, written at his death by Henry G. Pearson, and published by the Chicago, Burlington & Quincy. The manuscript was read to the Michigan Central men at a public meeting in the city of Chicago. A previous article appeared in some issues of *THE RAILWAY AGE GAZETTE*.

a month later than usual. So, although the Chicago end of the line was completed in Indiana, passengers and freight must be transported a distance of 13 miles over a plank road. The Michigan Central, on the other hand, having ordered its rails in good season from England, built steadily, and achieved the triumph of beginning its regular through service on May 21, 1852, a day ahead of the first through train on the Michigan Southern, and a week before that road was in regular running order. A month later, at a special session of the Illinois legislature, the six-mile bit of track in Illinois was legalized.

The increase in gross earnings in 1855 over 1854 was 40 per cent., and the limit of its capacity as a single-track road was fast being reached. Moreover, the increase of traffic from the new roads in Illinois which were in alliance with the Michigan Central was only just beginning to be felt.

In this period of feverish expansion and fierce competition the management of the railroad had remained unchanged. The burden of responsibility borne by Brooks and Forbes had, of course, increased enormously, and their long toil was filled with diverse activities and charged in the highest degree with excitement. It was not within the power of either man to hold himself to the strict letter of his proper duties. Thus Forbes busied himself with a comprehensive scheme of railroads for the State of Illinois, and even of lines beyond the Mississippi, at a time when there were not a hundred miles of track west of Chicago; thus he took hold of the company which, with Brooks as constructor, built the "Soo" canal. No detail escaped him, either. The thousand and one possibilities which his nimble imagination was continually starting up his relentless habit of action drove him to carry into execution. Having noted the character of the land in southwestern Michigan, he tried to have the cultivation of sugar beets begun there; he sent fir and spruce trees to be planted on the station grounds of the railroad; he suggested improvements in passenger cars; he threw himself with ardor into the details of construction and equipment of the company's boats on Lake Erie.

And with all these affairs on his hands he was supposed to have enough time to hear the complaints of dissatisfied patrons. "One of our large stockholders," he wrote to a correspondent, "wants to bring a friend to let me know how badly we manage. A white-gloved, mustached youth is shown up, who is in the habit of going from Detroit, 20 miles west, and he *tellth* me in a lithping *voith* I can't conceive of the ungentlemanly conduct of the conductor—often he could not get a theat, exthep alonghilde of thome rough illdredthed fellow, and onth he had paid a dollar to a fellow to get up!

"Well! I tried to hire the young gentleman at double his *entire* value per annum to go everywhere and *abuse* us, as being the type of a considerable clan of complainants who want railroad companies to send along *twenty tons* of cars to carry the number of passengers that *ten* tons of cars are made to carry, and this without the *inevitable consequence* of such waste, viz., the charging the passenger with this additional cost of his transportation."

The conditions under which Forbes did his work would, to the business man of to-day, seem appalling. Not only was there no telephone, but even the telegraph was used sparingly. Furthermore, since Brooks and Joy were at Detroit, and two of the leading directors, Green and Corning, were in New York and Albany respectively, the discussion of every important matter had to be through correspondence, and almost all Forbes' letters were written with his own hand. At the end of a day in which he had filled 31 pages of his letter-press book, he wrote: "Y'rs in great haste, hunger, and all uncharitableness, having been here at my desk since 8½ a. m., now 6 p. m., living upon crackers! but still, Yours truly."

In 1855, having impaired his health by overwork, Forbes resigned the presidency of the Michigan Central. But the new board laid its plans too large, disregarded Forbes' advice, and, in the panic of 1857 got into a tight place; the Michigan Central, with many other railways, went to the wall. But Forbes, still interested in the property, was called upon, and he went to England for help. Thanks to his heroic efforts the Michigan Central

was in a better position than ever before. Writing on December 9, Forbes summed up the story thus:

"The Michigan Central, after having been in a state of bankruptcy for several years, and having been sold to the highest bidder, has now been purchased by the same party, and is now in a better position than ever before. The Michigan Central, after having been in a state of bankruptcy for several years, and having been sold to the highest bidder, has now been purchased by the same party, and is now in a better position than ever before."

With this signal act of courage and devotion to the interests of the road, for which from the beginning he had been responsible, it may be said that the days of Forbes' railroad education were completed. As far as money went his profit had been small. The only direct return was a sum of \$20,000 which the board of the Michigan Central had voted to him at the end of his term to replace his salary; the opportunity at the time of the crisis of purchasing stocks and bonds at a low figure he had been too hard pressed to take much advantage of; and when, a few years later, the great rise in Michigan Central came, he had sold the larger part of his holdings. But in railroad financiering he had received an invaluable training. He had taken the road through all the stages from "promotion" to bankruptcy, and had brought it out triumphant. The lesson had been burnt into his soul that the one thing rare in railroad management is also the one thing indispensable—an instinctive honesty which, acting promptly through a clear brain and a strong will, shall produce sound judgment and efficient action.

BALANCED COMPOUND ATLANTIC TYPE LOCOMOTIVES; ATCHISON, TOPEKA & SANTA FE.

Balanced compound Atlantic type locomotives have given splendid results in express passenger service on the Santa Fe. There are now 171 locomotives of this type in service on that road, including an order of 23 recently received from the Baldwin Locomotive Works. Several changes have been made in the design of this last lot of locomotives. The Atlantic type locomotives built in 1909 were fitted with both superheaters and reheaters. In the new engines a reheater only is used, and it is built into the shell as an integral part of the boiler. The fireboxes are of the Jacobs-Shupert type. As in the previous locomotives, the steam pressure is 220 pounds; with driving wheels 73 in. in diameter the tractive force is 23,800 pounds.

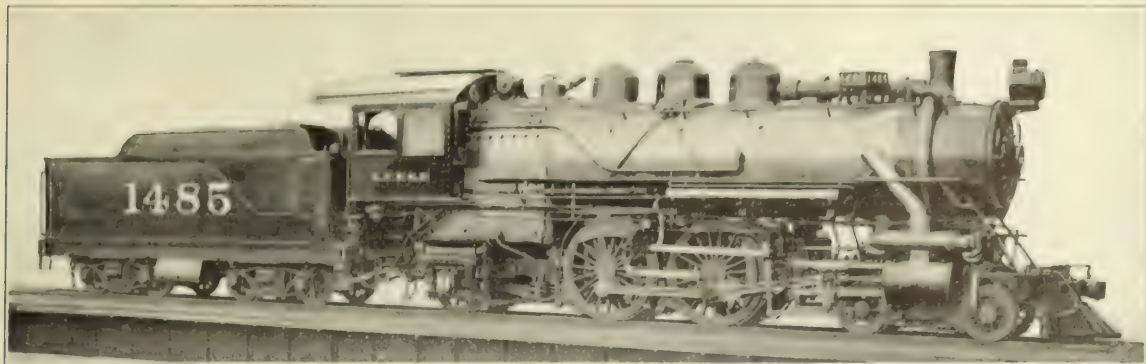
The inside and outside firebox shells are each composed of eleven channel sections. In order to provide ample steam room, the barrel ring immediately in front of the firebox is sloped on the top; the flattened sides of this ring are stayed by T irons. Two steam domes are provided, one being placed near the front tube sheet and the other on the gusset. The latter is of cast steel and is in one piece.

The Buck-Jacobs reheater is built into the boiler shell as an integral part of it, and is placed adjacent to the smokebox. The heater is 48 in. in length and has 417 tubes. Between it and the evaporating section of the boiler is a combustion chamber 30 in. in length. This arrangement reduces the length of the tubes to 14 ft. 6 in., but experience indicates that this will not reduce the efficiency. The arrangement of the reheater makes it possible to place all the steam piping on the outside of the boiler. The live steam supply is drawn from the rear dome and is conveyed to the forward one through two pipes, each 5 in. in diameter. The throttle valve is placed in the forward dome and communicates with an external dry pipe which is placed on the top center line of the boiler. The pipe terminates in a T head, from which external steam pipes extend to the steam chests.

The steam distribution is controlled by one piston valve on each side as in the former locomotives. The steam chest heads are provided with internal extensions, which form steam tight sliding joints with the interior surface of the piston valve. The front steam chest head is closed, but the back head communicates with a pipe connection leading to the reheater. The high pres-

side steam exhausts into the interior of the valve and is then conveyed to the reheater by the pipe connection. Internal baffles here compel the steam to follow a circuitous route along the tubes. The steam leaves the reheater through right and

the main exhaust in order to gain the necessary volume. The exhaust is drawn through neckwork, whose openings are tilted to the guide rails. The frames consist of front and rear main sections. The trailing frame is of the Atlantic type with



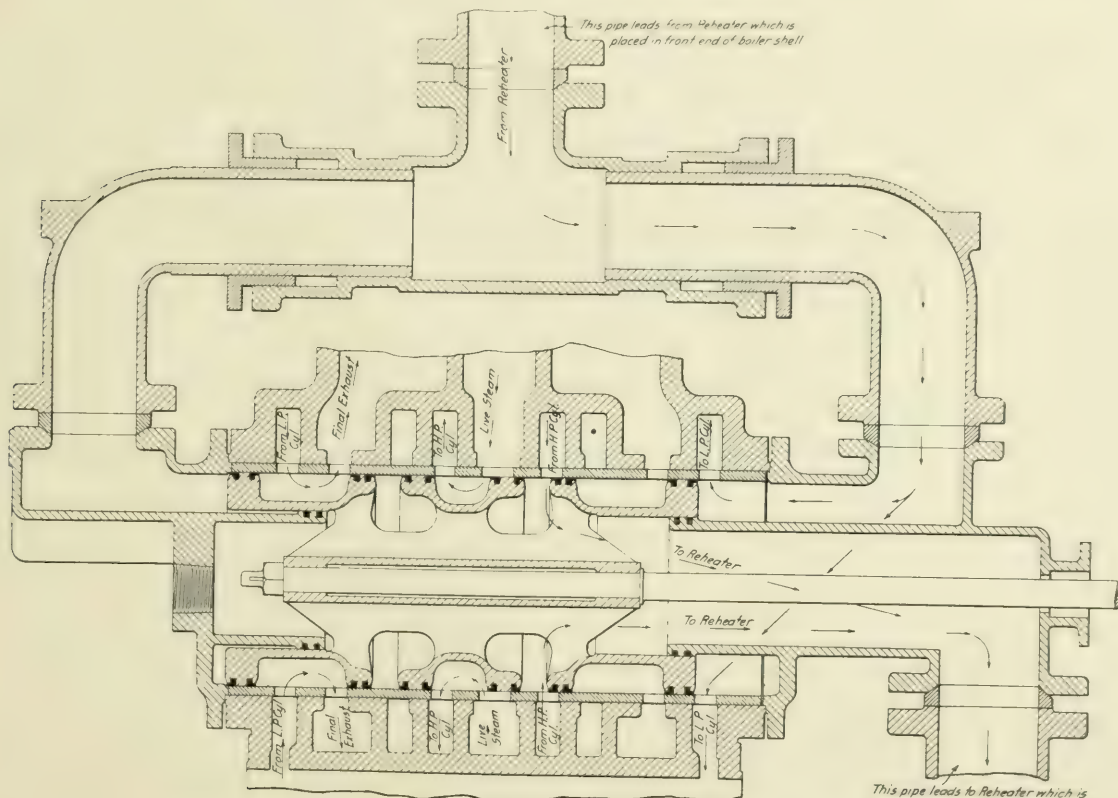
Atlantic Type Locomotive With Balanced Compound Cylinders; Atchison, Topeka & Santa Fe.

left hand pipe connections, and enters the steam chests through annular shaped openings formed in the heads. The valves are arranged for outside admission to the low pressure cylinders; hence the low pressure ports are placed in the ends of the steam chests adjacent to the heads. The steam escapes under the outside sections of the valve and thence into the exhaust passages.

As in the previous Atlantic type locomotives all four main rods are connected to the first pair of driving wheels. The valve gear is of the Walschaert type and the links are placed back of

outside journals. The front truck has a swing bolster. The principal dimensions of these locomotives are as follows:

General Data	
Type	4-4-2
Service	Passenger
Fuel	Oil
Tractive effort	23,800 lb.
Weight in working order	31,475 lb.
Weight on drivers	11,115 lb.
Weight on front truck	62,225 lb.
Weight on trailing truck	57,225 lb.
Weight of engine and tender in working order	405,000 lb.



Section Through Steam Chest of Balanced Compound Atlantic Type Locomotive.

General Data.

W.....	6 ft. 10 in.
.....	32 ft. 8 in.
.....	61 ft. 1 in.
Ratios.	
Total weight ÷ tractive effort.....	9.7
W.....	4.7
Tractive effort X diam. drivers ÷ boiler heating	-
Total boiler heating surface* ÷ grate area.....	-
Firebox heating surface* ÷ total boiler heating sur-	-
.....	7.5
Weight on drivers ÷ total boiler heating surface*..	44.7
Total weight ÷ total boiler heating surface*.....	92.3
Volume equiv. cylinders, cu. ft.....	8.30
Total boiler heating surface* ÷ vol. cylinders.....	302.00
Grate area ÷ vol. cylinders.....	5.70

*No allowance has been made for reheater surface.

Cylinders.

K.....	Bal. comp.
Diameter.....	15 and 25 in.
Stroke.....	26 in.
K.....	Bal. piston
Driving, diameter over tire....	3 3/4 in.
.....	10 x 10 3/4 in.
.....	9 x 12 in.
.....	3 1/4 in.
Trailing, diameter.....	47 in.
.....	8 x 14 in.
S.....	Wagon top
W.....	220 lb.
Outside diameter of first ring.	72 in.
Firebox, width and length....	C. and S., 5 1/16; B.,
plates, thickness.....	T., 9 1/16 in.
Tubes, number and diameter.	and B., 3; S., 5 1/2 in.
Heating surface, tubes.....	14 ft. 6 in.
.....	2,318 sq. ft.
.....	190 sq. ft.
.....	2,508 sq. ft.
.....	48 sq. ft.
Heating surface, superheater	1,147 sq. ft.
Wheels, diameter.....	34 1/4 in.
Water capacity.....	9,000 gal.
Fuel capacity.....	3,300 gal.

TRAIN ACCIDENTS IN NOVEMBER.

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of November, 1910. This record is intended to include usually only those accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. It is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation.

Collisions.

		Kind of-
1. N. Y. & N. J. R. Co., N. Y. City, N. Y.	xc.	P. & F.
2. N. Y. & N. J. R. Co., N. Y. City, N. Y.	xc.	P. & F.
3. N. Y. & N. J. R. Co., N. Y. City, N. Y.	xc.	P. & F.
4. N. Y. & N. J. R. Co., N. Y. City, N. Y.	xc.	P. & F.
5. N. Y. & N. J. R. Co., N. Y. City, N. Y.	xc.	P. & F.
6. N. Y. & N. J. R. Co., N. Y. City, N. Y.	xc.	P. & F.
7. Penn., Richmond, Ind. xc.		P. & F.
8. Balt. & Ohio, Altamont xc.		P. & F.

	Kind of
1. Chi. M. & St. P., Hosmer, S. D.	P.
2. Chi. M. & St. P., Hosmer, S. D.	P.

The above accidents occurred on the following dates: 1. Nov. 1, 2. Nov. 1, 3. Nov. 1, 4. Nov. 1, 5. Nov. 1, 6. Nov. 1, 7. Nov. 1, 8. Nov. 1, 9. Nov. 1, 10. Nov. 1, 11. Nov. 1, 12. Nov. 1, 13. Nov. 1, 14. Nov. 1, 15. Nov. 1, 16. Nov. 1, 17. Nov. 1, 18. Nov. 1, 19. Nov. 1, 20. Nov. 1, 21. Nov. 1, 22. Nov. 1, 23. Nov. 1, 24. Nov. 1, 25. Nov. 1, 26. Nov. 1, 27. Nov. 1, 28. Nov. 1, 29. Nov. 1, 30. Nov. 1.

At the time of the collision at Altamont, Va., on the twenty-eighth occurred at midnight. Westbound express train No. 7 ran into a helping engine which had just been detached from the front end of the express. Sleet was falling and the helper was delayed in entering the side track by reason of the switch being frozen. The accounts indicate that the engineer of the express train assumed that another engine, which he saw standing on his side track, was the one which had just been detached from his train. Both of the engines were knocked down a bank. A part of the train fouled the eastbound main track and train No. 96 on that track was derailed and badly damaged.

The collision at Altamont, W. Va., on the twenty-eighth occurred at midnight. Westbound express train No. 7 ran into a helping engine which had just been detached from the front end of the express. Sleet was falling and the helper was delayed in entering the side track by reason of the switch being frozen. The accounts indicate that the engineer of the express train assumed that another engine, which he saw standing on his side track, was the one which had just been detached from his train. Both of the engines were knocked down a bank. A part of the train fouled the eastbound main track and train No. 96 on that track was derailed and badly damaged.

In the accident at Altamont, Pa., on the nineteenth one engineman and two firemen were killed and three other trainmen were injured. The second of two locomotives pushing a westbound freight train was wrecked by the explosion of its boiler and the boiler was thrown across the adjoining track immediately in front of another train moving in the same direction; this other train being composed of express cars drawn by two locomotives. Both of the engines of this train were derailed and fell against the freight train, knocking over several freight cars. The explosion of the boiler is said to have been due to low water.

Of the half dozen electric-car accidents reported in the newspapers as occurring in the United States in the month of November, one in Chicago resulted in injuries to 12 persons, and one in Kalamazoo, Mich., in the death of six and injuries to 26. In both of these cases an electric car was struck by a locomotive on a grade crossing. In the Kalamazoo case it is said that the conductor of the street car had gone forward, according to the rule, to look out for trains on the steam road and that he stood between the two main tracks of the steam road as the train approached; but he says that when he gave the signal to his car to proceed over the crossing he neither saw nor heard the approaching locomotive. The front part of this electric car was completely crushed; but in the rear part a number of passengers were imprisoned and received many burns and electric shocks, after the car was struck by the engine, by reason of the presence, in the metallic parts of the car, of a considerable electric current, which continued until the trolley was disconnected from the overhead wire.

FOREIGN RAILWAY NOTES.

The municipality of Bogota, Colombia, after a successful boycott, forced the owners of the Bogota City Railway Company to sell out for \$800,000. The final payment of \$375,000 was made by the city on December 8.

The narrow gage railway which was built by the Japanese government from Otomari (Karsakoff) to Toyohara (Vladimiroff), 25 miles, is now being rebuilt. The curves and grades are being eliminated and the narrow gage tracks replaced by standard gage tracks. This line will be extended from Toyohara northward to the east coast of Japanese Sakhalin at Sakaima.

The Moscow-Windau-Rybinsk Railway has recently bought an electric locomotive of Russian make, for experimental and demonstrative purposes. The car cost 75,000 rubles (\$38,625) and is to develop a speed of 35 to 67 miles per hour. This car is to run on the line between St. Petersburg and Tsarskoye Selo, and should it give satisfactory service, more cars will be installed by the railway company.

General News Section.

The Union station at Newcastle, Pa., was destroyed by fire December 13. Estimated loss, \$10,000. This station was occupied by the Pennsylvania, the Erie, the Baltimore & Ohio and the Pittsburgh & Lake Erie.

The Michigan Central has recently installed Western Electric apparatus for train despatching on its lines between Jackson and Niles; Jackson and Bay City, and Jackson and Grand Rapids; and similar equipment will soon be put up on the line between Windsor, Ont., and St. Thomas.

Representative Rainey, of Illinois, a democrat, has introduced in Congress a resolution calling for an investigation, by five members of the House, of the traveling expenses of Theodore Roosevelt while he was president, the purpose being to find out to what extent Mr. Roosevelt rode free and how he secured favors of that kind.

In the federal court at Indianapolis, Ind., last week, the Baltimore & Ohio, the Cleveland, Cincinnati, Chicago & St. Louis, the Indianapolis Union, the Chicago Terminal, the Chicago, Indianapolis & Louisville and the Pennsylvania were fined for violation of the safety appliance laws. Most of the counts in the indictments had to do with insecure coupling apparatus and hand-holds.

The Twenty-eighth and Twenty-ninth streets cross-town street railway, New York City, which hitherto has been worked with horses, is now equipped with fifteen electric cars, propelled by power from Gould storage batteries. Cars of this make have been run a distance of more than 100 miles on a single charge of the batteries. Storage battery experiments were made on this line several years ago.

The railroad commissioners of Indiana have filed suit in the superior court of the state to recover penalties from the Chicago, Indianapolis & Louisville for the failure of the road to obey the law requiring the installation of the block system. The commission granted an extension of time of one year to July 1, 1910, but since then the road has neglected to comply. The statutory penalty for noncompliance is \$1,000 a week.

On the Hudson & Manhattan lines beneath the Hudson river, between New York and Jersey City, business was suspended last Monday for 4 hours and 40 minutes, by reason of a fire in the company's power house at Washington and Bay streets, Jersey City. The fire started about 4:45 a. m., and all of the morning passengers from Jersey City for New York City, usually traveling by these lines, were obliged to cross by the ferry boats. From seven o'clock to 9:30 every boat was crowded.

The striking machinists, blacksmiths, boilermakers and other shop men of the Missouri Pacific returned to work last Wednesday, accepting the company's offer of three cents an hour increase in pay, which offer was made last May. The machinists struck May 2, but the other trades did not join the machinists until October 21. An officer of the road says that the men have made a complete surrender and have acquiesced in the rules adopted by the railways at Chicago last March.

The electrification of Chicago railway terminals was taken up by the Chicago city council on December 19. The president of the Association of Commerce presented a formal announcement that a committee from that association had carefully considered this problem and now desired the aid of the city. In accordance with this request, the mayor appointed four members of the council to cooperate with that committee. At the same meeting an ordinance was introduced to compel all steam roads to electrify their lines throughout a radius of seven miles from the city, the work to be completed by January 1, 1913. No action was taken on the ordinance.

The representatives of the Brotherhood of Locomotive Engineers last week rejected the proposition of the Managers' Committee, headed by W. B. Scott of the Harriman Lines, that the engineers either accept the offer of the railways of advances in wages averaging 9½ per cent., or submit the entire question

to arbitration by Adams, Kepp and Bell. The union not previously in a collision with the railway, as the managers may wish for illustration, and, consequently, the managers of the managers' committee, most notably General Harriman, Scott and Commissioner Neill asking them to undertake to mediate between the railways and their employees. The employees after this decided to accept mediation. Mr. Scott in a public statement said that the offer of the railways if accepted would have increased the pay of locomotive engineers in every branch of the service, on the 61 roads represented, from 7½ to 14½ per cent. "without changing in any manner the long established basis of a day's work or methods of computing time for overtime."

Disastrous Explosion at the Grand Central Terminal.

By an explosion of gas, what kind of gas is not yet known, on the morning of Monday, December 19, the sub-station of the power system of the New York Central, electric division, at Fifth-street, New York City (the northeast corner of the terminal yard), was almost completely demolished, and windows were broken in scores of buildings within a radius of half a mile. Ten or more persons were killed and over 100 seriously injured, some of the killed being passengers in a street car which was passing at the time and which was overturned by the force of the blast. About a half hour before the explosion a pipe conveying Pintsch gas was broken by a passenger car, which, in being pushed to the end of a yard track for the purpose of having its supply of illuminating gas replenished, was run at uncontrolled speed and broke over the bumping post. But, so far as can be learned at the present writing, there is much conflict and doubt in the testimony as to just what occurred and as to why the dangerous flow of gas was not discovered and stopped. Also, while the explosion has so far been generally attributed to gas from this pipe, it has not been explained how it could have got inside of the building so as to form an explosive mixture in a confined place. The pipe was outside of the building and there are no windows on that side of the building. Agents of the plate glass insurance companies estimated that their losses in the region of the explosion would amount to \$25,000.

Ties of Eucalyptus Obliqua.

A shipment of 70,000 railway ties of "stringy bark" (*Eucalyptus obliqua*), sometimes termed Tasmanian oak, left Hobart for the United States in October. Two similar shipments will follow, making a total of 210,000 sleepers of Tasmanian timber for the United States. Stringy bark is much in demand for railway sleepers, being nearly everlasting. Some forest tramways in use by Tasmanian sawmills were laid with stringy-bark sleepers more than fifty years ago, and they are still perfectly sound. The average life of these sleepers resting on gravel ballast and subjected to a rainfall varying between 20 and 60 inches per annum is about fifteen years. The wood is practically non-inflammable, and this is especially suitable for underground railways. It is comparatively immune from the ravages of white ants and other land insects, and also is especially suitable for harbor construction, being one dense and immune from the attacks of marine insects. A sample of the wood was recently taken from a Hobart pier after being under water for thirty to forty years and it was perfectly sound.—*Consular Reports*.

Jersey City to Washington in 244 Minutes.

A special train was run over the Central of New Jersey, the Philadelphia & Reading and the Baltimore & Ohio last Friday morning from Jersey City, N. J., to Washington, D. C., in four hours and four minutes, which is seven minutes better than the best time ever before made between the two cities. Exact comparisons cannot be made, as the best record made heretofore was over the Pennsylvania (November 28, 1891), and the distances are slightly different over the different routes; and, moreover, they have been changed since the last record runs by

the establishment of the new Union station in Washington. The new Reading cut-off north of Philadelphia has also shortened the line. The distance traversed by this train appears to be about 227 miles, making the rate of speed 55.8 miles an hour. The temperature on the morning of this run was about 12 deg. above zero, and there was a strong northwest gale blowing. Besides this drawback it was necessary to use six minutes in changing engines at Philadelphia, instead of the two minutes allotted, because of the ice on the couplings; and speed had to be reduced at three places south of Philadelphia where the line was undergoing repairs. The train was run for an English newspaper reporter.

Reduction of Dues in Reading Relief Association.

The advisory committee of the relief association of the employees of the Philadelphia & Reading has announced that beginning January 1, there will be a reduction in the dues assessed against the older members, the association having now a surplus fund amounting to more than \$670,000. To members who have belonged to the fund for 21 years and are still in the service, the reduction will be 33 1-3 per cent., equal to \$3 a year, for the men receiving the lowest wages, and \$15 a year for the fifth or highest grades. Where an employee is disabled by accident, payments will be continued beyond the present limit of 52 weeks, but at half rates; this to be continued as long as the disability continues or until the employee has been offered work in the service of the road suitable to his capacity. This applies to all members of the fund without regard to the length of time they have been members. Payments for disablement by sickness are also to be extended the same way, but this applies only to those who have been members 15 years. This association was established in 1888 and now has 23,000 members.

Freight House at Frederick, Md.

The engraving shown herewith is from a photograph of the freight house of the Baltimore & Ohio at Frederick. Frederick is 61 miles from Baltimore, and in the early days was for a time the western terminus of the road. This building was erected in 1831 on land which was given to the company by the city of Frederick. It was originally used as a passenger station. A correspondent who sends us the photograph calls this the oldest freight house in the world, a statement which very likely would be challenged in a number of places in England. The Frederick freight house is still in use and in good repair. The multiplicity of telegraph, telephone and electric light wires shown in the picture affords an interesting suggestion of the changes in railway practice which have taken place during the life of the building. It was along the right-of-way of the Baltimore & Ohio

that the first telegraph line in America was put up, but this building, it appears, had been in use 13 years before the occurrence of that event.

New Passenger Station for the Long Island at Jamaica.

The Long Island Railroad has started construction work on the new station at Guilford street and Archer place in Jamaica, N. Y. The building is to be 70 ft. x 174 ft., four stories high, with a temporary roof built so that four additional stories can be added to the building. The station will be of fireproof construction throughout, with steel skeleton on concrete foundations. The walls will be faced with dull glazed terra cotta. The main waiting room will be decorated with Rockwood Faience tile, and the



Station and Office Building, Jamaica, N. Y.; Long Island Railroad.

various retiring rooms will be made to conform. There will be a tunnel underneath the tracks leading from the waiting room to the station platforms, and the platforms will be protected with umbrella sheds. The new Jamaica station is part of the scheme of improvements which the Long Island Railroad is making at that point. Various cross-over tunnels are being built so that no tracks will cross others at grade. It is expected that the station work will be completed by the spring of next year, while the other work on the Jamaica improvement will not be finished until later in the year.



Freight House of the Baltimore & Ohio Railroad at Frederick, Maryland; Built 1831.

A New Style in "Farmers' Specials."

The latest enterprise in the field of "university extension" as applied to agricultural knowledge is that of the agricultural experts of Missouri and Kansas, apparently the two states combined, in a trip over the Kansas City, Clinton & Springfield recently. The professors and lecturers traveled in a train of three Farmers' Missouri passenger motor cars. The placards on the side of this train, as shown in the accompanying picture, seem to indicate that the teachings of these gentlemen may have been



Farmers' Special on the K. C. C. & S.

somewhat discolored, but we are assured that the expedition was highly successful and that nearly 5,000 farmers listened to the lectures, in which were included the subjects of poultry raising and good roads. The expense of this train was of course much less than would have been required to run a locomotive and full sized cars.

Hearings in New York by Hadley Railroad Securities Commission.

The Railroad Securities Commission, consisting of Arthur T. Hadley, chairman; Frederick N. Judson, Frederick Strauss, Walter L. Fisher, B. H. Meyer and W. E. S. Griswold, has been holding hearings in New York in the last part of last week and beginning of this week. The more important witnesses, in the order in which they testified, were as follows: Richard Hale, a corporation lawyer of Boston Mass.; Milo R. Maltbie, member of the New York Public Service Commission, First district; Francis Lynde Stetson, legal representative of the Morgan interests; Frank W. Stevens, chairman of the New York Public Service Commission, Second district; Robert S. Brookings, a St. Louis banker and manufacturer; Jacob H. Schiff, of the banking firm of Kuhn, Loeb & Co., New York; W. M. Acworth, an English economist and author of "Elements of Railway Economics"; Paul D. Cravath, a New York corporation lawyer, and Edward M. Shepard, a New York lawyer.

Mr. Hale laid especial emphasis on the desirability of having issues of stock with no par value. He believed that the original or present value of a railway should be used as a basis for issuing new securities. He also believed that rates should be "mostly determined on a basis of property valuation rather than capitalization." The board of directors of the corporation said Mr. Hale should name the price at which new stock should be sold, providing, of course, stockholders are permitted to subscribe pro rata. There should, however, be effective regulation of the uses to which the money received from the sale of stock should be put.

Commissioner Maltbie testified that he believed the commission should have power to prevent the sale of stock of the corporation below par. He said that unless the strictest control is emphasized over corporations mere control of the details of stock issues amounts to very little. He believed that the commission should have the right to audit the accounts of corporations.

Mr. Stetson said that he regarded state regulation of the issue of railway securities as infinitely preferable to federal regulation. Mr. Stetson is framing a bill to be submitted to the New York legislature providing that a corporation may cancel the par value marked on certificates of stock by vote of its stockholders, the measure being permissive and not compulsory

and applying to existing as well as new corporations. So far as rates are concerned, Mr. Stetson said that he thought state capitalization and no other on them at all. Mr. Stetson said that he disapproved of federal regulation in the issue of securities, both on grounds of economic expediency and on constitutional grounds. He was strongly of the opinion that any attempt on the part of the federal government to regulate the issue of new securities would be unconstitutional.

Chairman Stevens said that he did not think capitalization had much to do with the question of rates. He agreed with Mr. Stetson both in thinking it advisable to permit issues of stock without a par value and in strongly opposing federal regulation. He added that too great a tendency to assume the necessity of a rigid system of capitalization was entirely wrong.

Mr. Brookings was opposed to regulation of the issue of new securities, but preferred federal regulation to state regulation. Any effort to establish a protectorate over investment he held to be politically and economically unwise. He made the point that investors pay no attention to denominational value of stock as related to actual value, and that expert examination is open to any investor who can read railway reports, or who can employ a more competent person to advise him. He advocated publicity, but thought that the government should not assume financial responsibility but actually regulate the price paid, for instance, for branch lines, etc. He held that rates cannot be fairly based on security par values nor on present physical valuation, but must be based on the total of what has been put into the road in money, time and brains.

Mr. Schiff was very strongly in favor of federal regulation as opposed to state regulation. In purely financial operations he distrusted all regulation, believing that a road should be allowed to deal with its own credit as best it could. He did not approve of issuing participation certificates with the par value eliminated.

Mr. Acworth said:

"Practically speaking, a railway company only comes into existence by special act of Parliament, called with us a 'private bill.' A railway company before it can come into existence has to comply with the standing orders of Parliament. Standing orders are not statutory, but practically have statutory force."

In the building of railways, Mr. Acworth declared, the bill provides for a limited time, normally five years, and a penalty of £50 (\$250) a day in case the line is not opened within the prescribed period.

"The deposited bill," said Mr. Acworth "is subjected to a scrutiny of officers of both houses of Parliament, in order to see that nothing departing from precedent appears in it. If there be any such departure, it has to be explained and accounted for. In some cases the proposed departure is flatly refused; in other cases the proposal is permitted to go before a committee and to be discussed at length.

"Before the committee any proposal of the bill can be subjected to exhaustive investigation by the usual procedure of examination, cross-examination, and reexamination of witnesses by counsel as in any ordinary law court.

"If the committee is convinced that the promotion is reckless or shows any taint of *mala fides*, that is almost sure to be fatal to the bill. So far, I have been speaking of new companies, but for very many years past almost the whole of the raising of railway capital has been done by the existing companies, and their cases differ fundamentally."

Railways cannot issue mortgage bonds and only one-quarter of their capitalization can be debenture bonds, the remainder being stock.

"The Northwestern, let us say," he continued, "proposes to make a new line ten miles long at a cost of £250,000; it wants another half-million for the purchase of lands and enlargement of stations; it wants another million for rolling stock at once, and may want another million for similar purposes before long. It accordingly applies to Parliament for power to raise four millions, three million by shares, and one million by debentures. So far as the money is required for the construction of the new branch and the purchase of specific pieces of land, estimates will have to be deposited, but nobody is the least likely to challenge them, and if unchallenged by opponents, they will, as I have said, go unquestioned by the committee. Public control comes down to this.

"Counsel for the bill puts the question to the general manager: 'You have enumerated in your bill the objects for which

you require money, and you have described the land you require. Are you responsible for this, and is it correct?" 'Yes'; and upon this the committee instantly and unanimously decides that the bill may proceed.

"There are a good many statutory restrictions on the company's dealings with its capital after the bill has become an act, but legal ingenuity between 1845 and 1910 has done a good deal to nullify their effect. For example: I pointed out that borrowing powers are restricted to one-fourth of the authorized capital, but it is not illegal to issue an acknowledgment of obligation, technically known as a 'Lloyd Bond,' in payment for work done, and such a bond naturally takes precedence of dividends on shares. Debentures may only be issued until half the share capital is paid up, but there is nothing to prevent the company the day after it is constituted issuing the whole of its share capital to a contractor fully paid up, and then proceeding to put in force its borrowing powers."

In reply to a question from one of the commisison, Mr. Acworth said that every bill authorizing the construction of a railway in the kingdom contained a clause fixing the maximum rates and charges.

Mr. Cravath said that the question was the delicate one of morals and that in his opinion, publicity would prevent whatever abuses exist in that direction. He contended that the notion that all dealings between such corporations were immoral was a false one. When he spoke of publicity he said he meant that in cases where such transactions involved the sale of stock by directors in one corporation to another corporation in which they were officers he would require that the amount of their holdings and the price paid for them should be disclosed.

Going more into detail regarding his views on the question of over-regulation, Mr. Cravath said that he believed that any arbitrary requirements, for instance, as to their issuance of securities, the price received for them, the purposes of their issue, etc., would be dangerous. He believed that if corporations were required to reveal in advance the specific purposes for which the securities were to be sold, it would much hamper the corporations. For example, he said he had been told that, in good time, if it were known in advance that a corporation was to spend a large sum of money for equipment, that corporation was under an immediate disadvantage in securing the best terms from the equipment companies.

As to the regulation of the price at which securities could be sold, Mr. Cravath stated that he would draw a sharp distinction between bonds and stocks. He differed, however, from most of the other witnesses who have thus far appeared before the commission as its session in New York, in that he would have the flexibility attach to issues of stocks rather than to issues of bonds. He believed that the present laws respecting stock issues were adequate, but that greater restriction should be placed upon the issuance of bonds. He would favor any scheme of regulation which should say that bonds could only be issued at a fair market value. He would also have the amount of bonds bear some relation, not to nominal capitalization, but to the amount of money actually put into the property by the stockholders. He said he would provide that bonds should be issued for money or for certain classes of property. He was strongly of the opinion that large issues of collateral trust bonds which had for the basis of their security the stocks of other corporations, were economically dangerous.

Mr. Cravath stated that the defect of the present system of laws regarding stock issues was that there was no statute defining clearly what the stock represents. Incidentally, he said he was an advocate of a permissive law for the issuance of stock without par value.

Discussing the question of rates, Mr. Cravath said he thought it was a mistake to hold that the rates should be fixed in any way with the present return on the securities of the existing railways, which he did not believe were capitalized unconservatively. He said that in rate making there was undoubtedly a relation between the structural value of the railways and their outstanding capitalization, in which the public was interested, but he did not hold it to be an important one.

At the conclusion of Mr. Cravath's testimony, Edward M. Shepard took the stand and was questioned about the provisions of the bill prepared by the committee of which he is a member, looking to permissive legislation for the issuance of stock without par value. He said he believed such a measure would prove to be a remedy for most, if not all, of the evils now existing in

connection with stock issues. He said he had never seen why nominal capital, or bonds, of themselves, should have any bearing upon rates. They should be determined, he believed, by consideration of the question as to what are the underlying realities, such as cost, etc.

Mr. Shepard would not express a definite opinion, but said he was much in doubt as to the constitutionality of Federal Government's power to require Federal incorporation, or to regulate the capitalization of corporations engaged in interstate commerce. He declared that the enforcement of the utmost publicity would accomplish all of the ends sought. In his opinion it would be unwise for the government to undertake the protection of investors, who, he said, did not need it, much preferring to be guided by the opinions of the reputable bankers.

Traffic Club of New York.

A meeting will be held at the Waldorf-Astoria on Tuesday, December 27, at 8 p. m. The address which has been announced for this meeting to be delivered by the Hon. Walker D. Hines has been postponed to the January meeting. The entertainment committee has arranged for the Mendelssohn Quartette to furnish an entertainment, and in addition a buffet luncheon will be served. Guest tickets may be secured, as usual, from C. A. Swope, secretary. The board of governors have changed the date of the regular meeting in January to the 17th.

The Transportation Club of Buffalo.

The Transportation Club of Buffalo elected on December 9 the following members to the board: George E. Chase, traveling passenger agent of the St. Paul; Charles L. Couch, vice-president of the F. W. Weaver Coal Company; John B. Harris, Philadelphia Coal & Iron Company; Peter Palmateer, assistant passenger agent of the Santa Fe; James A. Stevenson, general agent of the Mutual Transit Company.

American Society of Civil Engineers.

At the meeting held in New York on Wednesday, December 21, two papers were presented for discussion, as follows: Notes on the Bar Harbors at the Entrances to Coos Bay, and Umpqua and Siuslaw Rivers, Oregon, by Morton L. Tower, M. Am. Soc. C. E., and Timber Preservation, Its Development and Present Scope, by Walter Buehler, M. Am. Soc. C. E. These papers were printed in the November number of *Proceedings*.

International Railway General Foremen's Association.

The convention of the International Railway General Foremen's Association will be held in Chicago, July 25-27, 1911, instead of in May.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AM. BRIDGE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thompson, Scranton, Pa.; next meeting, June 22, 1911, Niagara Falls, N. Y.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND FREIGHT AGENTS.—C. M. Hurt, Boston, Mass.; next meeting, St. Paul, Minn., 1911.
- AMERICAN ASSOCIATION OF LOCAL FREIGHT AGENTS' ASSOCIATION.—G. W. Dennison, Pennsylvania Co., Toledo, Ohio.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carey building, Cincinnati, Ohio.
- AMERICAN RAILROAD RAILWAY ASSOCIATION.—H. C. DODGINS, 39 W. 39th St., New York.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Sept. 17-19, 1911; St. Louis, Mo.
- AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION.—J. H. FRY, Merchants building, Chicago; March 21-23, 1911, Chicago.
- AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; May 6, 1911; Detroit, Mich.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; June 14-16, 1911, Atlantic City, N. J.
- AMERICAN RAILWAY LIFT FREIGHTS ASSOCIATION.—O. E. Hutton, Bloomington, Ill.
- AMERICAN SOCIETY FOR TEACHING MATERIALS.—Prof. F. Macdonald, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 320 W. 57th St., New York; 1st and 3d Wednesdays, except July and August, annual, Jan. 18-19, New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Hauser, 13 Park Row, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 29th St., New York.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phil-
lips, 143 Dearborn St., Chicago, April 26, 1911; New Orleans, La.
ASSOCIATION OF RAILWAY CLERK ASSOCIATIONS.—J. R. McSherry, C. & E. L. C.
CARGO, Mo., 1911; Montreal, C. E.
ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—G. B. Chislow, I. C.
R.R., Chicago.
ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—F. W. Jaker, 143
Adams St., Chicago, Dec. 19, 1911; Boston, Mass.
ASSOCIATION OF INSPECTORS AND CAR ACCOUNTING OFFICERS.—C. P.
Condit, 24 Park Place, New York, June 30, 1911; Cape May
City, N. J.
CANADIAN RAILWAY CLUB.—Lionel Powell, Grand Trunk Ry., Montreal,
Que., last Tuesday in month, except June, July and Aug.; Montreal.
CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clarence H. McLeod, 114 Dorchester
St., Montreal, Que., Thursday, Montreal, annual last week
January.
CAR THERMIST ASSOCIATION OF CHICAGO.—Nate Kline, 241 North 10th
Court, Chicago; 2d Monday in month, Chicago.
CENTRAL RAILWAY CLUB.—H. D. Johnson, 25 Forest St., New York, 3d
Friday in January, March, May, Sept. and Nov.; Richmond, N. Y.
CITY ENGINEERS' ASSOCIATION.—St. Paul, 3d Friday in month, except
St. Paul, Minn.; 2d Monday, except June, July and Aug.; St. Paul.
ENGINEERS' SOCIETY OF PENNSYLVANIA.—L. R. Dierker, Box 703, Harris-
burg, Pa.
ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—L. K. Hilde, 503 Edgar
Avenue, Pittsburgh, 4th and 5th Thursdays, annual, June 27, 1911,
Pittsburgh.
FREIGHT CLERK ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R.R.,
Richmond, Va.; 20th annual, June 21, 1911; St. Paul, Minn.
GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—H. D. Johnson, 209
East Adams St., Chicago, Wednesday preceding 3d Thursday,
Chicago.
INDIANAPOLIS RAILWAY AND MECHANICAL CLUB.—B. S. Downey, C. & H.
D., Indianapolis, Ind.
INTERNATIONAL MASTER BELLER MAKERS' ASSOCIATION.—Harry D. Vought,
95 Liberty St., New York; next convention, Omaha, Neb.
INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Seaboard, La Salle
St. Station, Chicago; May 15-18, 1911; Chattanooga, Tenn.
INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan,
D. & I. R. Ry., Two Harbors, Minn. Next convention July 25-27,
Chicago.
INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASSOCIATION.—A. L. Wood-
worth, Lima, Ohio.
INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain,
11 Brussels; 1915, Berlin.
IOWA RAILWAY CLUB.—W. R. Harrison, Union Station, Des Moines, Ia.;
2d Friday in month, except July and August; Des Moines.
MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building,
Chicago; June 19-21, 1911, Atlantic City, N. J.
MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF UNITED STATES
AND CANADA.—A. P. Dane, B. & M., Reading, Mass.
NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.;
2d Tuesday in month, except June, July, Aug. and Sept.; Boston.
NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d
Friday in month, except June, July and August; New York.
NORTH-WEST RAILROAD CLUB.—T. W. Flannagan, Soo Line, Minn.; 1st Tues-
day after 3d Mon., except June, July, August; alternately at St. Paul
and Minneapolis, Minn.
NORTHERN RAILWAY CLUB.—C. L. Kennedy, C. & M. & St. P.; 4th Saturday;
Duluth, Minn.
OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Bldg.; second Wed.
RAILWAY CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas
City; 3d Friday in month; Kansas City.
RAILWAY CLUB OF PITTSBURGH.—C. W. Altemus, P. & L. E., Pittsburgh.
Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St.,
Bethlehem, Pa.
RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood,
Ohio; annual, May 22-24, 1911; Milwaukee, Wis.
RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday,
except June, July and August.
ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery,
P. & P. U. Ry., Peoria, Ill.; Oct., 1911; St. Louis.
ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis,
Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Sta-
tion, Chicago.
SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. &
W. P. Ry., Montgomery, Ala.
SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Prudential
Bldg., Atlanta, Ga.; 3d Thurs.; Jan., April, August and Nov.;
Atlanta.
TOLEDO TRANSPORTATION CLUB.—L. G. Macomber, Woolson Spice Co., To-
ledo; 1st Sat.; annual, May 6, 1911; Toledo.
TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; 1st Sat. after 1st
Wed.
TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last
Tuesday in month, except June, July and August; New York; Jan. 17.
TRAFFIC CLUB OF PITTSBURGH.—T. J. Walters, Oliver building, Pittsburgh,
Pa.; meetings monthly; Pittsburgh.
TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stew-
art Ave., Chicago; annual, June 20, 1911; Baltimore, Md.
TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R.,
East Buffalo, N. Y.
WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Win-
nipeg, Man.; 2d Monday, except June, July and August; Winnipeg.
WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d
Tuesday of each month, except June, July and August.
WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, First National Bank bldg.,
Chicago; annual, Jan. 17-19, 1911; Chicago.

Traffic News.

The Senate has adopted a resolution calling on the Interstate Commerce Commission for the testimony taken in the recent hearings on the proposal to increase freight rates. This testimony fills a trifle of 10,000 pages.

The Interstate Commerce Commission has agreed to receive the grand jury's report on the case of the Southern Railway Co. in the latter part of March.

J. S. Taylor, foreign freight agent of the Southern and the Mobile & Ohio, at Mobile, announces the establishment of the Seeburg steamship line, which is to make regular trips between Mobile and ports in Haiti, San Domingo and the Lesser Antilles. The first sailing was appointed for December 21. Mr. Taylor sent a representative with the first trip of the steamer, with a view to working up freight business between the United States and the countries named; and in instructing the agents of his roads to solicit business for the new line he gave them an elaborate condensation of the commercial history on the coun-
tries.

Crop Conditions.

The final estimates of the department of agriculture indicate the harvested acreage, production, and value of important farm crops of the United States, in 1910 and 1909, to have been as follows:

CROPS.	Acreage. (000 omitted.)	Production, (000 omitted.)	Farm Value, December 1.	
			Per Bu. Cents.	Total. (000 omitted.) Dollars.
Corn, 1910.....	114,002	3,125,713	48.3	1,523,968
Corn, 1909.....	108,771	2,772,376	59.6	1,652,822
Winter wheat, 1910.....	29,427	464,044	89.1	413,575
Winter wheat, 1909.....	28,330	446,366	102.9	459,154
Spring wheat, 1910.....	19,778	231,399	89.8	207,868
Spring wheat, 1909.....	18,393	290,823	93.1	270,892
All wheat, 1910.....	49,205	695,443	89.4	621,443
All wheat, 1909.....	46,723	737,189	99.0	730,046
Oats, 1910.....	35,288	1,126,765	34.1	384,716
Oats, 1909.....	33,204	1,007,353	40.5	408,174
Barley, 1910.....	7,257	162,227	57.8	93,785
Barley, 1909.....	7,011	170,284	55.2	93,971
Rye, 1910.....	2,028	33,039	72.2	23,840
Rye, 1909.....	2,006	32,239	73.9	23,809
Buckwheat, 1910.....	826	17,239	65.7	11,321
Buckwheat, 1909.....	834	17,438	69.9	12,188
Flaxseed, 1910.....	2,916	14,116	230.6	32,554
Flaxseed, 1909.....	2,742	25,856	152.6	39,466
Rice, 1910.....	722	24,510	67.8	16,624
Rice, 1909.....	720	24,368	79.4	19,341
Potatoes, 1910.....	3,591	33,811	55.5	187,985
Potatoes, 1909.....	3,525	376,537	54.9	206,545
Hay, 1910.....	45,691	*60,978	\$12.26*	747,769
Hay, 1909.....	45,744	*64,938	\$10.62*	689,345
Tobacco, 1910.....	1,233	†984,349	†9.3	†91,459
Tobacco, 1909.....	1,180	†949,357	†10.1	†95,719

* Tons. * Per ton. † Pounds. † Per pound. x Equivalent to 5,930,000 bags of 186 pounds, average weight.

The total value of crops above specified on December 1, 1910, was \$3,735,464,000, against \$3,971,426,000 on December 1, 1909. The average of prices was about 8.5 per cent. lower on December 1, 1910, than on December 1, 1909.

Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of the American Railway Association, in presenting statistical bulletin No. 85, giving a summary of car shortages and surpluses by groups from August 4, 1909, to December 7, 1910, says:

"The surplus shows an increase of 10,849 cars between November 23 and December 7, bringing the total to 33,915. For the same period in 1909 the surplus was 57,470 cars or 3,555 cars more than at the date of this bulletin. The increase in the surplus during the corresponding fortnight last year was 17,942 cars. The shortage for this report is 11,901 cars. While this total is 6,692 cars less than the shortage on the corresponding date of 1909, the decrease in shortage since our last bulletin is only 2,772 cars as against a decrease of 8,903 cars in the corresponding period last year.

"The increase in surplus for the entire country as between box and coal cars was in proportion to the existing surplus of these

classes, being 4,427 cars for the former and 3,532 for the latter, with 2,511 increase in miscellaneous. Taken by groups, however, box cars show a decrease of 1,593 in group 6 (North-western), and of 135 cars in group 3 (Central), these decreases being more than offset by increases in the other groups, particularly in group 10 (Pacific), and 11 (Canadian), where the increases were heavy. In coal and gondolas, group 6 (North-western), also shows a decrease, while the surplus of this class increased heavily in group 3 (Central)."

The accompanying table gives car surpluses and shortages by groups for the last period covered by the report, and the charts show total surpluses and shortages in 1907, 1908, 1909 and 1910:

INTERSTATE COMMERCE COMMISSION.

The Interstate Commerce Commission's hearing in the cases involving the advances in rates between Mississippi and Missouri rivers has been postponed indefinitely.

Judges of the Commerce Court.

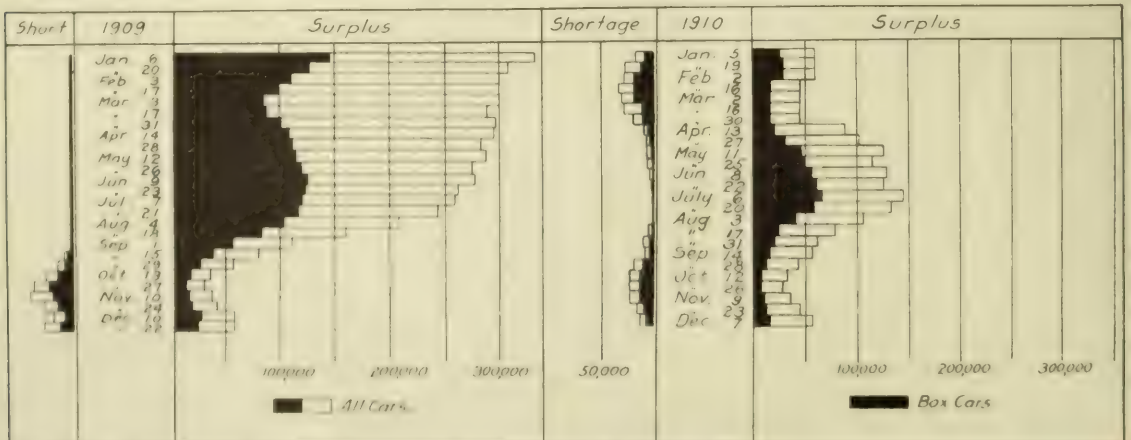
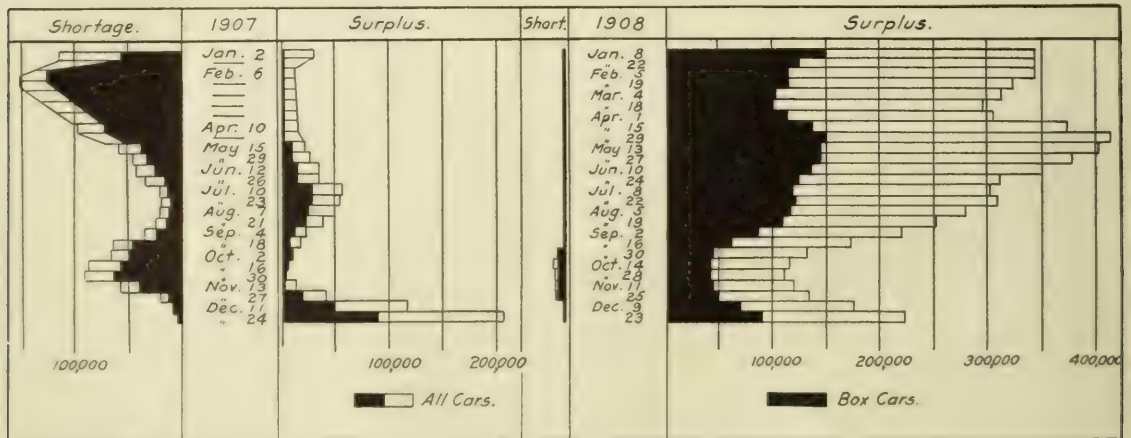
Announcement of the appointment of members of the Commerce Court by President Taft was made in the *Railway Age Gazette* of last week, page 1162, and some comments were printed in the editorial columns.

Martin Augustine Knapp, A. M., LL. D., who is appointed for

CAR SURPLUSES AND SHORTAGES.

Group.	Year.	No. of roads.	Surpluses				Shortages			
			Box.	Coal, gondola and hopper.	Other kinds.	Total.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.
1.	1910.	8	221	704	277	1,535	242	175	0	425
2.	1910.	8	2,747	148	1,246	4,862	6	2	930	41
3.	1910.	26	1,444	396	4,340	2,575	125	3	403	1,162
4.	1910.	10	328	12	278	603	1,396	329	1,426	6
5.	1910.	18	100	26	150	333	1,879	441	375	0
6.	1910.	19	4,761	793	1,345	3,870	161	10	24	349
7.	1910.	4	376	86	547	707	0	0	0	0
8.	1910.	13	1,103	68	721	1,894	275	108	13	17
9.	1910.	10	1,112	142	334	633	355	28	0	0
10.	1910.	21	2,182	1,093	1,496	5,499	283	0	28	91
11.	1910.	5	1,671	417	47	903	713	0	0	83
Total.		159	16,795	3,885	10,781	22,454	5,435	1,093	3,199	2,174

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia, and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, Utah, and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages in 1907, 1908, 1909 and 1910.

two cases, and who will be the presiding judge, has been a member of the Interstate Commerce Commission since 1891, and chairman of that body since January, 1898. Mr. Knapp was born at Stamford, N. Y., November 6, 1813, and was graduated from Wesleyan University in 1838. His home is in Schenectady, N. Y., and he was corporation counsel of that city for seven years, 1877-1883. His work on the Interstate Commerce Commission is well known to the readers of the *Railway Age Gazette*. Mr. Knapp's nomination was confirmed December 20.

Robert Woodrow Archibald, the second member of the court, has been judge of the United States District Court for the middle district of Pennsylvania since 1901. His home is at Scranton, Pa. Mr. Archibald was born at Carbondale, Pa., Sep-

tember 24, 1838. He was born in Germany, N. Y., December 11, 1863, son of Charles John Carlisch, U. S. A. He was admitted to the bar in 1873 and was district attorney and judge in Dakota territory previous to his appointment as federal judge. He was a member of the South Dakota constitutional convention in 1889. His home is at Sioux Falls, S. D.

Julius William Hunt, the third member of the court, was twenty years county judge in Cook county. He has been president of a district and city board of education in Chicago. For years his name has been identified with every movement for the betterment of civic conditions, and he has also given much time to charitable work. He was admitted to the bar in 1890 and is professor of law in the law school of Northwestern University from



R. W. Archibald.



Martin A. Knapp.



Copyright by Hunt & Esling.
W. H. Hunt.



John E. Carland.



Phot. by Edmonston, Washington.
B. H. Meyer



Photograph by M. A. C. Chicago.
J. W. Mack.

tember 10, 1848, and was graduated from Yale in 1871. He was a judge of the state courts in Pennsylvania from 1885 to 1901.

William Henry Hunt, A. M., was born at New Orleans November 5, 1857, the son of William H. Hunt, Secretary of the Navy. He was educated at Yale, but was prevented from graduating by ill-health. He has been in governmental service since 1881; first as collector of customs in Montana and Idaho; then attorney-general of Montana; member of the Montana legislature; district judge (six years); justice of the Supreme Court of Montana (seven years); secretary of Porto Rico; governor of Porto Rico (four years); and United States district judge for the district of Montana from 1904 until the beginning of the present year, when he was appointed an associate judge of the newly established court of customs appeals. His home is at Helena, Mont.

John Emmett Carland has been United States district judge in

1895 to 1902, and since 1902 has been a professor of law at the University of Chicago. He was appointed a member of the Civil Service Commission of Chicago in January, 1903, but resigned in May of the same year to become judge of the circuit court of Cook county. In 1904 he was assigned as judge of the juvenile court of Chicago, in which office he made a distinguished reputation for those philanthropic motives and good sense that are necessary to the proper performance of the duties of such an office. He was assigned as a judge of the appellate court of the first Illinois district in 1909. He is an ex-president of the Conference of Jewish Charities; president of the Milk Commission, of the League for the Protection of Immigrants, and of the Friends of Russian Freedom; vice-president of the Children's Hospital Society and of the Society for Social Hygiene; a member of the executive committee of the National Conference of Charities and Corrections, the Chicago School of Civics and

Philanthropy, the Chicago Tuberculosis Institute and the Juvenile Protective League; a director of the Civil Service Association, the Play-Ground Association and the Associated Jewish Charities. Judge Mack was born in San Francisco, July 19, 1866. He was graduated from Harvard University in 1887, and subsequently studied at the universities of Berlin and Leipzig, Germany. In politics he is a Democrat.

New Interstate Commerce Commissioners.

Balthasar Henry Meyer, new member of the Interstate Commerce Commission, was born in 1866 at Mequon, Ozaukee county, Wis. He grew up on a farm; taught district school in 1884-86; was principal of the village school at Fredonia, Wis., 1887-88, and principal of the high school at Port Washington, Wis., 1889-92. He graduated in the Latin course from the Oshkosh Normal School in 1893, and from the academic department of the University of Wisconsin in 1894. He took a graduate course in economics, history and transportation at the University of Berlin, Germany, in 1894-95, and was honorary fellow and extension lecturer at the University of Wisconsin in 1895-96. He was a university fellow at the same university in 1896-97, and received from his *alma mater* the degree of Ph. D. in the latter year. He became an instructor in political economy in 1897, assistant professor in 1899, and professor of political economy in 1900. He has continued his university work while serving on the commission. He has done special work for the Industrial Commission, the Interstate Commerce Commission and the Bureau of the Census, and has been director of transportation of the Carnegie Institution. Before his appointment to the Wisconsin commission he wrote about forty monographs and articles on transportation and other economic subjects, many of which were published in *The Railway Age* and the *Railroad Gazette*. His book, "Railway Legislation in the United States," was published by the Macmillan Company in 1903. He is a member of numerous economic, political science and historical societies.

The Wisconsin commission was created as a result of the successful war waged by Governor (now Senator) Robert M. La Follette against the so-called "stalwart" wing of the Republican party in Wisconsin. Having been the offspring of this political contest, it is a high tribute to those who originally and have since composed it that it has never allowed itself to be used—if any attempts have been made to use it—for political purposes. One of the things that first brought the Wisconsin commission into prominence was its opinions and decisions in the passenger rate cases in 1907. The 2-cent fare question had been pending before a number of State legislatures and commissions. The decisions applied only to the Chicago, Milwaukee & St. Paul, the Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha, all of which, it was held, should reduce their rates from 3 to 2½ cents. The opinion was the most scientific and exhaustive discussion ever written on the way that the costs of railway transportation ought to be apportioned among the various kinds of traffic. It is understood that Mr. Meyer was the author of most of it, or, at least, of those parts of it dealing with the economic issues involved. Besides ordering the maximum rate reduced to 2½ cents, the commission recommended that the railways should sell mileage books for 2 cents a mile. The railways complied both with the commission's order and with its suggestion about mileage books.

The sort of stuff the commission was made of was shown when some time later a bill was introduced in the State legislature requiring a flat 2-cent rate. The members went before the legislature and tried to get it not to pass the bill. But the 2-cent fare craze had hit Wisconsin as hard as other states, and the bill was passed. It was chiefly in consequence of this that John Barnes resigned as chairman of the commission. The 2-cent fare law in Wisconsin has never been contested in the courts. It probably is only a matter of time, however, until it will be. The results of similar litigation elsewhere indicate that in this event it will be nullified.

In 1904 Mr. Meyer was appointed expert special agent representing jointly the Interstate Commerce Commission and the Bureau of the Census, and in that capacity had charge of the "Commercial Valuation of Railway Operating Property in the United States: 1904." The results of his work were published as Bulletin 21 of the Bureau of the Census, and constitute one of the most interesting and authoritative studies of American railways. Mr. Meyer was recently appointed by President Taft a

member of the commission to investigate the subject of regulation of railway securities.

Charles C. McChord, the second new member of the Interstate Commerce Commission, like Mr. Meyer, has had experience as the chairman of a state railway commission. He formerly presided over the State Railroad Commission of Kentucky, having been appointed a member of the commission in May, 1892, and elected chairman of the board. He resigned in 1895 and was elected to the Kentucky state senate, where he served four years. While in the legislature he introduced and secured the passage of an act popularly known as the McChord railroad law, which empowered the commission to make reasonable interstate freight and passenger rates. He subsequently again became a member of the commission in 1899, also its chairman. He was re-elected commissioner and chairman in 1903 and retired in 1907, since which time he has been engaged in the practice of law. He was born on December 3, 1859, at Springfield, Ky., and was educated at Center College at Danville, Ky. After leaving college he practiced law at Springfield, Ky., being prosecuting attorney from 1886 to 1892.

Hearing on Ex-Lake Rates.

Commissioner Prouty of the Interstate Commerce Commission took testimony in Chicago last week regarding the complaint of the Chicago Board of Trade against the eastern roads, that the adjustment of freight rates on grain from Buffalo to the Atlantic seaboard points is unreasonable. The rate is 2 to 5 cents higher when the grain moves to Buffalo by water than when it moves to that point by rail. This differential against grain moving to Buffalo by lake offsets the lower water rates from Chicago to Buffalo, and Chester A. Legg, attorney for the Chicago Board of Trade, and W. M. Hopkins, manager of its transportation department, charged that the purpose in making these rates is to drive the grain traffic from the lakes to the railways. Mr. Hopkins testified that the rate from Buffalo to Boston on grain brought to Buffalo by water is 5.3 mills per ton per mile, while on grain brought to Buffalo by rail it is only 3.6 mills per ton per mile. From Buffalo to New York on wheat the comparative rates are 5.3 and 4.4 mills per ton per mile, and on corn 4.6 and 4.4 mills.

Grain shippers gave testimony indicating that the effect of these rates is to cause the grain to move all rail. Captain Sullivan, a Chicago boat-owner, testified that one Chicago firm which up to 1907 shipped from 1,500,000 to 3,000,000 bushels of oats a year by boat now shipped all rail. He said that it had been made practicable by the expenditure of \$110,000,000 by the government for improvements on the lakes to reduce lake rates, but that they had been reduced still further and to an unreasonable extent by the necessity imposed on the boats of offsetting in their rates the higher railway rates east of Buffalo.

B. D. Caldwell, vice-president of the Lackawanna, testified that the ex-lake rates from Buffalo could not be fixed in relation to the rates of the tramp boats, because the latter fluctuate while the railway rates have to be published 30 days in advance. He said that ex-lake rates are purely local rates fixed as reasonable of themselves, and that they have no reference to the divisions of the all-rail rates. One reason given by the witnesses for the railways for the difference between the ex-lake rates and the proportions of the through rail rates is the cost of transshipment and of switching incurred in handling the ex-lake grain.

T. N. Jarvis, vice-president of the Lehigh Valley, and F. La Bau, freight traffic manager of the New York Central Lines, denied the charge that a conspiracy existed among the railways to divert traffic from the water lines to the railways. Mr. Jarvis called attention to the fact that the Lehigh Valley has a reason for trying to foster rather than destroy lake traffic, in that it owns no railway line west of Buffalo, but does own and operate a line of lake boats, the Lehigh Valley Transportation Company. He said the ex-lake tonnage received by his road is about one-third greater than the rail tonnage received by it.

COURT NEWS.

Judge Kullisat of the federal court at Chicago has extended to February 15 his injunction restraining the Illinois railway commission from putting into effect its order fixing switching rates in Chicago. The continuance was agreed upon so as to allow time to close the negotiations between the railways and commercial organizations at Chicago for a settlement of the question.

REVENUES AND EXPENSES OF RAILWAYS.

SULL OF COURTESY, 1910, AND ALSO FOR THE LIBRARY OF CONGRESS

[illegible]

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Charles E. Pugh, first vice-president of the Pennsylvania Railroad, at Philadelphia, Pa., will be retired on March 1, 1911, under the pension rules of the company.

A. M. Ardery, superintendent of the Virginia & Truckee at Carson City, Nev., has been appointed vice-president and general manager, with office at Carson City. E. B. Yerington, secretary and general freight and passenger agent, has been appointed secretary, with office at Carson City.

Charles H. Markham, president of the Gulf Refining Company, with office at Pittsburgh, Pa., and formerly vice-president and general manager of the Southern Pacific, has been elected president of the Illinois Central, succeeding J. T. Harahan, who retires under the pension system of the road on January 12.

Carl C. Wright, whose appointment as general solicitor of the Chicago & North Western, with office at Chicago, has been announced in these columns, was born April 19, 1859, at Whitehall, N. Y. He received his education at Tabor College, Tabor, Iowa; Colorado College, Colorado Springs, Colo.; and in the law department of the Iowa State University. From 1887 to 1892 he was in Wyoming and during this time was locally connected with the Chicago & North Western in that state. In the latter year he went to Omaha to engage in the general practice of law, and in 1903 was elected city attorney of Omaha. Two years later he resigned that position to go with the Chicago & North Western as assistant attorney at Omaha, from which position he was promoted to general solicitor at Chicago.



C. C. Wright

Operating Officers.

J. F. Messmer has been appointed car accountant of the Peoria Terminal Railway, with office at Peoria, Ill.

W. S. Williams, trainmaster of the Illinois Central at Clinton, Ill., has been appointed superintendent, with office at Clinton, succeeding C. R. Westcott, resigned.

J. P. Atkins, car service agent of the Pere Marquette at Detroit, Mich., has been appointed chief supervisor of the Michigan Car Demurrage Supervising Bureau, with headquarters at Detroit.

W. A. Parker, chief engineer of the St. Joseph & Grand Island, at St. Joseph, Mo., has been appointed acting general manager, with office at St. Joseph, succeeding James Berlingett, resigned to go to another company.

G. W. Gillespie, chief train dispatcher of the Grand Trunk, at Durand, Mich., has been appointed master of transportation, succeeding Richard Doyle, resigned. H. J. Tobin succeeds Mr. Gillespie, both with offices at Durand.

W. G. Koch, formerly superintendent of the Missouri, Kansas & Texas, at Denton, Texas, has been appointed assistant superintendent of the St. Louis & San Francisco, on the line between St. Louis, Mo., and Newburg.

W. X. Garrison, trainmaster of the West Jersey & Seashore, at Camden, N. J., has been appointed passenger trainmaster,

and D. A. Clapp, assistant trainmaster at Atlantic City, has been appointed freight trainmaster, both with offices at Camden.

C. P. Stembel, superintendent of the Eastern division of the Minneapolis & St. Louis at Minneapolis, Minn., has had his jurisdiction extended over the entire line. J. A. Swygart, superintendent of the Western division at Watertown, S. D., has resigned to engage in other business and that office is abolished.

C. A. Bray, chief dispatcher on the St. Louis division of the Cleveland, Cincinnati, Chicago & St. Louis, has been appointed an assistant trainmaster, with office at Mattoon, Ill., his duties to be on the west end of the division. Horace Goodwin, dispatcher at Terre Haute, Ind., has been appointed an assistant trainmaster, with jurisdiction over the east end of the division.

J. W. Coon, hitherto assistant to G. L. Potter, third vice-president of the Baltimore & Ohio, at Baltimore, Md., has been appointed assistant to A. W. Thompson, the new general manager, who succeeds Mr. Potter in the duties of general manager. R. N. Begien, assistant to chief engineer, at Baltimore, Md., has been appointed an assistant to the general manager, and his relationship to Mr. Thompson will be the same as when Mr. Thompson was chief engineer. A sketch of Mr. Begien's railway life was published in the *Railway Age Gazette* of May 13, 1910, page 1234.

E. H. Daniel, whose appointment as superintendent of the Central of Georgia, with office at Macon, Ga., has been announced in these columns, was born March 13, 1872, at Talbotton, Ga. He was educated at Le Vert college in his native town, and began railway work March 1, 1890, as a telegraph operator on the Central of Georgia, at Millen. He was later transferred to Savannah and then to Columbus. In October, 1895, he was appointed train dispatcher, and five years later was appointed chief dispatcher at Columbus, remaining in this position until May, 1905, when he was appointed trainmaster, which position he held at the time of his recent appointment as superintendent.

Traffic Officers.

William J. Bogert has been appointed general agent of the Illinois Southern, with office at Pittsburgh, Pa., a new agency.

Frank A. Hart has been appointed a general agent of the Chicago, Burlington & Quincy, with office at Clinton, Iowa, succeeding J. M. Rodman, deceased.

H. M. Guess has been appointed a contracting freight agent of the Indianapolis Southern, with office at Indianapolis, Ind., succeeding J. J. Clarke, resigned.

M. E. Malone, traveling passenger agent of the Canadian Pacific at Cincinnati, Ohio, has been appointed a traveling passenger agent, with office at Spokane, Wash.

T. G. Orr, traveling passenger agent of the Canadian Pacific at Pittsburgh, Pa., has resigned to become city ticket agent of the Buffalo, Rochester & Pittsburgh, with office at Pittsburgh.

Emile J. Herbert has been appointed first assistant general passenger agent, and F. O. Hopkins assistant general passenger agent of the Canadian Pacific, eastern lines, both with offices at Montreal, Que.

B. W. Herrman, agent of the Norfolk & Western at Columbus, Ohio, has been appointed general agent, with office at Cincinnati, Ohio, succeeding L. V. Finkle, deceased. G. C. Van Zandt, agent at Ironton, Ohio, succeeds Mr. Herrman.

C. B. Kealhofer has been appointed general freight agent of the Atlanta, Birmingham & Atlantic, with office at Atlanta, Ga., succeeding W. H. Quigg, resigned. As has been announced in these columns, J. R. Rowland has been appointed traffic manager, a new office.

C. B. Stout, freight solicitor of the Union Line of the Pennsylvania Lines West, in connection with the Indianapolis, Ind., agency, has been appointed freight solicitor of the Pittsburgh, Cincinnati, Chicago & St. Louis, with office at Louisville, Ky., succeeding J. T. Wray, promoted. Howard M. C. Sloan succeeds Mr. Stout.

W. A. Newman, assistant general freight agent of the New York Central & Hudson River in New York City, has been appointed general freight agent of the Lake Shore & Michigan Southern, the Dunkirk, Allegheny Valley & Pittsburgh and the Lake Erie, Alliance & Wheeling, with office at Cleveland, Ohio,

succeeding George R. Wheeler, resigned to engage in other business. F. J. Cook, general freight agent of the Chicago, Indiana & Southern at Chicago, has been appointed general freight agent of the Toledo & Ohio Central and the Zanesville & Western, with office at Toledo, Ohio, succeeding Indiana Fitch, assigned to other duties. Fred Zimmerman, general freight agent of the Indiana Harbor Belt, at Chicago, has been appointed also general freight agent of the Chicago, Indiana & Southern, succeeding Mr. Cook.

W. I. Jones, whose appointment as assistant general freight agent in charge of coal traffic of the Missouri Pacific, with office at St. Louis, Mo., has been announced in these columns, began railway work as a locomotive fireman on the St. Louis, Iron Mountain & Southern. He was later made weigh-master and freight inspector of the Western Railway Weighing Association and Inspection Bureau, and was afterward a bill clerk in the freight department of the Missouri Pacific at St. Louis. In 1890 he was made tariff clerk in the general freight office, where he remained for a year. He was then out of railway service until 1902, when he was made chief clerk to the assistant general freight agent. He was subsequently made commercial agent at Monroe, La., and for a year from November, 1907, was chief clerk in the general freight office at St. Louis. His next office was chief clerk to the freight traffic manager, which position he held until his recent promotion.

R. B. Miller, traffic manager of the Southern Pacific Lines in Oregon, the Oregon Railroad & Navigation Company, the Oregon & Washington and the Ilwaco Railroad, and general freight agent of the Corvallis & Eastern, with office at Portland, Ore., has been appointed traffic manager of the Oregon-Washington Railroad & Navigation Company (See editorial note in the *Railway Age Gazette*, December 2, page 1033), with jurisdiction over the lines south of the Columbia river and east of the Cascade mountains, including the line between Megler, Wash., and Nashcotta, with office at Portland. F. W. Robinson, general freight agent of the Oregon & Washington and the Oregon Railroad & Navigation Company; H. E. Lounsbury, assistant general freight agent of the Oregon Railroad & Navigation Company; Wm. McMurray, general passenger agent of the above companies, and J. M. Scott, assistant general passenger agent, have all been appointed to similar positions on the Oregon-Washington Railroad & Navigation Company. W. D. Skinner, general freight and passenger agent of the Oregon & Washington at Seattle, Wash., has been appointed general freight and passenger agent of the lines west of the Cascade mountains, including the line from Portland, Ore., to Vancouver, Wash., with office at Seattle.

Engineering and Rolling Stock Officers.

Curtis Dougherty, who was recently promoted from engineer maintenance of way to chief engineer of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern, with office at Cincinnati, Ohio, as has been announced in these columns, was born July 30, 1863, in Jersey county, Illinois. He graduated as a civil engineer from Washington University at St. Louis in 1885, and began railway work in the following year with the Wisconsin Central. For four years from 1888 he was an engineer on the Chicago & Western Indiana; he then went with the Illinois Central, first as roadmaster, and later as superintendent, remaining with that road until 1907. His next position was assistant chief engineer of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern. In 1908 he was promoted to contracting and consulting engineer, and in 1909 engineer maintenance of way, from

which position he was promoted to chief engineer, as announced November 1, 1910.

M. J. Jurek has been appointed master mechanic of the New England Great Northern, with office at Bangor, Me.

F. F. Hebert, engine house foreman of the Pennsylvania railroad at Meadville, N. Y., has been appointed general manager of the Meadows shops. F. A. Lammerding succeeds Mr. Hewitt.

A. C. Bonchall has been appointed master mechanic of the United Railroad of Havana, with office at Havana, Cuba, succeeding William M. Stokes, resigned to go to the Galena Oil Co. at Buenos Ayres, South America.

J. C. Garden, master mechanic of the Eastern division of the Grand Trunk, at Montreal, Que., has been appointed master mechanic of the Battle-Creek (Mich.) shops, succeeding J. T. McGrath, resigned. J. Duguid succeeds Mr. Garden.

A. F. Blaess, roadmaster of the Illinois Central at Louisville, Ky., has been appointed assistant engineer maintenance of way, with office at Chicago, succeeding L. A. Downs, whose appointment as superintendent at Fort Dodge, Iowa, has been announced in these columns.

Special Officers.

John S. Dennis, assistant to vice-president of the Canadian Pacific, has been appointed manager of the company's irrigation and land interests in Alberta and British Columbia, and will also perform such other duties as may be assigned to him by the president, with office at Calgary, Alb.

OBITUARY.

Theodore E. Eisman, chief of tariff bureau of the Michigan Central, died December 18, at his home in Detroit, Mich., at the age of 40 years.

Major John Fletcher Hanson, president of the Central of Georgia Railway and the Ocean Steamship Company of Savannah, died December 15 at Atlanta, Ga. Major Hanson was born November 25, 1840, in Monroe county, Ga. He was educated in the public schools and for a time worked on a farm. During the civil war he served in the Confederate army and was prominent in carrying out the reconstruction work in Georgia following the war. He was first a cotton merchant at Macon, and later became a cotton manufacturer. His first connection with a railway was in 1894, when he was made a director of the Georgia, Southern & Florida; he was later made a director of the Central of Georgia. From April, 1900, to December, 1903, he was chairman of the board of directors of that company. He was elected president of the same company in December, 1903, and since June, 1902, had been president of the Ocean Steamship Company. Major Hanson was always frank and straightforward in his speech and dealings with men and affairs. He never shrank from a duty or dodged an issue. His convictions were always clear and he had the courage to stand by them and defend them. Without means or influential friends he impressed on men and affairs his strong personality and ability, winning recognition in that way, and at the time he was elected to the presidency of the Central of Georgia he was practically without railway experience, except that gained as a director of the road and for a short time as its chairman. Under his management the railway and the steamship company prospered and developed. He was a member of the first Pan-American Congress in 1889 and was a member of the United States Monetary Committee. At the time of his death he was a member of the Union League Club of New York, and the Piedmont Driving Club and the Capital City Club of Atlanta.

The Bagdad railway, a continuation of the Anatolian line from Constantinople to Konia, and completed from Konia to Bulgurlu in Asia Minor, is being extended 520 miles via Adana and Aleppo, Syria, with Bagdad as its goal. The entire construction will take about four more years. The work is being done by a German engineering company, incorporated in Switzerland for the purpose (Die Gesellschaft fuer den Bau der Eisenbahnen in der Türkei). The material employed is almost entirely of German manufacture, and includes the latest German steel rails and steel ties. It has been decided that Mersine will be the port to and from which the new sections of the Bagdad railway will run. Harbor works will have to be erected by the railway company and surveys of the port are being made.



C. Dougherty

Railway Construction.

ALGOMA CENTRAL & HUDSON BAY.—Bids are wanted by R. S. McCormick, chief engineer of the Manitoulin & North Shore, Sault Ste. Marie, Ont., up to January 2, 1911, for the construction of the roadbed and structures on the M. & N. S., as follows: Crean Hill, at Mile 22.7 west of Sudbury, Ont., to a connection with the present line at Espanola; Espanola, south to a point at or near Mile 61.

ANGELINA & NECHES RIVER.—This road is now in operation for freight and passenger traffic from Keltys, Tex., east to Naclina, 19.9 miles.

ATCHISON, TOPEKA & SANTA FE.—Surveys have been made for a line through the Palo Verde Valley, Cal., via the towns of Blythe, Neighbors, Palo Verde and Rannells.

Double-tracking work was completed early in December between Daggett, Cal., and Cottonwood, 25 miles, and the line is now in operation. The Sharp & Fellows Construction Company were the contractors.

BIG SANDY & CUMBERLAND.—This road has been extended from Blackey, Va., to Matney.

CANADIAN NORTHERN.—The Rosburn subdivision has been extended from Russell, Man., west to Caldor, 40.80 miles; the Shelbrooke subdivision has been opened for business from Prince Albert, Sask., west to Shelbrooke, 28.5 miles; the St. Rose subdivision has been opened for business from Ochre river, Man., to St. Rose, 11.30 miles. The company now has work under way on 76 miles in Manitoba; 283 miles in Saskatchewan, and 221 miles in Alberta. The Cowan Construction Company, the Northern Construction Company, Ltd., Winnipeg, and McMillan Brothers & Kenny, are the contractors.

CANADIAN PACIFIC.—Work is now under way on extensions as follows: Tillston, Man., west to a point in Saskatchewan, 25.71 miles; in Saskatchewan, between Colonsay and Regina, 58 miles; from Bulylea, south 6.9 miles; Estevan, west 20 miles. In Alberta from Irricana, east 36.9 miles, and from Carmangay, north 56 miles. In British Columbia the Wardner-Fort Steel line is being extended 24.9 miles, also the Port Moody spur, 3.5 miles, and the Wellington Camp branch, 3.3 miles. The grading work has been finished but track laying has not yet been started.

The Esquimalt & Nanaimo has been extended from Wellington, B. C., north to Cameron Lake, 30 miles.

CENTRAL ARKANSAS & EASTERN.—An officer writes that work is under way by Thompson & Scott, St. Louis, Mo., from McGregor, Ark., east to Stuttgart, 18 miles, and from Junction, north to Hazen, 17 miles. C. D. Purdon, chief engineer, 1342 Pierce building, St. Louis. (June 24, p. 1812.)

CHARLOTTE HARBOR & NORTHERN.—This company is building with its own men from Pierce, Fla., to Mulberry, three miles. (August 5, p. 262.)

CHATTANOOGA SOUTHERN.—A new company, to be known as the Tennessee, Alabama & Georgia, is to be formed to take over the rights and property of this company, including the 27 miles of new track from Rome, Ga., to Rockmart, where connection is to be made with the Seaboard Air Line. Eight miles additional are to be built to connect with the Rome & Northern. This new construction will give the Chattanooga Southern, via the Seaboard Air Line from Rockmart, a through line from Chattanooga, Tenn., to Atlanta, Ga. (September 2, p. 1439.)

COLUMBIAN & PROVIDENT SOUTHERN.—The Columbia Rd. Line is now open for passenger and freight traffic from McLaughlin, S. D., northwest to Mott, N. D., 104 miles, and Eagle Butte extension is open for business from Cheyenne Junction, S. D., to Eagle Butte, 64 miles.

CUTLER & NORTH WESTERN.—A new branch of the Sioux City division has been opened for business from Sioux City, Iowa, north via Merrill, and Craig to Hawarden, 43 miles.

DETROIT, BAY CITY & WESTERN.—This road has been opened for freight traffic from Bay City, Mich., southeast to Caro, 28 miles. It is expected that the line will be opened for passenger service about January 1, 1911.

DETROIT & MACKINAC.—An officer writes that surveys are being made from Posen, Mich., to Rogers City, 13 miles.

DULUTH, WINNIPEG & PACIFIC.—Work is now under way by Foley, Welch & Stewart, St. Paul, Minn., on an extension from Pale Face river, Minn., to Duluth, 50.40 miles. The Wisconsin Bridge & Iron Company, Milwaukee, Wis., has contracts for all the steel bridges on the line.

END, OCHILTREE & WESTERN.—An officer writes that surveys are under way to Ochiltree, Tex., 113 miles from Dalhart. The company is carrying out the construction work with its own men. During the year track was laid on the section from Dalhart to Wilko, 11.8 miles. A. E. Weist, Jr., vice-president and general manager, Dalhart.

ESQUIMALT & NANAIMO.—See Canadian Pacific.

GULF COAST & PROVIDENT CITY.—This company is building from Provident City, Tex., to Glenflora, 31 miles. J. A. Edmondson is doing the grading work, and John Greig the clearing and grubbing. J. G. Reaves, vice-president and general manager, Provident City. (September 23, p. 558.)

KANSAS CITY & MEMPHIS.—Incorporated in Arkansas with \$6,000,000 capital, to build from Rogers, Benton county, Ark., to Memphis, Tenn., with branches to a point in Faulkner, Ark., and to Little Rock; also, from Rogers to Siloam Springs and Eureka Springs, with Wagoner, Okla., as the ultimate destination. The plans call for building about 350 miles of line, on which work is to be started at once. The names of the incorporators are not given.

LEXINGTON & EASTERN.—See Louisville & Nashville.

LOUISVILLE & NASHVILLE.—An officer writes that work is under way by the Callahan Construction Company, Knoxville, Tex., on an extension from Baxter, Ky., to Wisconsin, 26 miles, and between Pongo and Amon, two miles, as well as on the Torres creek spur, an additional two miles.

The Lexington & Eastern has been extended from Jackson, Ky., to Dumont, two miles, and a new branch has been opened for freight traffic from Jackson to Quicksand, three miles.

LOUISIANA & NORTHWEST.—An officer writes that the company is relocating 1.5 miles of main line into Natchitoches, La., and that new terminals and a station are being put up at Natchitoches.

LIDA VALLEY RAILROAD.—Financial arrangements have been made, it is said, to build from Stonewall, Nev., on the Las Vegas & Tonopah, to Lida, about 25 miles, with a one-mile branch to Hornsilver. A. D. Goodenow, general manager.

MAINE CENTRAL.—Work has been finished by this company on the elimination of the Raines Hill crossing in Augusta, Me. The Fletcher-Lahey Company, Boston, Mass., were the contractors. (April 22, p. 1065.)

MANITOULIN & NORTH SHORE.—See Algoma Central & Hudson Bay.

MCCRORY & BEEDEVILLE SOUTHERN.—Work is now under way from McCrory, Ark., to Beedeville, Okla., 14 miles. Clayton Hailey, president, and G. G. McCrory, chief engineer, McCrory. (June 24, p. 1812.)

MEXICO NORTH WESTERN.—Work is now under way by R. M. Dudley, general contractor, Madera, Chihuahua, Mex., on a 41-mile section of the line which is to connect Terrazas with Madera.

MEXICAN RAILWAY.—A concession has been granted by the state of Guerrero, Mex., to F. E. Olendorf, Taxco, Guerrero, to build from Naranjo to Taxco, 19 miles, through a mining section. This is to be a narrow gage line, and it is expected that the work will be finished within a few months.

MISSOURI, OKLAHOMA & GULF.—An officer writes that surveys have been finished and location is made for lines as follows: Spur line to Bromide, Okla., three miles; Coalton, Okla., to Okmulgee, 13 miles, and from Wagoner to Pittsburg, Kan., 125 miles.

MOORE GRAND TRACTION.—An officer writes that the company expects to let contracts next spring for a line from Salina, Kan., south via Gypsum City, Roxbury, Canton and Newton to Wichita. M. M. Bremen, president, Roxbury.

MUSCATINE NORTH & SOUTH.—This road has been extended from Chick Junction, Iowa, south to Kingston, 13 miles.

NEW YORK CENTRAL & Hudson RAILROAD.—The Clearfield, Pa., branch of the Port Authority dry-dock has been extended from Redbank, Pa., to Clearfield, three miles.

NEW YORK, PENNSYLVANIA & NORFOLK.—The Cape Charles Railroad has been opened for business from Cape Charles, Va., to Townsend, nine miles.

NORFOLK & WESTERN.—An officer writes that work is now under way on the Falmouth Port Line, and connection from Port, Va., to Addison, 10.60 miles; also on the Dry Fork branch and extension from Cambridge, W. Va., to Cedar Bluff, Va., 14.70 miles, and on the North Fork branch from Jeanette, W. Va., on 4.31 miles.

NORTH VIRGINIA & ALBANY.—On Dec. 1 work has been finished from Granger, Wash., to Parker, on 17.2 miles, and track laying will be carried out by the company's men.

OKLAHOMA, KANSAS & MISSOURI INTERURBAN.—The company expects to build an extension from Hottelville, Okla., via Baxter Springs, Kan., to Galena, 30 miles. A line is also to be built from Riverton, Kan., to Columbus, nine miles. The company has finished work from Miami, Okla., to Huttonville, five miles.

PACIFIC RAILWAY & NAVIGATION COMPANY.—Work is now under way from the present end of track to Wheeler, Ore., 31 miles. The J. W. Sweney Construction Company, Portland, are the contractors. The line has been located on the section from Timber to Astoria, 82.28 miles.

RICHMOND & CHESAPEAKE BAY.—An officer writes that during the spring of 1911 a line is to be built from Ashland, Va., north to Doswell, seven miles.

ROARING FORK.—Work is under way by Bunn & Co., Big Stone Gap, Va., from Roaring Fork to Big Black mountain, five miles.

ROCKPORT & ARANSAS PASS, INTERURBAN.—Incorporated in Texas with \$10,000 capital and headquarters at Rockport, Tex. The plans call for a line between Rockport and Aransas Pass. The incorporators include: C. F. Hoff, S. A. Clevenger, C. G. Johnson and W. H. Vernon.

SAN PEDRO, LOS ANGELES & SALT LAKE.—An officer writes that work is under way by the Utah Construction Company and the Shattuck-Edinger Company on the line to take the place of the old line between Guelph, Nev., and Caliente, 62 miles.

SOUTHERN PACIFIC.—The report of this company for the year ended June 30, 1910, shows that the additions and changes on line owned or operated made during the year included the following: Central Pacific—Change in line, Deeth, Nev., to Wells, 16.38 miles; Elmhurst, Cal., to Stonehurst, 0.75 miles; the Inter-California was completed from Tecolote, Mex., to Hanlon Junction, Cal., 21.71 miles; the Nevada & California was finished from Mabel to Haiwee, 12.58 miles, and from Haiwee to Olancha, 9.2 miles; the Southern Pacific added 6.23 miles of line, due to change of trackage rights over the Northwestern Pacific; the Tucson & Nogales, from Tucson, Ariz., to Sahuarita, 17.76 miles, was bought from the Twin Buttes Railroad, and a new line built from Sahuarita to Calabasas, 37.69 miles, has been opened for traffic. In addition, the company has construction work under way on lines as follows:

Under the measures reported for the construction of new lines, the Southern Pacific of Arizona, reports that the company has completed to June 30, 1910. The mileage projected under the concession is shown below:

	Projected.	Actual.	Miles.
San Bernardino & Agua Prieta	669.97	—	—
Yuma & Coachella	229.82	—	—
Total	899.79	—	—

Since the close of the fiscal year the Southern Pacific of Mexico has been granted a concession to build from Guadalajara to Mexico City, passing through Zamora and Morelia, changes were also made in all the concessions held by this company in the states of Sonora and Sinaloa. The company is given until November 6, 1915, to complete the line it is now building to Guadalajara and which is at present completed to the Santiago river. It must also designate before that date what branch lines, not to exceed 93 miles in length, it wishes to construct between Navajao and Guadalajara. The company formerly held various concessions to build the following lines: (1) From Tonichi, Sonora, to a point on the northern boundary between San Bernardino and Agua Prieta; (2) from the confluence of the Yaqui and Moctezuma rivers in Sonora, passing through Moctezuma and Cupmas to Nacoziari, Sonora; (3) a branch from line No. 1 to La Barranca, Sonora; (4) a line from Empalme to Guaymas, Sonora; (5) the part of the line which is still lacking between Empalme and Morrito; (6) a line from Lomas to Nogales, Sonora; (7) the part of the line which is to be constructed in order to reach the port of Mazatlan connecting with the main line between Culiacan and Mazatlan, Sinaloa. Under the new concession the company must construct at least 31 miles each year on some of the seven lines, must have 186 miles completed in five years, and all of them must be entirely completed in ten years. The company will have the right to import free of duty for five years, for the exclusive use of the line between Alamos and Guadalajara, machinery for workshops, artisans' tools, lubricating oil, and powder. (See report of this company elsewhere in these columns.)

According to press reports, a line is to be built from Redmond, Ore., at the southern terminus of the Des Chutes Railroad, to Odell, on the Klamath-Natron cut-off, and a line will probably be built from Grants Pass to a point on the northern coast of California at Crescent City. The company also has under consideration the question of constructing a line to Coos Bay.

ST. LOUIS, BROWNSVILLE & MEXICO.—Work is now under way on a branch from Brownsville, Tex., to Brulay plantation, 10 miles.

ST. LOUIS & ST. LIBORY.—This company has projected a line from St. Louis, Mo., southeast to Nashville, Ill., 52 miles. D. O. Thomas, secretary and general manager, Belleville, Ill.

TENNESSEE, ALABAMA & GEORGIA.—See Chattanooga Southern.

TEXAS SOUTHEASTERN.—This road, which is owned by the Southern Pine Lumber Company, according to press reports, will be extended from Lufkin, Tex., to Dallas, about 130 miles, if financial aid is given by towns along the proposed route.

WASIOTO & BLACK MOUNTAIN.—See Louisville and Nashville.

WESTERN OF GEORGIA.—Surveys have been made from Aberdeen, Ga., to Franklin, 37 miles. I. L. McCord, New York, is the contractor. J. N. Orr, president, Noonan, Ga.

WHITE SULPHUR SPRINGS & YELLOWSTONE PARK.—This road has been opened for business from Ringling, Mont., to White Sulphur Springs, 23 miles.

The plans submitted by the Sao-Paulo-Rio Grande for building a line to connect the Parana Railway with the Sao Francisco line at Rio Negro, have been approved by the Brazilian government. The cost of building the line is estimated at about \$157,500.

	Length of Projected Line, Miles.	Track Completed, Miles.	Grading Completed, Miles.	Grading Progressing, Miles.
Arizona Eastern Railroad:				
Phoenix, Ariz., to Hassayampa	30.22	19.91	1.59	12.80
Winkelman to San Carlos	32.79	.94	6.23	—
Bentonian & Willaburg Railroad:				
Beaverton, Ore., to Willaburg	10.55	10.50	.05	—
California Northeastern Railway:				
Weed, Cal., to Klamath Falls, Ore.	88.72	88.72	—	—
Central California Railway:				
Niles, Cal., to Redwood City	16.24	15.52	.72	—
Louisiana Western Railroad:				
Eunice, La., to Mamou	10.76	9.50	—	—
Morgan's Louisiana & Texas R. R. & S. S. Co.:				
Lafayette, La., to Port Allen	52.57	49.12	2.50	—
Nevada & California Railways:				
Olancha, Cal., to Owenyo	29.50	—	29.50	—
Oregon Eastern Railway:				
Natron, Ore., to Klamath Falls	193.80	—	17.13	15.85
Oregon Western Railway:				
Drain, Ore., to Marshfield	73.12	—	—	3.24
Pacific Railway & Navigation Company:				
Hillsboro, Ore., to Tillamook	91.00	59.00	—	—
Sacramento Southern Railroad:				
Sacramento, Cal., to Walnut Grove	23.90	10.12	7.80	2.65

Railway Financial News.

ALABAMA GREAT SOUTHERN.—A dividend of $2\frac{1}{2}$ per cent. has been declared on the common stock, payable December 30. In June, 1909, and in June, 1910, 2 per cent. was declared on the common stock. Previous to 1909 no dividends were paid on the common stock.

ALGOMA CENTRAL & HUDSON BAY.—The Banque Franco-Américaine is offering in Paris, France, \$3,000,000 new first mortgage 5 per cent. bonds of the Algoma Central & Hudson Bay at 463.50 francs per 515 franc bond.

CENTRAL OF NEW JERSEY.—Besides the regular quarterly dividend of 2 per cent., an extra dividend of 2 per cent. has been declared payable out of the earnings of the Lehigh & Wilkesbarre Coal Co. There have been two previous 2 per cent. extra dividends from earnings of the coal company, one paid December 15, 1909, and the other June 25, 1910. Howard W. Maxwell has been elected a director, succeeding J. Rogers Maxwell.

CHATTANOOGA SOUTHERN.—The *Commercial & Financial Chronicle* says that it is proposed to form a new company called the Tennessee, Alabama & Georgia, which is to take over the Chattanooga Southern and is to issue bonds to pay for the proposed extension from Rome, Ga., to Rockmart, 27 miles. See this company also under Railway Construction.

CHESAPEAKE & OHIO.—The syndicate headed by Kuhn, Loeb & Co., New York, which last March underwrote the \$31,930,000 20-year $4\frac{1}{2}$ per cent. convertible bonds issued in connection with the purchase of the Hocking Valley and for other purposes, has been dissolved, the bonds having all been sold.

CHESAPEAKE & OHIO.—See Kanawha Bridge & Terminal.

CINCINNATI, BLUFFTON & CHICAGO.—The circuit court has ordered the sale of this property on March 15, 1911, fixing the upset price at \$800,000.

CUMBERLAND RAILWAY & COAL.—The Dominion Steel Corporation confirms the report that this company, or its directors, have bought a controlling interest in the stock of the Cumberland Railway & Coal Company. The Cumberland Railway & Coal Company owns coal mines at Spring Hill, Nova Scotia, and operates a railway running from Spring Hill Junction, on the Intercolonial to Parrsboro, on the Bay of Fundy.

DELAWARE, LACKAWANNA & WESTERN.—The New Jersey Railroad Commission has given permission to the Newark & Bloomfield, which is leased to the Delaware, Lackawanna & Western, to issue \$1,496,150 additional stock for cash at par.

INTERBOROUGH RAPID TRANSIT.—The new plan of financing has been completed, and is ready for submission to the New York Public Service Commission. This plan will call for \$150,000,000 of new capital. The entire amount will be secured by a first mortgage on the Interborough's present and future property, as the plan calls for the retirement of the outstanding bonds under the existing \$55,000 first mortgage, which are callable in blocks not less than \$1,000,000 at 105 and interest on any interest date.

Proceeds of the \$150,000,000 bond issue will, according to the draft now prepared, be used for the following purposes:

Additional interest	\$75,000,000
Unpaid interest	37,000,000
Redemption of outstanding first mortgage bonds	35,000,000
Redemption of I. & R. T. notes	1,841,000
Total	\$148,841,000

INTERSTATE RAILROAD.—The company has increased its capital stock from \$1,000,000 to \$1,500,000. The road runs from Norton, Va., to Stoner, 16 miles.

KANAWHA BRIDGE & TERMINAL.—The Chesapeake & Ohio has bought the entire capital stock of this company, which owns the bridge across the Great Kanawha river near Charleston, W. Va. The bridge gives the C. & O. its entrance into Charleston and connects it with the Kanawha & Michigan.

MINNEAPOLIS & ST. LOUIS.—Of the \$5,000,000 5 per cent. notes due February 1, 1911, \$1,000,000 are to be paid off, and holders of the remaining \$4,000,000 are offered the privilege of having their notes extended at 5 per cent. to February 1, 1913. The \$4,000,000 notes will be secured by the same collateral now securing the \$5,000,000 notes.

NEWARK & BLOOMFIELD.—See Delaware, Lackawanna & Western.

PHILADELPHIA & READING.—The New York Stock Exchange has listed \$4,110,000 additional general mortgage 4 per cent. bonds of 1887-1897. Of these bonds, \$1,500,000 are to pay for new acquisitions and betterments, and the remaining bonds are to be used for refunding purposes.

TENNESSEE, ALABAMA & GEORGIA.—See Chattanooga Southern.

TONOPAH & TIDEWATER.—A press despatch from Tonopah, Nev., says that the Tonopah & Tidewater is to lease the Tonopah & Goldfield, thereby gaining a connection with the Southern Pacific.

TONOPAH & GOLDFIELD.—See Tonopah & Tidewater.

WABASH-PITTSBURGH TERMINAL.—The receivers of the Wabash-Pittsburgh Terminal and the West Side Belt have been given permission by the United States circuit court to issue \$2,000,000 receivers' certificates to buy 2,000 freight cars for the West Side Belt. The trustee of the bondholders and bondholders' protective committee approved the application and the Wabash Railroad objected.

In the suit brought by the Colonial Trust Company (Chapin committee interests), Pittsburgh, to compel the Wallace protective committee to return bonds deposited with it pending an adoption of a reorganization plan, Judge Noyes, in the United States circuit court, has decided in favor of the Colonial Trust Company. The court holds that the agreement under which bonds are deposited with the Wallace committee permits of owners withdrawing their bonds if they are dissatisfied with the work being done by the protective committee. The time for depositing bonds under the plan of the Chapin committee (Colonial Trust interests) has been extended to January 16, 1911.

FOREIGN RAILWAY NOTES.

A concession has been granted to the Société de Développement de St. Moritz, of Switzerland, for building and operating an electric funicular railway from St. Moritz to l'Alpe Glop.

German freight traffic shows a steady increase from one quarter to another. As compared with the corresponding quarters of last year, freight receipts during the first quarter show an increase of 5.3 per cent. and for the third quarter 7.4 per cent. The increase in passenger receipts is not as regular, for while the first quarter of this year shows an increase of 17.4 per cent. over the same period last year, the increase during the second quarter was only 3.6 per cent. Quarterly returns for passenger traffic tend to show such differences, however, according to the number of Sundays that happen to fall in the respective quarters. German lines total 37,244 miles, or 567 more than a year ago. Therereceipts of the principal government lines are shown in the detail as follows for the month of September, 1910. It should be noted that the Bavarian lines are included:

Line.	Total receipts,	
	September, 1910.	Increase over September, 1909.
Prussian and Hessian	\$42,042,224	\$3,095,428
Bavarian	6,302,814	669,864
Saxony	3,829,350	179,114
Württemberg	1,649,340	82,348
Baden	2,075,733	88,146
Alsace Lorraine	3,410,698	128,282

The Prussian and Hessian lines, managed by the Prussian railway department, have 6,903 stations and 593 workshops. Of these workshops, 70 employ more than 300 persons. Some 3,000 apprentices are trained in 66 workshops. In connection with the Prussian and Hessian lines, the government owns and operates 99 gas works, which produce annually 776,886,000 cu. ft. of gas, and 142 electrical works.

Supply Trade Section.

Charles E. Pollard, designing and selling engineer of the E. W. Bliss Company, Brooklyn, N. Y., died suddenly at his home of apoplexy December 16.

J. G. Bower has been appointed assistant manager of sales for the Western district of the Pressed Steel Car Company, Pittsburgh, Pa., and the Western Steel Car & Foundry Company, with office in the Old Colony building, Chicago, effective January 1, 1911.

The Kennicott Co., Chicago Heights, Ill., has leased one-half of the 14th floor of the Corn Exchange Bank building, Chicago, to be occupied by its sales office exclusively. The company is engaging in new lines and increases in its previous lines are responsible for this step.

Cass L. Kennicott, vice-president and general manager of the Kennicott Co., Chicago Heights, Ill., will deliver an address before the engineering students of the University of Illinois early in February on the Application of Water Seitching to Economical Locomotive Operation.

The Jeffrey Manufacturing Company, Columbus, Ohio, has opened a new office in the Fourth National Bank building, Atlanta, Ga., with D. C. Rose, formerly with the Dodge Manufacturing Company, New York, as manager. A stock of Jeffrey chains and catalogs will be on hand.

The Detroit River Tunnel Company has installed a 25-ton Northern crane, made by the Northern Engineering Works, Detroit, Mich., in its machine department and another of the same make in its power station. Several similar cranes were also installed by the Northern Engineering Works in the Pennsylvania Railroad terminal buildings in New York.

John H. Barker, president of the Haskell & Barker Car Company, died at his home in Michigan City, Ind., on December 4 of double pneumonia. W. J. McBride, vice-president and general manager of the Haskell & Barker Car Company, has been elected president, succeeding John H. Barker. Charles Porter, secretary of the company, has been appointed treasurer and Louis Boisot, secretary.

The Empire Steel & Iron Company, Catsauqua, Pa., has declared a semi-annual dividend of 2 per cent. on its preferred stock—a reduction of 1 per cent., semi-annually. According to a statement of the company, the earnings for the entire year were more than sufficient to pay the full dividend of 6 per cent. on the preferred stock, but owing to the depressed condition of the iron business and the uncertain outlook for the near future it was thought wise to curtail.

The stockholders of the Union Switch & Signal Company, Swissvale, Pa., at the annual meeting in Pittsburgh, Pa., authorized increasing the capital stock from \$2,500,000 to \$5,000,000. A quarterly dividend of 3 per cent. on common and preferred stocks has been declared, payable January 10. Besides, a 60-per cent. stock dividend, payable in equal amounts of common and preferred stock, is announced. It was also announced that stockholders of record on December 31 will have the right to purchase, pro rata, 10,000 shares of new stock at \$75 per share. The par value of the stock is \$50. The remaining 10,000 shares of the new stock will be held in the treasury against future needs. George Westinghouse, president of the company, said that the year now closing would show the greatest volume of business ever done in the history of the company.

TRADE PUBLICATIONS.

Illinois Central.—This company has issued an illustrated folder on the Choice of Routes to Cuba. Time tables, dates of sailings and information about Cuba are included.

Nut Burring Machine.—The National Machinery Company, Tiffin, Ohio, has devoted a two page leaflet to the advantages and illustrations of the national semi-automatic nut burring machine.

Levee Canal.—This company gives some interesting information on the attraction of the Levee Canal, and its construction in a 40-page illustrated booklet. Attention will possibly turn New Orleans.

Southern Pacific.—This company has published a 40-page pamphlet on the attraction of the Levee Canal, showing the growth of this town and the agricultural possibilities of the surrounding country.

Belted Corliss Engines.—The Chubbuck Co., Milwaukee, Wis., has issued a reprint, bulletin No. 1501, on belted Corliss engines giving full description of the Reliance pattern of Corliss engines built by that company.

Northern Pacific.—In a 50-page illustrated booklet called Eastern Washington and Northern Idaho, the Northern Pacific gives detailed information as to population, progress and agricultural resources in that region.

Core Drills.—The Ingersoll-Rand Company, New York, in its illustrated catalogue No. 9001, considers the advantages of Calyx diamondless core drills. These drills are used mainly for mineral prospecting, well digging and soundings.

Air Compressors.—The Chicago Pneumatic Tool Company, Chicago, has published a 100-page catalogue of Franklin air compressors. Diagrams, illustrations, tables and other data give full information about the various types and the methods of installation.

Electric Railways.—Bulletin No. 4794, of the General Electric Co., Schenectady, N. Y., describes the 1,200-volt direct-current interurban lines of the Milwaukee Electric Railway & Light Co. This is a reprint of an article which appears in the *Electric Railway Journal*.

Steam Pumps.—Dean Bros., Indianapolis, Ind., have issued catalogue No. 83 on the Atlantic type steam pumps, boiler feeders and pressure pumps manufactured by that company. The catalogue gives many illustrations and full details concerning these pumps.

Switchboard Meters.—The General Electric Company, Schenectady, N. Y., has devoted its bulletin No. 4662A to Thomson watt-hour meters for switchboard service. The various features of these meters are pointed out in detail, and diagrams, illustrations and tables are included.

Great Northern.—The passenger department of the Great Northern has issued two publications, describing the opportunities in cheap land in the states of Oregon and Minnesota. The homestead laws are fully explained and photographs and descriptive matter concerning the agricultural possibilities of that country are included.

Four-Cylinder Balanced Simple Locomotive.—The American Locomotive Company, New York, has issued Bulletin 1007, relating to the four-cylinder balanced simple Atlantic type locomotive built for the Rock Island, which has now been in service one year. The bulletin is illustrated with drawings showing the general plan and details of the cylinders and valves. The principal item of interest is the report of results of tests made with the engine in fast passenger service between Chicago & Rock Island, as compared with the performance of a two-cylinder simple Atlantic and a four-cylinder balanced compound, the three engines being nearly equal in weight, size of boiler and cylinder capacity.

Mallet Articulated Locomotives.—Record No. 68 of the Baldwin Locomotive Works, Philadelphia, Pa., relates to Mallet articulated locomotives. It describes successive improvements made in this type of engine since it was introduced on American railways in 1904. Among these are: First, the separable boiler with the evaporating portion in the rear section and the feed-water heater in the front section, the separable joint surrounding an intermediate combustion chamber. Second, a frame connection employing a single radius bar; with this form of con-

nection the frames can move vertically with reference to each other without binding at the joint. Third, an improved form of front frame construction, made so the transverse distance between the cylinders can be kept within reasonable limits regardless of distance between frame centers. Fourth, the pneumatic reversing gear connected with the reverse shafts of both high and low pressure cylinders. The record includes illustrations and data relating to 13 different locomotives of various sizes and wheel arrangements. The form of the record has been changed so as to make it more convenient for reference. The half-tone illustration and description are on the left-hand page and the outline drawing, with general dimensions, weights, etc., on the right-hand page. Among the larger locomotives thus illustrated are those having six drivers in each unit, as supplied to the Southern Pacific and the Chicago, Burlington & Quincy; those having six drivers in the front unit and eight in the rear unit, as supplied to the Great Northern; and those having eight drivers in each unit, as supplied to the Norfolk & Western, the Southern Pacific and the Atchison, Topeka & Santa Fe.

RAILWAY STRUCTURES.

AUBURN, WASH.—The Northern Pacific will build a round-house and repair shop and about 50 miles of yard track.

BARSTOW, CAL.—The Atchison, Topeka & Santa Fe expects to open for business the new passenger station at Barstow. The cost of the improvement was \$250,000. (February 11, p. 332.)

CINCINNATI, OHIO.—The Cincinnati Union Depot & Terminal Company has accepted the city's ordinance for a new union passenger station previously mentioned in the *Railway Age Gazette*. The building is to be 200 x 400 ft., located at the corner of Pearl and Third streets. The plans call for fourteen through tracks.

EVERETT, WASH.—According to press reports, the Great Northern will build new wharves, docks and storage tanks for handling fuel oil.

FT. DODGE, IOWA.—The Minneapolis & St. Louis is building a seven-stall roundhouse and has just completed a new machine shop.

JAMAICA, N. Y.—See an item regarding new passenger station for the Long Island Railroad in General News.

LOS ANGELES, CAL.—Plans have been submitted by the Southern Pacific to the city council of Los Angeles for a tunnel through North Main street. The cost of the improvement will be about \$9,200.

MANCHESTER, N. Y.—According to press reports, the Lehigh Valley will build an extensive freight transfer station at Manchester.

MARCUS, WASH.—The Great Northern will build a bridge over the Columbia river at Marcus.

NATCHITOCHES, LA.—See Louisiana & Northwest under Railway Construction.

NEW HAVEN, CONN.—Plans are said to have been approved for a new stone and brick passenger station for the New York, New Haven & Hartford, to be built at New Haven, the work to be finished in about one year.

OBAR, N. MEX.—The Chicago, Rock Island & El Paso is building a new station at Obar.

REDFIELD, ME.—The Maine Central has bought one acre of land in Redfield, to be used as a site for yards and a station.

SAN DIEGO, CAL.—The Atchison, Topeka & Santa Fe is planning to put up a new station at San Diego.

SEATTLE, WASH.—The Oregon & Washington has been granted a permit to build a new bridge on Jackson street. (August 26, p. 375.)

TACOMA, WASH.—The Oregon & Washington has bought land at Tacoma as a site for terminals, freight yards and shipping wharves.

WALTON STATION, TEX.—The cannibosome of the Houston & Texas Central was burned on December 18 and five locomotives which were in the building at the time were badly damaged.

Late News.

The news in this column were received after the classified departments were closed.

The senate on Wednesday confirmed the nominations of B. H. Meyer and C. C. McChord as interstate commerce commissioners.

William R. Butler, of Mauch Chunk, Pa., has been elected a director of the Lehigh Valley to succeed S. P. Wolverton, deceased.

At Pau, France, on Wednesday of this week Mr. Legagneux, the French aviator, flying in the Michelin Cup competition remained in the air from 8:34 a. m. to 2:35 p. m., and made a distance of 516 kilometers, or 320.43 miles.

The Lehigh Valley has declared a semi-annual dividend of 5 per cent. on the common stock. This is an increase of 2 per cent. semi-annually and places the stock on a 10 per cent. per annum basis, as compared with 6 per cent. previously paid.

The Minnesota Railroad Commission at St. Paul, last Tuesday, held a conference with seven signal engineers and three representatives of signal departments—10 railways in all—on the question of drafting a suitable law for Minnesota to regulate the interlocking of signals at crossings; and it was decided to have the question investigated, with a view to seeing if the laws of Illinois and of Canada on this subject would be suitable for application in Minnesota. The chairman of this committee of signal engineers will be Mr. Jorgeson, engineer of the Minnesota commission.

The Pittsburgh, Shawmut & Northern is said to have ordered 6,700 tons of 85-lb. rails from the Carnegie Steel Company. The Mexico North-Western is said to have ordered 5,100 tons of 70-lb. rails from the Tennessee Coal & Iron Company. The Delaware, Lackawanna & Western will probably be in the market shortly for 5,000 tons of bars and track supplies. The Norfolk & Southern is said to be in the market for 8,000 tons of rails. The New York, Ontario & Western is said to be in the market for 10,000 tons of rails. The Delaware & Hudson is said to be in the market for 10,000 tons of rails. The Baltimore & Ohio is considering an order for 40,000 tons of rails.

Walker D. Hines, chairman of the executive committee of the Atchison, Topeka & Santa Fe, told the Hadley Commission on the issuance of railway stocks and bonds (see general news elsewhere in this issue) that, in his opinion, congress has the power to regulate the capitalization of railways engaged in interstate commerce and that he personally was not disposed to offer any objection to the exercise of that power. "I take the broad position," said Mr. Hines, "that any power that can regulate commerce can regulate the operation of the corporations, whose purpose it is to provide the channels of commerce. It is manifest that the public is going to insist upon regulation. It is manifest that state regulation is inadequate; it is a matter far more of federal concern and it follows that eventually and preferably at the very outset federal regulation should be exclusive."

Judge Lovett, president of the Union Pacific and Southern Pacific, said he was in favor of federal regulation rather than state. He added that there was no relation between rate making and regulation. As to the legality of congress to regulate railway rates, Judge Lovett said he was not prepared to give an opinion. He was strongly in favor of the issue of stock without par value. The witness said that if congress had the power to regulate rates it should exercise it so that there would be a uniformity of rates in all states. It should have the exclusive power to fix rates, otherwise he would object to federal regulation at all. The government was not interested, he said, as to whether bonds were good or bad; the interest of the government lay properly in whether the railway received proper consideration for its securities. "It is of no importance what a road owns," he said, "but what it gets." Judge Lovett added that he believed the theory of valuing a railway property by trying to determine the cost of its reproduction was utterly impractical and the adoption of that theory would be exceedingly mischievous.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The *Memphis & Tennessee Bridge Company* will probably be in the market for 2 locomotives shortly.

The *Nashville Copper Mine* is in the market for one consolidation locomotive, with 26 in. x 24 in. cylinders.

The *Iron Springs & Tourist Company*, has ordered 2 eight-wheel switcher locomotives from the Baldwin Locomotive Works.

The *Albany Falls Granite* has ordered 2 consolidation locomotives and 1 eight-wheel American locomotive from the Baldwin Locomotive Works.

The company, *New Orleans & Texas Pacific* has ordered 10 consolidation locomotives and 5 of the Pacific type from the Baldwin Locomotive Works.

The *New Orleans & Western* has ordered 2 six-wheel switching locomotives and 6 consolidation locomotives from the American Locomotive Company. The switchers will have 20½ in. x 26-in. cylinders, 51-in. driving wheels, and the total weight will be 150,000 lbs. The consolidation locomotives will have 21 in. x 32-in. cylinders, 55-in. driving wheels and the total weight will be 202,000 lbs.

The *Boston & Maine* has ordered 40 Pacific locomotives from the American Locomotive Company. The cylinders will be 22 in. by 28 in., the driving wheels 73 in., and the total weight 232,000 lbs. The same railway has also ordered 20 6-wheel switcher locomotives from the American Locomotive Company. The cylinders will be 19 in. by 26 in., the driving wheels 51 in., and the total weight 138,000 lbs. This railway has also ordered 40 consolidation locomotives from the Baldwin Locomotive Works.

The *Minneapolis, St. Paul & Sault Ste. Marie* has ordered 16 Pacific locomotives from the American Locomotive Company. The cylinders will be 25 in. by 26 in., the driving wheels 75 in., and the total weight will be 254,000 lbs. These locomotives will be equipped with superheaters. The same railway has also ordered 15 consolidation locomotives from the American Locomotive Company. The cylinders will be 25 in. by 30 in., the driving wheels will be 63 in., and the total weight will be 225,000 lbs. These locomotives will also be equipped with superheaters.

CAR BUILDING.

The *Chicago & Alton* is in the market for 25 caboose cars.

The *Chesapeake & Ohio* is in the market for 200 40-ton flat cars.

The *Cold Blast Transportation Company* is in the market for 25 all steel tank cars.

The *Swift Refrigerator Transportation Company* is in the market for 50 produce cars.

The *Chicago, New York & Boston Refrigerator Line* is in the market for 300 refrigerator cars.

The *Atlanta & West Point* is in the market for 2 first-class coaches and 2 all-steel postal cars.

The *Pittsburgh, Shawmut & Northern* will be in the market shortly for 2,000 freight cars, including gondola and flat cars.

The *Baltimore & Ohio* has ordered 20 60-ft. coaches from the Pullman Company and 30 70-ft. coaches from the American Car & Foundry Company.

The *Pennsylvania Equipment Company* is in the market for 25 to 50 second-hand wooden self-clearing hopper coal cars of 60,000 to 80,000 lbs. capacity.

The *Pittsburgh & Lake Erie* has ordered 10 coaches and 2 combination passenger and baggage cars from the American Car & Foundry Company. This report is unconfirmed.

The *Great Northern* reported in the *Danvers Appeal* of December 2, at being at the market for freight equipment, has ordered 300 flat cars from the American Car & Foundry Company.

The *London & North Western* is reported in the *Western Age* of December 16, has ordered 400 Standard Simplex flat cars from the American Car & Foundry Company. The body measurements will be 31 ft. 6 in. long and 6 ft. 4 in. high. The over all measurements will be 33 ft. 8¾ in. long, 9 ft. 11¼ in. wide, 10 ft. 7¾ in. high over sides and 11 ft. 3¾ in. high over brake shaft. Bodies and underframes will be steel. The capacity will be 100,000 lbs. The following special equipment will be used:

<ul style="list-style-type: none"> Axles Boilers, body Boilers, ends Brake beams Brake shoes Complers Draws Draw fastenings Draw pins Locating blocks Paint Spring Wheels 	<ul style="list-style-type: none"> 6 ft. 4 in. diameter, A.R. steel, 36 in. Cast steel Standard, 5 in. 7 in. shank Standard Simplex, 5 in. 7 in. shank Standard, 5 in. 7 in. shank Standard, 5 in. 7 in. shank Standard, 5 in. 7 in. shank Standard, 5 in. 7 in. shank Standard, 5 in. 7 in. shank Standard, 5 in. 7 in. shank Standard, 5 in. 7 in. shank Standard, 5 in. 7 in. shank Standard, 5 in. 7 in. shank Standard, 5 in. 7 in. shank
--	--

Other special equipment will conform generally to B. & O. specifications, the railway on which these cars will be used.

IRON AND STEEL.

The *Norfolk & Western* has ordered 3,500 tons of bridge steel from the Pennsylvania Steel Company.

The *Chesapeake & Ohio* is in the market for 15,000 tons of rails, which will be used entirely for renewals.

The *Canadian Car & Foundry Company* has ordered 20,000 tons of plates and shapes from the Carnegie Steel Company.

The *Virginia* has ordered about 2,500 tons of bridge steel from the Virginia Bridge & Iron Company, of Roanoke, Va.

General Conditions in Steel.—Steel men believe that the opening of the year will see a readjustment in prices to a lower basis. In any case the prices will not be higher in the near future. The consumers of finished steel products are taking advantage of this and are withholding all orders except those for immediate use. They have nothing to lose by this policy, for the steel industry is now operating at less than 50 per cent. of its capacity and therefore will be able to fill promptly any increase in orders. The steel manufacturers are trying to maintain the present prices by reducing the output to suit the demands. The prices of light rails have already been reduced by several independent companies. No agreement to maintain the prices of this product exists, so the falling off in orders found a response in a reduction of prices from \$28 a ton to \$24, and even to \$22 a ton.

Settlement of Brake Beam Suit.

The litigation which has been pending for the past two and a half years between the Chicago Railway Equipment Company, Chicago, and The Damascus Brake Beam Company, Cleveland, Ohio, has been finally settled, by a decision of the court of last resort, in favor of The Damascus Brake Beam Company. The controversy involved the right to make the split brake-head, which has been marketed (for use on high speed beams) under the designation Waycott Special. Patent No. 886,603, on the invention of Philip T. Handiges, was issued to The Damascus Brake Beam Company on May 5, 1908. Immediately thereafter, an interference proceeding was instituted by the Chicago Railway Equipment Company, which proceeded through the several tribunals of the patent office, each of which decided in favor of The Damascus Brake Beam Company, and finally went to the Court of Appeals of the District of Columbia, which is the tribunal of last resort on a question of this kind, and which has just handed down its opinion, written by Associate Justice Van Orsdale, affirming the right of The Damascus Brake Beam Company to its patent. As is usual in matters of this kind, more or less effort was made during the pendency of the

litigation to impress on the purchasers of the goods the possibility of being ultimately forced to reckon with a rival manufacturer. The decision in favor of The Damascus Brake Beam Company sustains the right of that concern to make and sell the split brake-head in question.

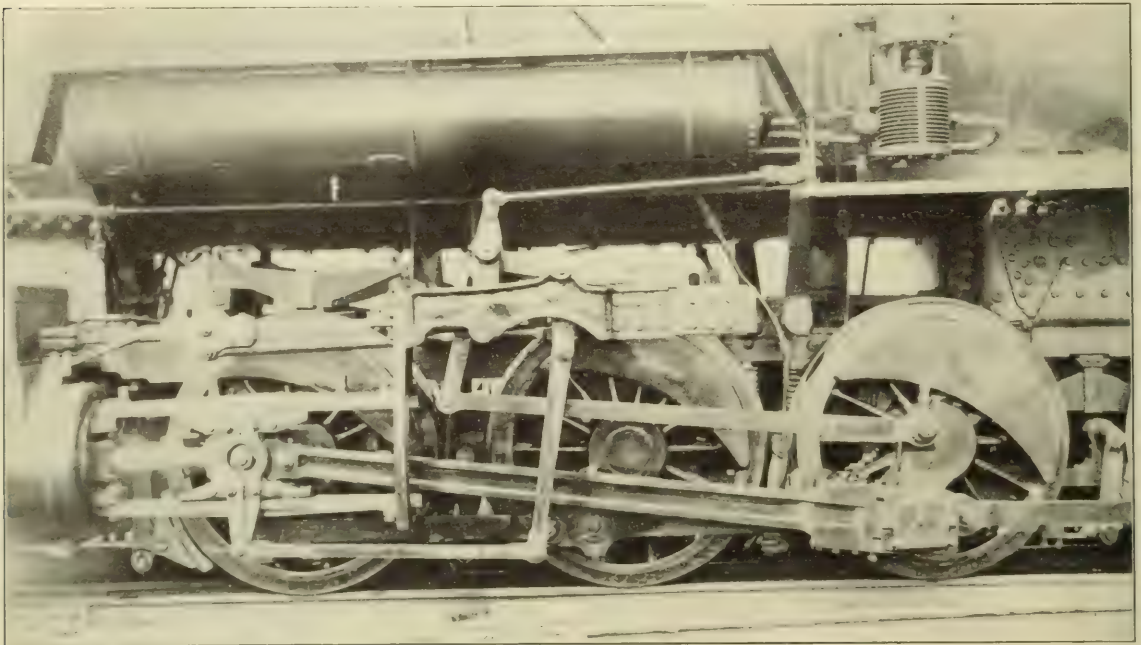
The Improved Baker-Pilliod Valve Gear.

Reports from the locomotive works this year show an increasing number of locomotives built with the Baker-Pilliod valve gear; with the successive applications there has been found opportunity to improve the gear, making it simpler, with fewer parts, lighter, and, consequently, at a lower cost both for original construction and repairs. The development of this gear has been somewhat like that of the Walschaert. The earlier forms of the latter, as used in this country, were not well balanced, and there has been a constant effort to improve the gear in this direction. The same is true of the Baker-Pilliod. In the original construction some of the levers were irregularly loaded, producing twisting moments and unequal wear, but the new form as here illustrated is well balanced and much more

of the bell crank is now on the center line of the gear. It has two vertical arms instead of one, and its position has been shifted forward, so that the vertical arm connects to the gear connection rod.

The eccentric arm which was used originally has been dispensed with, and the gear connection rod now connects the bell crank with the lower end of the radius bar and continues on down to a connection with the front end of the eccentric rod. One of the most important improvements is the change in position of the eccentric rod. The excessive angularity of this rod in the former design was an objectionable feature, and this has been happily remedied by the use of the gear connection rod, which allows the eccentric rod to assume a nearly horizontal position. With the gear as now designed the combination lever no longer carries the weight of the back end of the eccentric arm and the front end of the eccentric rod. This was one of the principal causes of wear in the old gear.

We have referred to the symmetrical design of the new gear, and it will be seen that nearly all parts are centrally hung, except the combination lever, and its offset is utilized as a means



Improved Baker-Pilliod Valve Gear as Applied to a Consolidation Locomotive.

symmetrical about the center line of motion. The Baker-Pilliod gear as applied to a Pacific type of locomotive on the Chicago & Alton was illustrated and described in the *Railway Age Gazette*, January 15, 1909. Some of the recent improvements relate to better facilities in the way of construction and repairs and others to a better movement of the gear itself, securing a more perfect control of the valve motion.

Commencing with the housing or fixed portion of the device, the frame is now made in one piece instead of two, as formerly, and the same casting serves for either side of the engine, replacing the four castings which were formerly required. The new frame is equipped with an extension which permits of the use of the same frame on a variety of engines. One design also serves for the bell crank, as there is now sufficient valve travel obtained to make it answer for a variety of engines.

The radius rod connects at the center of the top of the yoke instead of on the inside, as formerly. The trunnions on the radius bar are bushed in the new gear and the lower end is fitted with a taper pin, so as to connect with the gear connection rod. Several important improvements have been made in the location and design of the bell crank. It is now centrally hung and held in the frame by taper fitted pins. The pins are larger and much longer than in the old practice and the horizontal arm

of transferring motion from the center line of the eccentric rod to the center line of the valve. This is the only lever in the new gear that is subject to twisting moments. In the present construction special attention has been given to the prevention of wear, and all pins are in double shear, taper-fitted, amply keyed, and are all arranged so as to be easily removed for repairs. Improvements have also been made in the methods of lubrication, and each separate detail is now provided with an oil cavity integral with the part and no loose cups are used. The new design dispenses with an objectionable irregularity which was found in the old gear, that due to the curved path of the front end of the eccentric rod. This path is now an arc of a circle, and the valve events are more nearly square in all positions. By this change it is possible to equalize the port openings in full gear.

A comparison of the design here illustrated with that of the former gear will make it evident that considerable improvement has been secured. Every desirable feature in an ideal valve motion is now obtained and many of the objections in the older forms of link motion are entirely overcome. Such a device, which has already demonstrated its good qualities, should now appeal more strongly to those interested in improving this vital part of the locomotive. This valve gear is made by The Pilliod Company, New York.

ANNUAL REPORT

SOUTHERN PACIFIC COMPANY—TWENTY-SIXTH ANNUAL REPORT.

INCOME FOR THE YEAR

The gross receipts and debits of the Southern Pacific Company in respect of its bonded stock are listed in the Proprietary Companies in respect of the same, and the other receipts and debits of the Southern Pacific Company and of its Proprietary Companies after deducting and offsetting the net results between them, were as follows:

	Year Ended June 30, 1910	Year Ended June 30, 1909	Increase or Decrease
Average miles of operating separately, proportionately and consolidated	2,700.76	2,600.15	100.61

TRANSPORTATION OPERATIONS

Gross operating revenues—\$135,022,606.87
Outside operating expenses—\$87,784,222.00

Total	\$135,022,606.87	\$120,521,908.74	+\$14,500,698.13
Operating expenses	\$87,784,222.00	\$80,191,446.46	+\$7,592,775.54
Outside operations—expenses	9,750,813.57	8,604,258.34	+\$1,146,555.23
Taxes (rail lines and prop- erty, less net result of operations)	4,519,374.01	3,788,242.14	+\$731,131.87
Total	\$87,784,222.00	\$79,584,375.14	+\$8,199,846.86
Revenue over expenses and taxes	\$47,238,384.87	\$40,937,533.60	+\$6,300,851.27

INCOME OTHER THAN FROM TRANSPORTATION OPERATIONS

Interest on bonds owned of Proprietary Companies (Table No. 4)	\$884,174.84	\$819,018.78	+\$65,156.06
Interest on bonds owned of companies other than Prop- rietary Companies (Table No. 4)	1,388,733.65	\$67,711.80	+\$1,321,021.85
Dividends on stocks owned of companies other than Proprietary Companies (Table No. 5)	\$5,939,573.28	992,492.22	+\$4,947,081.06
Income from lands and se- curities not pledged for redemption of bonds	894,164.31	\$1,888.13	+\$892,276.18
Income from sinking funds pledged for the redemption of bonds	161,514.97	65,800.00	+\$95,714.97
Balance of interest received on loans and of interest accruing to June 30, on open accounts other than with Proprietary Companies	1,508,878.56	1,430,663.96	+\$78,214.60
Miscellaneous income	65,150.84	60,177.50	+\$5,073.34
Total	\$10,709,180.45	\$5,197,722.33	+\$5,511,458.12
Surplus	\$57,947,565.32	\$46,135,255.93	+\$11,812,309.39

*Includes \$4,590,000 extra dividend from Wells Fargo & Co.'s Express.

FIXED CHARGES.

Interest on outstanding fund- ed debt of Southern Pacific Co. and Proprietary Com- panies (Table No. 6)	\$20,200,665.24	\$17,121,743.73	+\$3,078,921.51
Sinking fund contributions and income from sinking fund investments	378,514.97	572,800.00	-\$194,285.03
Hire of equipment—balance.	448,342.77	404,051.30	+\$44,291.47
Less rentals for lease of road, for joint track, yards, and other facilities, viz.: Collections ..\$179,619.88 Payments ... 398,734.68	\$21,027,522.98	\$18,098,595.03	+\$2,928,927.95
Total fixed charges	\$20,706,637.78	\$17,568,970.14	+\$3,137,667.64
Surplus over fixed charges	\$37,240,927.54	\$28,566,285.79	+\$8,674,641.75

OTHER CHARGES.

Land department expenses	\$113,866.28	\$103,286.95	+\$10,579.33
Taxes on granted and other lands	278,085.58	246,181.00	+\$31,904.58
Miscellaneous expenses	29,260.10	54,934.68	-\$25,674.58
Taxes and other expenses of Southern Pacific Company	317,082.52	414,668.92	-\$97,586.40
Additions and betterments payable from income of Southern Pacific Company	511,819.89	503,847.75	+\$7,972.14
Reserve for depreciation of rolling stock owned by Southern Pacific Company and leased to other com- panies	527,594.94	363,964.08	+\$163,630.86
Total other charges	\$1,777,709.31	\$1,686,883.38	+\$90,825.93
Surplus over fixed and other charges	\$35,463,218.23	\$26,879,402.41	+\$8,583,815.82

The resources of the Southern Pacific Company and Proprietary Companies for the year, and the disposition made thereof (excluding offsetting accounts between them), briefly stated, were as follows:

Resources at beginning of year		
Increase during the year in outstanding stocks and bonds of Southern Pacific Company		
Increase during the year in outstanding stocks and bonds of Proprietary Companies		
Borrowed from Union Pacific Railroad Com- pany	14,816,984.76	
Increase in current cash liabilities	10,901,568.97	
Sinking fund investments released on maturity and redemption of bonds	1,670,780.31	
Less increase in sinking funds and trust funds	\$1,399,603.48	
Increase in reserve for refunding outstanding old bonds of Southern Pacific R. R. Co.	1,566,151.50	
Increase in reserve funds and other contingent liabilities	949,946.75	
Decrease in contingent assets	2,777,248.85	
Gain in profit and loss, viz.: Income from transportation operations	\$135,022,606.87	
Income other than from transportation operations	10,709,180.45	
Profits on stocks sold, pro- ceeds from sale of lands, and other profit and loss credits	9,261,788.92	
Less:		
Operating expenses and taxes	\$87,784,222.00	
Fixed and other income charges	22,530,669.78	
Dividend on common stock	17,238,346.93	
Discount and commission on capital issues	1,993,184.75	
Reserve for refunding out- standing old bonds of Southern Pacific R. R. Co. and other profit and loss charges	4,895,438.30	
	134,440,858.76	
		20,552,717.48
Total resources for the year		\$86,493,157.02

Applied as follows:

For construction of new lines, additions, betterments, equipments, and other prop- erty as shown in detail under "Capital Expenditures"	\$38,157,575.91	
For stocks and bonds of Proprietary Com- panies acquired during the year, as shown in detail in Tables Nos. 12 and 13:		
Purchased for cash	\$6,106,769.67	
Taken over in settlement of advances	13,470,487.57	
	\$19,577,257.24	
Deduct: cost on books of securities sold, ex- changed, redeemed, or cancelled	715,921.12	
		18,861,336.12
For stocks and bonds of other companies acquired during the year as shown in detail in Table No. 14:		
Purchased for cash	\$10,565,351.61	
Deduct: cost on books of securities sold, redeemed, or cancelled	2,700,967.85	
		7,864,383.76
Increase in current cash assets	\$1,602,979.49	
Deduct: decrease in deferred assets	527,916.78	
		1,075,062.71
Increase in material and supplies	1,585,081.72	
Increase in loans, deposits, and notes receivable	7,722,494.47	
		11,227,222.33
Balance—Cash on hand June 30, 1910		\$86,493,157.02

The combined assets and liabilities, excluding therefrom the stocks of the Proprietary Companies deposited against the issue of stocks and bonds of the Southern Pacific Company, also the offsetting open accounts between the Southern Pacific Company and the Proprietary Companies, on June 30, 1910, summarized, were as follows:

Stocks and bonds of Proprietary Companies—	\$734,865.39
Stocks and bonds of other companies—unpledged	45,408,882.4
Bay Shore Line Terminals, and other real estate	51,551,638.95
Timber treating plants, saw mills, and other	31,938,448.59
Steamships and other floating equipment—	12,625,210.07
Advances to Southern Pacific Railroad Co. of Mexico	35,965,601.75
Advances to electric lines in California—	12,103,947.75
Advances to Kern Trading & Oil Co.—	4,086,700.63
Advances to Pacific Fruit Express Co.—	1,165,212.25
Lands and other investments—	1,908,905.19
Sinking funds—	14,773,183.62
Trust funds—	692,473.15
	\$997,259,447.53

Current and Deferred Assets.

Cash—	\$11,227,222.33
Time loans and deposits—	17,047,375.62
Cash accounts—	15,892,508.33
Land contracts—	1,150,087.17
Lands and other investments—	711,147.41
	\$9,357,978.73

Contingent Assets.

San Antonio & Aransas Pass Ry. Co.—	\$1,390,753.59
Expenditures closing crevasse of Colorado River, protection of levees, etc.—	4,022,480.29
Unadjusted accounts—	739,133.29
Land contracts—	1,150,087.17
	\$7,302,454.34

Total \$1,064,119,880.60

Capital Liabilities.

Southern Pacific Company, common stock—	\$272,672,305.64
Southern Pacific Company, preferred stock called for redemption but not presented—	18,325.00
Proprietary Companies:	
Common stock (stock pledged by Southern Pacific Company excluded)—	77,563,111.00
Preferred stock (stock pledged by Southern Pacific Company, excluded)—	12,000,000.00
	\$362,253,741.64
Southern Pacific Company, funded debt—	\$126,792,540.00
Proprietary Companies, funded debt—	361,288,896.35
	\$488,081,436.35
Total stocks and bonds—	\$850,335,177.99

Current and Deferred Liabilities.

Interest and dividends matured—unpaid—	\$644,155.00
Interest and dividends due July 1 and October 1—	11,717,373.73
Interest accrued to June 30, but not due—	4,007,538.47
Due to Union Pacific Railroad Co.—	10,901,568.97
Vouchers and pay-rolls—	12,058,556.12
Other cash accounts—	1,297,328.61
Deferred liabilities—	1,702,393.87
	\$42,328,914.77

Contingent Liabilities.

Insurance funds—	\$5,119,725.50
Rolling stock and floating equipment—	7,130,144.44
Replacement and replacement funds—	3,113,859.32
Principal of deferred payments on land contracts—	1,626,647.59
Fund for refunding outstanding old bonds of Southern Pacific R. R. Co.—	2,539,604.38
	\$19,529,981.23
Difference between par value of stocks of Proprietary Companies and the par value of stock and face value of bonds of the Southern Pacific Company issued therefor—	16,720,493.59
	\$135,792,313.00
	\$1,064,119,880.60

EQUIPMENT.

The accounting regulations of the Interstate Commerce Commission in respect to charges for "Additions and Betterments," effective July 1, 1909, have been adopted by the Southern Pacific Company and its subsidiaries. The results of the operations during the year in the equipment department are shown in the following table:

Condemned, destroyed, sold or transferred to another class, and credited to Equipment.	Added and Charged to Equipment.	Free Asset, S. P. Co. Number.	Total Number.
Passenger-train cars—	1,500	252	1,851
Freight-train cars—	252	1,851	2,103
Work equipment—	210	925	1,135
	2,457	2,351	3,064
	210	218	1,143

Condemned, destroyed, sold or transferred to another class, and credited to Equipment.

Added and Charged to

	Equipment Number.	Free Asset, S. P. Co. Number.	Total Number.
Box cars—	1,500	252	1,851
Passenger-train cars—	252	1,851	2,103
Freight-train cars—	210	925	1,135
Work equipment—	210	925	1,135

The original cost of locomotives condemned, destroyed, sold or transferred to another class and credited to equipment was \$535,045.81; of total passenger-train cars, \$455,325.42; of total freight-train cars, \$1,301,014.69; of work equipment, \$81,714.14; making a total of \$2,372,100.06. The cost of locomotives added and charged to equipment was \$545,823.08; of total passenger-train cars, \$593,461.83; of total freight-train cars, \$703,217.38; of work equipment, \$282,939.43; making a total of \$2,127,441.71. The cost of locomotives added and charged to free assets S. P. Co. was \$256,042.84; of total passenger-train cars, \$2,001,492.14; of total freight-train cars, \$2,667,656.75; of work equipment, \$144,118.12; making a total of \$5,069,309.85. The total cost of locomotives added and charged to equipment and to free assets S. P. Co. was \$801,865.92; of total passenger-train cars, \$2,596,953.97; of total freight-train cars, \$3,376,874.13; of work equipment, \$427,057.35; making a grand total of \$7,196,751.57.

*Credit. †Caused by the purchase of 12 Mallet Mogul and 13 Mallet Consolidation and the sale of 33 locomotives of lighter weight.

The original cost, salvage value, and amount charged to the operating expenses of the equipment retired during the year were as follows:

	Locomotives.	Passenger-train Cars.	Freight-train Cars.	Work Equipment.	Total.
Original cost (estimated if not known)—	\$535,045.81	\$454,325.42	\$1,301,014.69	\$81,714.14	\$2,372,100.06
Proceeds from sale or salvage value—	156,113.21	293,040.13	506,624.35	39,645.00	995,422.69

Charged to Operating Expenses—\$378,932.60 \$161,285.29 \$794,390.34 \$42,069.14 \$1,376,677.37

The locomotives added during the year averaged 102.21 tons total weight of engine, without tender, and 92.70 tons upon drivers, and freight-train cars 50 tons capacity.

The number of locomotives and cars of standard gauge owned, and the total average capacity of freight-train cars at the close of the year were as follows:

	This Year.	Last Year.	Inc. or Dec.	Per Cent.
Locomotives—	1,808	1,822	—14	.77
Total weight, excluding tender (tons)—	134,790	131,565	3,225	2.45
Average weight, excluding tender (tons)—	74.02	71.62	2.40	3.35
Total weight on drivers (tons)—	111,097	108,013	3,084	2.86
Average weight on drivers (tons)—	61.01	58.80	2.21	3.76
Passenger-train cars—	1,942	1,736	206	11.87
Freight-train cars—	44,979	44,188	791	1.79
Total capacity (tons)—	1,728,039	1,632,708	95,331	5.84
Average capacity (tons)—	39.05	37.88	1.17	3.91
Work equipment—	6,318	5,375	943	17.54

The equipment owned by the respective companies is shown in Tables Nos. 24 and 25. The changes during the year, the capacity, and the service of all equipment, are shown in Tables Nos. 33, 34 and 35.

TRANSPORTATION OPERATIONS.

The results of the year's transportation operations compared with those of the preceding year are as follows:

	This Year.	Last Year.	Increase or Decrease.	Per Cent.
Average miles of railway operated—	9,752.26	9,626.43	125.83	1.31
Passenger, including—				
First-class—	\$40,741,845.79	\$34,345,339.36	\$5,899,506.43	17.18
Mail and express—	1,976,372.85	1,678,761.29	297,611.56	17.72
Freight—	77,018,534.26	69,828,880.14	7,139,654.12	10.26
Switching—	2,381,222.48	1,993,923.67	387,298.81	19.46
Total rail lines—	\$124,523,905.08	\$110,846,404.46	\$13,677,500.62	12.34
Outside operations—				
Revenue—	10,498,701.79	9,675,504.38	823,197.41	8.51
Total revenues—	\$135,022,606.87	\$120,521,908.74	\$14,500,698.13	12.03

Operating Expenses.

	This Year.	Last Year.	Increase or Decrease.	Per Cent.
Maintenance of way and structures	16,098,708.22	\$14,534,135.25	\$1,565,569.97	10.77
Maintenance of equipment	15,808,390.67	14,379,762.48	1,428,628.19	9.93
Traffic expenses	2,481,186.30	2,069,939.51	411,246.79	19.87
Transportation expenses	35,658,045.72	32,846,193.00	2,811,852.72	8.56
General expenses ..	3,467,706.51	3,362,844.42	104,862.09	3.12
Total rail lines	\$73,514,034.42	\$67,191,874.66	\$6,322,159.76	9.41
Outside operations	9,780,813.57	8,604,258.34	1,146,555.23	13.33
Total expenses ..	\$83,264,847.99	\$75,796,133.00	\$7,468,714.99	9.85
Gross revenues over total expenses ..	\$51,757,758.88	\$44,725,775.74	\$7,031,983.14	15.72

Passenger Traffic.

Revenue passengers carried	40,190,200	39,337,735	852,465	2.17
Revenue passengers carried one mile	1,805,834,993	1,541,212,518	264,622,475	17.17
Revenue from passenger trains per mile of road	\$4,553.98	\$3,961.01	\$592.97	14.97
Revenue from passenger trains per revenue train mile (a)				
(b)	\$1.89	\$1.84	\$0.05	2.72
Average revenue per passenger per mile	2.188 cents	2.185 cents	.003 cents	.14
Average distance carried	44.93 miles	39.18 miles	5.75 miles	14.68

Freight Traffic.
(Way-bill Tonnage.)

Tons of revenue freight carried	25,962,704	22,713,143	3,249,561	14.31
Tons of revenue freight carried one mile	6,628,685,724	6,055,858,314	572,827,410	9.46
Ton miles per mile of road — revenue freight	678,797	629,087	49,710	7.90
Revenue from freight per mile of road (a)	\$7,772.58	\$7,121.07	\$651.51	9.15
Revenue from freight per revenue train mile	\$4.53	\$4.38	\$0.15	3.43
Average receipts per ton per mile—revenue freight	1.162 cents	1.154 cents	.008 cents	.69
Average distance carried—all freight	243.42 miles	256.52 miles	—13.10 miles	5.11

(a) Based on traffic over rail lines only, length of ferries used between rail stations excluded in distance over which traffic was moved. (b) Revenue passenger trains and all mixed train miles, including 553,003 miles run by motor cars. (c) Revenue freight train and all mixed train miles.

	Total.	141-lb.	116-lb.	96-lb.	90-lb.
Miles of first and additional main tracks operated, excluding mileage operated under trackage rights					
Main line	5,603.47	1.11	—	20.37	696.55
Branches	4,382.57	.65	.24	.38	71.82
Total	9,986.04	1.76	.24	20.75	768.37
Per cent. of total miles of track	100.00	.02	—	.21	7.69
Per cent. last year	100.00	.02	—	.21	2.55

Compared with the preceding year, the per cent. of operating expenses (including expenses of outside operations) to the gross revenues (including those from outside operations) was as follows:

Rail Lines.

	This Year.	Last Year.
For "Maintenance" (Maintenance of Way and Structures, and Maintenance of Equipment)	25.62	26.08
For "Operation" (Traffic Expenses, Transportation Expenses, and General Expenses)	33.41	34.53
Total rail lines	59.03	60.61
Total rail lines and outside operations	61.67	62.89

The operating revenues and operating expenses for the year for all lines, distributed among the respective primary accounts provided for in the classification promulgated by the Interstate Commerce Commission, are shown in Table No. 28 and for each Company in Table No. 29. The details of passenger and freight traffic are shown in Tables Nos. 31 and 32.

The expenses for "Maintenance" increased \$2,994,198.16, or 10.36 per cent., and for Operation \$3,327,961.60, or 8.70 per cent., a total increase of \$6,322,159.76, or 9.41 per cent. These increases resulted principally from the greater amount of repairs and renewals made during the year, the greater mileage of locomotives and of cars, and the higher wage schedules. The increase in expenses for outside operations occurred in the operation of the steamship lines and in the dining car, restaurant and hotel service, resulting principally from the increase in service to the public and from the higher cost of operation.

There are in service twenty-three gasoline motor cars. The mileage of these cars, aggregating 553,003 miles, is included in the mileage statistics.

In the following statements the operating expenses, charged as provided

For in the classification of the Interstate Commerce Commission, have been continued under corresponding items of account in the present statement, except expenses in a separate form.

Maintenance of Way and Structures.

	This Year.	Last Year.	Increase or Decrease.	Per Cent.
Average miles operated—first and additional main tracks	9,989.40	9,858.22	131.18	1.33
Railroad	8,198,182.22	8,198,182.22	—	—
Ties	1,909,692.80	2,065,206.05	—165,513.25	—8.00
Rails	812,116.76	1,294,691.11	—482,574.35	—59.27
Frogs, switches, and other track material	1,722,552.05	1,414,415.24	308,136.81	21.79
Total material road-way and track	\$4,873,551.84	\$4,946,144.24	—\$72,592.40	1.47
Repairs of roadway	6,357,014.43	5,419,665.25	937,349.18	17.30
Bridges, trestles, and culverts	1,203,268.68	1,177,362.39	25,906.29	2.20
Buildings, grounds, and appurtenances	2,178,647.77	1,876,373.58	302,274.19	16.11
Snow and sand fences, and snow sheds	181,324.31	130,954.91	50,369.40	38.46
Electric power, telegraph, and telephone lines	138,810.69	165,997.75	—27,187.06	16.38
Superintendence	832,846.56	726,198.93	106,647.63	14.69
Stationery and printing	40,138.91	29,200.02	10,938.89	37.46
Other expenses	92,817.18	61,238.18	31,579.00	51.57
Property abandoned	200,284.85	—	200,284.85	—
Total	\$16,098,708.22	\$14,533,135.25	\$1,565,569.97	10.77
Cost per mile—all main tracks	\$1,611.58	\$1,474.21	\$137.37	9.32

The increase resulted principally from the maintenance of 131 miles of additional main tracks and 142 miles of sidings, the cost of labor of replacing 216 miles more of rails this year than were replaced last year, from the higher wage schedules, and from charges under the rules of the Interstate Commerce Commission for property abandoned formerly charged to "Profit and Loss."

The following rails, ties, tie plates, and continuous rail joints were used in making renewals, and the entire cost thereof charged to operating expenses, with the exception of \$975,356.61 for increased weight of rail, and improved frogs and switches. In accordance with the Classification of Expenditures for Additions and Betterments promulgated by the Interstate Commerce Commission this sum was charged to capital expenditures.

	This Year.	Last Year.	+Increase.	—Decrease.
Miles of new steel rails	757.74	541.07	+ 216.67	—
Per cent. of renewals of all rail in track, including sidings	5.69	4.14	+ 1.55	—
Number of burnettized ties	2,231,076	1,551,217	+ 679,859	—
Number of other ties	1,383,337	1,726,175	— 342,838	—
Total number of ties	3,614,413	3,277,392	+ 337,021	—
Equal to miles of continuous track	1,277.18	1,162.31	+ 114.87	—
Per cent. of renewal of all ties in track, including sidings	9.59	8.89	+ .70	—
Number of tie plates	6,647,605	4,071,970	+ 2,575,635	—
Equal to miles of continuous track	1,174.49	722.05	+ 452.44	—
Number of continuous rail joints	566,798	349,306	+ 217,492	—
Equal to miles of continuous track	805.11	496.17	+ 308.94	—

The weight of rails per yard in main line and branches at the close of the year was as follows:

	80-lb.	76 and 75-lb.	70-lb.	65-lb.	61.5 and 60-lb.	56-lb.	54-lb. and 54-lb.	52-lb.	50-lb. and less than 50-lb.
Main line	2,666.34	2,069.14	—	—	113.07	12.14	—	—	—
Branches	125.20	641.17	10.72	244.15	1,619.10	118.46	297.02	88.48	1,165.18
Total	2,791.54	2,710.31	10.72	244.15	1,732.17	130.60	297.02	88.48	1,189.93
Per cent. of total miles of track	27.96	27.14	.11	2.44	17.34	1.31	2.97	.89	11.92
Per cent. last year	29.48	29.04	.11	.68	18.01	2.42	2.34	.90	14.24

At the timber treating plants of the companies, 2,340,676 cross ties and 29,899 switch ties were burnettized and 4,868 cross ties and 970,331 cubic feet of piling and other timber were creosoted.

Maintenance of Equipment.

	This Year.	Last Year.	Increase or Decrease.	Per Cent.
Locomotives	\$6,452,213.63	\$5,848,394.35	\$603,819.28	10.32
Passenger-train cars	1,913,598.23	1,527,519.39	386,078.84	25.28
Freight-train cars	5,665,182.95	5,399,991.54	265,191.41	4.91
Work equipment	338,764.54	323,629.58	15,134.96	4.68
Floating equipment	331,417.59	341,903.62	—10,486.03	3.07
Shop machinery and tools	372,183.43	298,856.08	73,327.35	24.54
Superintendence	631,900.65	540,515.72	91,384.93	16.91
Other expenses	103,129.65	98,952.20	4,177.45	4.22
Total	\$15,808,390.67	\$14,379,762.48	\$1,428,628.19	9.93

Although a part of the increase resulted from higher wage schedules and increased price of material, the greater part thereof resulted from the greater service of the equipment. In mileage of locomotives there was an increase of 11.49 per cent., of passenger-train cars of 12.32 per cent., and of freight-train cars of 10.00 per cent.

As in the past, the companies have charged to operating expenses the original cost (estimated, if not known), less salvage, or purchase price of all equipment condemned, destroyed, sold, or vacated from any cause during the year. The amount thus charged is reported under the item of "Renewals" in Table No. 28, and amounted to \$1,376,677.37 against \$1,365,771.92 last year.

The average cost of repairs and renewals per locomotive and per car per annum, and the average number of serviceable locomotives and cars owned during the year were:

	Average Cost per Annum		Av. Serviceable Number	
	This Year.	Last Year.	This Year.	Last Year.
Locomotives, for repairs....	\$3,342.82	\$2,973.37		
for renewals.....	208.09	208.74		
Total	\$3,550.91	\$3,182.11	1,821	1,846
Passenger-train cars, for repairs....	\$1,032.14	\$910.33		
for renewals..	86.25	51.90		
Total	\$1,118.39	\$962.23	1,883	1,759
Freight-train cars, for repairs.....	\$108.55	\$103.65		
for renewals..	17.70	19.05		
Total	\$126.25	\$122.70	44,873	44,011

The equipment owned by the respective Companies is shown in Table No. 25, and the capacity, the service, and the average cost of maintenance, are shown in Tables Nos. 33, 34, and 35.

	Traffic Expenses		Increase or Decrease		Per Cent.
	This Year.	Last Year.			
Outside agencies	\$964,728.18	\$857,529.16	\$107,199.02	12.50	
Advertising	680,402.51	414,008.69	266,393.82	64.34	
Superintendence	582,875.60	571,942.87	10,932.73	1.91	
Stationery and printing....	210,652.50	210,630.56	21.94	.01	
Other expenses	42,527.51	15,828.23	26,699.28	168.68	
Total	\$2,481,186.30	\$2,069,939.51	\$411,246.79	19.87	

The Interstate Commerce Commission accounting regulations require that transportation issued in payment for advertising should be credited to Passenger Revenue and the equivalent charged to Operating Expenses. This accounting regulation has caused the greater part of the increase in advertising.

	Transportation Expenses.		Increase or Decrease		Per Cent.
	This Year.	Last Year.			
Locomotives, fuel for...	\$9,061,522.80	\$7,988,454.54	\$1,073,068.26	13.43	
Locomotive service, other than fuel	7,306,933.04	6,453,241.74	853,691.30	13.23	
Train service	5,865,668.33	5,136,827.76	728,840.57	14.19	
Station and terminal service	8,627,740.71	8,222,464.62	405,276.09	4.93	
Ferry and river service.	675,816.87	647,573.69	28,243.18	4.36	
Injuries, loss, damage, and other casualties	2,256,754.68	2,709,161.05	—452,406.37	16.70	
Superintendence	1,459,396.31	1,345,488.49	113,907.82	8.47	
Stationery and printing.	331,100.99	287,355.07	43,745.92	15.22	
Other expenses	73,111.99	55,626.04	17,485.95	31.43	
Total	\$35,658,045.72	\$32,846,193.00	\$2,811,852.72	8.56	

The work done by the transportation department of the rail lines over that of last year is shown in the following table:

	Tons per Train		Increase or Decrease		Per Cent.
	Tons.	Per Cent.	Tons.	Per Cent.	
Gross operating revenues	\$1,677,500.62	12.34			
Transportation expenses	2,811,852.72	8.56			
Revenue passengers carried one mile.....	264,622,475	17.17			
Mileage of cars in passenger service.....	16,431,224	12.32			
Locomotive mileage with passenger trains, including helping	4,381,606	14.71			
Tons of revenue freight carried one mile.....	57,427,410	9.46			
Tons of revenue and company freight carried one mile.....	758,049,388	10.51			
Mileage of cars in freight service.....	50,199,961	10.00			
Locomotive mileage with freight and mixed trains, including helping	1,373,678	7.16			
Total locomotive mileage in service for which the attendant expenses are charged to "Transportation Expenses"	5,444,576	11.47			

The average number of tons of freight per train, of loaded cars per train (excluding empties), and of tons per loaded car for the year were:

Revenue and Company Freight (Way bill Tonnage.)	Tons per Train		Loaded Cars per Train.		Tons per Loaded Car.	
	Tons.	Per Cent.	Cars.	Per Cent.	Tons.	Per Cent.
Lines east of El Paso	28.27	8.5	18.89	84	20.26	48
Lines west of El Paso	26.11	4.90	25.02	2.46	24.11	50
Average all lines	27.19	4.47	21.95	1.24	20.86	33

*Tons miles per revenue freight train and all mixed train miles.

The cost per locomotive mile run in revenue service and in non-revenue service for which the expenses are charged to "Transportation Expenses" was:

	This Year.	Last Year.	+ Increase. —Decrease.
For fuel for locomotives.....	17.189 cents.	16.895 cents.	+ .294 cents.
For all transportation expenses..	67.641 cents.	69.489 cents.	—1.848 cents.

	General Expenses.		Increase or Decrease.		Per Cent.
	This Year.	Last Year.			
Salaries and expenses of general officers	\$300,944.92	\$348,549.88	—\$47,604.96	13.66	
Salaries and expenses of clerks and attendants....	1,649,445.36	1,643,814.51	5,630.85	.34	
Law expenses	491,720.43	496,707.99	—4,987.56	1.00	
General office expenses.....	203,845.70	219,599.13	—15,753.43	7.17	
Stationery and printing....	157,685.82	125,048.45	32,637.37	26.10	
Insurance	310,574.31	305,079.71	5,494.60	1.80	
Personnel	175,090.77	143,666.28	31,424.49	21.87	
Other expenses	178,399.20	80,378.47	98,020.73	121.95	
Total	\$3,467,706.51	\$3,362,844.42	\$104,862.09	3.12	

GENERAL.

Under the concessions granted for the construction of the railway of the Southern Pacific Railroad of Mexico, referred to in the last annual report, there were completed during the year 115.84 miles, making a total of 899.69 miles of railway completed to June 30, 1910.

The miles of railway projected under the concessions, the miles completed, under construction, and remaining to be constructed are as follows:

	Projected Miles.		Remaining to be Built.	
	June 30, 1910.	Under Construction.	To be Built.	To be Built.
Main Line—Empalme to Guadalajara	840.64	669.87	11.78	158.99
Branch Lines	652.51	229.82	—	422.69
Total	1,493.15	899.69	11.78	581.68

Under the concessions to the Southern Pacific Company, 170.77 miles remain to be completed by November, 1912, and, under the concession to the Cananea, Yaqui River and Pacific Railroad Company, 422.69 miles by May, 1914.

The advances by the Southern Pacific Company for account of the construction of these lines, amounted on June 30, 1910, to \$35,965,601.75. Interest accruing during the year on these advances has not been taken into the "Income for the year" or the assets of the Company.

In addition to the completed lines of railway reported under "Properties and Mileage" and the railway of the Southern Pacific Railroad of Mexico, hereinbefore referred to, construction is progressing on the following lines:

	Length of Projected Line. Miles.	Track Completed. Miles.	Grading Completed. Miles.	Grading Progressing. Miles.
Arizona Eastern Railroad:				
Phoenix to Hassayampa, Arizona.....	39.22	19.91	1.59	12.80
Winkelman to San Carlos, Arizona.....	32.79	.94	6.23	
Beaverton & Willsburg Railroad:				
Beaverton to Willsburg, Oregon.....	10.55	10.50	.05	
California Northeastern Railway:				
Weed, California, to Klamath Falls, Oregon	88.72	88.72		
Central California Railway:				
Niles to Redwood City, California.....	16.24	15.52	.72	
Louisiana Western Railroad:				
Eunice to Mamou, Louisiana.....	10.76	9.50		
Missouri Louisiana & Texas R. R. & S. S. Co.:				
Lafayette to Port Allen, Louisiana.....	52.57	49.12	2.50	
Nevada & California Railway:				
Olancho to Owenyo, California.....	29.50	—	29.50	
Oregon Eastern Railway:				
Natron to Klamath Falls, Oregon.....	193.80	—	17.13	15.85
Oregon Western Railway:				
Drain to Marshfield, Oregon.....	73.12	—	—	3.24
Pacific Railroad & Navigation Company:				
Hillsboro to Tillamook, Oregon.	91.00	59.00		
Sacramento Southern Railroad:				
Sacramento to Walnut Grove, California	23.90	10.12	7.80	2.65

No. 11.—SOUTHERN PACIFIC COMPANY—ASSETS—JUNE 30, 1910.

ASSETS.	June 30, 1910.	*June 30, 1909.
<i>Capital Assets.</i>		
Stocks and bonds of Proprietary Companies pledged—Tables Nos. 12 and 13.....	\$232,532,667.41	\$247,287,543.73
Stocks and bonds of other companies pledged	5,975,513.18	
Total stocks and bonds pledged.....	\$232,532,667.41	\$253,263,056.91
Stocks and bonds of Proprietary Companies unpledged—Tables Nos. 12 and 13.....	45,408,883.94	11,792,671.50
Stocks and bonds of other companies unpledged—Table No. 14.....	51,551,638.95	37,711,742.01
Bay Shore Line terminals, and other real estate	31,938,448.59	25,298,354.22
Timber treating plants, saw mills, and other property	404,698.70	375,691.80
Steamships and other floating equipment—Table No. 24.....	12,625,710.07	11,573,526.34
Rolling stock—Table No. 25.....	16,222,784.92	10,257,687.40
Advances for construction and acquisition of new lines.....	33,545,888.99	31,099,774.58
Advances to Southern Pacific Railroad Co. of Mexico.....	35,965,601.75	29,885,102.13
Advances to electric lines in California.....	12,103,947.75	9,082,856.92
Advances to Kern Trading & Oil Co.....	4,086,700.63	3,862,737.78
Advances to Pacific Fruit Express Co.....	1,165,212.25	
Lands and other investments.....	1,908,905.19	475,201.04
Total	\$479,461,089.14	\$424,678,402.63
Sinking funds	1,044.00	594.00
	\$479,462,133.14	\$424,678,996.63
<i>Current Assets.</i>		
Cash	\$10,718,579.79	\$31,783,013.42
Time loans and deposits.....	17,047,375.62	11,450,000.00
Loans and notes receivable.....	3,316,788.85	1,465,783.94
Agents and conductors.....	2,006,158.68	2,075,972.26
Income accrued to June 30 on securities owned	1,113,904.35	687,062.39
Individuals and companies.....	3,237,510.52	2,689,300.27
U. S. Government transportation.....	907,525.38	1,240,594.82
Material and supplies.....	11,241,592.98	9,561,451.26
	\$49,589,436.17	\$60,953,178.36
<i>Deferred Assets.</i>		
Individuals and companies	\$182,422.13	\$292,962.09
<i>Proprietary Companies.</i>		
Direct Navigation Co.....	\$46,474.76	\$36,704.98
Galveston, Harrisburg & San Antonio Ry. Co.....	10,391,263.47	10,502,434.45
Louisiana Western R. R. Co.....	42,334.49	
Morgan's Louisiana & Texas R. R. & S. Co. Co.....	664,768.68	
Nevada & California Ry. Co.....	42,823.93	
Oregon & California R. R. Co.....	4,946,702.45	6,435,863.90
Southern Pacific Terminal Co.....	21,533.35	104,495.77
	\$16,155,901.13	\$17,079,499.10
Due from other Proprietary Companies....	\$1,304,416.41	\$1,600,694.57
<i>Contingent Assets.</i>		
San Antonio & Aransas Pass Ry. Co.....	\$1,190,753.59	\$3,980,736.58
Individuals and companies.....	31,784.07	178,266.81
Unadjusted accounts—Proprietary Companies.....	138,184.78	228,652.65
Expended for account of Colorado River Crevasse	4,022,480.29	3,769,866.36
	\$5,383,202.71	\$8,157,522.40
Total assets	\$550,277,511.71	\$512,762,853.15

*The assets for the year 1909 have been restated to accord with the classification observed in the year 1910. Includes \$1,098,000. face value, San Antonio & Aransas Pass Ry. Co. Income Bonds (see Cont. Bonds), on which interest is payable on January 1, of each year, only if amount out of net earnings and income.

No. 11.—SOUTHERN PACIFIC COMPANY—LIABILITIES—JUNE 30, 1910.

LIABILITIES.	June 30, 1910.	*June 30, 1909.
<i>Capital Liabilities.</i>		
Common stock	\$272,672,305.64	\$213,910,358.64
Preferred stock called for redemption but not presented	18,325.00	58,626,400.00
Preferred stock—subscription receipts outstanding		365.00
Total capital stocks	\$272,690,630.64	\$272,537,123.64
First mortgage six per cent. steamship bonds, due January 1, 1911.....	\$1,644,000.00	\$1,715,000.00
Four per cent. gold bonds (Central Pacific Stock Collateral), due August 1, 1949: Authenticated by Trustee, \$33,818,500.00 Less in treasury.....	5,049,000.00	
	28,769,500.00	28,769,500.00
Four per cent. twenty year convertible bonds, due June 1, 1929.....	81,137,000.00	79,896,545.71
Four per cent. convertible bonds subscription receipts and scrip.....	15,040.00	
Four and one-half per cent. twenty year gold bonds, due July 1, 1929.....	227,000.00	72,000.00
Two-five years four per cent. gold bonds, due June 1, 1910.....		7,253,000.00
San Francisco Terminal first mortgage four per cent. bonds, due April 1, 1950.....	15,060,000.00	
Total funded debt	\$126,792,540.00	\$117,706,045.71
	\$399,483,170.64	\$390,243,169.35
<i>Current Liabilities.</i>		
Coupons matured—unpaid	\$118,635.00	\$114,897.47
Coupons due July 1.....	3,199,600.00	3,124,482.50
Interest accrued on bonds and loans to June 30, but not due.....	3,379,871.25	2,435,195.62
Dividends due—unpaid	120,242.57	54,523.20
Dividends due, July 1 and October 1.....	8,180,168.73	8,794,585.17
Mortgage bonds satisfied.....	21,000.00	
Traffic and car service.....	322,562.42	651,200.62
Due to Union Pacific R. R. Co.....	10,901,568.97	
Vouchers and payrolls.....	9,762,361.83	7,950,119.46
	\$36,096,010.77	\$23,125,004.04
<i>Deferred Liabilities.</i>		
Pacific Mail Steamship Co.....	\$198,220.04	\$21,501.86
Taxes assessed but not due.....	346,042.69	213,974.67
Wells Fargo & Co.'s Express contract.....	144,000.00	176,000.00
	\$688,262.73	\$411,476.53
<i>Proprietary Companies.</i>		
Central Pacific Ry. Co.....	\$4,364,732.82	\$4,746,879.06
Houston, East and West Texas Ry. Co.....	157,742.85	227,280.41
Houston & Shreveport R. R. Co.....	39,262.72	68,799.37
Houston & Texas Central R. R. Co.....	732,192.87	351,486.20
Louisiana Western R. R. Co.....		76,422.97
Morgan's Louisiana & Texas R. R. & S. Co. Co.....		70,964.41
Nevada & California Ry. Co.....		90,996.84
Southern Pacific R. R. Co.....	40,146,628.73	34,862,690.93
Texas & New Orleans R. R. Co.....	377,216.14	851,955.54
	\$45,817,776.13	\$41,347,475.73
Due to other Proprietary Companies.....	\$1,349,172.58	\$1,003,548.32
<i>Contingent Liabilities.</i>		
Marine insurance fund	\$3,180,381.32	\$3,186,137.15
Steamship insurance fund.....	1,607,697.54	1,607,697.54
Floating equipment replacement fund.....	5,447,809.15	4,694,006.36
Reserve for replacement and depreciation of rolling stock	1,481,083.40	1,160,593.98
Insurance fund	285,919.00	131,305.50
Unadjusted accounts	2,075,991.87	2,405,346.33
Principal of deferred payments on land contracts	157,760.83	128,927.98
	\$14,176,642.11	\$13,314,014.84
Total liabilities	\$497,521,034.96	\$469,444,688.81
Balance to credit of profit and loss.....	\$4,756,470.75	43,318,164.34
Total liabilities	\$552,277,511.71	\$512,762,853.15

*The liabilities for the year 1909 have been restated to accord with the classification observed in the year 1910.

Railway Age Gazette

Including the Railroad Gazette and The Railway Age

PUBLISHED EVERY FRIDAY, AND DAILY EIGHT TIMES IN JUNE, BY
THE RAILROAD GAZETTE (INC.), 83 FULTON ST., NEW YORK.

CHICAGO: Plymouth Bldg. CLEVELAND: Williamson Bldg.
LONDON: Queen Anne's Chambers, Westminster.

W. H. BOARDMAN, *President.*

E. A. SIMMONS, *Vice-Pres. & Treas.*

HENRY LEE, *Secretary.*

The address of the company is the address of the officers.

EDITORS:

W. H. BOARDMAN, <i>Editor.</i>	ROY V. WRIGHT	B. B. ADAMS
SAMUEL O. DUNN,	G. L. FOWLER	W. E. HOOPER
<i>Western Edit. Mgr.</i>	WILLIAM FORSYTH	F. W. KRAEGER
BRADFORD BOARDMAN,	S. W. DUNNING	H. H. SIMMONS
<i>Eastern Edit. Mgr.</i>	CLARENCE DEMING	

Subscriptions, including regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00 a year.
Canada.....	6.00 a year.
Foreign Edition (London).....	£1 12s. (\$8.00) a year.
Single Copies.....	15 cents each.

Shop Edition and the eight M. M. and M. C. B. Convention Daily issues, United States and Mexico, \$1.50; Canada, \$2.00; Foreign, \$3.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

VOL. 49.

DECEMBER 30, 1910.

NUMBER 27.

CONTENTS

EDITORIAL:

Editorial Notes.....	1217
New Construction in 1910.....	1217
Cars and Locomotives Built in 1910.....	1218
Motive Power and Rolling Stock Ordered in 1910.....	1218
Review of 1910.....	1220
Receiverships and Foreclosure Sales.....	1223
Agreement Between Western Railways and Locomotive Engineers.....	1224
New Books.....	1225

ILLUSTRATED:

Review of 1910 Annual Reports.....	1245
Charles H. Markham.....	1254

MISCELLANEOUS:

Railway Officers on the 1911 Outlook.....	1226
Changes in Railway Ownership and Control.....	1242
Dividend Changes and New Securities Issued in 1910.....	1248
Railway Built in 1910.....	1251
Mileage of Railways Block Signaled.....	1255
Cars and Locomotives Ordered in 1910.....	1257
Report of the Interstate Commerce Commission.....	1264
Transportation and Traffic in England.....	1267
Foreign Railway Notes.....	1244, 1248, 1251, 1253, 1254, 1271

GENERAL NEWS SECTION

SUPPLY TRADE SECTION.....	1272
	1283

THE table published elsewhere in this issue shows that the railways of the country have increased their mileage of automatic block signals during the past year considerably more than 3,000 miles, bringing the total mileage of such in the country up to about 17½ thousand miles; and almost half of this is on single track lines. Considering the differences of opinion among railway managers and signal engineers as to the economy and suitability of automatics on single-track, this showing is remarkable. Some of the new automatics put up in 1910 took the place of non-automatic, and the net increase in mileage of all lines block signaled is only about 3,600 miles. One line reports the abandonment of all its block signaling—4 miles. This was manual signaling on a single-track line, and the line has been

made double track. Some companies think that the block system is necessary on double track, but the one cited reported to be not one of these companies. These figures, therefore, about the apparent already that a line which are not altered by their managers to be important enough to justify the introduction of automatic signals, the extension of the use of the block system promises henceforth to be rather slow. The introduction on this line of an automatic block system, such as the single manual system with 10-mile blocks, seems likely to be brought about only by governmental compulsion or in cases where the incentive of self interest is very clear, as in the case of those trolley roads in the West, which had collisions killing large numbers of persons.

NEW CONSTRUCTION IN 1910

THE new railway built during the past year in the United

States is greater than that for the previous year. This is quite a satisfactory showing, as financial conditions have not yet sufficiently improved to induce investors to back new projects, and uncertainty as to the prospects of future traffic has caused the suspension of work already started and prevented other plans for new work being carried out. Official returns from nearly all the railways in the United States, supplemented by our own records and figures furnished by the state railway commissions, show that approximately 4,122 miles of new main line were built in the United States during the calendar year 1910, as compared with 3,748 miles during 1909. The 1909 record was over 500 miles more than for the preceding year, which was the smallest since 1897. These figures include 63 miles of cut-offs in Wisconsin, on the Chicago division of the Minneapolis, St. Paul & Sault Ste. Marie, but they do not include new second, third or fourth track, sidings or electric lines. The actual increase over last year amounts to about 10 per cent.

Many of the larger railways which are included in the list have only added new mileage for work started the previous year, and with a few exceptions no new work of importance has been started. Considerable progress was made during the year in making permanent improvements to roadbed to carry heavier rolling stock, straightening alinement and reducing grades. Many of the strongest railways have reduced construction to the minimum.

On the cut-off which the Atchison, Topeka & Santa Fe is building between Texico, N. Mex. and Coleman, Tex., which is to have a total length of 310 miles, there was completed a section of 160 miles between Lubbock and Coleman. This was the longest single stretch of new road built. The Chicago, Milwaukee & Puget Sound added the largest amount of new mileage, having built 72 miles in Idaho, 93 miles in Washington, 132 miles in South Dakota and 124 miles in North Dakota, a total of 421 miles. The Santa Fe is second with 100 miles in California and 298 miles in Texas. The Northern Pacific built 236 miles.

In Canada, the Grand Trunk Pacific built 335 miles, and on the eastern end the National Transcontinental built 437 miles, a total of 772 miles. On the western end work is under way on 1,163 miles of main line and branches, and on the eastern end on 807 miles. The Canadian Northern added 484 miles in the western provinces of Canada, and revision work was carried out on a section of 11 miles of main line. This company is now at work on 76 miles in Manitoba, 283 miles in Saskatchewan, and 221 miles in Alberta, a total of 580 miles. The Canadian Northern Ontario added 75 miles of new mileage, and now has work under way between Toronto and Ottawa, on 258 miles; also on a 30-mile section between Gowganda Junction and Port Arthur, which are 500 miles apart. This line is being built to connect the eastern lines in Ontario with the western lines at Port Arthur, and will form part of the through route to the Pacific coast. The Canadian Pacific laid a total of 367 miles, and work is now under way on about 263 miles.

In Mexico, the Southern Pacific added 41 miles, has work under way on 33 miles additional, and has located the line from

Tepic to Madgalena. Particulars of the work being carried out by that company were given in our issue of last week. The National Railways of Mexico added 22 miles and has work under way on 64 miles additional.

New main track mileage is reported in 38 states and territories, including Alaska, where 61 miles of new track were built. Texas, which was first in 1909, was first this year, with 756 miles; Washington and North Dakota come next in order, each with over 300 miles; Idaho, Minnesota, Oregon and South Dakota built between 200 and 300 miles each; California, Oklahoma, Montana, North Carolina and Arizona, in descending order, also built over 100 miles of main line in 1910. The largest decrease was in Nevada, where only 12 miles were built, as compared with 303 miles in 1909; nearly all the mileage added in that state last year was built by the Western Pacific, which is now open for traffic. No new mileage was reported in Connecticut, Delaware, District of Columbia, Indiana, Maryland, Massachusetts, Nebraska, New Hampshire, Ohio, Rhode Island, Utah, or Vermont. In Canada, 1,844 miles were reported, as compared with 1,488 miles in 1909, an increase of 356 miles, and in Mexico only 138 miles were reported, as compared with 281 miles the previous year, a decrease of 143 miles. The following table shows our figures for mileage built in the United States during the last eighteen years:

1892.....1,760	1899.....4,894	1905.....4,388
1893.....1,760	1900.....4,894	1906.....5,623
1894.....1,760	1901.....5,368	1907.....5,212
1895.....1,692	1902.....6,026	1908.....3,214
1896.....1,692	1903.....3,652	1909.....3,748
1897.....3,265	1904.....3,832	1910.....4,122

CARS AND LOCOMOTIVES BUILT IN 1910.

AS shown elsewhere in this issue, the amount of equipment ordered by railways in 1910 has been smaller than it was in 1909 and comparatively small as compared with the amount ordered on the average during the last decade. On the other hand, the numbers of cars and locomotives built in 1910 are greater than the numbers built in 1909, and the average numbers of locomotives built compare favorably with those for previous years. We have received reports from 50 car builders and 12 locomotive builders in the United States and Canada. Our investigation indicates that the total number of freight cars built during 1910 has been 180,945; passenger cars, 4,412; locomotives, 4,755. These figures compare with the following for 1909: freight cars, 93,570; passenger cars, 2,849; locomotives, 2,887.

An interesting comparison may be made between the figures for equipment built in the United States alone during 1910 and in previous years. The average number of freight cars built per year in the United States during the 11 years 1899-1909, inclusive, was 142,140; the number built in the United States in 1910 was 170,690. The average number of passenger cars built in the United States per year during the 11 year period mentioned was 2,392; the number of passenger cars built in the United States in 1910 was 4,280. The average number of locomotives built in the United States per year during the 17 years 1893-1909 inclusive was 3,159; the number of locomotives built in the United States in 1910 was 4,529.

The reason why the amount of equipment ordered this year has been less than last year, while the amount built has been larger, is to be found in the peculiar fluctuations of the equipment market. Last year the railways did not place their large orders until the latter half of the year. They continued to place them during the early part of this year, but since about the middle of the year orders have been small. The consequence has been that at the beginning of 1910 the builders had a large amount of work before them and were kept pretty busy during the year, while at the end of the present year they find themselves with much smaller orders on their books than at the beginning of 1910. It seems safe to predict, judging by present inquiries, that orders will show a marked increase during the early part of the new year.

Of the freight cars built in the United States during the past year 166,119 were for domestic service, and 4,571 for export. Of the passenger cars, 4,012 were for domestic service, and 276 for export. Of the freight cars 147,244 were steel or had steel underframes, and of the passenger cars 1,607 were of steel or had steel underframes. All of the freight cars and passenger cars built in Canada were for domestic service. Of the freight cars 2,942 were of steel or had steel underframes. The following table shows the cars built in the past 12 years:

Year.	Freight.	Passenger.	Total.
1899.....	115,886	1,305	121,191
1900.....	115,631	1,636	117,267
1901.....	136,950	2,055	139,005
1902.....	162,599	1,948	164,547
1903.....	153,195	2,007	155,202
1904.....	60,806	2,144	62,950
1905.....	165,155	2,551	168,006
1906.....	240,503	3,167	243,670
1907.....	284,188	3,457	288,645
1908.....	76,555	1,716	78,271
1909.....	93,570	2,849	96,419
1910.....	180,945	4,412	185,357

* Includes Canadian output.

Returns from 12 locomotive builders (9 in the United States and 3 in Canada, including one small plant in the United States whose output is estimated) show that of the 4,529 engines built in the United States 4,215 were for domestic service and 314 were for export. They include 286 compound engines. Of the 226 engines built in Canada all were for domestic service and no compound engines were built. Figures for locomotives built during the last 18 years are given in the following table:

Year.	No. Built.	Year.	No. Built.	Year.	No. Built.
1893.....	2,011	1899.....	3,478	1905.....	5,491
1894.....	695	1900.....	3,153	1906.....	6,952
1895.....	1,101	1901.....	3,384	1907.....	7,362
1896.....	1,175	1902.....	4,070	1908.....	2,342
1897.....	1,251	1903.....	5,152	1909.....	2,887
1898.....	1,875	1904.....	3,441	1910.....	4,755

* Includes Canadian output.

MOTIVE POWER AND ROLLING STOCK ORDERED IN 1910.

THE statistics of motive power and rolling stock ordered in 1910, which we give elsewhere, are decidedly unsatisfactory. They indicate with painful clearness that during the year that ends today the railways of the United States have certainly not been adequately increasing the amount of their equipment, if, indeed, they have not actually been letting the amount of it fit for service decline. Whether compared with those of 1909, or with those for a longer period of years, the orders have been discouragingly small. The number of locomotives ordered in 1909 was 3,350. This year it was 3,787. The number of passenger cars ordered in 1909 was 4,514. This year it has been but 3,881. The number of freight cars ordered in 1909 was 189,369. This year it has been but 141,204.

We began keeping this record of motive power and rolling stock ordered since 1901. If the figures for 1910 be compared with those for the previous nine years for which we have records, this year's showing seems even worse than when compared with that for 1909. The total number of locomotives ordered in the nine years 1901-1909, inclusive, was 34,747, or an average of 3,860 per year. The total number of passenger cars ordered during the same period was 25,176, or an average of 2,797 per year. The total number of freight cars ordered during the same period was 1,689,554, or an average of 187,726 per year.

It will be noted that the average orders for both locomotives and freight cars during the preceding nine years were larger than the orders during 1910. On the other hand, the orders for passenger cars in 1910, although smaller than in 1909, were larger than the average of previous years.

The history of the orders for equipment during this year is almost exactly the reverse of that of last year. Orders were light during the first six months of 1909 and heavy during the last six months. During the first six months of 1910 they were very satisfactory. A heavy slump became manifest about June 1, and during the next five or six months they were very small. There has been some improvement during the last month or two. It does not seem hard to define the conditions that caused the

heavy slump in orders after June 1. It was on May 31 that Judge Dyer at Hannibal, Mo., issued the injunction restraining the western lines from advancing freight rates. After the government got this injunction orders fell off almost as if they had been cut with a knife. The action of the government in starting the proceeding at Hannibal indicated to the railways that its attitude toward advances in rates was antagonistic and created a feeling of uncertainty and fear among railway managers that caused them not only to reduce the number of orders they were giving, but to cancel many orders they had already given. The subsequent federal legislation for the regulation of railways and the agitation over freight rates deepened this feeling of uncertainty and fear, and it was further aggravated by the heavy increase in operating expenses and the declines in net earnings that were disclosed by the monthly reports after the end of the fiscal year 1910.

Last year it was noted that the orders of the large railways for equipment were proportionately larger than those of the small railways. The reverse has been true this year. In many instances large systems which placed heavy orders last year have bought almost no cars at all this year. One large system which bought 12,000 cars last year bought 1,000 this year; another which bought 9,000 last year bought 1,560 this year; another which bought 5,360 last year bought 600 this year; another which bought 5,960 cars last year bought only 325 this year, and of these 125 were cabooses. During the extreme period of dullness following the end of the fiscal year about the only things that kept up the spirits of the car makers at all were the substantial orders for refrigerator cars, which, however, came in the main not from the railways but from the private car lines. It is difficult to see how the conditions that have prevailed during the last six months can continue without doing great harm both to the railways and the railway supply interests.

The year has not been prolific in the development of new designs for freight cars. The bulk of those intended for coal and ore or lumber, principally of the hopper gondola type, are of all-steel construction and of 50-ton capacity. The principal orders for box cars are still for all-wooden cars, though many are built with steel underframes with 40 to 50-ton capacity. Several roads are experimenting with box cars having steel underframes and steel underframes with wood siding, and for large capacity cars this will doubtless prove to be a desirable type of construction. Many refrigerator cars are now built with steel underframes and a considerable improvement has been made in the upper work on this class of car in the way of providing more effective and permanent insulation. The equipment of oil tank cars has been greatly improved, not only by the addition of a large number of new cars, but in the rebuilding of old cars and the substituting of steel underframes for the old wooden ones. Greater safety in freight trains and a large reduction in repairs will result from this wholesale overhauling of the oil tank car, and credit for the proper direction of this work should be given to the M. C. B. committee on this subject.

Rollled steel wheels for freight cars are now used in very large numbers and cast steel wheels with hardened flange and tread are entering the field as promising competitors with the chilled cast iron wheel for high capacity cars.

A number of the smaller car manufacturing companies are extending their products so as to include various methods of reinforcing old wooden cars, especially in the building of steel underframes. Large numbers of steel underframes are also furnished to the railways to be used in new freight car construction. The cast steel truck is rapidly replacing the bar iron diamond truck, which has been the usual construction for so many years.

The year is notable for the inauguration of solid trains of steel passenger cars, including sleepers, parlor cars, coaches and dining cars, passing through the tunnels to the new Pennsylvania station in New York City. To have overcome all the difficulties connected with the change from wood to metal in the construction of sleeping cars and parlors cars, and to have built such a large number as have been turned out in the past year, is a

triumph which is scarcely appreciated by those who do not fully understand the immensity of the undertaking. The use of steel sleepers is extending to other lines, as it is now the established standard of the Pullman Company. While the art of building steel passenger cars has been developed to a point where railways are justified in building large numbers of them, there is still much to be learned and something better still to be desired. The weight of these cars is excessive, and stronger efforts should be made by the railways to reduce it without sacrificing strength and safety. Little has been learned as to the effect of wrecks and of heat on steel passenger cars; that must come gradually. The insulation from heat, cold and noise is far from perfect, and this phase of the problem should have more attention. Ventilation, with the improved methods, is now carried to such a degree that sleeping cars often are not warm enough in winter; some more attention needs to be given to the proper means of keeping the air in cars fresh without getting them too cold. Some railways are hesitating about ordering steel passenger cars because they are not satisfied that the problem of painting them to prevent corrosion has been sufficiently worked out. The testimony of some car painters with limited experience with steel equipment is that the steel cars are retaining the protecting coatings about as well as wood cars. Here, too, time and experience are required to show what is needed in the way of protecting steel passenger cars from corrosion, not only on the outside, but inside and underneath. It is surprising that the work has been done so well, but it should be recognized that it still admits of improvement.

Our record showing the number and types of locomotives built during 1910 includes a large number of the Mallet articulated type. The various modifications of boiler and wheel arrangements for these engines, as well as their enormous weight, must be regarded as the prominent and most striking feature of locomotive development in the United States during the past year. As this type of locomotive has been improved along different lines by the two large locomotive companies, we may refer to some features peculiar to each.

The American Locomotive Company has in its Mallet practice confined itself to rather simple designs both as to boiler and wheel arrangement. While the boilers are very large, they follow the usual construction for the smaller engines, the firebox having a combustion chamber and the boiler shell being principally occupied with long tubes which extend to the smokebox. The tubes have reached the unusual length of 24 ft. and in the latest engines—those for the Chesapeake & Ohio—the combustion chamber is 6½ ft. long. The successful use of tubes of the same length on the Delaware & Hudson Mallets has confirmed the builders in the use of very long tubes, which will be features of a large number of engines to be built. The good steaming qualities of both the Delaware & Hudson and the Chesapeake & Ohio Mallet boilers would indicate that the efficiency of the 6 or 8 ft. of the front end of tubes 24 ft. long, when used directly for steam making purposes, is at least equal to that of the same amount of tube heating surface when used as a feed water heater. The American Locomotive Company has not heretofore used feed water heaters, superheaters, or reheaters in this type of locomotive, but recently orders have been received to equip some Mallet engines with superheaters.

As the tests of smoke tube superheaters show an economy about equal to the 4-cylinder compound locomotives in freight service, it is possible that another form of Mallet locomotive may be built which will have four simple cylinders, all of the same size, and a smoke tube superheater. This would avoid the very large cylinders and pistons which have been used in Mallet engines, and there would be only one size of piston, piston rod and cross-head to maintain; besides this, the arrangement of steam and exhaust pipes would be simpler.

Until recently the American Locomotive Company has been content to place the entire weight of the engine on the drivers, and they prefer to do this where curvature will permit. On some Mallet locomotives for the South African roads and those

for the Chesapeake & Ohio leading and trailing pony trucks are used.

In the practice of the Baldwin Locomotive Works pony trucks, front and back, have been generally used. The separable boiler used by this company has medium length boiler tubes in the back unit and a feed water heater in the front one, and in some engines there is a superheater and a reheater in the compartment between them. The separable boiler doubtless has important advantages, especially in the repair shop, as it is possible to separate the two units and place them on two pits with ample room for the men working on them. It must be a convenience also to get at the ends of the short tubes for running repairs by the use of the manholes, which affords admission to the middle compartment. This design has also been utilized in the conversion of old locomotives into Mallets, as new front units or back units can be supplied by the builders and the remaining part fitted up by the railway company.

The year's work has not produced a locomotive whose weight exceeds the Santa Fe Mallet No. 1700, the total weight of which is 462,450 lbs., and the weight of which on drivers is 412,350 lbs. The nearest approach to this is the Virginian Railway Mallet, built this year by the Baldwin Locomotive Works, which weighs 448,750 lbs., with 405,400 lbs. on drivers. In this engine the feed water heater in the front section contains a large central flue in addition to the small tubes, and in this flue is placed a nest of 2-in. pipes through which the steam flows in its passage from the high pressure to the low pressure of cylinders. This form of reheater has been applied to a number of Mallet engines.

The American Locomotive Company built during 1910 94 engines of the articulated type, and these were distributed among 14 different roads, 11 of which have never before used this class of engine. Up to the middle of December the Baldwin Works had built this year 155 articulated engines. The largest Mallet engines with eight wheels in each unit develop a tractive effort of 96,000 lbs., while those with 10 wheels in each unit will develop a tractive effort of 105,000 lbs. working compound and 126,000 working simple. To develop this enormous power a boiler pressure of 220 lbs. is necessary, and it is possible only at slow piston speed. Several Mallet locomotives have been built for logging railways in different parts of the country, and this type appears especially suitable for this class of work, where the grades are unusually steep, the curves sharp and numerous, and where in many cases units of considerable power are required.

On the Mallet engines recently built for the St. Louis & San Francisco by the American Locomotive Company the steam pipes to the high pressure cylinders are on the inside of the boiler. This change was made so as to avoid the obstruction of outside pipes, which interfere with the view of the engineer. One of these Frisco Mallets is equipped with an automatic stoker, which is giving satisfactory results, and it seems probable that the automatic stoker and locomotives will find its most successful application in the Mallet type of engine, where so large an amount of coal must be burned per hour.

In addition to the fuel economy obtained from superheaters, a decided improvement is found in the operation of high speed passenger engines equipped with this device. It enables an engine to haul heavier loads at higher speeds than the same engine using saturated steam. This has been demonstrated by recent tests on the New York Central and on the Rock Island. The smoke tube superheater has been specified for 85 locomotives on order for the New York Central. The Santa Fe has over 100 engines equipped with its own design of superheater, and during 1910 the Baldwin Locomotive Works equipped more than 300 locomotives with superheaters of various types. The reduction in boiler pressure with superheater engines has been carried to the limit for fast passenger engines, as it is found there is a considerable drop in pressure from boiler to steam chest on account of the friction of steam through the superheater tubes, and this may amount to 15 or 20 lbs.

Apart from the articulated compound, low compound locomotives have been ordered in 1910. The Baldwin Locomotive

Works delivered to the Santa Fe 23 Atlantic type engines with balanced compound cylinders. These engines are fitted with the Jacobs-Shupert fireboxes and reheaters. The Santa Fe now has in service 171 balanced compound Atlantic locomotives. The Grand Trunk ordered 12 compound 2-cylinder consolidations.

The Rock Island has made an interesting test of the 4-cylinder simple balanced Atlantic type locomotive with a smoke tube superheater in competition with a 2-cylinder simple Atlantic and a 4-cylinder balanced compound Atlantic, all of about the same size. The results show that in fast passenger service the 4-cylinder simple engine is more economical in fuel and better adapted to high speed service than the other types. The same results have been obtained from tests on several English railways where the 4-cylinder simple locomotive with superheater is now the favorite for heavy fast passenger service.

The Walschaerts valve gear is being used extensively, and other types of improved valve gear are being applied in considerable numbers.

The regular and successful operation of electric locomotives in handling heavy passenger trains through the Pennsylvania tunnels in New York City, which began in November of this year, is a notable event in electric traction, and the decision of the New York Central and the New Haven to extend their electric service indicates the successful operation of electric locomotives on those lines.

While the year has seen comparatively few locomotives constructed, many of them have been of unusual size and design, and experience with these will serve to make a considerable advance in our knowledge of locomotive performance.

REVIEW OF 1910.

NINETEEN hundred and ten has been a very unusual year in railway history. So many cross-currents have been at work to affect results that it is hard to tell whether in future the owners and managers of the railways and the public will look back to it as a year of progress or as one of retrogression. The year was marked by much important federal legislation for the regulation of railways, by numerous controversies over and arbitrations of wage matters and by an unprecedented struggle over and investigation of proposed advances in railway rates.

The monthly figures of the Interstate Commerce Commission show that both gross and net earnings per mile during the fiscal year were the largest in the history of American railways, exceeding by substantial amounts those of 1907. Operating expenses per mile were somewhat larger than in any previous year, but the increase in them did not offset the increase in gross earnings. Following are the figures for 1907, 1909 and 1910: Gross earnings, 1907, \$11,383; 1909, \$10,381; 1910, \$11,660; operating expenses, 1907, \$7,687; 1909, \$6,865; 1910, \$7,727; net earnings, 1907, \$3,696; 1909, \$3,516; 1910, \$3,933.

The end of the fiscal year, however, marked a change in the fortunes of the railways. In fact, the change had begun before the end of the fiscal year. The wage advances which had been made in the late spring and early summer began to tell on operating expenses, and at the same time the increase in gross earnings became less on most roads and was turned into a decrease on many. The consequence has been that during the latter half of the calendar year a very large majority of the railways have shown declines in net earnings as compared with 1909. Meantime, the railways have been holding down their expenditures for materials and supplies with a firm hand, particularly in the latter half of the year. The effect has been greatly to impair the prosperity of all concerns depending chiefly on railways for business and to stay prosperity in all lines of business.

All classes of persons are looking forward with much interest and some of them with considerable anxiety to the decisions which will be rendered by the Interstate Commerce Commission in the cases involving

advance in freight rates. It is felt that whatever the decisions of the commission may be they will be followed by an improvement in conditions, but that the extent of the improvement will depend largely on what the decision are. Many railway managers, however, think a decision by the commission tending to permit advances in rates would make the condition of the railways and dependent industries worse.

When the year opened a number of measures for the regulation of railways were pending in Congress. The session resulted in the enactment of several laws giving the Interstate Commerce Commission much greater authority. The most important was the Mann-Elkins act, which has been fully reviewed from time to time in these columns. Its principal provisions make telegraph, telephone and cable companies subject to regulation by the commission, amend the long and short haul clause of the Interstate Commerce act by giving the commission wide discretion to determine when a lower rate may be charged for a longer haul; prohibit a railway which has reduced a rate to meet water competition from advancing the rate unless there has been some change in conditions besides the elimination of the water competition; give the commission power when any new rate, fare or classification, or any regulation affecting a rate, is proposed, on complaint or on its own motion, to suspend the rate, etc., for 120 days pending investigation of its reasonableness and then for six months more if the investigation has not been finished; require railways to quote rates in writing and penalize them for misquotations; empower the commission to fix such through rates as seem to it desirable; give the commission full authority on its own motion to institute hearings and issue orders; create a commerce court of five judges, to which appeals from the commission shall lie in practically all cases involving rates and accounts, except criminal proceedings; and create a special commission to investigate the issuance of railway securities.

President Taft has appointed the judges of the commerce court, promoting Chairman Knapp, of the Interstate Commerce Commission, to chief justice of the new court. Commissioner Cockrell also will retire from the commission on January 1 and the president has appointed to succeed them B. H. Meyer, chairman of the Wisconsin Railway Commission, and C. C. McChord, formerly chairman of the Kentucky Railway Commission. The special commission on the issuance of railway securities has also been appointed and is now holding hearings, President Hadley, of Yale University, being chairman.

Congress also amended the act for expediting cases arising under the Sherman law and the Interstate Commerce act; amended the employers' liability act; passed a law requiring common carriers to make monthly reports of accidents to the commission and giving the commission full authority to investigate accidents; and passed an act requiring the commission to designate the number, dimensions, locations and manner of application of safety appliances used on equipment. The commission has prescribed the safety appliance standards for new cars. These are much more complete and definite than the M. C. B. standards. It is probable that further hearings will be held regarding the subject of installing additional and different safety appliances on old cars. As to new equipment, the act goes into effect on July 1, 1911. As to old equipment, the commission is authorized to extend the period within which any carrier must comply with the law.

While the Mann-Elkins act to amend the Interstate Commerce law was pending the railways announced advances in freight rates which had been under consideration for about two years. At the instance of Attorney-General Wickersham, Judge Dyer, of the federal court, issued at Hannibal, Mo., on May 31, an injunction to restrain the western lines from making the advances which they proposed and which were to have gone into effect on June 1. The government

charged that the railways had secured a combination in restraint of trade in violation of the Sherman antitrust law. The result of the proceedings between President Taft and a committee of railway presidents at Washington resulted in an understanding that the president would use his influence with Congress to end the problem of the Mann-Elkins bill giving the commission power to suspend advances in freight rates pending and put into effect at such a time as should be determined that the railways would withdraw the proposed advances and submit them to the Interstate Commerce Commission. In accordance with this agreement the advances in rates were postponed, not only by the western lines but by the railways all over the country.

The provision giving the commission power to restrain advances in rates was speedily passed and put into effect. The advances in rates were again announced and hearings regarding their reasonableness were begun. The testimony regarding them is all in. It is very voluminous and a large amount of matter got into the record which has no direct bearing on the questions involved, but the evidence contains a vast amount of very important data regarding the railway situation. The hearings were given wide publicity through the press, and as a result the public now probably has a better understanding of the railway situation than it ever had before. One of the most important advances made by the western roads was one of 10 cents a ton on coal from points in Indiana and Illinois to points in these states, particularly to Chicago. The Illinois Railway Commission investigated these advances, found that the roads were not making a reasonable profit from the coal business, and, while it refused to allow the 10-cent advance, permitted a 7-cent advance.

The opposition to the increase in rates and more penetrating government regulation of railway management has impaired railway credit, and this, taken in conjunction with the world-wide demand among investors for a high interest rate, has made the year a poor one for railway financing. In the early part of the year, however, large amounts of securities were sold abroad. Dividend changes were few and comparatively unimportant. There were no important roads placed in receivers' hands and the sales under foreclosure were the aftermath of previous years' financial troubles.

When the year opened the railways in the Northwest were suffering from a strike declared by their employees belonging to the Switchmen's Union of America, and which the railways soon after won decisively. There was also a strike of conductors, trainmen and yardmen on the Grand Trunk and the Central Vermont, which began on July 18 and was called off on August 2. On the former date President Hays made a proposition to the employees, which they rejected. The proposition which they finally accepted was substantially that made at the beginning of the strike by Mr. Hays, although they were given some concessions not originally contemplated.

In general, however, the year was free from railway labor disturbances. There were various strike votes, but they were usually followed by some form of mediation or arbitration, which resulted in peaceable settlement. Among the arbitrations were those between the Illinois Central and its telegraphers; between the Chicago lines and their switchmen belonging to the Brotherhood of Railroad Trainmen and also with their switchmen belonging to the Switchmen's Union; between the western roads and the Brotherhood of Firemen and Enginemen; between the Baltimore & Ohio and its trainmen; between the New York Central and its conductors and brakemen; etc. All the arbitrations resulted in the employees being given less than they asked for and more than the railways thought they were entitled to.

The trainmen on the eastern lines started out with the determination of getting their wages standardized instead of having them on different bases on the different roads. They were in a very large measure successful. They first de-

manded advances on the Baltimore & Ohio, which had a combination of wages almost as high as those on the Pennsylvania, higher than on most eastern roads, and a strong labor organization. The mediation by Chairman Knapp, of the Interstate Commerce Commission, and Labor Commissioner Neill resulted in advances on the Baltimore & Ohio, and subsequently the Baltimore & Ohio scale, with slight differences on different roads owing to differences in conditions, was adopted on most of the eastern lines. As the year closes, the railways have just got another of their wage troubles settled. The Brotherhood of Locomotive Engineers sought very large advances on 61 western railways. The managers offered them advances varying from $7\frac{1}{2}$ to $14\frac{1}{2}$ per cent., averaging about $9\frac{1}{2}$ per cent. Their proposition was rejected and a strike vote was taken. The managers then asked for mediation under the Erdman act, which resulted in a settlement under which the roads gave aggregate advances of 10.1 per cent.

The net results are that railway labor in most parts of the country is now receiving higher wages than ever before. There have been as yet, however, no indications that it will give more or better work in return.

The courts during the year have rendered a number of decisions which tend to strengthen the hands of the Interstate Commerce Commission. Perhaps the most important were those in the case of the commission against the Illinois Central, involving the question of distribution of cars, and in the Missouri river rate cases. The court in the former case upheld the order of the commission in language which led many to think that it would not interfere with any orders issued by the commission in performance of its administrative duties, unless their effect would be practically to confiscate the property of the railway or railways affected. In the Missouri river rate cases the commission had ordered the proportions between the Mississippi and Missouri rivers of the through class rates from the Atlantic seaboard to the Missouri river reduced on the ground that the through rate should be less than the sum of the local rates from the seaboard to the Mississippi river plus the locals from the Mississippi river to the Missouri river. It had made a similar order regarding rates from the seaboard to Denver. The railways attacked these orders on the ground that the commission had exceeded its power. The Supreme Court held against the roads, without, however, clearly defining the commission's powers or holding that the rates fixed by it were reasonable in themselves. It is an interesting fact that the decision in the car distribution case was written by Justice White, who has just been appointed Chief Justice, while Justice White dissented from the majority opinion in the Missouri river rate case. While the effect of these decisions is to indicate that the commission has more power than the counsel of the railways thought it had, it cannot be said that they have made any clearer just what the extent of its power over rates and service is.

The commission has rendered a number of important decisions during the year. The most important were those in the so-called Pacific coast cases, in which extensive reductions to points between the Missouri river and the Pacific coast were ordered. While the commission held that the rates to such points as Spokane, Wash., Salt Lake City, Utah, and Phoenix, Ariz., are unreasonable and indicated that, generally speaking, they ought to be reduced about 20 per cent., it did not require that the reductions be made at once, but directed the roads to make a check showing what their earnings are under the rates now in effect and what they would be if the commission's rulings were complied with. The roads have been making this check. There is no doubt that the result will be extensive reductions in rates in the West. It now seems not improbable, however, that another result will be advances in many of the rates to the Pacific coast.

In April the commission held that the rates of the Pullman Company were unreasonable and that the company should make some reductions in the rates for lower berths and should establish a differential between the rates for upper and lower berths. Chairman Knapp and Commissioner Harlan dissented. The order of the commission applied only to rates between Chicago and St. Paul and between points in the Northwest. The Pullman Company got a hearing, and announced when the commission convened in Chicago to hold it that the company had decided to make quite substantial reductions in rates for lower berths throughout the country and to establish a differential between upper and lower berths which would make the upper berths about 20 per cent. cheaper than the lowers. The commission has announced that it has tentatively accepted the reductions proposed by the Pullman Company. The net reduction will be, it is estimated by the commission, about \$1,500,000 annually.

The signal engineers of the railways have made marked progress during the past year, not so much in new inventions as in more complete and intelligent utilization of improved features already known and pretty well tried. Improvements have been made in electric interlocking machines. The use of track circuit locking, both route locking and approach locking, has been used extensively. The use of signals worked by electric motors, at plants where the switches are worked mechanically, by hand power, is now general and is common for home signals as well as for distant signals. The use of alternating currents for track circuits wherever there is any danger from stray currents is now considered a necessity. The top-post signal mechanism has found increasing favor.

The introduction of automatic block signals on single-track lines has increased, and this increase seems likely to continue. Theoretical disadvantages connected with the use of automatic signals on single track appear to be outweighed by the increase in the capacity of the railway that is made possible, and by other advantages. Moreover, the manufacturers and the maintainers have both so improved their work that those failures of signals which delay trains and cause other annoyances are less frequent than in former years. This greatly helps the progress of automatic signaling on single-track.

The influence of the signal engineer in the operating department seems to be increasing. In former years his work has in many cases seemed to fail of adequate appreciation, but this condition happily is passing away.

The electric interurban railways are beginning to pay attention to block signals, and one of them, the Illinois Traction System, has announced its intention of having its whole line signaled. Disastrous collisions in Indiana, Illinois and elsewhere have impressed this plain lesson, which has been for so many years neglected. One electric road in the state of Washington has introduced not only automatic block signals but automatic train stops, as recently noticed in these columns.

Over 4,000 miles of new road were built during the year, which is fully up to expectations. The greater part of this mileage was on new lines or extensions on which work had been begun in the previous year; projects decided on during 1910, either new roads or extensions of old ones, have been limited to only the most pressing needs.

A number of changes in the personnel of railway presidents took place during the year. Daniel Willard became president of the Baltimore & Ohio, succeeding Oscar G. Murray; Darius Miller became president of the Burlington, succeeding George B. Harris; Edwin T. Lamb was elected president of the Norfolk Southern; Fairfax Harrison was elected president of the Chicago, Indianapolis & Louisville, succeeding Ira G. Rawn, deceased; John F. Stevens succeeded George B. French as president of the Spokane, Portland & Seattle; W. A. Gardner was elected president of the Chicago & North-Western, succeeding Marvin Hughitt, who was made chairman of the board; G. G. Lacy was elected president of the St. Joseph & Grand Island; Lucius Tuttle retired

from the presidency of the Boston & Maine and was succeeded by Charles S. Mellen, also president of the New York, New Haven & Hartford. J. T. Harahan will soon retire from the presidency of the Illinois Central and will be succeeded by Charles H. Markham; William T. Noonan was elected president of the Buffalo, Rochester & Pittsburgh; H. G. Hetzel was elected president of the Chicago & Western Indiana, and F. R. Sheldon was elected president of the Kanawha & Michigan, succeeding Nicholas Monsarrat, deceased.

The railway year was marred by two bad scandals. One was the alleged defrauding of the Chicago & Western Indiana out of about \$850,000 by its former president and real estate agent, and a Chicago real estate dealer. The other was the defrauding of the Illinois Central out of amounts estimated at from \$1,500,000 to \$2,000,000 by a conspiracy between certain of its operating officers and certain car-repair concerns. Disgraceful as these things are, they suggest, not, as many people think, that wholesale dishonesty is characteristic of railway management, but rather that dishonesty in the railway business is very uncommon. The number of cases where railways have been robbed of considerable amounts by trusted officers and employees has been very small when one considers the magnitude of the railway business in this country and the enormous sums of money that annually pass through the treasuries of the railway companies.

While the record of the year 1910 cannot be said to be anywhere near entirely satisfactory, it is believed that railway men have reason to enter on the year 1911 rather hopefully. In the first place, railway management, after having gone through the crucible of public agitation for some five years, is now on a higher plane and better entitled to public confidence and co-operation than ever before. As has already been said, one of the results of the hearings before the Interstate Commerce Commission has been to educate the public and press regarding railway matters as they never before have been educated. Everyone who talks much with those outside the railway business or reads the newspapers and the magazines much must have noted evidences of declining popular hostility and of increasing popular understanding of railway needs and friendliness toward railway enterprise. The railways are a long way yet from occupying the place in public esteem that they desire and merit. But in view of what already has been accomplished, both in putting the management on a higher plane and in creating a more favorable public sentiment, there seems good ground to expect that the long struggle to establish proper relations between the roads and the public will ultimately be fairly successful.

RECEIVERSHIPS AND FORECLOSURE SALES.

THERE were seven roads placed in the hands of receivers in 1910, the most important one being the Buffalo & Susquehanna. This property had been financed largely by Fisk & Robinson of New York, and when Fisk & Robinson placed their affairs in the hands of a receiver it became necessary to place the Buffalo & Susquehanna also in a receiver's hands. H. I. Miller was appointed receiver. The other small roads that Fisk & Robinson had been interested in were in such shape as to make receiverships unnecessary. It will be noted by examination of the accompanying tables that even a smaller mileage of roads were put in receivers' hands in 1910 than in 1909, although there was two more roads this year than the year before.

The Delaware & Eastern was put in the hands of a receiver following the failure of the bankers who had been financing the road; the road having failed to earn its operating expenses for some time previous.

The Bartlett-Florence, an 11-mile road, running from Bartlett, Tex., to Jarrell, was put in the hands of S. W. Brown as receiver in August.

C. C. Murphy was appointed receiver of the New Mexico Central in January.

F. W. Matthews was appointed receiver of the 10-mile San Antonio & Rio Grande.

As noted in the article on Changes in Railway Ownership and Control, the Savannah Valley Railroad was sold to the Brinson Railway, but apparently not under foreclosure of any mortgage.

William Bird was appointed on December 27, temporary receiver of the Albia & Centerville, a 24-mile road, running from Albia, Iowa, to Centerville.

In the following table, which shows receiverships established in 1910, no mention is made of the Hocking Valley. At the time of the sale of control of the Hocking Valley to the Chesapeake & Ohio, minority stockholders, in an effort to prevent the exercise of this control by the Chesapeake & Ohio, applied to the state courts of Ohio for a receiver, and the application was granted; but an injunction was issued immediately by the federal court preventing the receiver from taking possession of the property, and the state courts' action was later overruled.

RECEIVERSHIPS ESTABLISHED IN 1910.

Railway.	Mileage.	Funded debt.	Stock.
Bartlett-Florence.....	11	\$78,000	\$25,000
*Buffalo & Susquehanna Railway	361	17,568,000	14,000,000
Delaware & Eastern.....	46	1,234,500	720,000
Fort Dodge, Des Moines & So. .	167	5,702,000	6,700,000
New Mexico Central.....	116	2,500,000	2,500,000
San Antonio & Rio Grande.....	10	.....	.....
Albia & Centerville.....	24	.....	400,000
	735	\$27,082,500	\$24,345,000

*The Buffalo & Susquehanna Railroad, a subsidiary of the Railway, was placed in the hands of the same receiver as the Railway. Mileage, funded debt, etc., is combined mileage, funded debt, etc., of the two companies.

The number, mileage and capitalization of the railways that have failed since 1875 are as follows:

SUMMARY OF RECEIVERSHIPS FOR 35 YEARS.

Year.	No. of roads.	Miles.	Bonds and stocks.
1876.....	42	6,662	\$467,000,000
1877.....	38	3,637	220,294,000
1878.....	27	2,320	92,385,000
1879.....	12	1,102	39,367,000
1880.....	13	885	140,265,000
1881.....	5	110	3,742,000
1882.....	12	912	39,074,000
1883.....	11	1,990	108,470,000
1884.....	37	11,038	714,755,000
1885.....	44	8,836	385,460,000
1886.....	13	1,799	70,346,000
1887.....	9	1,046	90,318,000
1888.....	22	3,270	186,814,000
1889.....	22	3,803	99,664,000
1890.....	26	2,963	105,007,000
1891.....	26	2,159	84,479,000
1892.....	36	10,508	357,692,000
1893.....	74	29,340	1,781,046,000
1894.....	38	7,025	395,791,000
1895.....	31	4,089	369,075,000
1896.....	34	5,441	275,597,000
1897.....	18	1,537	92,909,000
1898.....	18	2,069	138,701,000
1899.....	10	1,019	52,285,000
1900.....	16	1,165	78,234,000
1901.....	4	73	1,627,000
1902.....	5	278	5,835,000
1903.....	9	229	18,823,000
1904.....	8	744	36,069,000
1905.....	10	3,593	176,321,000
1906.....	6	204	55,042,000
1907.....	7	317	13,585,000
1908.....	24	8,009	596,359,000
1909.....	5	859	78,095,000
1910.....	7	735	51,427,500
Total, 35 years....	719	129,233	\$7,421,953,500

Although there were 18 roads sold under foreclosure in 1910 as compared with 12 in 1909, the mileage in 1910 was less than half the mileage sold in 1909; in other words, most of the more important roads forced into receiverships in the financial depression of 1908 had gotten their affairs straightened out and passed through reorganization before the beginning of 1910. The small roads had taken longer to straighten out their affairs.

The Wabash-Pittsburgh Terminal, the Wheeling & Lake Erie, the Ann Arbor and the Detroit, Toledo & Ironton are still in the hands of receivers, and there was not sufficient progress made in 1910 toward reorganization or foreclosure sale for any definite plans to be made public. The 18 roads that were sold under foreclosure in 1910 had a total mileage of 1,100, with \$42,639,059 funded debt outstanding and \$51,021,050 stock outstanding. Taking the roads up roughly in order of their importance, the Chicago Terminal Transfer was sold in January to representatives of the Baltimore & Ohio. The finances of the company were reorganized and a new company—the Baltimore & Ohio Chicago Terminal—was formed, this company issuing its securities in exchange for Chicago Terminal Transfer securities; the B. & O., of course, retaining control.

The Chicago, Cincinnati & Louisville was bought in by the Chesapeake & Ohio Railway of Indiana for \$5,200,000; the Chesapeake & Ohio of Indiana being a subsidiary of the Chesapeake & Ohio. The total bonded debt of the C. C. & L. was paid off from the purchase price received from the C. & O., and a new \$50,000,000 mortgage was authorized, of which \$8,200,000 bonds are to be issued at present.

The two Walsh roads—the Southern Indiana and the Chicago Southern—were sold to a new company—the Chicago, Terre Haute & Bedford—which issued \$6,500,000 income 4 per cent. bonds; \$5,500,000 stock; left undisturbed \$7,537,000 first mortgage 4 per cent. bonds of the Southern Indiana, and authorized \$20,000,000 first and refunding mortgage bonds.

The Wisconsin & Michigan was sold in February for taxes, the selling price being \$67,990, which, it is understood, just about covered taxes and interest.

The Altoona & Beech Creek was sold for \$15,100 to A. H. Davis.

The Berkeley Springs & Potomac, which is a six-mile line, operated by the Baltimore & Ohio, was sold under foreclosure to the B. & O., the sale being a formality to perfect the title.

The Cincinnati, Bluffton & Chicago was ordered sold December 5.

The Manistique Railway was sold to the vice-president and general manager of the Duluth & North Minnesota.

The Mt. Airy & Eastern was sold for \$20,000.

The Rio Grande Railroad was sold to a representative of the St. Louis & San Francisco.

The Savannah, Augusta & Northern was sold to W. J. Oliver, who held a contractor's lien on the property.

The Sebasticook & Moosehead was sold in June. The Guardian Savings & Trust Co. of Cleveland had 90 per cent. of the outstanding bonds deposited with it, but these securities were withdrawn.

The Sparks Western was sold to the Georgia & Florida for \$100,000.

The following table shows the foreclosure sales in 1910, no account being taken of sales other than foreclosure or of sales of electric roads. The Pittsburgh, Summerville & Clarion is now shown in the table, because, apparently, although sold to G. W. Mageath and associates, the sale was not a foreclosure sale.

Railway	Mileage.	Funded debt.	Stock.
Altoona & Beech Creek	24	—	\$99,600
Baltimore & Ohio Chicago Terminal	36	—	30,000
Chicago, Cincinnati & Louisville	84	\$6,170,000	4,206,000
Chicago Southern	134	3,790,000	1,500,000
Chicago, Terre Haute & Bedford	190	16,239,000	30,000,000
Cincinnati, Bluffton & Chicago	53	1,000,000	1,100,000
Manistique Railway	24	115,000	150,000
Mt. Airy & Eastern	19	30,059	24,250
Pittsburgh, Summerville & Clarion	—	—	—
Rio Grande Railroad	60	—	1,000,000
Sebasticook & Moosehead	—	—	—
Savannah, Augusta & Northern	25	380,000	—
Southern Indiana	116	100,000	180,000
Sparks Western	113	10,749,000	11,000,000
Wisconsin & Michigan	145	2,401,000	941,000
Total	1,100	\$42,639,059	\$51,021,050

Following is the record taken from our files of foreclosure sales since 1875:

SUMMARY OF FORECLOSURE SALES IN 35 YEARS.			
Year.	No. of roads.	Miles.	Bonds and stocks.
1876	30	3,840	\$217,848,000
1877	34	3,875	198,984,000
1878	48	3,906	311,631,000
1879	65	4,909	243,288,000
1880	31	3,775	263,882,000
1881	29	2,617	137,923,000
1882	16	867	65,426,000
1883	18	1,354	47,100,000
1884	15	710	23,504,000
1885	22	3,156	278,394,000
1886	45	7,687	374,109,000
1887	31	5,478	328,181,000
1888	19	1,596	64,555,000
1889	25	2,930	137,815,000
1890	29	3,825	182,495,000
1891	21	3,223	169,069,000
1892	28	1,922	95,898,000
1893	25	1,613	79,924,000
1894	42	5,643	318,999,000
1895	52	12,831	761,791,000
1896	58	13,730	1,150,377,000
1897	42	6,675	517,680,000
1898	47	6,054	252,910,000
1899	32	4,294	267,534,000
1900	24	3,477	190,374,000
1901	17	1,139	85,808,000
1902	20	693	39,788,000
1903	13	555	15,885,000
1904	13	524	28,266,000
1905	6	679	20,307,000
1906	8	262	10,400,000
1907	6	114	13,777,000
1908	3	138	2,547,000
1909	12	2,629	250,033,000
1910	17	1,100	93,660,100
Total, 35 years...	963	117,820	\$7,240,162,109

AGREEMENT BETWEEN WESTERN RAILWAYS AND LOCOMOTIVE ENGINEERS.

AS noted in our news columns the controversy between the western railways and their locomotive engineers regarding wages and conditions of employment was settled by an agreement reached on December 24. The settlement finally reached differs so very little from the proposition made by the railway managers on November 7 that it is clear it might easily have been effected without the resort to a strike vote for the purpose of intimidating the railway managements. It seemed inevitable that the settlement, whether effected by strike, mediation or arbitration, ultimately would be substantially on the basis proposed by the railway managers, for the offer made was the greatest in both percentage and money ever tendered to a labor organization in the history of western railways; and also because the managers clearly indicated that if the employees would withdraw their demands for certain rules they would give them additional advances in wages which would have made their proposition only one-tenth of 1 per cent. less than the advance finally agreed on. The prolonging of the controversy was entirely due to manifestations of self-seeking ambition by certain of the labor leaders, which, it is believed, have not tended to strengthen them with their organization.

One of the three principal points in controversy was the demand of the men for double pay for running Mallet locomotives. This type of engine is now in use on eight of the sixty-one railways concerned. It was claimed by the managers that the care and skill required in handling Mallets is no greater than in handling locomotives of smaller size, because their reverse-levers, sand-levers, bell-ringers, etc., are operated by air power, and so simply that they could be manipulated by a child. They have other labor-saving devices, such as driving-box lubricator, water pressure to cool hot bearings, Walschaerts outside valve gear, and some minor improvements. There is some additional responsibility connected with the operation of one of these large engines, and the railways invariably have taken this

into consideration and made substantial differential in the rate of pay on them. To go further than that, as the engine men demanded, and pay almost twice as high wages on Mallet as on other freight engines, would tend to make futile the efforts of the railroads to reduce the cost of transportation.

It is constantly necessary in the present state of the rate controversy for even the most honest and well-intentioned of railway men to keep in mind the effects of his actions on public feeling and to avoid doing anything that will in the slightest seem like wilful extravagance. Therefore, in conceding the engine men a differential amounting to an increase of approximately 18 per cent. for Mallet type locomotives the managers seem to have gone as far in the interest of harmony as circumstances justify; farther, indeed.

A second important point in controversy was the regulation of pay for preparatory time, this being the period intervening between the time the men are required to report for duty and that set for the departure of their trains, usually 30 minutes. During this period the engine man is required to look over and oil the locomotive and satisfy himself that it is in proper condition to make the trip. The brotherhood demanded compensation for this time.

While recognizing fully the equity of paying them for all time worked, the managers insisted this 30 minutes has always been included in what constitutes a day's work. One hundred miles or less, ten hours or less, entitle engineers to a day's pay for any trip or run consisting of 100 miles or less, completed within ten hours' time; if over 100 miles are run, or more than ten hours used, the additional mileage or hours are paid for at the same rate. If a trip of less than 100 miles consumes more than ten hours, overtime is paid for all time used to complete the trip in excess of ten hours. This basis of computing a day's work and overtime has been maintained for many years, and there is no disposition on the part of the western managers to change it. They insist that for a trip of 100 miles or less—for which the engineer reports for duty, for example, at 7 a. m. for a train which is to start at 7.30 a. m., and which reaches its destination and relieved him from duty at 5.00 p. m., he having been on duty but ten hours all told, including the 30 minutes for which preparatory time is now claimed,—no compensation over a day's pay should be allowed. If, however, the trip consumed 10 hours and 30 minutes, the managers were willing to pay for preparatory time. To allow for preparatory time when the maximum hours in a day's work were not put in, seemed unreasonable.

In other trades a day's work is so many hours, after which overtime at the rate of time, time and a half or double time, according to the urgency and nature of the work, is allowed; rarely, if ever, is overtime allowed until the total hours constituting a day's work have been put in. The locomotive runner may and frequently does complete his trip within from three to seven hours, when he is the gainer of several hours' time which can be devoted to his own use for either rest or recreation.

A third point in controversy arose through demands of the men that their organization be given seniority rights on motor cars; and on this the managers granted the demand of the men, for the sake of peace. This was a matter properly to be handled by the individual roads, as motor cars are in use on but five or six of the railways represented, and about half of them are on a single system. Locomotive enginemen ordinarily get experience first as roundhousemen or mechanics; second, as locomotive firemen; third, as runners of switching engines; fourth, on freight trains, and, lastly, on passenger trains. On reaching the last stage an engineman is, or should be, as competent to handle a locomotive in passenger service, as experience in all branches and under all conditions of the service will make him; but he will not necessarily be qualified for service on a gasoline motor car.

The gasoline motor car is propelled by an internal com-

bustion engine quite different in construction and principle from a steam locomotive. Its control is entirely as a motor car, and must equip himself with a knowledge of a power different entirely from steam, and after getting a superficial knowledge of a gasoline motor a locomotive engineman must have weeks, possibly months, training to give him enough practical experience and understanding of its principles and operation as to entitle him to operation as a motor car. During this time of the failures and breakdowns must be expected, and consequent interruptions to business, annoyances to the public and loss and expense to the railway company. A man specially trained as a motorman has naturally the same interest in his own success as one trained as a locomotive runner, and in addition a more vital interest in his occupation, as, unlike the brotherhood engineer, he cannot fall back on the locomotive, after a short service on the motor car, at the very time when his knowledge of motor cars is just beginning to be of value to the company, and simply because the work does not appeal to him and the novelty of running a new machine has worn off.

It cannot be argued, of course, that a locomotive engine runner who fully qualifies himself for the service cannot advantageously be used as a motorman. The real trouble arises out of his right under the agreement to relinquish at will a service in which he has had experience to a brother locomotive engineman who, though he may have done what he could to qualify for the service, still lacks the practical experience which is essential in any occupation before efficiency is possible. Past results show more reliable and economical operation and fewer casualties and breakdowns with the specially trained and experienced motormen than with the locomotive engineer.

Seniority rights of conductors, brakemen, switchmen enginemen and firemen have not in the past been interchangeable, although after a year or more of experience each may have a fair knowledge of the work of the other, and in an emergency might act temporarily for each other, as in the case of a conductor relieving an engineman, or a brakeman relieving a fireman. The duties of conductors and brakemen are not materially different in motor car and in steam service, and no question need be raised between the railways and organizations of these employees regarding motor car operation. The situation regarding locomotive enginemen is, for the reasons stated, altogether different, and it may yet appear that the managers have gone too far in granting this concession simply for the purpose of ending a controversy, which, as we have pointed out, had no merit as applied to this service.

NEW BOOKS.

Railway Management at Stations. By E. B. Ivatts. London: McCorquodale & Company; New York: D. Van Nostrand Company. Cloth, 605 pages, 5½ in. x 8¼ in.; price, \$2.50.

This well known work, a complete treatise on the duties of the station agent, both passenger and freight, now appears in its fifth edition. The first edition was noticed in our issue of June 26, 1885. The book has been adopted as one of the text books in the examination of clerks on some of the English railways. It is written wholly from the British standpoint, but it deals fully with general principles and takes up the most minute details, so that it contains much of interest to American readers. Indeed, Mr. Ivatts, though his career as a railway officer was spent mostly in England, Ireland and India, was for a short time on the old Buffalo & Lake Huron, now a part of the Grand Trunk Railway of Canada, so that he is familiar with American methods.

The thoroughness with which Mr. Ivatts does his work is indicated by the fact that the index to the book, in small type, fills 30 pages. There is a glossary filling 25 pages. Indeed, about the only fault of the book is its extreme devotion to detail. It would be necessary to introduce severe tests to compel a young beginner to assimilate it—but such a course would pay.

RAILWAY OFFICERS ON THE 1911 OUTLOOK.

The following are answers to our usual circular letter of inquiry. We classify them geographically, but have agreed in each case to protect the identity of the writer:

QUESTION 1.—DO COMPLAINTS ABOUT RATES COME TO YOU BASED ON THE COST TO THE ULTIMATE CONSUMER, OR TO WHAT EXTENT ARE THEY DUE TO RIVALRIES BETWEEN DIFFERENT TRADE CENTERS?

Answers from Roads in Central West, and Trunk Lines.

Road A.—Substantially all the complaints that come to us with reference to rates have no relation whatever to the cost to the ultimate consumer. They bear almost wholly on the question of a fair and proper adjustment of rates as between different trade or industrial centers. —*President.*

Road B.—I do not recall hearing any complaints about rates based on the cost to the ultimate consumer. Such complaints as are made are due to rivalries between different trade centres, and rivalries between middlemen or other sellers of goods. —*Chairman.*

Road C.—We have only a small local road, and hear no complaints about our road. —*President.*

Road D.—Very few complaints; public seems to be willing to concede advance. —*President.*

Road E.—I have not yet heard any complaint from the ultimate consumer with respect to freight rates. —*President.*

Road F.—I think as a general thing the objections to increases in rates are due to rivalry between the different trade centers, and if the adjustment could be kept as it is there would be very little objection. —*President.*

Road G.—There are practically no complaints about rates based on the cost to the ultimate consumer. They are usually due to rivalries between different trade centers or to the competition our patrons meet at the important centers of distribution. —*Vice-President.*

Road H.—Complaints about rates are due almost wholly to competition between trade centers and rivalry among politicians. —*President.*

Road I.—I think the basis for most of the complaints about freight and passenger rates is a desire of one locality to get some advantage over another, rather than any desire to reduce the cost of transportation, and thereby the cost of various articles transported to the ultimate consumer. —*General Superintendent.*

Road J.—Complaints are numerous and probably not abnormal, considering the great volume of traffic handled. None of them are from the consumer, but from the manufacturer, jobber or middleman, and are nearly all in regard to relative rates between the different producing and jobbing centers. Fully 50 per cent. of the shippers feel that the railways—especially east of the Mississippi river—should have better rates, and have so expressed themselves; but a limited number of people—who might be classed as insurgents—seem to control and direct big commercial organizations, and seem to think it their duty to oppose every advance. This was illustrated in the recent advance in the rates on coal from Illinois points to Chicago, which was strenuously opposed by the Illinois Manufacturers' Association even after their own accountants learned from the books of the railways that the rates were not remunerative. This is simply human nature, for I never yet saw a buyer who would voluntarily see the price that he paid for a commodity advanced; and the purchaser of transportation is no exception to the general rule. Most of them will tell you that they think railways are entitled to an advance in rates, but they will then sit down to prove to you that their own particular commodity—whether high or low class—should not be advanced. —*President.*

East—Answers to Question 1.

Road A.—Complaints about rates *do not* come to us either from manufacturer or consumer; nor have there been public meetings, nor committees of safety, nor indignation meetings held in any town or community which we serve, about rates charged either for passenger or freight service. Where then comes the clamor about rates, and why do the lawyers who are appearing before the commission and protesting about increased rates conceal whom they are representing? Why are not the local newspapers along the line, and published in those communities where there are factories and industries, filled with items and editorials covering the hardships to their factories and industries, and giving accounts of meetings of employees and of owners, all on the subject of unjust rates, etc.? I defy anyone to produce any such news items from manufacturing centers and communities. —*Vice-President.*

Road B.—As less than 25 per cent. of our tonnage originates on this line, and as nearly all of it is confined to limestone and ores, we have had very few complaints about rates. —*Vice-President.*

Road C.—The ultimate consumer is apparently never taken into consideration in movements for rate reductions. —*President.*

Road D.—In the majority of cases complaints about rates seem to be almost wholly based upon an assumed probability, or possibility, that, regardless of the effect upon the railway, advances can be prevented, or reductions forced. In one instance representation was made at Washington, by sundry lumber manufacturers, that a 10 per cent. general advance in rates was being attempted under the filing of a specific tariff. The representation was made to the secretary of the navy, who passed it to the attorney-general, who moved, by telegraph, to request a suspension of the operation of the tariff. The request was promptly honored, conditional upon its being explained how it could legally be met. Transfer of the matter to the Interstate Commerce Commission resulted, and the operation of the tariff was suspended for some time. After it was made effective a record was kept of the effect upon the shippers. It appears to be shown that, in four months, they actually paid \$1,886.52 *less* than they would have paid had not the tariff been arranged for—at the end of a year, more or less, of negotiation and consideration by traffic experts. The extent to which pressure at trade centers is exerted, or attempted, in connection with transportation development, on the theory of public benefit, for the benefit of the state or of the nation at large, is not, and cannot be, changed by law, or by amendments, decrees or decisions. The individual merchant prefers, as a rule, not to move to new and changed conditions which are brought about to help many persons, many communities and many sections of natural resources where there are no communities. Being established, and comfortable as he is, he rebels against being disturbed. He is blinded to the good of all by selfishness. —*President.*

Road E.—Complaints about rates seldom are based on the cost to the ultimate consumer. They are very much more frequently due to rivalries between different trade centres. The freight rate is usually a negligible factor in the sales price of almost any article, with the exception of commodities, and the commodities rates we all know are very low. —*Vice-President.*

South—Answers to Question 1.

Road A.—The complaint regarding rates seem to be largely traceable to rivalry between different trade centers and not to consumers. The majority of consumers with whom I come in contact are willing to submit to increases in rates that will justify an increased service. —*Vice-President.*

Road C.—All the complaints that come to us in regard to rates are from parties who want an advantage in rates over their competitors in business. No one ever bothers about the ulti-

ultimate consumer, the rates charged by railway have but little to do with the price paid by the ultimate consumer.

—General Superintendent.

Road D.—Complaints of rates are general and not specific. There is, of course, rivalry between different communities to secure lower rates, but the general proposition to advance rates seems to be an unpopular one with the public on general principles and through ignorance of conditions. —Vice-President.

Road E.—No specific complaints have been made as to rates. —General Manager.

Road F.—There is no noted complaint in this section of the country and the individual complaints are not based on the cost to the ultimate consumer nor due to rivalry between different trade centers, but are actuated by selfish motives on the part of the complainant, who is usually a manufacturer or jobber.

—General Manager.

Road G.—Complaints of rates are in the main induced by the commercial rivalry of towns, cities or states. The ultimate consumer manifests little or no interest, other than that engendered by those in whom he may be interested, either as a community or in business undertakings.

—Vice-President.

Southwest—Answers to Question 1.

Road A.—The ultimate consumer is a complainant from whom we hear very little. The most numerous complaints respecting rates come from traffic men employed by large corporations and traffic managers of boards of trade and similar commercial organizations; these latter have their own jobs to struggle for and their activities represent competition between localities rather than solicitude for the consumer. Comparatively few complaints respecting rates are based, in the last analysis, on the amount of money represented by the rate, or on the addition that such rates make to the cost of a given article; complaints arise principally from alleged favoritism as between given localities, or alleged favoritism as between one commodity and another, or alleged poor train service.

—Chairman.

Road B.—The ultimate consumer makes very little complaint about rates; most of the complaints originate by reason of rivalry between trade centers.

—Vice-President.

Road C.—Complaints about freight rates rarely originate with the ultimate consumer. These complaints have their origin either in the rivalry between different trade centers or between individual wholesale dealers and jobbers. A great many articles which are purchased by the actual consumer get practically the same price in all sections of the United States, and such articles make up such a large percentage of the cost to the actual consumer that freight rates, *per se*, cut very little figure in his expenditures. The only way this does affect the actual consumer is when the dealer takes advantage of a slight increase in freight rates to add several times the increase in freight rates to the retail cost.

—Vice-President.

Road D.—Complaints about rates almost invariably come to us on account of rivalry between trade centers, and rarely, if ever, from the ultimate consumer.

—General Manager.

Road E.—So far as my experience goes, complaints do not come to us based on the cost to the ultimate consumer, but are altogether due to rivalries in different trade centers. The complaints from the ultimate consumer are so few in this section of the country as to justify the conclusion that such consumer is either not sufficiently advised as to the rate proportioned to fix responsibility on it for the selling price, or else knows that freight rates are not to blame. So far as my experience goes, I am inclined to believe that people do not know anything about the freight rate on their products and such an item is too small compared to the other cost to be much of a factor. All requests for rate reductions, that is practically all, come from the large sellers and manufacturers, and the ultimate consumer knows very little about them.

—Vice-President.

Road F.—I don't have heard much about freight rates, but I have heard a great deal about the cost to the ultimate consumer. It is generally due to rivalries between different trade centers.

—Vice-President.

West and Transcontinental—Answers to Question 1.

Road A.—Complaints rarely come to us about rates because of the cost to the ultimate consumer. (Most of our rates are based on the desire to obtain an advantage over a rival community, or to remove an alleged discrimination in favor of a rival community, or to increase the profits, or decrease the loss, in an existing business by taking something away from the transportation company. The employment by many progressive cities now of an active man makes it necessary for that man, in order to justify his employment, to create more or less disturbance and to show that he is needed, in order to place the particular community and the business done therein on a satisfactory basis with other communities. Rarely do we have any complaints as to rates because of the freight paid by the individual consumer of merchandise or manufactured articles.)

—President.

Road B.—On our lines, for some time past, the principal complaints against rates have been their relation to each other, involving chiefly the exceptions to the hard and fast rule in the fourth section of the Interstate Commerce law before its amendment. It may be said also that, as a rule, all complaints against given rates are supported by reference to other rates—either the rates on other commodities or the rates between other points—but it is not always that these comparisons are founded upon rivalries between trade centers for the same consuming territory. I think it is safe to say that it is very rare, in fact I do not recall a case, where a complaint against rates is based upon the cost to the ultimate consumer.

—Vice-President.

Road C.—Complaints about rates are almost wholly instigated by competition between trade centers. Cost to the ultimate consumer is a favorite argument for reduction in rates whether applicable or not, just as is every other argument which can be advanced, such as higher intermediate rates, cost of service, rate per ton per mile on the same or some other similar commodity elsewhere, etc., etc.; but real solicitude for an ultimate consumer is not in fact the occasion for many of the demands for reduction in freight rates.

—Assistant to President.

Road D.—We have practically no complaints of rates based on the cost to the ultimate consumer. All are related to competition between the different jobbing or would-be jobbing cities.

—Vice-President.

Road E.—Complaints in regard to freight rates in this territory do not come from the consumers, but are due to the rivalry between the various trade centers and competition between various manufacturers and supply men. The cost to the consumer is in but very rare cases reduced or governed by freight rates.

—General Manager.

Road F.—I have received very few, if any, complaints about increase in rates; but what agitation I have heard about this subject seems to be due to rivalries between the different trade centers.

—Vice-President.

Road G.—We seldom, if ever, receive a complaint about rates from the ultimate consumer. In almost all cases the complaints grow out of a desire on the part of communities to secure some advantage over places with which they compete, or to be put on what they regard as more of an equality with other trade centers. The freight rate fabric of this country, as it exists to-day, has been evolved out of commercial conditions as they have changed from time to time during the past half century. Under it, some cities favored in their geographical location have drawn a somewhat better adjustment of rates than others not so fortunately situated. Many of the latter class are constantly striving to overcome their natural handicap at the expense of the rail-

ways, usually by the employment of traffic experts, whose principal, if not sole, duties are to devise ways and means of securing a reduction in the freight rates for the community they serve. To this element, and the personal ambitions of a certain class of politicians, can be attributed most of the anti-railway agitation in the past four or five years. The so-called ultimate consumer is little concerned with or affected by freight rates except where, as is often the case, a merchant seizes upon a slight raise in the freight rate as an excuse to increase his price to the purchaser several times that amount and lays the whole advance to higher freight rates.

—President.

Canada—Answers to Question 1.

Road A.—Complaints about rates originating with individual shippers are very rare. I do not recall any instances where such complaints were based on the cost to the ultimate consumer. In my opinion, the agitation about rates is kept up largely by the secretaries or traffic managers of freight bureaus, who, in order to justify the continuance of their positions and payment of salaries, must keep up an appearance of activity, whether or not there is any real necessity for it. I think it will be found, in the majority of cases, that any increase in rates would be ultimately borne by the consumer and not by the shipper, and the amount of such increased cost to the consumer by reason of the rate would be so small as to pass unnoticed.

—President.

Road B.—Any complaints in regard to rates that are presented to us are generally owing to business rivalries between different towns or cities.

—General Manager.

Mexico—Answers to Question 1.

Road A.—Practically all complaints about rates that are presented to us are due to rivalries between different trade centers.

QUESTION 2.—TO WHAT EXTENT ARE YOUR RAILWAY IMPROVEMENTS OR EXTENSIONS WAITING ON THE DECISION BY THE INTERSTATE COMMERCE COMMISSION ON RATE ADVANCE CASES? WHAT WILL BE THE EFFECT ON IMPROVEMENTS AND EXTENSIONS IF THE COMMISSION DECIDES (A) THAT ANY GENERAL ADVANCES ARE UNREASONABLE; (B) THAT ONLY SMALL ADVANCES ARE REASONABLE; (C) THAT VERY SUBSTANTIAL INCREASES ARE REASONABLE?

Central West and Trunk Lines—Answers to Question 2.

Road A.—I do not believe that the question of the improvements or extensions this company will make during the coming year depends in any great degree upon the decision of the Interstate Commerce Commission in the matter of the rate advances sought by our company with others.

—President.

Road B.—The roads with which I am connected are making only unavoidable improvements and extensions pending the decision by the Interstate Commerce Commission on the rate advance cases. If the commission should decide that very substantial increases are reasonable, there would be a great increase in improvements and considerable building of extensions. If they decide that only small advances are reasonable, or that any general advance is unreasonable, engagements for new work will be limited to what cannot be avoided.

—Chairman.

Road C.—We are trying to get additional money to extend our road, but owing to general agitation have not been able to interest any capitalists in this enterprise.

—President.

Road D.—Our expenditures will be governed by our earnings, ~~and~~ ^{and} if increases are allowed we can do more general repairs.

—President.

Road E.—Our budget of improvements for the year 1911 has been authorized and is normal in amount. The decision in this respect has not been influenced by consideration of the possible outcome of the freight rate case now before the Interstate Commerce Commission.

—President.

Road F.—I do not think this company, or any others, will make very extensive improvements the coming year, unless the Interstate Commerce Commission makes a decision in favor of the increase in rates.

—President.

Road G.—Improvements and extensions are suspended pending a decision of the Interstate Commerce Commission on the rate advance cases. We shall confine ourselves to bare maintenance for the purpose of securing safety, unless advances are conceded practically as asked for. Should this latter conclusion be reached by the commission we shall resume the ordinary course of improvements and extensions, unless general business conditions are so seriously affected by this long period of indecision as to rates as to continue or aggravate the present dullness in general business.

—Vice-President.

Road H.—Our improvements and extensions will only be affected by the decision of the Interstate Commerce Commission on rate advances to such an extent as those decisions may impair the credit of the railways in general.

—President.

Road I.—Improvements are depending almost entirely on earnings, and earnings are dependent in part on advances in rates. The prospects for an increase in tonnage are not promising; therefore, if no advances can be permitted, or only small advances, this line will suffer as to its physical condition.

General Superintendent.

Road J.—There will be no very expensive railway improvements this year, nor—in my opinion—in the next two or three years. There will be exceptions in localities. Any advances that are made in rates will probably be fully absorbed by increases in expenses. I think railway development will be checked for three or four years and then will begin to increase and perhaps catch up for lost time.

—President.

East—Answers to Question 2.

Road A.—Railway improvements and extensions are being held in abeyance until the present agitation and uncertainty for the future is adjusted. Our operations are upon the basis of keeping the property safe and serviceable, but with no attempt at expansion or extension while present unsettled conditions remain. If the commission decides (a) that any general advances are unreasonable, it will mean a still greater effort at economy, and an absolute stoppage of expansion; (b) that only small advances are reasonable, it will not materially alter the situation, because advanced costs of operation in wages to employees and material manufactured and purchased by the railway companies will more than eat up any such small advances; (c) that very substantial increases are reasonable, it will seem to settle the question of doubt as to whether the railways are to be allowed a reasonable return for investments made and efforts put forth, and will immediately lead to extension and expansion in the thought that the laborer, being deemed worthy of his hire, is to receive recompense accordingly.

—Vice-President.

Road B.—Owing to the fact that so much of our traffic is passing over, improvements and betterments will not be made unless our tonnage is largely increased.

—Vice-President.

Road C.—Apparently pretty much all business is held up awaiting the decision in the rate case by the Interstate Commerce Commission and in the Standard Oil and American Tobacco Company cases by the supreme court.

—President.

Road D.—We are not directly interested in these specific rate hearings. We have always struggled along on the theory—whatsoever the theory of a shipper, or of all shippers—that they and we are, beyond all power to change the fact, partners, with one common interest, and there appeared to be no exceptions taken to this until after the governmental experimenting with the regulative struck in, and led all hands to believe, apparently, that somehow, vaguely, more of the shippers appear to yet have any clear idea of just how, if at all, Washington aggregations can make two and two equal something all the way from 4½ up.

The more they don't, the madder they become, and, it being more convenient, they proceed to take it out of the railway.

—President.

Road I.—This company, like all others, is going very slowly with its improvement programs, based more upon fear as to the business outlook than the effect of the proposed rate increase, which, as regards this property, is trifling, only amounting to 25 per cent. or 30 per cent. of the recent wage increases.

—Vice-President.

South—Answers to Question 2.

Road A.—We are not spending any money that we can withhold pending a decision of the Interstate Commerce Commission on the rate cases now before them. (a) Nothing more than absolutely necessary to keep the property going will be spent, because of inability to earn more than fixed charges. (b) Our expenditures will be curtailed accordingly. (c) A decided impetus will be given to railway expenditures in order to meet the growing demand for improved facilities and service.

—Vice-President.

Road B.—The improvements contemplated by the company are the subject of very careful consideration, and only those which it is believed will bring prompt material results in increasing earnings or reducing the cost of transportation will be undertaken. As to the effect of decisions of the Interstate Commerce Commission in the rate advance cases on our earnings, I can answer only in a general way that advances, if allowed, will be helpful in promoting improvements.

—Vice-President.

Road C.—Owing to the fact that we believe the Interstate Commerce Commission will do what is right in the end, we are going ahead with construction and improvements regardless of their decisions; this applies to our company, but other railways are holding up improvements, and I suppose it would be almost impossible for any company to finance itself until the action of the commission has been decided.

—General Superintendent.

Road D.—Only indirectly are improvements and extensions waiting on the decision by the Interstate Commerce Commission in rate advances. I consider that should the commission decide that any general advance is unreasonable, only such improvements would be made as were absolutely required. If they decide that only small advances are reasonable, I think it would give the roads a more hopeful feeling, and might possibly have the effect of starting some improvements that are now held in abeyance. If they should decide that very substantial increases are reasonable, I believe that it would have the most beneficial effect upon the entire railway and trade situation throughout the country.

—Vice-President.

Road E.—Improvements so far as our line is concerned are not being withheld on account of pending decisions of the Interstate Commerce Commission. It is my opinion that any decision rendered by the commission will be reasonably just and will be rendered only after the fullest investigation of the interests of all concerned.

—General Manager.

Road F.—Practically all of the important railway improvements and extensions in this country are awaiting the decision of the Interstate Commerce Commission on the rate advance cases. If the commission decides (a) that any general advances are unreasonable, there will be practically no improvements or extensions in the South during the coming year, or (b) that only small advances are reasonable, then only what is necessary, so that the present partially completed standard of work will be carried on, or (c) that very substantial increases are reasonable, I believe that it will immediately result in extensive improvements and the resuming of improvements in the South which were discontinued during the panic of 1908, some very important ones of which exist in this immediate vicinity.

—General Manager.

Road G.—Improvements to the extent of over twenty millions of dollars have been deferred awaiting a restoration of confidence

in the continued prosperity of the country. A great part of these improvements are contingent upon secured property and are intended to provide facilities and open up new sources of business, as well as for economic operation and better service. Should it be decided that any general advance is unreasonable there would be no incentive other than to do the best possible with present facilities, postponing all expenditures not fully justified and demanded by existing conditions. If only small advances are allowed the condition would not merit criticism by the feeling of uncertainty would still remain a controlling factor. If substantial increases are allowed, equitably distributed, confidence would be in a measure restored and there can be no doubt but that conditions prevailing prior to 1907 would be partially resumed, unquestionably not to the same extent, for some time to come, on account of local conditions, such as adverse state legislation and the unreasonableness of municipalities brought about by the past few years of baiting and agitation against the railways.

—Vice-President.

Southwest—Answers to Question 2.

Road A.—To no great extent. Certain additional mileage might be bought or built if the general level of earnings were high enough to permit such use of the enhanced surplus. (a) A decided slowing-up and hesitation; (b) probably no change; (c) in the near future an awakening of interest in possibilities of acquiring or building further mileage, and in making grade revisions, laying second track and reducing curvature. (It should be remembered in this connection that the rate increases asked by the western roads relate to comparatively few commodities, so that, after such rate increases shall have been granted, the western roads will have to file, and obtain consent for, additional increases before any substantial increase of revenue will result. In the East, the increases asked for cover a very wide range of commodities and, when granted, will mean an immediate substantial general increase of revenue).

—Chairman.

Road B.—We are withholding all improvements and extensions—simply completing some work undertaken prior to proposed advances in rates. If the advances are held unreasonable, I am inclined toward the opinion that all betterment and construction work will cease until such time as the diverging lines between earnings and expenses shall meet and the revenues of the carriers be restored, either through advance in rates or reduction in expenses, the latter primarily meaning reduced wages. If only small advances are permitted, it will undoubtedly take carriers a year or more to re-establish their credit. If substantial increases are permitted, the tendency would be to immediately restore the credit of the carriers; this would bring about improvements and extensions.

—Vice-President.

Road C.—Not only are increased rates necessary to justify the railways in extending their lines or building new feeders, but the increase ought to be granted to enable roads to properly conserve their present lines in the way of much needed improvements.

—Vice-President.

Road D.—We are not holding up improvements or extensions waiting for the decision of the Interstate Commerce Commission in the rate advance cases.

—General Manager.

Road E.—We began construction of 500 miles of railway some two years ago, expecting to be able to place our bonds, as the road was built in 100-mile sections. The uncertainty as to what the decision of the Interstate Commerce Commission will be on the rate advance cases, has, in my judgment, much to do with the indifference of capital to railway securities as investments. After building 75 miles of unusually good road in an unusually good territory, we are unable to find a market for our bonds and for the present are not constructing. If the commission decides that any general advances are unreasonable, I very much fear there will not be much, if any improvement, in the market; hence further extensions will be delayed or abandoned.

—Vice-President.

Road F.—Our improvements and extensions have been held up to a considerable extent owing to the stringent money conditions and the hesitancy of the investors in purchasing railway bonds. In my opinion, one of the principal causes for this is the action of the courts in enjoining the railway companies from putting the increased rates into effect, which has alarmed the investing public and which alarm has been reflected in the price and sale of railway securities. If the commission should decide that any general advances in these rates is unreasonable, the sluggishness in the bond market will continue for a considerable period, if not indefinitely. Should they decide that at least a reasonable portion of the advance in rates asked for is reasonable and just, I believe we will have a revival of railway improvements and extensions.

—Vice-President.

West and Transcontinental—Answers to Question 2.

Road A.—We have suspended all work that we can, for the reason that the general outlook is not satisfactory. If some of the rate cases now pending before the courts, affecting the rights of railways and other forms of business to manage their own affairs, are decided on a reasonable basis, and if the commissions are willing to admit that some rates should be advanced, improvements and additions to railways, no doubt, will be made, but it is not likely there will be any very large undertakings begun.

—President.

Road B.—In the territory served by our lines there are no contemplated advances of importance, but there are pending before the Interstate Commerce Commission complaints which have evoked a preliminary order from the commission that threaten very material reductions in rates. In some degree it may be fairly said that the attitude of the public toward the carriers is causing much hesitation and delay, if it has not caused indefinite postponement in the matter of railway building which would otherwise have been undertaken.

—Vice-President.

Road C.—The general attitude of the public, legislators and commissioners is as important as the mere question of rate advances, and until it is improved it is difficult to see how money can be obtained for improvements or extensions. The situation must, of course, become worse if advances are deemed unreasonable because the borrowing power of the railways will be curtailed even more than it is now; if substantial increases are permitted, that borrowing power will probably be materially increased, provided other conditions do not become more adverse. The granting of small advances is not likely to help the situation, except that a principle will be established.

—Assistant to President.

Road D.—We find it very difficult at present to get capital for present extensions, owing a great deal we think to the pending decisions before the different tribunals. We are of the opinion that it will be very difficult for some time to obtain capital for new enterprises if the commission decides that general advances are unreasonable. If they should decide that very substantial increases may be made, we feel that we could easily expect to be able to market considerable securities.

Vice-President.

Road E.—Extensions are being made in but one state, and are due entirely to the development of new and heretofore unsettled territory. Extensions in other states are held up on account of unfavorable laws. The decision of the Interstate Commerce Commission as to advance of freight rates does not affect extensions, but does affect improvements. Improvements of no kind are being undertaken other than those forced by the necessities of operation or laws. No change can be made in this operation unless very substantial increases in rates are made.

—General Manager.

Road F.—We are not holding back any improvements or extensions awaiting on decision of the Interstate Commerce Commission in any rate advance cases. If the commission decides that any general advances are unreasonable it might possibly affect our business so that we would hold back some improvements.

The recent Reno decision has affected our line considerably, and we are getting out a new rate sheet which will affect our earnings somewhat, although, as our local business affected by these reductions in rates is not very large, the effect will be correspondingly small.

—Vice-President.

Road G.—Our improvements are waiting to some extent on the commission's decision in the matter of higher rates, as there is very naturally a reluctance to put more money into the property when we do not know whether we are going to be permitted to earn a reasonable return on the capital already in it, to say nothing about more. I do not know what the effect will be if the decision is that a general advance is unreasonable. Our plant is here, it cannot be removed and we cannot close up shop, so we will have to get along as best we can with the facilities we have. Whether with an adverse decision we still will be able to make necessary improvements will depend on the attitude of the investing public and our ability to earn a return on the new capital required. On the other hand, if substantial increases are granted, I think there is little question but that confidence in railway securities will be quickly restored and the roads will be able to carry out their program of providing facilities to keep pace with the country's traffic growth.

—President.

Canada—Answers to Question 2.

Road A.—All railway improvements or extensions made out of capital are necessarily held up until financial conditions have improved to such an extent as to permit of the sale of additional railway bonds or stocks. Financial conditions are not likely to improve until there is some assurance as to the ability of the railway companies to so increase their rates as to enable them to safely earn the increased interest or dividends arising from new issues of securities made necessary to meet the cost of improvements. If the commission should decide that any general advances are unreasonable, expenditures will be regulated accordingly, and this applies also as to whether general advances are unreasonable, small advances are reasonable or substantial advances are reasonable—expenses will be regulated accordingly.

—President.

Road B.—Being a Canadian railway we are only under the jurisdiction of the public utility commission of the province. The development or extension of our line is not subject to any delay owing to any action of that board.

Mexico—Answers to Question 2.

Road A.—We expect to spend considerable money during the coming year on additions and improvements to our properties, and the carrying out of that programme will in no way be dependent upon the decision of the Interstate Commerce Commission.

QUESTION 3.—WHAT IS YOUR OPINION OF THE EFFECTS ALREADY PRODUCED AND THE PROBABLE FUTURE EFFECTS OF THE PROVISION OF THE MANN-ELKINS ACT GIVING THE INTERSTATE COMMERCE COMMISSION POWER TO SUSPEND ADVANCES IN RATES PENDING INVESTIGATION OF THEIR REASONABLENESS?

Central West and Trunk Lines—Answers to Question 3.

Road A.—We regard the effects already produced, as also those probable in the future, as the most serious and far reaching in character of any attempt yet made at railway regulation and control, as far as we know, by any country which does not own and operate the railways generally, chiefly for the reason that, in effect, it subjects the rate making power of the railways to political exigencies of the leading parties and candidates in every election, state or national.

—President.

Road B.—My opinion is the same opinion that I would entertain of a law giving strangers to any business the right to say when proprietors of the business shall advance or reduce their sales prices, and to say what prices they shall charge. The owners of property who conduct business with reference to it

should be allowed to determine their selling price. If the government is to determine this for the railways, it ought to own the railways, or have such a substantial money interest in them as will compel government agents, when prescribing railway rates, to act in the interest of the property owners, as well as in the interest of the public. To act in the interest of the public generally means to act in the interest of political parties. —Chairman.

Road C.—I don't think it is practical to make the Interstate Commerce Commission the general manager for all the railways in the United States. —President.

Road D.—The commission seem to be loaded down with things to do; and, while I think they are fair, it seems they are slow, because of overload, and if they suspend all rules it will be very tiresome. —President.

Road E.—Exercised with discretion, I have no doubt that the power of the Interstate Commerce Commission to suspend rates will prove an important element of that stability of the rate structure which is desired by all. It is probable, however, that up to this time the power has been exercised in some measure under popular and political clamor. —President.

Road F.—I do not think the effects of carrying out the provisions of the Mann-Elkins act will be bad. —President.

Road G.—I think it too soon to give a positive opinion. If the commission will act promptly and fairly, the result should be beneficial to the railways because the public will be deprived of a contention having considerable justification, namely, that the railway companies receive substantial benefits from advances that are subsequently cancelled by rulings of the commission. —Vice-President.

Road H.—I think the effects already produced have been to withdraw from the market funds for railway purposes, not so much because of the already existing laws, but because the investor had no assurance of the extent to which Congress would go in the regulation of common carriers. I believe the people in general, however, now feel that with the present political situation no radical legislation can be had for the next two or three years, which situation is welcome to the public, and the effect will be to open the purse strings of the investing public for railway improvements and extensions. I believe the future effects of this provision of the Mann-Elkins act should be accepted gracefully by the railways, and that if the roads act sincerely in harmony with the law they will be fairly treated by the Interstate Commerce Commission and granted such advances in rates from time to time as their necessities require, and when such advances are once granted they will be more satisfactory to the people in general than the same advances made by the railways without review on the part of the public. —President.

Road I.—It appears to me that it is proper, before any railway advances rates, that it be supervised by some competent body like the Interstate Commerce Commission. —General Superintendent.

Road J.—The effect is, very clearly, to make rates more inflexible. The country in general has no conception of the extent to which rates were being adjusted, and these adjustments meant, in very many cases, putting the rates down. Now that the rates cannot be advanced except at the end of a long lawsuit, traffic managers realize that the methods of adjusting rates to which they have been accustomed must be discarded. I think that this will prove a misfortune to the shipping public and, while not a direct misfortune to the railways, it will hurt the railways indirectly because it will hurt the shipping interests. —President.

East—Answers to Question 3.

Road A.—The power to suspend advances in rates pending investigation of the reasonableness is an arbitrary control of the revenues of the railway companies. If sauce for the goose is also sauce for the gander, then why not a similar law which will

impend advances in rates of watered with the railways, such pending, or advances made by the government, under threat of strike, etc., until their reasonableness can be investigated? It would require an essay to suitably answer this topic.

—Vice-President.

Road B.—This power has already, I believe, resulted in making rates more rigid than in the past; this rigidity is often unfavorable to the shipping public, for obvious reasons. This condition will not be improved in the future. The immensity of our country and its wonderful growth can best be served by conditions that will permit rates being flexible. —Vice-President.

Road C.—I think the effect has been and will continue to be bad. —President.

Road D.—When the operation of law ceases to be mandatory, and essays to move out into the realm of discretionary, of what value can opinion of the result be? —President.

Road E.—We feel that the Interstate Commerce Commission will generally postpone all rate advances so that it will require about ten months to bring about any increase in the future. —Vice-President.

South—Answers to Question 3.

Road A.—It depends altogether upon the color of the commission. With a conservative business foresight on the part of the commission we believe that the law will be advantageous. —Vice-President.

Road C.—The Mann-Elkins act has had the effect, together with other acts and legislations, of paralyzing railway improvements. —General Superintendent.

Road D.—The effect is discouraging, and the probable future effect of it, if based on past experience, is not encouraging. —Vice-President.

Road E.—In some sections of the country, doubtless, traffic is more or less disturbed on account of the pending investigation, but we have not felt any material effect in this vicinity. —General Manager.

Road F.—I consider that this power is the most drastic and far reaching of any proposition of the Interstate Commerce acts to date and that it has done more towards curtailing improvements and extensions during the past six months than everything else. —General Manager.

Road G.—Unless competition fixes the rates it is almost impossible to determine how this can be accomplished by human agency, subject to political influences. Unhindered with such contending factors, it would be impossible for a few individuals to justly and equitably fix rates without injuring certain interests, localities or individuals. If the rates were made effective, as before the recent amendment, or as first contemplated therein, with the burden of proof upon the purchaser of transportation to show the unreasonableness, the questions of rates would undoubtedly adjust themselves automatically and equitably, as all parties interested would get together and work the problems out on sound business principles, controlled by forces stronger than any that can under present conditions be otherwise commanded. —Vice-President.

Southwest—Answers to Question 3.

Road A.—The Mann-Elkins act has further taken out of the hands of railway managers the power readily to adapt their revenues to needs arising from increased costs, growing traffic, etc. Its future effect, while in some respects good, will be to require railways to exercise, at their peril, the gift of prophecy as to the needs of the future, and will result in preferring and favoring railways financially comfortable to those whose daily existence depends upon whether revenues are above or below a certain point. —Chairman.

Road B.—It is my opinion that the power to suspend advances in rates pending investigation has injured the credit of carriers.

It has certainly left the officials in charge very much in doubt as to the source of revenue necessary to properly care for the property.

—*Vice-President.*

Road C.—The power to suspend rates is very far-reaching. It practically places the making of rates in the hands of the commission. One of the worst features about this measure is the delay. Whatever increases in rates ought justly to be made by the railways are delayed by the commission in putting them into effect, and the railways are deprived of whatever additional revenue they would afford until the commission passes on the question. Whatever increases the railways are entitled to, they are entitled to at the time they are asked for, not one or two years afterwards, and whatever losses occur to them in the interim represent just that much revenue taken from them unjustly.

—*Vice-President.*

Road D.—I think the effect of the Mann-Elkins act will be to make capital very timid about investing in railway securities, and will retard the development of the country, as it will prevent the building of many new railways.

—*General Manager.*

Road E.—I think that provision has caused the investing public to turn down railway securities, but if the commission manifests a disposition to allow substantial increases in the freight rates or such increase as the railways are now requesting, this provision of the Mann-Elkins act will not be of permanent injury.

—*Vice-President.*

Road F.—I believe it is unfair to the railways and to the public. First, it lays the entire burden of proof on the railway companies, which is contrary to all fixed customs. Second, it is essential to their life that these reasonable increases in rates be allowed. If refused, and these improvements and extensions are not made, as required by the railway companies to meet the above conditions, but are held up from six to twelve months pending the delays of hearings and investigation to determine by outside interests the reasonableness of the increases, the inevitable result will follow and will reflect against the interest of the people; namely, congestion of traffic, delay to traffic, inability of the railways to furnish necessary equipment and facilities for handling the same. In the end, these will have to be met by greater increase than were planned, and, as I see it, the only consolation the people will have will be their complaints of inability to have their traffic moved excepting with unreasonable delays and increased expenses to them caused by the delays. I think it would be much wiser, if a law of this character is necessary, to permit the increases to go into effect, then hold an investigation, and if they are found reasonable at the end of the investigation, all well and good, but if found unreasonable, the commission should have the power to require a refund to the shipper to the extent of the unreasonable allowance.

—*Vice-President.*

West and Transcontinental—Answers to Question 3.

Road A.—It is having a very bad effect and will continue to have a very bad effect on the initiative of the owner of railway securities, and the manager of railway properties, in going ahead with the furnishing of needed transportation facilities. The tendency of the commission seems to be to suspend any and all rate advances upon the slightest complaint by any shipper, and to pay no attention to the arguments given by the railway companies of changed conditions, either commercially or through the ownership of railway properties.

—*President.*

Road B.—The effect has been and will be just what it was designed for—to prevent any advance in rates without a long and tedious hearing before the Interstate Commerce Commission, eventuating, in many cases, in a compromise, in most cases a refusal, and, in rare cases, an advance in rates. I regard it as an invasion of the property rights of stockholders.

—*Vice-President.*

Road C.—The effect already produced is to take away from the railways the power to advance rates. Every important ad-

vance we have published since the amended law took effect has been promptly suspended by the Interstate Commerce Commission. Our right to advance rates has been most effectually nullified. The probable future effect depends largely upon the action of the commission on the rates already suspended. If the commission quite generally approves of the advances it will have a depressing effect upon the freight experts who are in the employ of business interests for the purpose of getting the lowest possible rates, and the greatest possible refunds in the shape of claims allowed. If, however, the commission quite generally disapproves of the proposed advances in rates, then the final effect upon the railways will be the same as if the law should forbid any further advances whatever.

—*Assistant to President.*

Road D.—We have had no occasion to make advances that have been withheld by the commission under the Mann-Elkins act, but we do not feel that this provision is particularly unreasonable.

—*Vice-President.*

Road F.—I presume the managements of all roads in the United States regretted to see the commission empowered to suspend advances in rates pending investigation of their reasonableness. However, I believe the personnel of the commission is of such a high order, and their decisions in the past have all shown that they intend to give the railways every consideration possible, that I believe the commission will allow railways to increase rates where it is shown the present rates are too low, the only loss being the time and expense in submitting such increases to the commission.

—*Vice-President.*

Road G.—The effect was to immediately place in the hands of the commission the rate making power which formerly had been held by the carriers. It is true the roads still have the right to reduce rates, but with their expenses increasing as they have been in the past year or two it will be suicidal for them to make many reductions in rates which for the most part are already too low, especially under conditions that make it questionable whether they will be permitted to raise individual rates that are admittedly too low. The provision referred to places a grave responsibility on the commission and the manner in which it exercises its power will determine the future effect of the statute.

—*President.*

Canada—Answers to Question 3.

Road A.—The effect has been and will be to defer any action on the part of the railways until determination of the matter at issue.

—*President.*

Road B.—The provisions of the Mann-Elkins act do not affect us to any extent.

—*General Manager.*

QUESTION 4.—PRESIDENT TAFT IN HIS RECENT MESSAGE RECOMMENDED LEGISLATION TO AUTHORIZE AND PROVIDE FUNDS FOR THE INTERSTATE COMMERCE COMMISSION TO MAKE A VALUATION OF RAILWAYS. WHAT IS YOUR OBJECTION TO SUCH LEGISLATION?

Central West and Trunk Lines—Answers to Question 4.

Road A.—We see no objection to the Interstate Commerce Commission being provided with funds to enable it to make a valuation of railways, but we cannot see any possible good that can result either to the country or the railways from this being done.

—*President.*

Road B.—Legislation to authorize and provide funds for the Interstate Commerce Commission to make a valuation of railways would produce results interesting to students of statistics and, possibly, of some historic value. It would be of no use whatever in furnishing a basis for the regulation of rates. Other considerations than the value of properties regulate the rates. It is often impossible for a road to make a rate that will give anything like a return on the cost or value of the property. On the other hand, it not infrequently happens that roads get a large return disproportionate to the value of the property.

—*Chairman.*

Road C.—I don't see any advantage in a valuation of railways being made by the Interstate Commerce Commission, because the value of railways changes every year.

—President.

Road D.—A useless expense; can see no good to come from it.

—President.

Road E.—I am opposed to a valuation of the railways by the government. Such a valuation will inevitably be used in making rates on the basis of limiting the income of the railways to a fair return on the investment. This is now a widespread theory, which had its origin in a misunderstanding of certain opinions of the Supreme Court which dealt with government-made rates deemed to be so low as to be confiscatory. The courts have not yet undertaken to limit the maximum income of railway property. What they have done is to prohibit reductions below a minimum of a fair return on the investment. I believe that rates should be based on value of service. If this principle were popularly accepted its application might yield a just reward to well managed railway property, and so stimulate efficiency and the competition in service which the public justly expects from the resourceful American railway manager. The valuation principle is the very antithesis of this, and, by removing the opportunity for the greater reward for superior efficiency, will reduce railroading to the level of that kind of public service which is typified by supplying gas or electric light to a municipality, something which is measured by a meter. The obvious fact that a fair appraisalment of the railways today will demonstrate that, taken by and large, they are not now earning a fair return on the investment is a temptation to railway officers to yield to that principle as the easiest way of gaining their case before the public. An immediate victory might be comfortable, but the ultimate result would be government ownership.

—President.

Road F.—I think it would be a waste of money. The states have nearly all made these valuations.

—President.

Road G.—My objections to this are the cost to the nation and the railways and the almost entirely negligible value of such appraisalment in connection with rate regulations.

Vice-President.

Road H.—I believe the funds provided for the Interstate Commerce Commission to make a valuation of railways will return but little to the government, for I can see no way in which this valuation can be used in arriving at a reasonable rate to be charged for transportation. I regard it a good thing for the railways, as I believe that such an investigation aided in every manner possible by the railways will prove to the public that the railways of the United States could not be reproduced today for their entire capitalization, and if such a showing should result, which I believe there is every reason to expect, it will have the effect of stopping any effectual arguments about watered stock on the part of politicians. What the public demands of the Interstate Commerce Commission is that it find a reasonable rate to be such a rate as will pay operating expenses on the average railway honestly administered, a fair return on the capitalization, and a surplus, which surplus should never be capitalized, but should be returned to the people in the way of improved facilities.

—President.

Road I.—I see no objection to having a physical valuation of railways prepared by governmental authorities, but I do not see how such valuation can be made a fair basis for freight and passenger rates.

—General Superintendent.

Road J.—Obtaining a valuation of railways is a very expensive proposition, and, while I think the roads have nothing to fear or be ashamed of by a valuation, it seems a pity to tax the roads, as well as the general community, for doing something which will be largely futile. Rates never have been made on the basis of valuation. It can be proved to any reasonable man that they never can be, and that all the valuation of a railway can ever determine is whether rates, as a whole, yield a reason-

able return or not. But this would not be good, that railways might not be larger business, and therefore earn a larger profit, by reducing some of their rates. The complete answer to the question is a long story in itself. I think it seems to be an excellent subject for our feature of the question. Something yet remains to be said on the subject of rate making.

—President.

East—Answers to Question 4.

Road A.—As the results of such a valuation of railways will unquestionably be a duplication of that condition which was found in connection with a similar investigation of the Great Northern, it would seem that there would be no objection to such legislation and investigation, providing the results will be given fair consideration and just treatment.

—Vice-President.

Road B.—I object to legislation authorizing and providing funds for valuation of railways, for the cost of reproducing a road is not its valuation as a road. The value of a road, it seems to me, depends upon whether it is so located and so organized and operated as to be of little or great utility to the public, of great or little profit to its owners. Rate regulation based on physical valuation alone would put a premium on extravagant construction and operation, also a discount on skillful management. The valuation of property results from the use to which it is put, and varies with the profitableness of that use, both present and prospective, actual and anticipated. There is no pecuniary value outside of that which results from such use.

—Vice-President.

Road C.—I think a valuation under such auspices would be shaped to meet political exigencies, and would be an aid to a partial confiscation of the properties.

—President.

Road D.—A tin railway might, under some conditions, be more valuable than a gold one. Either might be valuable today and a burden tomorrow. A valuation which would appear to be just with a million of acres of forest back of large blocks of mills, and a city surrounding them, would be monstrous against the effect of conflagration which destroyed them all. It would be worse still if, as with rate, etc., experimentation, it took twenty odd years for the investors in the railway to ascertain whether, probably, there ever would be a basis reached whereunder they could know where they were at.

—President.

Road E.—Few, if any, of the railways of this country have anything to fear from a valuation of railway property. The value of practically all the great properties today would be above the par value of the outstanding securities. In the cases of many of the properties it would be vastly above.

—Vice-President.

South—Answers to Question 4.

Road A.—There is no particular objection to this, as it is being done now by state authorities, provided, of course, we are given the right to make charge for what we do to offset the increased valuation.

—Vice-President.

Road B.—I don't see any objection to a valuation of railways by the Interstate Commerce Commission; it will be helpful in many ways as information. If, however, the valuation is for the purpose of determining proper rates to be charged for transportation, and if it should be made on the basis of the actual cost of building, it would be absurd. A low grade, cheaply built line is a far more valuable property than a parallel competing road built through a heavy country at great cost. The proper valuation of railways (or of a single railway) is a different matter, full of complications, and its application, when ascertained, to transportation problems is still an uncertain proposition.

—Vice-President.

Road C.—I believe that a physical valuation, if made by competent parties, would be a good thing. Railways have nothing to fear from this.

—General Superintendent.

Road D.—I would have no objection to the valuation of railways by the Interstate Commerce Commission if it were done intelligently by persons competent to judge of the present value of railway property.
—*Vice-President.*

Road E.—I believe this should not be a detriment, and it might prove of considerable value to railway owners.
—*General Manager.*

Road F.—I would object to the Interstate Commerce Commission making a valuation of the railways, because of the danger of not having practical railway men to make such a valuation, who would take into full consideration the many things which form a basis for determining the valuation of railways, namely, actual physical value, geographical location, competition, earning power, cost of operation, etc.
—*General Manager.*

Road G.—The valuation of the railways cannot be used for any purpose to the public good. The basis must be arbitrarily fixed. It cannot be made to apply uniformly to all roads. Those costing the least or having a small comparative physical value are compelled by reason of isolation, or spare business, to charge the higher rates. Well established roads having greater density of traffic may have been, on account of priority, the more cheaply built than competing lines of more recent and expensive construction and equal density of traffic. The objections will be that rates cannot be based on the valuation, but taxes will be, and out of proportion to other property, by reason of the inability of the railways to have themselves placed upon an equality.
—*Vice-President.*

Southwest—Answers to Question 4.

Road A.—I have no objection to such legislation if the valuation is made in a broad and scientific manner, not restricted to physical valuation nor to theories based upon capitalization, and provided that such legislation contemplates the possibility that franchises and good will have a present value, and that the potentialities of terminal and other property may be included as enhancing present values thereof.
—*Chairman.*

Road B.—I have no objections to a valuation of railways. If such work is undertaken, it should be in charge of thoroughly competent men and the railways should co-operate in having a valuation fairly made. A mere physical valuation cannot possibly be used as a basis for rates. The question of unearned increment in right of way, terminals and other property owned is one that will be difficult to decide. It is my opinion that the railways are entitled to the so-called unearned increment if a valuation is made.
—*Vice-President.*

Road C.—A proper and equitable valuation of the railways of the United States involves a task of tremendous magnitude, and when it shall have been accomplished the practical value of the information is questionable. In my opinion, the game is not worth the candle.
—*Vice-President.*

Road D.—So far as our line is concerned, there is no objection to a physical valuation of the property, but I think it is a useless expense on the part of the government, as it can serve no good purpose; physical valuations change from year to year and can never be made the basis of freight rates.
—*General Manager.*

Road E.—I have no objection to a physical valuation of railways. While I do not regard it as of value for rate making purposes, I am inclined to believe that the agitation for such valuation will not cease until it is accomplished, hence, the sooner it is done the better.
—*Vice-President.*

Road F.—I have no objections, if this valuation is arrived at along proper and impartial lines. I do not believe this valuation could ever be used as a basis for rates, nor do I believe it would be effective or fair in giving the securities to be issued upon the properties. The valuation of the different railways throughout the United States is so dissimilar that if the valuation were taken as a rate making basis a fair rate on one line would be an

unfair rate on another line. The same might be said of the matter of issuing securities against the properties. Under these conditions, you would have to make rates in the various sections on such a basis as would be fair to all of the lines, regardless of their valuation.
—*Vice-President.*

West and Transcontinental—Answers to Question 4.

Road A.—No objection to having Congress authorize funds for making valuations of railways, except a waste of the money belonging to the general taxpayer. Rates, obviously, cannot be based on valuation, but the information, no doubt, would be somewhat useful as showing that, taking the railways as a whole, the par value of their securities is less than their present fair valuation.
—*President.*

Road B.—I do not object to the recommendation of the president in this particular.
—*Vice-President.*

Road C.—We have no objection to a valuation of railways made for the purpose of regulating future issues of securities, provided Congress wants to go to the expense of making such a valuation, and the further expense of keeping it up to date. We object to a valuation of railways for rate making purposes, because we know that theory to be wholly impracticable of execution.
—*Assistant to President.*

Road D.—We have no objection to a valuation being made and funds provided therefor for the railways. Our state commission has made a very thorough and complete one as far as rates in this state are concerned.
—*Vice-President.*

Road E.—Have no objection to this being done.

—*General Manager.*

Road F.—I am opposed to the physical valuation of railways by the government, and believe it would be money wasted to make such a valuation. In my opinion, the making of rates has no connection with the physical value of the road over which the rates apply. Furthermore, the states whose commissions have made valuations of the roads within their borders have, I believe, found that the properties could not be reproduced for their present capitalization; and I am satisfied that, with two or three exceptions, this rule would hold throughout the United States.
—*Vice-President.*

Road G.—We do not object to the government's making a valuation of railways; in fact, if it is fairly and impartially done by competent men it will be a good thing, as it would settle the much mooted question of whether the railways as a whole are charging excessive rates; but, on the other hand, the result would be of little use as a basis for making rates, because after all there are so many factors that enter into the making of a rate, the most important being competition and the value of the service to the shipper and what the traffic will bear. Two roads running from A to B, one worth \$40,000, and the other \$80,000 per mile, must charge the same rate, otherwise the one having the lower rate would enjoy all the traffic.
—*President.*

Canada—Answer to Question 4.

Road A.—No objection to the legislation providing for valuation of railways.
—*President.*

QUESTION 5.—ARE THE STATE COMMISSIONS IN YOUR TERRITORY DISPOSED TO BE FAIR OR UNFAIR? HAVE THEY SHOWN IN THE LAST YEAR A TENDENCY TO BECOME MORE CONSERVATIVE OR MORE RADICAL?

Central West and Trunk Lines—Answers to Question 5.

Road A.—We see no particular change in the attitude of the state commissions. As far as our experience goes they seem to be fair and reasonable, although the tendency all the while to extend their powers and take greater control over railway operations is not, in our opinion, either necessary or desirable.
—*President.*

Road B.—I have not discovered any disposition on the part of state commissions, in the territory where I am interested, to be unfair. Their policy is to wait the action of the Interstate Commerce Commission and follow in its lead. Otherwise, I do not observe any tendency to become more radical.

—Chairman.

Road C.—Some of the members of the state commission in our territory are principally trying to make themselves conspicuous by opposing railways.

—President.

Road D.—Our state commission is a fair and good one.

—President.

Road E.—Today state commissions generally mean to be fair, but very few of them feel the weight of the ermine which should illustrate the judicial character of the office. They still consider themselves advocates for the people and against the railways, and thereby preclude some of the confidence the railway officers otherwise would place in them.

—President.

Road F.—The state commissions in this territory have always been fair and are very conservative.

—President.

Road G.—This company traverses two states. In one, the commission seems to be influenced by political considerations; in the other, by these and personal hobbies of the members. I cannot see much change in their attitude in the last year.

—Vice-President.

Road H.—The only state commission with which our line comes in contact is showing a tendency to become more conservative, and I believe it desires to be fair.

—President.

Road I.—I have not had much dealing with our railway commissioners, but from what I know of their conduct of railway affairs they are quite prejudiced against the latter, and I should judge this is in great part due to the fact that the positions are elective, and, of course, we know what that means—that a disposition must be shown to concede all requests made by the public, in order thereby to get favor with the voters.

—General Superintendent.

Road J.—We think that the state railway commissions try to be fair. Popular clamor and the exigencies of politics sometimes cause them to do things which they would not otherwise do; and against their own best judgment. There is considerable difference between these state commissions. Some are composed of intelligent, able men, who realize the responsibility and endeavor to deal fairly both by the shippers and railways. In other states, men occupy positions because they are good politicians, and are without training for important duties, and their sole aim is to reduce rates and, by so doing, get more votes.

—President.

East—Answers to Question 5.

Road A.—The state commission of the two states we traverse have not been unfair. A meddlesome interference with unimportant and minor trifling matters requiring the time of our general officers to attend hearings of matters which are in most cases absurd and should never be dignified with the time, trouble and expense of a hearing, is our principal grievance. The trouble with state commissions generally is that impractical and ignorant politicians, or theoretical or idealistic dreamers, find their way into these commissions, with consequent trouble for the railways in educating such characters.

—Vice-President.

Road B.—State commissions are disposed to be fair, according to their lights; some, however, do not seem to fully appreciate the intent of the acts by which they were created and under which they are working. This is true in small matters particularly. To illustrate, the public service commission of one state requires a monthly report from all railways showing delays to passenger trains. To enforce proper service is a perfectly legitimate function for utility commissions, but to de-

mand such reports from all railways regardless of whether they have ever received complaints or even suggestions as to some unsatisfactory service, is a purely practical matter. They, I think, are unjust and not in accord with the spirit of the law.

—Vice-President.

Road C.—I think they tend to become radical and selfish, and that their main stimulus is political.

—President.

Road D.—The commissions in our line have uniformly intended to be eminently fair. Their pay is not large, as salaries go. As a rule they cannot give exclusive attention to the duties of their offices. It is not possible to clearly determine how best to try to separate, or try to wed, state and federal laws, rulings, etc. Again, decisions and decrees to come are unknowable. It might be an interesting and impressive incident for a big fellow, in life's battle, to draw a proportionately big sword, and shout to a lot of lesser companions, "I am IT. Come on. Follow me." It would seem to me the lesser companions of the states have been, and are, warranted in asking the federal giant: "For God's sake where, what for, and why?"

—President.

Road E.—The commissions in the states this line passes through try to be fair, I think; their tendency is to become more radical. As in most cases their appointments are political, a position adverse to the transportation interests is nearly always taken.

—Vice-President.

South—Answers to Question 5.

Road A.—State commissioners, as a general rule, are purely politicians and lean to the public request without regard to the rights of the transportation companies. Their attitude within the last year shows a tendency to more conservatism, because the public at large has changed front considerably toward corporate interests.

—Vice-President.

Road B.—Our state commission undoubtedly intends to be fair. The railway managements of the state have nothing to complain of.

—Vice-President.

Road C.—State railway commissions are political and, therefore, the commissioners are demagogues. This seems to be the case all over the Union. Their whole idea seems to be to reduce rates in order to hold their positions.

—General Superintendent.

Road D.—I believe the state commissioners in our state are disposed to be fair. I cannot say that they have become more conservative or more radical. As is the case with most state commissions, their leaning is toward the people rather than toward the railways.

—Vice-President.

Road E.—The two state commissions concerned with our line have been found fair in all of their decisions. We cannot find that they have been conservative or radical to an extreme, but have endeavored undoubtedly to be perfectly fair.

—General Manager.

Road F.—The state commissions in this territory are disposed to be more fair than formerly, and are accordingly becoming more conservative.

—General Manager.

Road G.—The state commissioners are not disposed to be entirely fair. Under our form of government this is impossible. As individuals they might be so disposed, but they are controlled by the newspapers, who are in turn controlled by certain interests and politicians, who are watching every disposition on the part of the commission to favor the railways, using it for political capital. The few editorials asking that the railways be given a fair deal are carefully worded and generally so constructed as to be equivocal. The tendency towards restricted business and a changing public sentiment in favor of square dealing has softened the commissions somewhat in the past year.

—Vice-President.

Southwest—Answers to Question 5.

Road A.—Most of them are disposed to be fair, but are seldom, if ever, consistently fair in practice. Political considerations, especially the fact that the shippers vote while the railway doesn't, have their logical outworkings in decisions that burden the carriers unfairly. In the last year the tendency has seemed to be more conservative, even in the two most radical states through which we pass.

—*Chairman.*

Road B.—We are having no difficulty with state commissions. The tendency is toward a more conservative attitude.

—*Vice-President.*

Road C.—During the past year there has been no change in the attitude of the state commissions to alter the opinion expressed last year, which was as follows: "State commissions generally in this territory are disposed to be unfair, and are becoming more radical as time goes on. It is generally admitted that all important cases called by them are pre-judged; their decisions are usually made before they call the hearing, and the compilation of data and arguments, even of the most convincing kind, on the part of the railways is considered by railway officials a work of supererogation. The commissions are constantly at work grinding out decreased rates or extending concessions to shippers which have the effect of decreasing rates, and extensive reductions are looked for in the very near future on some of the largest items of traffic handled by the railways in this section." Since the above was expressed, the commissions have gone on grinding out still further reductions in rates, many of which, though small in themselves, in the aggregate amount to large sums to the railways, without benefit to the actual consumer. In the largest reductions made by the commission during the present year, the amount of such reduction imposed on the roads was promptly gobbled up by the steamship lines, who increased their ocean rates more than enough to offset the decrease taken from the pockets of the roads; hence, the revenues of the roads were largely depleted without even the doubtful benefit to the actual consumer, or to the producer.

—*Vice-President.*

Road D.—I think the state commissions in our territory are disposed to be fair, and they have become more conservative within the past year.

—*General Manager.*

Road E.—I regard one of our two state commissions as disposed to be fair. It has shown a tendency in the last year to become decidedly more conservative. I cannot say so much for the other commission.

—*Vice-President.*

Road F.—The state commission of our state so far has been extremely conservative. Nothing has been done by them to impair the situation in this state.

—*Vice-President.*

West and Transcontinental—Answers to Question 5.

Road A.—State commissions with which I am familiar are disposed to be fair, and are inclined to grow more conservative as they learn about the business. They all have the natural tendency to want to increase the power of their positions, which is the most dangerous tendency in the commission form of government, because it is gradually taking away from the owner of the property the management of that property.

—*President.*

Road C.—State commissions in our territory are (as elsewhere) political bodies subject to the whims of party caucus or direct primaries every so often. Their principal intent is to do that which will add to the political popularity of themselves and of their party. Under these circumstances it is not reasonable to expect them to be fair. The best that can be said for them is, to say they differ in degrees of radicalism.

—*Assistant to President.*

Road D.—We are of the opinion that our state commission is inclined to be very fair, and we think it has become more conservative during the past year.

—*Vice-President.*

Road E.—I notice no change in the attitude of the various state commissions. There is still a disposition to go the limit of the law in all matters.

—*General Manager.*

Road F.—Our line passes through three states, two of which have commissions, while the other has none. The commissioners of one of the states, I believe, have been fair. But new commissioners come into office January 1, and it is hard to say at this time what their attitude towards the railways will be. The commissioners of the other state have not been quite so conservative, although so far as our line is concerned we have no special complaint to make, except that they called upon us for considerable data, which cost us quite a little clerk hire, and which, frankly, I cannot see will be of much if any use to them.

—*Vice-President.*

Road G.—The state commissions in our territory have in the past been decidedly unfair, being influenced in their decisions more by political expediency than by a sense of exact justice. As to some, we have lately observed a tendency to become slightly more conservative, but, generally speaking, there has been little change in the attitude of state commissions.

—*President.*

Canada—Answers to Question 5.

Road A.—I cannot say that there has been any change in their attitude.

—*President.*

Road B.—They seem to be conservative and reasonable.

—*General Manager.*

Road C.—Commissions in this district are fair and just.

—*Vice-President.*

QUESTION 6.—IS PUBLIC SENTIMENT TOWARD YOUR ROAD BECOMING MORE FRIENDLY OR LESS FRIENDLY? WHAT HAVE YOU DONE, IN BRIEF, TO IMPROVE ITS PUBLIC RELATIONS?**Central West and Trunk Lines—Answers to Question 6.**

Road A.—I do not see that there is any particular change either one way or the other, so far as the sentiment of the public towards our road is concerned. We have not done anything in the way of changing our methods or policy with a view of establishing improved public relations, as it has always been the policy of the management of this company to do everything reasonable in this direction.

—*President.*

Road B.—Public sentiment toward the roads in which I am interested is not unfriendly. It does not seem to be changing much in the direction of friendliness or unfriendliness, save as railway officials—and, especially, heads of traffic departments—get in touch with the people who do business with the roads, and try to meet their wishes in respect to the promptness of shipment and obliging conduct in handling their goods, and in courteous treatment of passengers. The roads mentioned have done a good deal in this direction, with satisfactory results.

—*Chairman.*

Road C.—I think that public sentiment toward our railway is becoming more friendly than it has ever been.

—*President.*

Road D.—We try to keep in touch with the public along the line, and have always found them our friends.

—*President.*

Road F.—Public sentiment toward railways, I think, is changing to be more friendly.

—*President.*

Road G.—The attitude of the public towards this company, save when serving upon juries, is, and has been, unusually friendly, owing, I believe, to the frankness with which its representatives have met the public and its manifest efforts at fair dealing. For four years at least the railways of the state in general have been endeavoring to improve their relations with the public by openness of discussion and frankness in stating or meeting facts. The results have been favorable, but not so marked as could be desired.

—*Vice-President.*

Road H.—Public sentiment toward our road is becoming more friendly. I believe this to be generally true of all the railways.
—President.

Road I.—I think the general sentiment of the public toward railways has softened somewhat in the past two or three years, and this condition will probably improve if the railways continue to show a diminution in their net earnings. Otherwise I think that the tendency to harass railways with adverse legislation will continue, as there is evidently a sentiment in the public mind that the earnings of railways must be reduced, or that the public, through their authorities, must show their power to reduce railway earnings, before there will be a tendency to diminish this pressure.
—General Superintendent.

Road J.—I think that public sentiment toward railways is improving slightly. Sensational articles in newspapers frequently, however, undo the work of months. We are endeavoring to cultivate communities along our line by establishing closer relations with them, by endeavoring to be fair, by co-operating with state educational organizations, helping the farmers, etc.
—President.

East—Answers to Question 6.

Road A.—For this company, we feel that we have a remarkable *esprit de corps* among our patrons. It is, and has been for the past nine or ten years, our policy to meet frequently with those various public bodies—boards of trade, merchants' associations, farmers' associations, etc.,—which exist along our line, attend their annual dinners, and in some cases have an opportunity to make addresses from the speakers' platform; all of which has been punctiliously followed up with the direct purpose of getting close to the public. My first move when I came to this property was to assemble the eighty odd newspaper publishers doing business along our line, and to give them an annual outing in June of each year, the purpose being, as expressed by me at our first meeting, that we might know one another and that relations friendly and congenial should be established between the two great influences for civilization, the railways and the press. I have, hanging on the wall back of my desk, two large framed testimonials, with personal signatures from the editors and proprietors of all of the papers doing business along our line, expressing sentiments which leave no doubt as to the relations between us. Of these testimonials I am more proud than of any of my other associations or decorations.

—Vice-President.

Road B.—I do not see much change in public sentiment during the past year. We have been fortunate in maintaining very pleasant relations with our patrons.
—Vice-President.

Road C.—If it is correctly reflected by the politicians and the press, then less friendly. Have tried to preserve an attitude of patient humbleness.
—President.

Road D.—Public sentiment varies with every changing breeze; always did, always will. In the abstract it is for the railway, and it believes the railway is for it. Under analysis this, that, and the other individual, community and section wants all there is coming to it, with as little surrender as possible. The public is "just folks."
—President.

Road E.—Public sentiment is becoming more friendly, due to the higher railway officers making more frequent visits to the newspaper editors, to the prominent manufacturers, to the prominent citizens, etc.
—Vice-President.

South—Answers to Question 6.

Road A.—Public sentiment is becoming more friendly. We are striving to come in contact with the people and to provide what they need in way of service for the movement of their business. Personal contact is the principal remedy for improving public relations.
—Vice-President.

Road B.—Public sentiment toward our road is becoming more friendly. I believe this to be generally true of all the railways.
—President.

Road C.—The more intelligent people are becoming more friendly all the time. The average farmer is friendly along the line and along the tracks, but the live stock on the railways. We are continually robbed by this kind of people with petty claims, such as claims for stock being killed, fire set out, and other such claims. Along all the railways in the United States such people are banded together to give evidence in each others' favor to rob the roads, and they are encouraged by the small lawyers in every community.
—General Superintendent.

Road D.—I believe the public sentiment toward our road is becoming more friendly. The only thing we have done to improve our public relations is in improved passenger and freight service, giving the public improved and better facilities.
—Vice-President.

Road E.—Our relations with the public are entirely satisfactory to us. We endeavor to meet the public squarely and fairly on all matters that come up, and it is our position in this respect, we believe, that makes the public fair in their relations to us.
—General Manager.

Road F.—Public sentiment toward our road is becoming more friendly, because of our efforts to produce a friendly sentiment by giving the people more consideration in the matter of train service, rates, etc., and doing everything possible to cultivate friendly relations.
—General Manager.

Road G.—Public sentiment is apparently changing for the better. Hundreds of individuals who have been interviewed express themselves as being favorable to increased rates. They are, however, in many instances strongly interested in a return to more stable business conditions. We have endeavored to put before them, in pamphlets and through personal address and by the influence of employees, the true situation. Where they can be reached in this way good results follow. The general public are woefully ignorant of the railway side.
—Vice-President.

Southwest—Answers to Question 6.

Road A.—More friendly, we hope. We have run through all of our states demonstration trains to enlighten the farmers respecting agricultural problems. We have added train service and car service wherever possible. We have moved empty cars increasingly longer distances for the sake of supplying local and sometimes unremunerative demands for cars. We have sedulously striven for punctuality, especially of passenger trains.
—Chairman.

Road B.—Public sentiment is becoming more friendly. We have done everything within our power to improve public relations, and at the same time safeguard the interests of the railway with both the shipping public and the communities which our lines serve.
—Vice-President.

Road C.—Public sentiment seems to be becoming gradually more friendly toward the railways, as the public is getting a better understanding of the railway situation. This feeling, however, is passive and rarely exerts itself to insist upon a square deal being afforded the roads. Railway officers are cultivating this sentiment with the public in every possible way, through personal contact, candid and frank statements through the press, interesting themselves in improving agricultural conditions by demonstration trains for the benefit of the farmers, and in many other directions, too numerous to mention.
—Vice-President.

Road D.—Public sentiment is friendly toward our road. We have endeavored to encourage this by giving as good service as possible and accommodating the public in small as well as large matters, where we could.
—General Manager.

Road E.—Public sentiment toward all railways in our state is becoming more friendly. The policy of our road is to treat

the public with the utmost consideration and to leave nothing undone in any department which might be construed as a disregard of the rights of the public in its relations to our property.
—Vice-President.

Road F.—I find the public sentiment extremely favorable to our line. In our first year's operation, I have had no complaints from the public in regard to our service, rates or from other causes. Our line is small, and it has been our desire and motive to keep in close touch with the patrons of the road and call upon them individually, as far as it is possible to do so; and in our contact with them it is our endeavor to impress upon them the mutuality of interest between the carrier and the people.
—Vice-President.

West and Transcontinental—Answers to Question 6.

Road A.—Public sentiment, I think, is becoming a little fairer and more friendly. An effort is made to have all of the officers, high and low, meet with the patrons of the road at all points, to know them and discuss questions of mutual interest, to give reasonable service, to pay claims promptly, and to try to point out that the country cannot have the necessary transportation facilities if there is to be a continual struggle between the shipper and the railway.
—President.

Road B.—I find it difficult to conjecture just what you mean by the words "friendly" and "less friendly." That public sentiment has been unduly, and, I think, unjustly, aroused throughout the entire country in its attitude towards carriers, goes without saying, it seems to me. The railway question has been made the football of politics. The press, as a rule, has been unfriendly. I think its spirit is changing. The wish, however, may be father to the thought. The companies I serve have undertaken industrial development all along their lines, have decided upon a campaign of publicity, and have determined to publish their improvements already made and contemplated, and, so far as may reasonably be done, nail every published lie that comes to their attention by denials and such proof as can be brought before the public, and, in a general way, assume that they are entitled as corporations to the same hearing and treatment that private persons are entitled to.
—Vice-President.

Road C.—Public sentiment toward this railway, as compared with its sentiment toward other railways, is and always has been friendly.
—Assistant to President.

Road D.—Being a local institution, public sentiment is very friendly to us, and we do everything possible to merit this sentiment.
—Vice-President.

Road E.—Generally speaking, more friendly relations between the railways and the public exist; due to improved service and campaign of publicity, enabling the railway officials and the public to become better acquainted, which has established an apparent confidence heretofore unknown.
—General Manager.

Road F.—I believe the public in general is showing a more friendly attitude toward the railways. Our road has done nothing specially to improve its public relations. I believe in the railways working more in the open and taking the public more into their confidence.
—Vice-President.

Road G.—I think the sentiment of the public toward railways in general is becoming more friendly. The facts brought out in the present controversy over increased rates have been of immense value in an educational way, and the disposition of the average citizen now is to have full justice done to the carriers.
—President.

Canada—Answers to Question 6.

Road A.—I have not noted any particular change in the public sentiment toward this road, and we are doing what we can to improve our public relations by giving an efficient service

and showing a willingness to do everything we legally can, within reason, to facilitate the business of our patrons.

—President.

Road B.—Public sentiment towards our road has always been of a friendly nature.
—General Manager.

Road C.—I think, on the whole, it is becoming more friendly.
—Vice-President.

QUESTION 7.—ARE YOUR RELATIONS WITH YOUR EMPLOYEES BECOMING MORE SATISFACTORY OR LESS SATISFACTORY? WE HAVE IN MIND PARTICULARLY THREE PHASES OF THE SUBJECT OF THESE RELATIONS: FIRST, CO-OPERATION WITH THEM TO PREVENT LEGISLATION THAT WILL IMPAIR THE REVENUES OF THE ROADS; SECOND, INCREASING OR DECREASING EFFICIENCY OF LABOR; THIRD, INCREASING OR DECREASING REASONABLENESS IN THE DEMANDS OF EMPLOYEES REGARDING WAGES AND CONDITIONS OF EMPLOYMENT.

Central West and Trunk Lines—Answers to Question 7.

Road A.—The relations with our employees have not become any more satisfactory as a result of what has transpired during the past year. First, we do not find them particularly disposed towards co-operating with us to prevent legislation that will impair the revenues of the company or increase its expenditures. Second, the efficiency of labor, in our opinion, is less, generally speaking, since the leading organizations succeeded in forcing upon the railways the advances they got this year than prior thereto. Our experience also is that our employees are constantly making greater demands for wages and at the same time calling upon us for changes in conditions that will relieve them from doing as much work and will cause us greater expense.
—President.

Road B.—The relations with employees are becoming less satisfactory. The demands of employees regarding wages and conditions of employment are increasing in unreasonableness. The tendency is towards a decrease in the efficiency of labor. This seems to grow as wages increase and as hours of labor are shortened. There is co-operation between some of the employees and the railways to prevent legislation that will impair the revenues of the roads. Perhaps it would be better to say that some of the employees evince a wish in that direction. There is very little that can be called active co-operation. The majority of the employees seem to be under the impression that the railways can always get, without their assistance and by merely asking it from the public, or imposing it on the public, such increased earnings as will meet the demands for increase of pay. They do not indicate any idea that the railways need their co-operation.
—Chairman.

Road C.—Our relation with our employees is satisfactory, but we note an increasing inefficiency in labor.
—President.

Road D.—Relations always friendly, and they are helpful in every way.
—President.

Road F.—The relations between the road and its employees are now, and always have been, very friendly. I think they are seeing it is to their interests not to sanction hostile legislation.
—President.

Road G.—Less satisfactory, due to the rapidly disappearing personal relationship between subordinates and superiors, and a growing tendency to seek the direction and personal assistance of the heads of the various orders in case of differences. They are voluble with reference to a desire to co-operate to prevent unjust adverse legislation, but I have yet to see any particular result. The efficiency of labor is decreasing, because the individual is losing his identity and becoming a mere unit in an organization. Decreasing reasonableness both as to wages and conditions of service.
—Vice-President.

Road H.—Relations with our employees are becoming more satisfactory. They are in earnest co-operation to prevent any

legislation that will repair the revenue of the road. They seem to understand, in general, that it is necessary to do something in their power to have the public understand that the railways are entitled to an increase in rates and a decrease in adverse legislation and undue treatment. —President.

Road I.—Relations with employees are harmonious. You no doubt are aware that there is an organization in existence by which the railways, through their employees, undertake to oppose any legislation inimical to their interests. I cannot see that the efficiency of employees in general is increasing. I fear it is somewhat the reverse. As to demands for increasing salaries, employees in general are guided by what they think they can accomplish in the way of getting salaries increased. I do not think that any of the labor organizations pay much attention to the net earnings of the companies for whom they work. —General Superintendent.

Road J.—I cannot say that there is very much change one way or the other. I certainly do not see any noticeable improvement. —President.

East—Answers to Question 7.

Road A.—In similar manner to what we have done to improve relations with the public, we have always undertaken to establish ourselves in friendly relationship with our employees. We attend their annual balls and entertainments, we are invited to the annual dinner at the installation of officers of their organizations, and are given an opportunity, from the speakers' table, to discuss in heart to heart talks the relation we bear with them. I feel that, without conceit, I may say it would be difficult to find another property where the relations between officers and men even approximate conditions which exist upon this property. We give annual excursions to our foremen of shops for themselves and families; we bring even the track foremen together for conference and a dinner. It is our constant aim and endeavor, in a dignified and proper manner, to keep up and sustain those relations between our employees and the officers that are right and proper. —Vice-President.

Road B.—Our relations with our employees are cordial and satisfactory. They are outspoken in their dislike of antagonistic legislation. We think their efficiency is second to no others, and we cannot say that unreasonable demands have been made. —Vice-President.

Road C.—Less satisfactory. (a) They will aid in trying to increase revenues for their purely personal interest. (b) Efficiency is constantly decreasing. (c) Demands constantly becoming more exorbitant and unreasonable. —President.

Road D.—Relations with employees are delightful at the moment, and, perhaps, would be indefinitely if they were left to deal alone with their employer. An auxiliary result of discussions and dissensions, based largely upon theory, federally, is not lost upon labor leaders. —President.

Road E.—Relations with the employee seem to become less and less satisfactory. I think the employee will generally co-operate with his company as regards legislation which will imperil the revenue of the road. The labor efficiency is clearly decreasing. The demands, we feel, are becoming less and less reasonable. —Vice-President.

South—Answers to Question 7.

Road A.—Relations with our employees are less satisfactory. They are not active in co-operating with the railway interests for the advancement of legislation affecting their interests; their main object seems to be to increase their wages, and they are relying upon unionism to protect them, and as a result the work of the labor is less efficient. The increased demands for wages are growing more unreasonable every year, and it seems to be only a question of time when some great struggle will be inevitable unless it is avoided by some legislative enact-

ment that will provide a means of settlement of disputes and reasonable demands to enable the companies to carry on their business in the most efficient manner.

Road B.—Relations with employees are very satisfactory. The company has never had any serious trouble with its employees, and feels free from any apprehension of any. —General Superintendent.

Road C.—We have no trouble with our employees, and have never had. —General Superintendent.

Road D.—Our relations with our employees are not becoming more satisfactory. I did not ask them to co-operate with us to influence legislation in favor of increased rates, for the reason that I felt that any such action would bear the inference of the influence of the employer, and that it would carry little, if any, weight. I consider the efficiency of labor decreasing rather than increasing. I cannot say whether the demands of employees for increased wages are reasonable or unreasonable. From their standpoint it is entirely reasonable, and from our standpoint it is unreasonable. There is so much to be said on both sides that I do not consider myself competent to decide the question. Demands have been made upon me for increased wages that are unreasonable. Entirely reasonable demands, by other classes of our employees, have been made and granted. —Vice-President.

Road E.—We are not troubled with labor disturbances. Our employees seem disposed to co-operate with us in any matter of mutual interest. They seem to realize that what is good for the railway is also advantageous to them. —General Manager.

Road F.—Our relations with our employees are becoming more satisfactory in all three of the phases mentioned. —General Manager.

Road G.—The employees are affected similarly to the general public, and are usually ignorant of the true condition, and need as much education along these lines as the outside public. Where the facts have been presented to them in such a way as to couple their interests with the railways they have responded to prevent adverse legislation and to obtain increases in rates. Success has attended our efforts in both particulars whenever these forces have been exerted. There is an increased efficiency in labor of the higher classes in that they are using modern appliances, larger locomotives and faster machines. Individually there is a disposition to do less work, which is reflected in manual labor and among such classes as use hand tools. The demands of labor for better working conditions and higher wages is unreasonable among certain classes of well organized labor, forcing the compensation out of line with the proper conduct of the business. Certain employees are now getting higher monthly salaries than those who supervise them, or those who are technically trained and holding more responsible positions, as well as those in minor positions much better educated. The cost of living is advancing equally for all, causing unrest and dissatisfaction to those working for moderate salaries. —Vice-President.

Southwest—Answers to Question 7.

Road A.—Broadly speaking, relations are constantly less satisfactory. First, they do not act in unison to prevent legislation that will impair the revenues of the roads, and sometimes vote as a body against measures greatly favored by the railways. Second, they have shown no spirit toward increasing their own efficiency; higher pay seems to result in lower efficiency both actually and per dollar of pay, and they resent bonus methods, the piecework system and other plans designed to obtain higher efficiency. Third, if their demands respecting wages and conditions of employment have increased in reasonableness, it is because of the general public attitude favoring mediation and arbitration, and of the fact that the calling out

of an entire union has become so widespread and serious a matter, rather than because of a better feeling on the part of the employees themselves or of the heads of their unions.

—Chairman.

Road B.—Relations with our employees are satisfactory. They are beginning to appreciate the necessity for co-operation to prevent legislation which impairs revenue. The question of increase or decrease in efficiency of labor is difficult to answer; in some departments there is an increase and in others a decrease. We have had no unreasonable demands from our employees in connection with wages or conditions of employment; thus far they have been disposed to treat fairly. The increased cost of living has had great bearing on the demands of all labor.

—Vice-President.

Road C.—It seems apparent that employees are at last awaking to the fact that continued agitation on the part of demagogues and politicians against the railways will affect their interests, and to the extent to which the more intelligent of them are appreciating this fact they are lending their assistance in preventing such legislation. The efficiency of labor in railway service seems to be decreasing in proportion to increase in volume of business and number of employees. It seems evident that employees will continue to demand increases in wages, whether they are reasonable or not, as long as there is any possible chance either through threat of strike or through arbitration to get such increases. Some of their demands are not altogether unreasonable, but many of them are unreasonable to the point of absurdity, amongst which latter can be classed the almost universal objection to labor-saving machinery exemplified in the form of more powerful locomotives. The loyalty of many railway employees has been and is being destroyed by the apparent influence emanating from government sources by which they report to the officers of their unions anything that they may consider an infraction of the law. The effect of influencing any employee to act as an informer upon the actions of his employer is bound not only to destroy the employee's loyalty, but to seriously impair the efficiency of his service. This condition will materially impair discipline, and is therefore directly against the interests of the public, who are vitally concerned in the most perfect discipline prevailing upon American railways.

—Vice-President.

Road D.—We have not asked our employees to co-operate to prevent legislation which might impair the revenues of the road, as we do not think such an alliance would be beneficial. We think the efficiency of labor has increased on our road the past year. While our men have joined in the movement for general wage increases, we think they have done so at the request of their grand officers, as, so far as we can tell, they are well satisfied with present conditions.

—General Manager.

Road E.—Our relations with our employees have always been satisfactory. A feature of our policy is to have the confidence and co-operation of our employees in regard to all matters effecting the property, upon the ground that the success of the road is necessarily to a certain extent the success of the employees. Likewise its failure, to some extent, is their failure.

—Vice-President.

Road F.—Our relations with our employees are first-class in every respect. As stated, our line is small, and we have no contracts of any kind with any of our employees. They are treated fairly and understand that their positions with this company are secure in every way, and all that we expect from them is sobriety, loyalty and a reasonable performance of their duties. We are satisfied with the work performed by them.

—Vice-President.

West and Transcontinental—Answers to Question 7.

Road A.—Relations with employees are, on the whole, satisfactory. In an abstract way, employees take an interest in legislation that will tend to reduce the earning power of the

railways. Their chief interest, however, seems to be in forwarding legislation that will tend to put burdens on the railways for safety appliances before there is a very great need for them, and for inspections of one kind and another by some outside authority, other than the owners of the road, which increases expense without producing any real net benefit. The efficiency of labor, as a whole, does not show any change for better or worse over a year ago. The demands for wages and conditions of employment seem somewhat unreasonable, considering the fact that the total fund that the railway has at its disposal is already overtaxed. There seems to be little disposition on the part of those who voice the demands of the employees to consider the general economical situation of the country, and to give weight to the total wage that any given business can pay and still exist.

—President.

Road B.—Generally speaking, our relations with our employees are sound and co-operative in the matter of trying to prevent legislation that will impair the revenues of the roads. As to the question of increasing or decreasing efficiency of labor, there is with us, as I believe there is everywhere, the common rule of conduct—the employee tries to get the most money for the least labor, but I believe the managers are meeting that natural disposition of men with all the liberality that their revenues will permit.

—Vice-President.

Road C.—There does not appear to be any material change in the relations with our employees. These have usually been fairly satisfactory. There is an awakening on the part of employees in respect to political matters as they affect railways, and considerable good will probably come from the movement, as the employees are vitally interested as a matter of self-protection.

—Assistant to President.

Road D.—The same answer as to Question 6 might be given. Our relation to our employees is very satisfactory and very friendly.

—Vice-President.

Road E.—Co-operation between the railway and its employees is more satisfactory, and the employees are working in the direction of protecting the companies against unfair legislation. This was also very apparent during the recent elections in the various states.

—General Manager.

Road F.—Our relations with our employees are satisfactory, and so far as I know the efficiency of labor remains about the same. We are paying common labor a great deal more than we were a few years ago. There seems to be no limit to the demands of organized labor, such as train and enginemen; as fast as we settle with one organization the demands of another body are before us. However, these demands are all handled by the General Managers' Association in Chicago, and I believe they will all result in arbitration.

—Vice-President.

Road G.—Our relations with our employees are becoming more satisfactory to the extent that the vast army of railway men is beginning to realize that its own prosperity is bound up in the prosperity of the railways, and that the carriers' revenues cannot suffer much impairment without a blow being struck at their incomes; and this knowledge has recently prompted many of them to adopt co-operative measures to prevent further hostile legislation. There has been no marked change with respect to the efficiency of labor or with regard to the reasonableness of the demands of employees concerning wages and conditions of employment. We are confronted with numerous demands for increased wages, some of which seem unreasonable from our point of view, but the increasing cost of living during the past few years has created an undercurrent of discontent which has crystallized into requests for higher wages.

—President.

Canada—Answers to Question 7.

Road A.—There is but little change in the relations with our employees. The tendency of all influence in labor organization is

toward decreased efficiency of labor and increased demands for higher compensation.
—President.

Road B.—The relations are satisfactory.

—General Manager.

Road C.—This is most difficult to define. The demands on the part of labor are increasing all the time as to wages and conditions of employment, and the fact that our railway men are working so close to a large body of coal miners, who are always agitating, makes it somewhat difficult to know just where we are in this regard.
—Vice-President.

Mexico—Answers to Question 7.

Road I.—Our relations with our employees have been and are entirely satisfactory.
—Vice-President.

QUESTION 8.—WHAT KINDS OF TRAFFIC ON YOUR LINE OFFER THE BEST PROMISE AND WHAT KINDS OFFER THE POOREST PROMISE FOR 1911?

Central West and Trunk Lines—Answers to Question 8.

Road A.—It is difficult to say what kind of traffic offers the greatest promise and which the least for the coming year. There does not seem to be any difference in this regard as far as we can determine.
—President.

Road B.—The best promise for earnings of the lines referred to, for 1911, is from products of agriculture. The poorest promise is from manufactures and merchandise.
—Chairman.

Road C.—We pass through an agricultural country, and our business depends on the crops.
—President.

Road D.—Prospects fairly good for all classes.

—President.

Road G.—The answer to this question depends so largely upon the determination of the commission relative to rate advances, and the consequent course of the railways, that I cannot now give an intelligent answer.
—Vice-President.

Road H.—The business of our road is of such a versified nature that each year shows a gradual increase over the year previous, and is not dependent upon any one particular kind of business.
—President.

Road I.—Local traffic, which means farm products and general merchandise, and the demand for bituminous coal, are the best promises for revenue traffic for the coming year.

—General Superintendent.

Road J.—We look for the greatest improvement in traffic on account of the movement of grain and grain products.

—President.

East—Answers to Question 8.

Road A.—If one could answer this question with positive information he might, by reason of such knowledge, go into business and retire independently wealthy at the end of the year. The question enters the field of speculation, and our best prognostication would seem to indicate a leveling process of all lines for the year 1911, with no remarkable ups or downs; but surely no great or boom traffic to be expected.
—Vice-President.

Road C.—The merchandise business is showing sharp decreases.
—President.

Road D.—Agricultural and lumber traffic are mainstays here. The resources are vast. Some increase ought to be looked for against the worst general conditions which can be rationally imagined. One might look for splendid and permanent industrial development, at points where now waste, decay and neglect is the fate, in places, in the forests, if the temperate, judicial, and prompt were to take the place of what has been, and is, in high places.
—President.

Road E.—At the present time the outlook is a favorable one reasonably well. There has been a serious falling off in the merchandise traffic.
—Vice-President.

South—Answers to Question 8.

Road I.—I should say that lumber offers the best promise for 1911 on account of high prices of farm products. From present outlook, lumber is the least attractive because of the stagnant market, but this cannot continue very long unless there is a general easing off of prices of commodities now enjoyed throughout the South.
—Vice-President.

Road C.—I think there will be an improvement in traffic of every description in 1911, providing there is not too much legislation, both state and national.
—General Superintendent.

Road D.—In view of the high price of cotton, I consider that the traffic dependent upon agriculture offers the best promise. I do not consider that our traffic for 1911 shows any poor promise. The development in this section of the country is good, and, I think, will be reflected in the business that we will do this coming year.
—Vice-President.

Road E.—The passenger traffic and the handling of forest products is of greatest value to our line, and this will be the case during 1911.
—General Manager.

Road F.—Iron ore promises to be our best commodity movement for 1911, while the movement of fruit will be the poorest, due chiefly to discontinuation of the growing of peaches along our line.
—General Manager.

Road G.—The products of forests, agriculture and mining offer the most encouragement; manufactured articles give the least promise, unless confidence may be in some way restored.
—Vice-President.

Southwest—Answers to Question 8.

Road A.—So large a proportion of our traffic arises from products of the soil that a satisfactory answer cannot be made. Assuming that the crops of 1910 will be repeated or bettered, our best traffic will be in products of agriculture and in animals and the products thereof. Otherwise, the products of mines will be the largest single item of traffic.
—Chairman.

Road B.—There will be a very little difference in traffic conditions on our line during the year 1911. If crop conditions are favorable, there should be an increase in all commodities handled.
—Vice-President.

Road C.—It is rather early now to prognosticate what traffic offers the best promise for the year 1911. This section is largely agricultural, and a drouth of more or less severity has prevailed for the last two years. If good seasons prevail when the crops are planted and thereafter, products of agriculture, together with lumber, offer the best promise for traffic for the year 1911.
—Vice-President.

Road D.—Through California freight offers the best promise for the next year. The present outlook is that shipments of copper, bullion, ore, coke and coal will be less than during the present year.
—General Manager.

Road E.—We are expecting our best traffic for 1911 from the general increase that naturally comes with the opening up of an exceptionally good country, the establishment of industries, building of houses and the opening of business concerns. It is impossible to say just what character of traffic will be best or poorest at this time.
—Vice-President.

Road F.—Our principal traffic is sugar beets, potatoes, grain, hay, stock and merchandise, coal, etc. The promise of 1911 is very encouraging in all of the above lines.
—Vice-President.

West and Transcontinental—Answers to Question 8.

Road A.—The general merchandise is moving very fairly, and I think will continue to do so. Movements of structural ma-

terials in large quantities will not be very brisk in 1911; business, as a whole, will be slow, but I think will increase in volume, provided the country between the Rocky and Allegheny mountains has an adequate supply of moisture. —President.

Road B.—Conditions on our lines for the year 1911 are promising with respect to the volume of the products of the soil and their movement. The large lumber interests, however, wait upon a revival of the confidence that does not now exist as it did four years ago, but even the lumber industries are in a healthy condition. The mining industries, particularly copper, may be said to be normal, although, on account of the low price of copper, that may admit of some modification. —Vice-President.

Road C.—It is too early to estimate crop conditions of 1911. Merchandise traffic and construction material are quite likely to show a material reduction. Everything depends on general prosperity. If we do not have that, there will be a corresponding falling off in all kinds of freight. —Assistant to President.

Road D.—The traffic which offers the best promise for increase in 1911 is fruit; and the poorest, lumber. —Vice-President.

Road F.—I look for quite a revival in the mining industry next year, and as ore is one of the largest commodities we handle it should help us considerably. —Vice-President.

Road G.—The territory we serve is largely agricultural. The corn and oats crop harvested the past season was good and the early months of the coming year should see a good movement of these commodities, including what we might term the products of corn, such as livestock and meats. While the winter wheat crop was satisfactory, the partial failure of the spring wheat crop in the Northwest will result in a reduced volume of wheat tonnage and possibly some curtailment in flour shipments, and the movement of general merchandise into the Northwest probably will be somewhat restricted owing to the crop conditions referred to. The Northwest was also unfortunate in its potato harvest. In the early months of the year we usually have a good tonnage of potatoes from the Northwest, but the reduced yield the past season will have its effect on this class of freight. The movement of miscellaneous merchandise will be controlled entirely by trade conditions in 1911. There can be no doubt that the present business situation throughout the country is waiting for a settlement of several important questions now before the government. If they are disposed of in a conservative manner, there is no reason why that confidence which is now wanting should not quickly be restored and business conditions improve. In that event, the approaching year should be better from a traffic standpoint than 1910, which was in many respects unsatisfactory. —President.

Canada—Answers to Question 8.

Road A.—Given a demand for our grain abroad, the movement of grain should be fairly good the coming year by reason of the large crops. Merchandise and general business is not likely to show much of an improvement until business conditions are more settled. —President.

Road B.—Agricultural products, products of the dairy, asbestos and copper mining seem to offer the best promise for future development. In fact, all the sources of business throughout our district look reasonably prosperous for next year. —General Manager.

Road C.—Our lines of railway are largely in the coal business, and prospects are good for 1911. —Vice-President.

Mexico—Answers to Question 8.

Road A.—Due to the good crops throughout the republic, agricultural products offer the best promise of traffic for the year 1911. There is no specific commodity that can be said to offer the poorest promise. —Vice-President.

CHANGES IN RAILWAY OWNERSHIP AND CONTROL.

The most interesting features in the changes in railway control during the year were the further extension of the Hawley group of lines and the activities of the Hill and Harriman lines in the Northwest. As noted below, the Chesapeake & Ohio, now controlled by Edwin Hawley, Frank Trumbull and associates, gained two important lines north of the Ohio river, the Hocking Valley taking it to Toledo and the Chicago line, as it is now called—the old Chicago, Cincinnati & Louisville—which gives it an entrance into Chicago. Control of the Missouri, Kansas & Texas, which was bought by Mr. Hawley and associates in 1909, was made effective by the election of a Hawley board of directors. In the following list of changes in control, electric railways are omitted, with one or two exceptions where electric roads in Oregon were acquired by Hill interests.

Abbottsford & Northeastern.—This property, running from Athens, Wis., to Abbottsford, 15 miles, has been taken over by the Minneapolis, St. Paul & S. S. M., and is operated as a branch of the Chicago division (Wisconsin Central).

Albany & Northern.—Control of this 37-mile road was acquired in February by the Georgia, Southwestern & Gulf.

Algoma Central & Hudson Bay.—This company was taken out of the hands of the receiver and reorganized under the auspices of the Lake Superior Corporation. A new company was capitalized as follows: Fifty-year 5 per cent. first mortgage bonds \$6,750,000; 5 per cent. non-cumulative preferred stock \$5,000,000; common stock \$5,000,000. In consideration of the guarantee of principal and interest of the railway company bonds, the Lake Superior Corporation received \$5,000,000 common stock and holds \$1,125,000 of preferred stock for the benefit of the railway.

Ann Arbor.—Eugene Zimmerman resigned as president, and Joseph Ramsey, Jr., an associate of Newman Erb, took his place.

The \$3,001,000 common stock and the \$2,190,000 preferred stock which carry control of the Ann Arbor, and which stock was deposited under Detroit, Toledo & Ironton 5 per cent. notes, were sold on November 25 to Joseph A. Ramsey, Jr.

Arizona & Colorado.—See Arizona Eastern Railroad.

Arizona Eastern of New Mexico.—See Arizona Eastern Railroad.

Arizona Eastern Railroad.—The property and franchises of the lines in Arizona controlled by the Southern Pacific, namely the Maricopa & Phoenix, the Gila Valley, Globe & Northern, the Arizona & Colorado, the Arizona Eastern and the Arizona Eastern of New Mexico were consolidated in February under the name of the Arizona Eastern Railroad.

Baltimore & Ohio.—See Hocking Valley; also Valley Railroad; also see Berkley Springs & Potomac in article on Receiver-ships and Foreclosure Sales.

Beaumont & Great Northern.—All of the stock and bonds of this company were sold by J. M. West and R. C. Duff to William Carlisle. The road runs from Trinity, Texas, to Livingston, 33 miles.

Beaumont, Sour Lake & Western.—See New Orleans, Texas & Mexico.

Blackstone Railway.—See Norfolk & Western.

Brinson Railway.—This company took over the old Savannah Valley Railroad and issued \$275,000 7 per cent. cumulative stock and \$420,000 first mortgage 5 per cent. bonds of 1910-1935. The road runs from Savannah, Ga., to Mill Haven, 72 miles.

Buffalo, Rochester & Pittsburgh.—See Silver Lake Railway.

Caldwell & Northern.—The Carolina & North-Western bought the property of the Caldwell & Northern, and assumed the \$543,000 5 per cent. first mortgage bonds. The Carolina & North-Western line now runs from Chester, S. C., to Edgemont, N. C., 134 miles.

Camas Prairie Railroad.—This company was formed to operate the line from Lewiston Junction, Wash., to Grangerville, Idaho, 150 miles, which is owned jointly by the Oregon Railroad & Navigation Company (Harriman) and the Northern Pacific (Hill).

Canadian Northern.—See Edmonton & Slave Lake.

Carrollton & North Western.—See Caldwell & Northern.

Canadian Northern Ontario.—See Ontario & Ottawa.

Central New England.—The owners of all but 300 shares of the total Philadelphia holdings of the numerous stock of the Central New England have sold their stock to the New York, New Haven & Hartford, in accordance with an offer made by the New Haven to pay \$15 for the preferred and add to a share for the common. The New Haven had previously owned a majority of the C. N. E. stock.

Central Ontario.—See Ontario & Ottawa.

Chattanooga Southern.—Securities of this company were bought by Newman Lathrop \$80,000. Receiver not discharged.

Chesapeake & Ohio.—See Chesapeake & Ohio of Indiana; also Hocking Valley; also Kanawha & Michigan.

Chesapeake & Ohio of Indiana.—This is the name of the reorganized company which took over the Chicago, Cincinnati & Louisville (see C. C. & L. in the editorial on receiverships and foreclosure sales), and is itself a subsidiary of the Chesapeake & Ohio.

Chicago & Alton.—See Toluca, Marquette & Northern.

Chicago, Cincinnati & Louisville.—See Chesapeake & Ohio of Indiana.

Chicago Great Western.—See Leavenworth Terminal Ry. & Bridge.

Chicago, Milwaukee & Puget Sound.—See Montana Railroad.

Chicago, Rock Island & El Paso.—Stockholders of the Chicago, Rock Island & Pacific voted on December 15 to take over the subsidiary, the Chicago, Rock Island & El Paso, which runs from Bravo, Texas, to Santa Rosa, New Mexico, 112 miles.

Chicago, Rock Island & Pacific.—Three representatives of Phelps Dodge & Co., were elected directors, succeeding three representatives of the Pearson-Farquhar syndicate. The Pearson-Farquhar syndicate, composed largely of Englishmen, was formed, it is supposed, to acquire substantial interest in or control of a chain of railways running from the Atlantic to the Pacific. They were forced, however, to sell their holdings, which included a block of Rock Island preferred stock, which Kuhn, Loeb & Co., New York, bought. Phelps Dodge & Co. later acquired this substantial minority holding of preferred stock.

See also Chicago, Rock Island & El Paso.

Chicago Southern.—See Chicago, Terre Haute & Southeastern.

Chicago, Terre Haute & Southeastern.—See Southern Indiana and Chicago Southern in the editorial on Receiverships and Foreclosure Sales.

Cleveland, Cincinnati, Chicago & St. Louis.—See Evansville, Mt. Carmel & Northern.

Colorado Southern, New Orleans & Pacific.—See New Orleans, Texas & Pacific.

Columbia River & Central Oregon.—See Oregon-Washington Railroad & Navigation Company.

Coronado Railroad.—See San Diego Southern.

Dallas, Cleburne & Southwestern.—In February, the Missouri, Kansas & Texas bought all of the securities of this 10 mile road, which it had heretofore leased. There are \$10,000 stock and \$150,000 bonds outstanding.

Des Chutes Railroad.—See Oregon-Washington Railroad & Navigation Company.

Detroit, Toledo & Ironton.—See Ann Arbor.

Duluth & North Minnesota.—See Manistique Railway in the editorial on Receiverships and Foreclosures.

Edmonton & Slave Lake.—This property has been taken over by the Canadian Northern, which now operates it as part of its line.

Erie.—See Hocking Valley.

Evansville, Mt. Carmel & Northern.—This property has been leased for 99 years to the Cleveland, Cincinnati, Chicago & St. Louis.

Georgia, Southwestern & Gulf.—See Albany & Northern.

Gila Valley, Globe & Northern.—See Arizona Eastern Railroad.

Gulf Coast Railway.—Control of this company, which leased the Hawkinsville & Florida Southern, was sold in February to "Eastern capitalists." The Gulf Line and the Hawkinsville & Florida Southern merged about 19 miles.

Hawkinsville & Florida Southern.—See Gulf Coast Railway.

Hocking Valley.—The Chesapeake & Ohio acquired a majority of the common stock of the Hocking Valley. Control of the Hocking Valley was formerly held jointly by the Chesapeake & Ohio, the Lake Shore & Michigan Southern, the Baltimore & Ohio, the Erie and the Pittsburgh, Cincinnati, Chicago & St. Louis. The new directors of the H. V. voted to retire the \$15,000,000 preferred stock and to issue \$15,000,000 new common stock pro rata; but this plan has not as yet been carried out, because of injunction proceedings brought by the minority stockholders. The H. V., in connection with the Kanawha & Michigan gives the C. & O. an outlet to the Lakes at Toledo.

Illwaco Railroad.—See Oregon-Washington Railroad & Navigation Company.

Industrial Railroad.—See Lorain & Ashland.

Ironton, Bancroft & Ottawa.—See Ontario & Ottawa.

Iron Mountain Railroad of Memphis.—See Union Railway of Memphis.

Kanawha & Michigan.—Control of this road, which had been held by the Hocking Valley, was sold to the Lake Shore & Michigan Southern and the Chesapeake & Ohio, each one taking an equal share of stock, so that the Kanawha & Michigan is jointly controlled by the Chesapeake & Ohio and the Lake Shore & Michigan Southern, and gives the Chesapeake & Ohio its connection with the Hocking Valley, and gives the Lake Shore & Michigan Southern an extension of its Toledo & Ohio Central to the Ohio river.

Lake Creek & Coeur D'Alene.—See Oregon-Washington Railroad & Navigation Company.

Lake Shore & Michigan Southern.—See Kanawha & Michigan, also Hocking Valley.

Lake Superior Corporation.—See Algoma Central & Hudson Bay.

Leavenworth Terminal Ry. & Bridge.—The Chicago Great Western bought in August the entire \$600,000 stock of this company.

Lexington & Eastern.—The Louisville & Nashville bought all of the \$500,000 stock, and nearly all of the \$1,500,000 general mortgage bonds, and \$330,000 deferred debentures. The road runs from Lexington, Ky., to Jackson, 93 miles.

Lorain & Ashland Railroad.—This company and the Industrial Railroad Company have been consolidated under the name of the Lorain, Ashland & Southern.

Louisville & Nashville.—See Tellico Railroad; also Lexington & Eastern.

Lunenburg Railroad.—See Norfolk & Western.

Malheur Valley.—See Oregon-Washington Railroad & Navigation Company.

Maricopa & Phoenix.—See Arizona Eastern Railroad.

Marmora Railway.—See Ontario & Ottawa Railroad.

Mexican International.—This property, which had heretofore been operated separately, was taken over by the National Railways of Mexico, and is now operated as a part of the National Railways. A majority of the stock of the Mexican International was previously held by the National Railways; and in 1910 the Southern Pacific, which owned a majority interest in the Mexican International stock, sold its holdings to the National Railways of Mexico.

Minneapolis, St. Paul & Sault Ste. Marie.—See Abbottsford & Northeastern.

Missouri, Kansas & Texas.—See Dallas, Cleburne & Southwestern; also Texas Central.

Montana Railroad.—This line was taken over by the Chicago, Milwaukee & Puget Sound, and the Puget Sound now operates the Montana Railroad as part of its own line. The Puget Sound owns all of the Montana Railroad \$2,000,000 general mortgage

bonds and \$3,500,000 stock. The road runs from Lombard mountains to Harlowton, 89 miles.

National City & Otago.—See San Diego Southern.

National Railways of Mexico.—See Pan-American Railroad; also Mexican International.

New York, New Haven & Hartford.—See Central New England.

New Orleans, Texas & Mexico.—This is a new name for the company which operates that part of the St. Louis & San Francisco system heretofore operated by the Colorado Southern, New Orleans & Pacific, the Beaumont, Sour Lake & Western, the Orange Northwestern and that part of the Frisco itself running from Houston, Texas, to Brownsville.

Norfolk & Western.—This company has taken over the operation of the Blackstone and the Lunenburg—five and eight miles respectively.

North Coast.—See Oregon-Washington Railroad & Navigation Company.

Northern Central.—The stockholders have voted to authorize a new lease for 999 years to the Pennsylvania Railroad. This lease is being opposed by holders of a very small minority of the stock.

Northern Pacific.—See Camas Prairie Railroad.

Ontario & Ottawa Railroad.—This company controls the Irondale, Bancroft & Ottawa, the Central Ontario and the Marmora Railway. The Canadian Northern Ontario in August bought \$2,463,300 stock of the Ontario & Ottawa of the total \$2,650,000 outstanding.

Orange & Northwestern.—See New Orleans, Texas & Mexico.

Oregon & Washington.—See Oregon-Washington Railroad & Navigation Company.

Oregon Eastern.—See Oregon-Washington Railroad & Navigation Company.

Oregon Electric.—Control of this property was bought by James J. Hill. There is \$1,950,000 common stock outstanding, \$160,000 6 per cent. cumulative preferred stock, and \$2,000,000 first mortgage bonds. The road is 21 miles long.

Oregon Railroad & Navigation.—See Oregon-Washington Railroad & Navigation Company.

See also Camas Prairie Railroad.

Oregon, Washington & Idaho.—See Oregon-Washington Railroad & Navigation Company.

Oregon-Washington Railroad & Navigation Company.—This is the name of the new company which has been organized to take over and operate the Oregon Railroad & Navigation, the Oregon & Washington, the Columbia River & Central Oregon, the Ilwaco Railroad, the Des Chutes Railroad, the Lake Creek & Coeur d'Alene, the Oregon Eastern, the Oregon, Washington & Idaho, the Spokane Union Depot, the Umatilla Central, the Malheur Valley and the North Coast. The Oregon-Washington Railroad & Navigation Company is a subsidiary of the Union Pacific, and most of the roads taken over were already known to be Harriman lines. The North Coast, however, had been built by a company which carefully concealed who its backers were.

Pan-American Railroad.—The National Railways of Mexico bought a large majority of the stock of the Pan-American, and bought the entire \$1,000,000 stock of the Vera Cruz & Isthmus.

Pennsylvania Company.—See Pittsburgh, Youngstown & Ashtabula.

Pennsylvania Railroad.—See Northern Central.

Pittsburgh, Cincinnati, Chicago & St. Louis.—See Hocking Valley.

Pittsburgh, Youngstown & Ashtabula.—Stockholders voted to lease the property to the Pennsylvania Company. The Pennsylvania Company owns \$5,775,000 out of the total \$9,100,000 preferred stock and all of the \$2,100,000 common stock, the only change therefore is in the form of control.

Rhode Island & Massachusetts.—See Berkshire Railroad Company.

Rio Grande Railroad.—See this company in the editorial on Receiverships and Foreclosure Sales.

St. Louis & San Francisco.—See New Orleans, Texas & Mexico; also St. Louis, Brownsville & Mexico.

St. Louis, Brownsville & Mexico.—B. F. Yoakum and associates, who had acquired nearly all of the stock of the St. Louis, Brownsville & Mexico, turned their holdings over to the St. Louis & San Francisco.

St. Louis, Iron Mountain & Southern.—See Union Railway of Memphis.

St. Louis Southwestern.—See Stephenville, North & South Texas.

San Diego Southern.—The property of the National City & Otago and the Coronado Railroad was taken over by the San Diego Southern. Total mileage 50 miles. In May, 1910, \$1,515,000 stock had been paid in. There is no bonded debt.

Savannah Valley Railroad.—See Brinson Railway.

Silver Lake Railway.—The Buffalo, Rochester & Pittsburgh has taken over this property. The Silver Lake runs from Perry, N. Y., to Silver Springs, seven miles.

Southern Indiana.—See Chicago, Terre Haute & Southeastern.

Southern Pacific.—See Arizona Eastern Railroad, also Mexican International.

Southern Railway.—See Valley Railroad.

Spokane Union Depot.—See Oregon-Washington Railroad & Navigation Company.

Stephenville, North & South Texas.—This 43 mile road was taken over by the St. Louis Southwestern in April.

Tellico Railroad.—This 34 mile line was sold in March to Louisville & Nashville.

Texas Central.—Control of this company was bought from R. H. Baker by the Missouri, Kansas & Texas. The M., K. & T. asked the Texas Railway Commission for permission to lease the Texas Central and operate it as part of its system, but this permission was not granted, and the M., K. & T. is now to ask the state legislature to pass a law specifically permitting the lease.

Toledo & Ohio Central.—Control of this company was acquired by the Lake Shore & Michigan Southern at the same time that the Hocking Valley was bought by the Chesapeake & Ohio.

See also Kanawha & Michigan.

Toluca, Marquette & Northern.—The Chicago & Alton took over this 31 mile line, paying \$250,000. The Toluca, Marquette & Northern has \$150,000 stock and \$970,000 bonds.

Umatilla Central.—See Oregon-Washington Railroad & Navigation Company.

Union Pacific.—See Oregon-Washington Railroad & Navigation Company.

United Railways.—Control of this company was bought by James J. Hill and associates. The road (electric) runs from Portland, Ore., to Burlington, 13 miles.

Union Railway of Memphis.—A contract was made by this company with the St. Louis, Iron Mt. & Southern whereby the Union Railway will lease and operate the terminal properties of the Iron Mt. R. R. of Memphis.

Valley Railroad.—The Baltimore & Ohio sold a controlling interest in the stock of this company to the Southern Railway. The Valley R. R. runs from Harrisonburg, Va., to Lexington, 62 miles.

Vera Cruz & Isthmus.—See Pan-American Railroad.

Wisconsin Central.—See Minneapolis, St. Paul & Sault Ste. Marie.

The San Juan Serrocuella Railway was opened on August 7; the Central Northern Railway is also planning to extend its line from La Banda to Santiago del Estero.

Work is being pushed on the railway from Bahia Blanca to Carmen de Patagones. The extreme southern part of the province of Buenos Aires appears to be developing rapidly.

REVIEW OF 1910 ANNUAL REPORTS.

As in previous years, we show by the accompanying diagram certain tendencies in the results of railway operation during the last fiscal year. The groups of roads selected are fairly representative of conditions affecting the larger roads all over the country. It is necessary to keep in mind the scheme of construction of the charts. In each year the percentages of increase are calculated from some particular year, arbitrarily selected as the base. For example, in Fig 1 this year is 1899. Gross earnings, operating expenses and net earnings were not equal in that year; but, since the increases in each year represent the percentage of gain from the gross earnings or the operating expenses or the net earnings as they actually were in 1899, these three lines start from a common point. The purpose of the diagrams, therefore,

increase in operating expense was due to high costs of labor material, etc., instead of to inefficient operation of an overloaded plant.

The roads comprising Fig. 1 are as follows:

Atlantic, Texas & Gulf Pk.	St. Louis & Eastern
Baltimore & Ohio	New York, New Haven & Hartford
Chesapeake & Ohio	Maryland & Western
Chicago & North Western	Norfolk & Western
Chicago, Rock Island & Pacific	Philadelphia & Reading
Chicago, Milwaukee & St. Paul	Southern
Erie	Southern Pacific
Great Northern	Wabash
Illinois Central	

The details of the expense account are shown in Fig. 2. The overload of business shows again here in the percentage increase in the cost of conducting transportation in 1909.

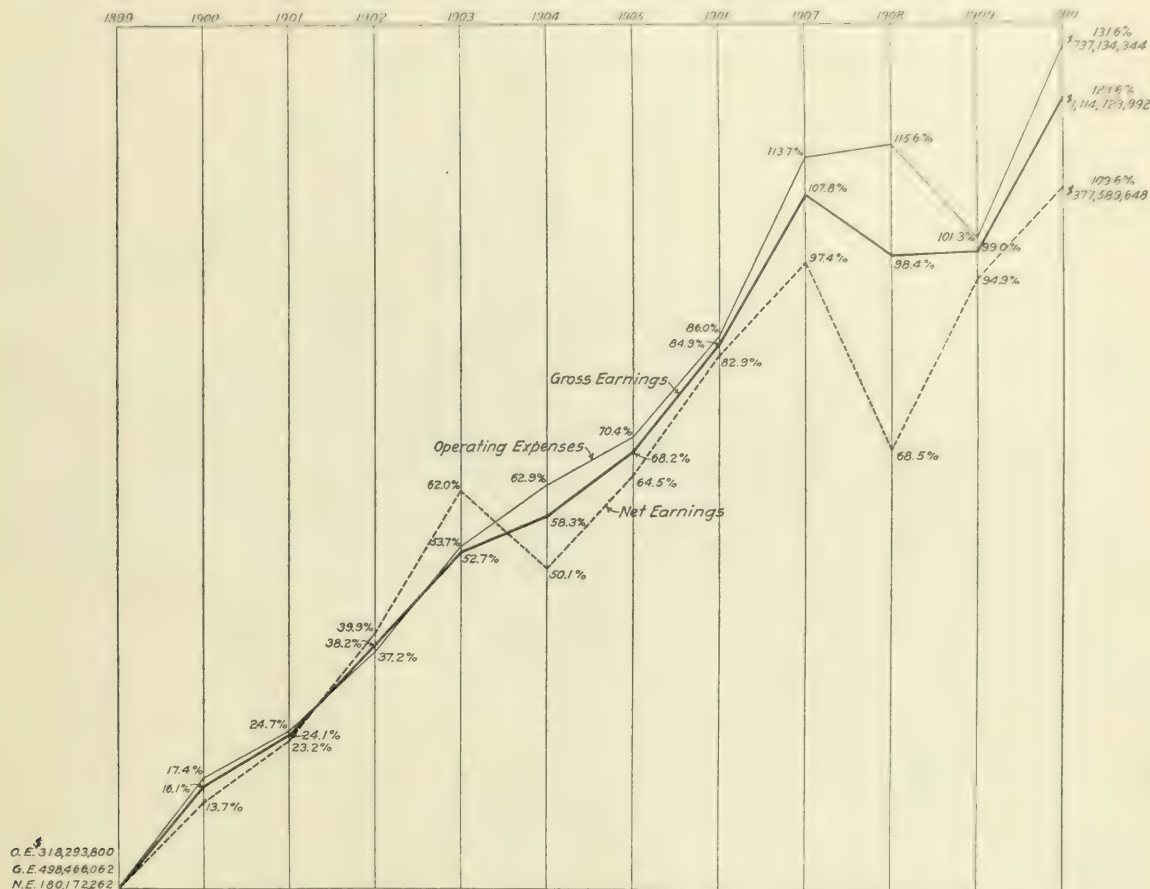


Fig. 1—Relative Increases in the Income Account, from 1899 to 1910; Seventeen Roads.

is to show proportionate results rather than absolute results; we are, for the present, considering the changing relations of gross earnings, operating expenses and net earnings, rather than the actual amount of either.

The rates of increase in earnings and expenses, as shown in Fig. 1, were about the same up to 1902. In 1903 there was a disproportionate increase in the amount saved for net, but 1904 was a bad year. During the next two years the rates of progress got back to normal. Then, in 1907, the overload of business increased the operating expenses at a disproportionate rate, which remained true in 1908 in spite of the heavy loss in gross. In 1909 expenses were brought back into line. The curves during 1910 resemble those of 1907, though in this year the in-

1908 the efforts to save money were more successful in the maintenance of equipment than in the other items, but the result of this is shown in the next year, 1909, when equipment had got in such shape that it was not possible to cut expenses in this department as sharply as in the others. The curves of 1910 show clearly the difference between the factors affecting operating expenses in that year and in 1907, as was pointed out in discussing Fig. 1. The costs of maintenance of equipment and of maintenance of way were affected by the increased costs of both material and labor. Conducting transportation, however, did not increase so rapidly, because, in spite of the cost of labor, the roads were in a condition to handle traffic with comparative efficiency.

Figure 2 is based on the roads shown in the following table:

Atchison, Topeka & Santa Fe.	Cleveland, Cin., Chicago & St. L.
Baltimore & Ohio.	Denver & Rio Grande.
Buffalo, Rochester & Pittsburgh.	Great Northern.
Chesapeake & Ohio.	Missouri, Kansas & Texas.
Chicago & Alton.	New York Central & Hudson River.*
Chicago & North Western.	New York, New Haven & Hartford.
Chicago, Burlington & Quincy.	Norfolk & Western.
Chicago, Milwaukee & St. Paul.	Southern Pacific.
Chicago, Rock Island & Pacific.	Wabash.

*Year ending December 31, 1909.

Figure 3 is striking. The rapid increases in taxation began in 1905. Two years later the percentage increase, as compared

Figure 3 is based on results from the following railway companies:

Atchison, Topeka & Santa Fe.	Illinois Central.
Baltimore & Ohio.	Louisville & Nashville.
Chesapeake & Ohio.	New York, New Haven & Hartford.
Chicago & North Western.	Norfolk & Western.
Chicago, Burlington & Quincy.	Northern Pacific.
Chicago, Milwaukee & St. Paul.	Southern.
Erie.	Wabash.
Great Northern.	

The next two curves, Figs. 4 and 5, do not represent small groups, but are taken from results reported in *Poor's Manual of Railroads* and cover most of the mileage in the country. Figures



Fig. 2—Relative Increases in the Expense Account; Nineteen Roads.

with 1899, was as much as the increase in net earnings. Taxes continued their upward climb after 1907, though more slowly, but in 1910 took the sharpest jump they have taken for ten years. This increase is due to the tax legislation which was more or less general throughout the country during the two years preceding the end of the fiscal year 1909. The effect of legislation increasing taxes is very often not felt for a year or two.

Laws do not go into effect until some months, at least, after passage, and then there are further delays in making assessments and, finally, collections. So we are only now seeing the results of this legislation.

for the fiscal year ending June 30, 1909, are the latest available. The two diagrams are not based on the same mileage, since some of the railways carry passengers and no freight, and vice versa. Taken together, the charts show the more or less steady increase in traffic density, particularly freight traffic. The relative increases of passenger miles and ton miles as compared with train miles indicate the extent of the use of heavier power.

Fig. 6 shows combined traffic statistics of the Northern Pacific and the Union Pacific, each figure being the sum of the same items on each road. They show single track miles, number of freight cars, capacity of freight cars, passenger miles and ton miles in their relation to each other for the last nine years.

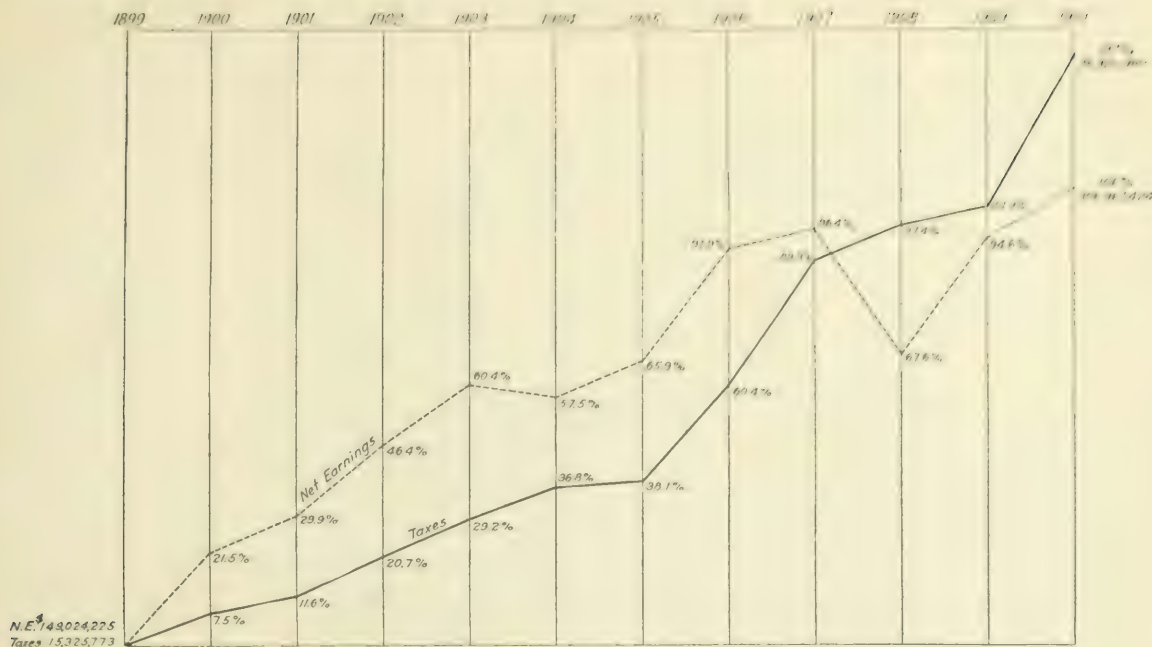


Fig. 3—Relative Increases of Net Earnings and Taxes; Fifteen Roads.

Single-track mileage is a partially arbitrary figure. It has been obtained, according to our usual formula, by taking all the miles of first, second, third, etc., track, and adding to these figures half the mileage of switches and sidings. The value of this figure for certain comparison, is due to the fact that it costs about half as much to maintain side track as it does to take care of the same amount of running line. The diagram is a striking exhibit of the building up of the West. It is interesting to see how passenger mileage on these two roads increased in 1908 as compared with the relatively small increase for other roads, as shown in Fig. 4. The relative set-back in 1909 has

just about been offset by the record-making increase in 1910. Freight traffic, as shown by the ton mileage curve, sustained much greater loss, but is recovering at nearly the same rate of increase as from 1904 to 1906. The increase in *average* capacity of freight cars has been steadier than the curve showing capacity of freight cars would indicate at first glance. When it is compared with the curve showing the number of freight cars in service it will be seen that it has increased at a nearly constant rate ever since 1904. From 1907 to 1909 the curve of total capacity continues upward, although no new cars to speak of were put in service, except for replacement. The percentage

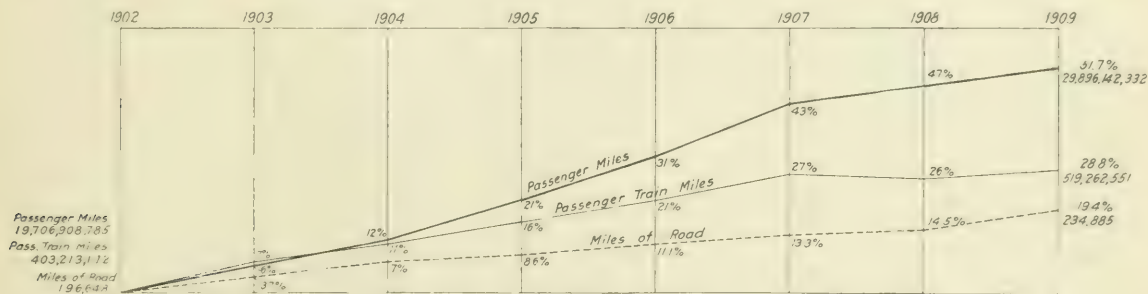


Fig. 4—Relative Increases in Passenger Traffic.

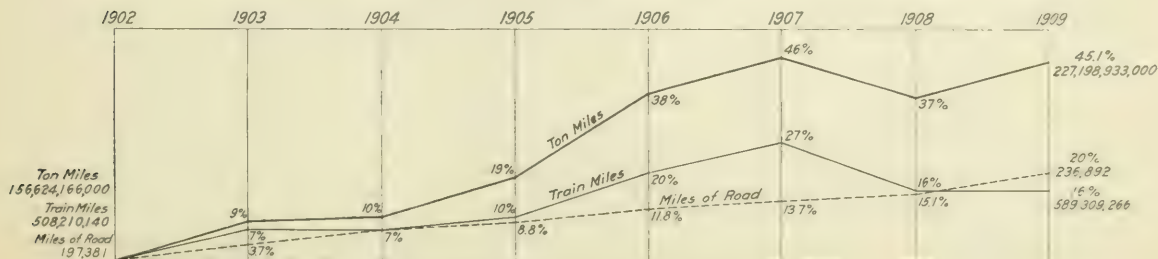


Fig. 5—Relative Increases in Freight Traffic.

increase in capacity of freight cars is now continuing upward and is at a safe distance above the percentage increase in ton mileage, in sharp contrast to the car shortage conditions of 1906.

The following table of revenue train loads allows reasonably close comparisons; the comparisons are not exact because of differences in statistical methods. They are computed by dividing revenue ton miles by revenue freight train miles plus all mixed train miles, according to the Interstate Commerce Commission's formula. The roads selected are representative roads

DIVIDEND CHANGES AND NEW SECURITIES ISSUED IN 1910.

The two tables, one showing the dividend changes in 1910 and the other the new securities issued in 1910, do not tell the same story; or rather they tell two opposite sides of the same story. With few exceptions, the dividend table shows that those roads that made any changes increased their dividends. It is notable, however, that the dividend changes are compara-

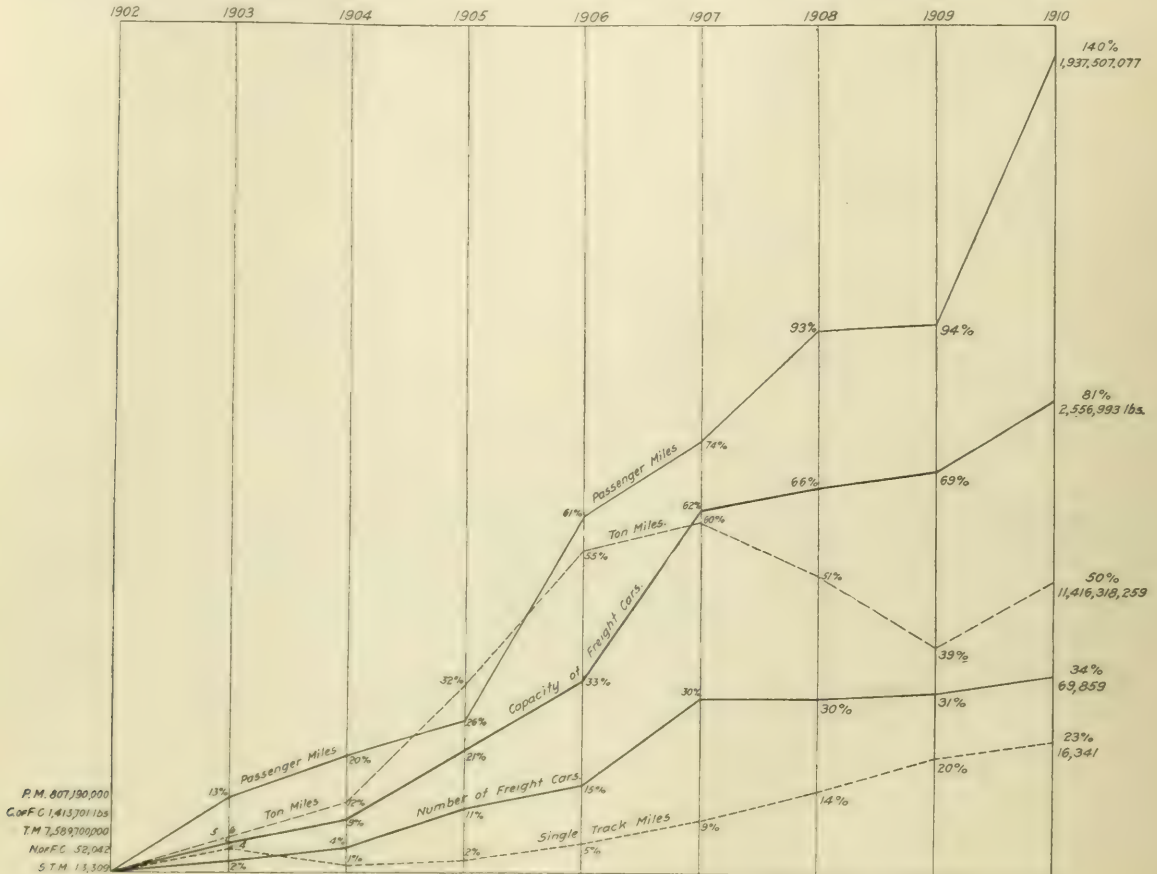


Fig. 6—Composite Diagram; Northern Pacific and Union Pacific.

and not record-breaking ones. Several coal and ore roads in the East enjoying particularly easy grades, have very high train loads.

REVENUE TRAIN LOADS, TONS.

	1910.	1909.	1908.	1907.	1906.	1905.	1904.	1903.	1902.	1901.
Baltimore & Ohio	443	437	438	441	439	399	401	416	406	381
Buff., Roch. & Pitts...	638	597	530	542	525	507	439	441	424	406
Ches. & Ohio	791	675	621	596	586	557	508	493	508	511
Illinois Central	361	355	352	364	353	319	278	288	275	235
Lehigh Valley	341	535	530	526	504	501	486	485	467	467
M., St. P. & S. S. M.	378	354	329	334	329	309	301	305	315	314
Norfolk & Western	429	431	431	407	400	367	339	344	346	324
St. L. & San Fran.	343	350	312	314	314	200	198	195	187	200
Wabash	353	353	361	360	348	293	280	302	285	283

ARGENTINE RAILWAYS.

The Pacific Railway will shortly issue \$5,000,000 in 4% per cent. debentures at 101.

There are at the present time 10,448 laborers at work on the state lines under construction.

The railway from Apostoles to Posadas, in the Territory of Misiones, was opened on August 16

tively few, and with the exception of the Lake Shore & Michigan Southern, which is a subsidiary company, none of the important large roads made any changes in their dividend rates or declared any extra dividends. The increases in dividend payments are mostly by the small roads—many of them subsidiaries—or comparatively new roads. This would appear to indicate that the increase in the total amount of business carried was of more than sufficient benefit to the smaller or newer roads to offset the increases in cost of operation, while the larger roads, even where their net earnings were larger in 1910 than in 1909, did not feel that railway credit was secure enough from attack to warrant larger distributions to stockholders.

The list of new securities sold shows a smaller volume of gross sales by railways than was the case in 1909, and the character of the roads issuing securities is notably different. Comparatively few of the larger companies found it practicable to sell large issues of either stock or bonds. The exceptions to this rule warrant special examination. The reason that the larger companies did not come into the market as large borrowers is probably primarily due to the hesitation of bankers in advancing large

NEW RAILWAY SECURITIES SOLD IN 1910.

Name of company.	Kind of security issued.	Amount.	Interest.	Term.
Algoma Cent. & Hud. Bay	First mortg. 4% bonds of 1916-1960			June
Am. Arho	Equip. bond, series A, 1%			May
Arch. Topeka & S. I.	Convertible mortg. 50 yr. 4% bonds of 1910-1960	43,686,000		June
Atlanta & West Point	Stock	1,000,000	\$1,152,000	June
Atlantic Coast Line	Stock	1,000,000		June
Atlantic Coast Line	First consol. mortg. 4% bonds of 1900-1940	1,000,000		January
Balt. & Ohio	Secured 4 1/2% notes of 1910-1913	40,000,000		May
Balt. & Ohio	One yr. 4% notes	10,000,000		March
Balt. & Ohio, Chi. Term. R. R. Co.	First mortg. 4 1/2% bond of 1900-1900	33,000,000 ¹	None	April
Bangor & Aroostook	First mortg. 5% bonds of 1900-1900	1,650,000	None	April
Birmingham Term.	First mortg. 4% bonds of 1900-1900	440,000	None	January
Boston & Albany	1% bonds of 1910-1935	2,000,000	None	August
Boston & Maine	Common stock	569,500		June
Boston & Maine	Stock	11,720,700	None	August
Boston R. R. Holding Co.	Stock	1,357,300	None ²	April
Boston R. R. Holding Co.	Stock	608,400		April
Boston R. R. Holding Co.	Cumulative 4% preferred stock	20,012,000	\$20,012,000	August
Buttala, Roch. & Pitts.	Consol. mortg. 4 1/2% bonds of 1907-1907	1,454,000	None	April
Buttala & Susq. Ry.	Receiv. 6% cert.	750,000		August
Canadian Northern	Perpetual Consol. 4% deb. stock	\$1,000,000	None	March
Canadian Northern	Deb. bonds, 2 1/2%	5,000,000	None	June
Canadian Northern	Imperial Rolling Stock Equipment 4 1/2% bonds, Series 1	500,000	None	January
Canadian Northern	Series V first mortg. equip. 4 1/2% bonds maturing 1911-1920	3,000,000	None	July
Central of N. J.	Consol. mortg. 4% bonds of Lehigh & Wilkesbarre Coal Co. ³	16,996,000	\$16,996,000	June
Chesap. & Ohio	Convertible 4 1/2% bonds of 1910-1930	31,370,000		April
Chesap. & Ohio	4 1/2% gen. mortg. bonds, 1892-1992	1,500,000	None	September
Chesap. & Ohio	Kalegh & Northwestern 4% bond, 1906-1936	100,000	None	September
Chesap. & Ohio	1st cons. mortg. 5% bonds, 1889-1939	2,000,000	\$2,000,000	December
Chicago & Alton	Collateral trust 5% convertible notes of 1910-1910	2,500,000	None	May
Chicago & Alton	3 yr. 5% coll. trust notes	2,650,000	None	March
Chicago & Alton	Equipment 5% notes, 1910-1920	722,000	None	October
Chicago, Ind. & Quincy	Gen. mortg. 4% bonds			Oct., Nov. & Dec.
Chicago & Eastern Ill.	Refunding and improvement mortg. 4% bonds of 1905-1955	2,238,000	None	March
Chicago & Gt. Western	First mortg. 4% bonds, 1909-1959	18,500,000	None	January
Chicago Great Western	First mortg. 4% bonds, 1909-1959	2,000,000	None	November
Chi., Indianapolis & Louisville	Refunding mortg. bonds, Series C of 1947	3,000,000	\$3,000,000	April
Chi., Ind. & Louisville	Refunding mortg. 4%, 1910-1947	3,000,000	None	April
Chi., Milwaukee & St. P.	Deb. 4% bonds of 1910-1925	{ 250,000,000 Fcs. }	None	June
Chicago & N. W.	Gen. mortg. 4% bonds	{ \$50,000,000 }	\$15,000,000*	June
Chi., Rock Island & Pac.	Equipment trust 4 1/2% notes, Series D	6,750,000	None	April
Chi., Rock Island & Pac.	Rock Island, Ark. & La. first mortg. 4% bonds ⁷ of 1910-1934	1,000,000	None	March
Chi., Rock Island & Pac.	First and refunding 4% bonds of 1904-1934	1,714,000	\$1,714,000	April & May
Chi., Rock Island & Pac.	First and refunding mortg. 4% bonds of 1904-1934	3,500,000	None	January
Chi., Rock Island & Pac.	First and refunding mortg. 4% bonds of 1904-1934	982,000	None	May
Cin., Hamilton & Dayton	First and refunding mortg. 4% bonds of 1909-1959	12,500,000		March
Cleve., Cin., Chi. & St. L.	Deb. 4% bonds of 1910-1930	{ 50,000,000 Fcs. }	None	May
Colo. & Southern	Refunding and Extens. mortg. 4 1/2% bonds of 1905-1935	{ \$10,000,000 }		July
Cuba R. R.	First mortg. 5% bonds	3,000,000	None	November
Denver, Laramie & N. W.	First mortg. 5% bonds, 1910-1940	600,000	None	May
Denver & Rio Grande	Preferred stock	22,500,000?	None	April
Denver & Rio Grande	First and refunding mortg. 5% bonds, 1908-1955	4,000,000	None	April
Duluth, Winnipeg & Pac.	First mortg. deb. stock	{ 8,750,000 }	None	June
Duluth, Winnipeg & Pac.	First mortg. 4% bonds of 1909-1939	{ \$4,750,000 }	None	June
Dunkirk, A. V. & Ptg.	First mortg. 4 1/2% bonds	1,000,000	None	June
Erie	General lien 4% bonds of 1895-1996	2,900,000	\$2,900,000	Never sold
Florida Ry.	First mortg. 5% bonds of 1909-1959	1,000,000	None	October
Frederick R. R.	First and refunding 5% bonds, 1910-1960	4,000,000	None	May
Grand Trunk Pac.	First mortg. 3% bonds of 1905-1962	1,500,000	None	May
Grand Trunk Pac.	Deb. 4% stock	{ \$2,000,000 }	None	August
Grand Trunk Pac.		{ \$10,000,000 }		
Grand Trunk Pac.		{ \$1,000,000 }	None	January
Grand Trunk Pac.		{ \$5,000,000 }		
Grand Trunk Pac., Branch Lines	First mortg. 4% bonds ¹⁴ of 1909-1939	{ \$1,270,500 }	None	April
Gt. Northern	St. Paul, Minneapolis & Manitoba Consol. mortg. 4% bonds, 1883-1933	{ \$6,352,500 }		
Gt. Northern	St. Paul, Minneapolis & Manitoba Consol. mortg. 4% bonds, 1883-1933	2,916,000	\$2,916,000	September
Gt. Northern	St. Paul, Minneapolis & Manitoba Pac. Exten. 4% bonds of 1820-1940	{ \$2,000,000 }	None	January
Gulf, Tex. & West.	First mortg. 5% bonds of 1909-1939	{ \$10,000,000 }		
Hocking Val.	First consol. mortg. 4 1/2% bonds of 1899-1999	1,007,000	None	January
Joplin Union Sta.	First mortg. 4 1/2% bonds of 1910-1940	1,584,000	\$1,584,000	May
Kan. City, Ft. Scott & Memphis	Refunding 4% bonds of 1901-1936	750,000	None	February
Kan. City, Ft. Scott & Memphis	Guaranteed refunding mortg. 4% bonds of 1901-1936	1,000,000	\$492,000	July
Kan. City, Mex. & Orient.	First mortg. 4% bonds of 1901-1951	1,069,000	759,000	July
Kan. City, Mex. & Orient.	First mortg. 4% bonds of 1901-1951	5,000,000 ¹²	None	July
Kan. City, Mex. & Orient.	First mortg. 4% bonds of 1901-1951	1,295,000	None	March
Kan. City Tan.	First mortg. 4% bonds of 1910-1950	12,400,000	None	March
Lake Shore & Mich. So.	Mortgage 4% bonds of 1906-1931	15,000,000	\$15,000,000	March
Lake Shore & Mich. So.	Jamestown, Franklin & Clearfield first mortg. 4% bonds	11,000,000	None	March
Lake Shore & Mich. So.	Notes (less than one year)	8,500,000	None	March
Laramie, Hahns Peak & Pac.	7% notes of 1910-1915	1,450,000	None	Jan. & April
Lehigh Val.	Common stock	20,166,500	\$6,000,000	April
Long Island	Debentures 4% bonds, 1939-1910	2,000,000 ¹⁴	None	September

¹ These bonds were issued to the Baltimore & Ohio to be held in its treasury. Of this amount \$28,000,000 was to reimburse the Baltimore & Ohio for expenditures made in buying the property and \$5,000,000 for improvements to be made to the terminal property.

² These bonds are guaranteed severally by the Southern Railway, the Illinois Central, the Seaboard Air Line, the Central of Georgia, the St. Louis & San Francisco and the Alabama Gt. Southern.

³ Issued to pay for Boston & Maine stock recently purchased.

⁴ This stock, together with bonds, was used to exchange for stock of the Boston & Maine.

⁵ There were \$1,277,000 sold in Jan., Feb., May and June, and \$177,000 sold in September to pay for Silver Lake Railway Co. Stock.

⁶ Guaranteed principal and interest by the Central of New Jersey.

⁷ Holders of \$5,551,000 Hannibal & St. Joseph 6% bonds are offered the privilege of accepting their bonds at par with a \$10 cash bonus for general mortgage bonds. Hannibal & St. Joseph bonds are due March 1, 1911.

⁸ The chairman of the board of directors gave out a statement to the *Wall Street Journal* saying that the bonds were sold to take care of obligations maturing before the first of June. There are \$6,000,000 bonds to be paid before the close of the fiscal year.

⁹ Guaranteed principal and interest by the C. R. I. & P. Ry. (old company).

¹⁰ These bonds were issued on account of \$1,000,000 Tucuman & Memphis first mortgage bonds which were deposited under the refunding mortgage.

¹¹ \$5,500,000 of these bonds were issued to pay or adjust indebtedness. As noted elsewhere, no account is taken of new securities issued in the C. H. & D. other re-organizations which are simply used to make an exchange with holders of securities of the old company.

¹² There was \$1,435,000 of these bonds issued to acquire second mortgage 5% bonds of the Western Pacific.

¹³ Guaranteed principal and interest by the Province of Saskatchewan.

¹⁴ As a bonus, each purchaser of a bond was given an option to buy \$300 par value preferred stock with each \$1,000 bond at \$40 per share, and \$300 par value common stock at \$25 per share.

¹⁵ Guaranteed principal and interest by the Atchison, Topeka & Santa Fe, the Chicago & Alton, the C. B. & Q., the C. M. & St. P., the C. R. I. & P., the M. K. & T., the Missouri & Pac., the St. Louis & San. Fran., and the W. P. & Wabash.

¹⁶ All of these bonds were issued to the Pennsylvania Railroad in payment of advances for construction and acquisition of new lines.

NEW RAILWAY SECURITIES SOLD IN 1910.

Name of company.	Kind of security issued.	Amount sold.	Amount of refunding covered.	Month in which sold.
Maine Central.....	4 1/2% notes, 1910-1912.....	5,000,000	None	March
Memphis, Dallas & Gulf.....	First mortg. 5% bonds of 1910-1940.....	1,800,000 }	None	June and July
Midland Valley R. R.....	Prior lien 5% bonds of 1910-1960.....	6,000,000 }	\$7,480,000	June and July
Midland Valley R. R.....	2 1/2 yr. 6% notes.....	1,800,000 }		
Mich. Cent.....	Notes.....	10,000,000	None	October
Mil. & Nor. R. R. Co.....	Milwaukee & No. first mortg. 6% bonds of 1880-1910.....	2,155,000	None	October
Minn., St. Paul & S. S. M. Ry.....	First consol. mortg. 4% bonds of 1888-1938.....	3,607,000	7,000	October
Mo., Kan. & Texas.....	1 yr. 3% notes.....	10,000,000	None	July
Mo., Okla. & Gulf.....	First mortg. bonds.....	2,950,000	None	June
Mo. Pacific.....	First and refunding mortg. 5% bonds of 1909-1959.....	29,806,000	\$19,700,000	February
Newark & Bloomfield.....	Stock.....	1,496,150 ¹³	None	September
N. Y. C. & H. R.....	N. Y. C. Lines equip. trust 4 1/2% certf.....	7,500,000	None	December
N. Y. C. & H. R.....	N. Y. C. Lines equip. trust 4 1/2% certf.....	22,500,000	None	June
N. Y. Oreg. & Western.....	Equipment 4 1/2% notes.....	684,000	None	April
N. Y., Phila. & No.....	Stock.....	1,250,000 ¹⁴	None	April
N. Y., Susq. & Western.....	Midland R. R. first mortg. 5% bonds of 1880-1940.....	3,500,000	\$3,500,000	April
N. Y., Westchester & Boston.....	First mortg. 5% bonds, 1904-1954.....	5,000,000	None	October
Norfolk Southern.....	1 yr. 6% notes.....	4,460,000	\$3,519,865	November
Norfolk & Western.....	Convertible 10-25 yr. 4% bonds.....	10,993,000	None	June
Orange & No. Western.....	Bonds.....	1,067,000 ¹⁵	None	November
Oregon Short Line.....	Stock.....	72,539,900 ¹⁶	None	November
Penn. R. R.....	Allegh. Val. Ry. general mortg. 4% bonds of 1892-1942.....	12,750,000	\$10,000,000	April
Penn. R. R.....	San Fran. frt. equip. trust 4% certf.....	11,000,000	None	May
Pitts., Cin. & St. Louis.....	Consol. mortg. 4% bonds of -1957.....	4,000,000	\$1,967,000	July
Pitts. & Shawmut.....	First mortg. 5% bonds of 1909-1959.....	3,000,000	None	May
Pitts., Shawmut & Northern.....	Receiv. certf.....	1,500,000	None	July
Pittsburg, Shawmut & North.....	Receivers' 5% certificates, 1910-1915.....	1,500,000	None	August
Phila. & Western.....	First mortg. 5% bonds.....	2,000,000	?	August
St. Louis, Brownsville & Mex.....	First mortg. 6% bonds of 1909-1939.....	7,256,000	None	May or June
St. Louis, Brownsville & Mex.....	Bonds.....	4,000,000	None	November
St. Louis, Iron Mt. & So.....	River & Gulf Div. 4% bonds, 1903-1933.....	1,785,000	None	April
St. Louis & San. Fran.....	Series Q equip. 5% notes.....	1,450,000	None	August
St. Louis & San. Fran.....	New Orleans, Tex. & Mex. div. first mortg. 5% bonds of 1910.....	6,000,000	None	July
St. Louis & San. Fran.....	New Orleans, Tex. & Mex. div. first mortg. 4 1/2% bonds of 1910.....	10,000,000	None	July
St. Louis & San. Fran.....	General lien 15-20 yr. 5% bonds.....	7,500,000	None	May
St. Louis & San. Fran.....	1 yr. 5% notes.....	8,000,000	None	April
St. Louis & San. Fran.....	New Orleans, Tex. & Mex. Div. first mortg. 4 1/2%.....	10,000,000	None	June
Southern Pac.....	San Fran. Term. first mortg. 4% bonds of 1910-1950.....	15,000,000	None	June
Southern Pac.....	San Fran. Term. first mortg. 4% bonds of 1910-1950.....	4,000,000	None	November
Southern Ry.....	Equipment trust 4 1/2% bonds, Series N.....	5,200,000	None	April
Southern Ry.....	5% notes of 1910-1913.....	10,000,000	\$10,000,000 ¹⁸	January
Stamford & Northwestern.....	First mortg. 6% bonds.....	1,872,880	None	March
Toledo & Ohio Cent.....	Car Trust 4% certf.....	1,200,000	None	March
Union Pacific.....	First lien and refunding 4% bonds of 1908-2008.....	4,902,000	None	March
Union Pacific.....	First lien and refunding mortg. 4% bonds of 1908-2008.....	£ 1,500,000 } (\$7,500,000)	None	September
Vandalia.....	Consol. mortg. 4% bonds of 1907-1957.....	5,000,000	\$500,000	April
Vermont Val. R. R.....	First mortg. 4 1/2% bonds, 1910-1940.....	1,500,000	800,000	September
Wabash.....	4 1/2% notes of 1910-1913.....	5,000,000	6,049,000	May
Wabash Pitts. Term.....	Receivers' certf.....	875,000	875,000	November
Western Ohio.....	Convertible collateral trust 6% bonds.....	500,000	370,000	June
Western Maryland.....	Stock.....	26,000,000	None	March
Winnipeg, St. L. & S. S. M.....	First consol. mortg. 4 1/2% bonds.....	1,207,000	\$7,000	May

¹² Retained in 1910 to June 1, 1913, at 4 1/2 per cent.

¹³ The Delaware, Lackawanna & Western leases this road and pays 6 per cent. dividends on the stock.

¹⁴ Most of this stock issued to the Pennsylvania Railroad.

¹⁵ All of these bonds were deposited under the New Orleans, Tex. & Mex. division mortgage of the St. Louis & San Francisco.

¹⁶ All of this stock was sold for cash to the Union Pacific, which owns all of the capital stock of the Oregon Short Line except directors' shares.

¹⁷ The total amount of securities retired was \$15,000,000; the company having already bought \$5,000,000 before the new issue of 3 year notes.

sums on railway credit at terms acceptable to railways. Another reason for the small amount of borrowing in 1910 is that in 1909 a large amount of readjustment of finances on a big scale was successfully carried through by the larger railways. The Missouri Pacific and the Southern Railway were noticeable examples. In 1910, with their finances adjusted, the companies could afford to wait for a better bond market. The more important large issues of new securities were the Atchison, Topeka & Santa Fe's \$43,700,000 convertible 4s, the Baltimore & Ohio Chicago Terminal's \$40,000,000 4 1/2s, the Chesapeake & Ohio's \$31,000,000 convertible 4 1/2s, the St. Paul's \$50,000,000 4 per cent. debentures, the New York Central's \$30,000,000 equipment 4 1/2s, and the Oregon Short Line's \$72,000,000 stock. Two of these transactions are private and did not increase the amount of securities in the hands of the public; that is, the Baltimore & Ohio Terminal issued its bonds to the Baltimore & Ohio; the Oregon Short Line sold its stock to the Union Pacific. Of the remaining large security issues, the St. Paul's \$50,000,000 were sold in France, leaving the Atchison, the C. & O., the B. & O. and the New York Central as the largest borrowers in the American market. It is probable that a large part of the Baltimore & Ohio's notes were subscribed for abroad and a considerable part of the other companies' securities were probably taken abroad.

It is rather striking to study the column showing the months in which securities were sold. The last of May, 1910, the government brought its injunction proceedings to restrain the rail-

ways from raising their rates, and it compelled the roads to wait until the new Interstate Commerce Commission law had been passed, making it the duty of the commission to compel the railways to justify their increases in freight rates before these increases should become effective. Ever since the first of June, therefore, the railway managements and investors have found themselves in a state of to be or not to be in regard to freight rate increases; the effect on the security market is obvious. The St. Paul's issue, which was actually sold abroad after the first of June, had been negotiated for for some months before, and it is probable that the arrangements for this sale had been made before the injunction proceedings were brought.

A word of explanation should be given in regard to the manner of preparation of our two tables. Wherever possible, the figures for new securities issued have been checked up by the railway companies themselves; but this official confirmation was not obtained in every case. Moreover, it is quite likely that the arrangement for the sale of some securities had been made during the past year, but no statement has been made public in regard to the transaction. By "amount of securities issued" we mean the amount for which arrangements had been made for a sale.

In the dividend table, the criterion as to what year to put the change in, is the time at which the change in the rate was declared. It would be confusing, and almost impossible, to distinguish in all cases as to earnings from what period the dividends were declared. Moreover, if dividends were declared in

December, 1910, payable in January, 1911, the charge would be credited to the calendar year 1910, in other words, the principal information given in the list of dividend changes is as regard to the attitude of the boards of directors of the railway.

RAILWAY BUILT IN 1910.

DIVIDEND CHANGES 15

Name of Company	Declared in 1897 Per Cent.	Annual Rate. Per Cent.	Month	Declared in 1897 Per Cent.
Mar. New Orleans, Tex. & Pa.			March	0
Can. Pac., com.		7 $\frac{1}{2}$	August	7
Central New York, income bonds			September	4
Central of New York, com.	1			10
Chesapeake & Ohio	1	5	May	
Chic., Rock Island & Pac. Ry.	2	3	September	4
Cincinnati Northern	1	3	February	0
Cleve., Cin. Chic. & St. L., com.	1	4	January	0
Delaware R. Ry., com.	100	8	February	3
Des Moines & Ft. Dodge, pref.	0	0	July	5
Evansville & Terre Haute, com.	5	5	September	4
Florida East Coast, income bonds	100	5	September	0
Grand Trunk, second pref. bonds	50	0		
Grand Rapids & Ind.	1	0	October	3
Green Bay & West., Class B Deb.	1	$\frac{1}{2}$	February	1
Inter-oceanic, second pref. bonds	1	1	November	1
Lake Shore & Mich. So.	18	1	March	1
Mex. Ry., second pref.	6	6	October	2
Mex. Ry., ordinary	3	1	October	0
Minneapolis & St. Louis, pref.	0	0	July	0
Minn., St. P. & S. S. M., com.	7	7	February	6
Nashv. Chat. & St. Louis	6	6	January	2
Nat. Ry. of Mex., first pref.	1	1	July	2
N. Y., Chic. & St. Louis, com.	3	3	February	0
New York & Harlem	11	13	September	10
New Orleans & N. E.	6	6	January	5
Pennsylvania	7	4	January	8
Peoria & East., income bonds	2	0	February	0
Pitts. & Lake Erie	80	10	January	10
Pittsburg, Wheeling & Ky.	0	3	October	3
Rome & Clinton	6	8	October	6
St. Louis, Iron Mtg. & So.	0	6	July	4
Seaboard Company, first pref.	2	2	August	5
Wabash & La. bonds	1	4	January	0
Western Maryland	1	4	April	4
Wisconsin Central, pref.	0	0	March	4
Youngstown & Ohio Riv.	1		July	0

*This is the regular *annual* rate and does not include extra dividend even when these extra dividends have been paid regularly for a number of years. A note is made of all regular extra dividends.

† Date of the change of the dividend rate or date of the declaration of the extra dividend.

¹ This is a 6 per cent. cumulative stock and it would seem that there are accrued dividends amounting to 159½ per cent.

² A regular extra dividend of 1 per cent, in addition to the 7 per cent. annual rate in 1910 and 6 per cent. annual rate in 1909 is paid from the proceeds of land sales.

³ In December, 1909, an extra dividend of 2 per cent. was declared from earnings from Lehigh & Wilkesbarre Coal Co. and in 1910 two extra dividends of 2 per cent. each were declared from the same source.

Only sufficient dividends are paid on the railway company stock to meet the interest on the railroad company bonds and after the sale of control of the St. Louis & San Francisco and the retirement of collateral trust railroad bonds a slightly reduced dividend on railway company stock was sufficient to meet railroad bonds interest.

⁸ This road was leased from March 1 to the Philadelphia, Baltimore & Washington for a guaranteed 8 per cent. on its stock. In February a special stock dividend of 70 per cent. was declared and a special cash dividend of 20 per cent. and an extra cash dividend of 5 per cent. was declared.

* This 5 per cent. was declared in February, 1910, to be paid out of the earnings of 1909 and compares with 2½ per cent. declared in 1909 payable out of 1908 earnings.

⁷ Ten per cent. is paid as rental by the N. Y. C. & H. R. and 4 per cent. annually is due from the Met. St. Ry. but in 1909 no payment was made by the Metropolitan and in the last half of 1910 1½ per cent. was paid by the street railway.

* In addition to this 7 per cent. an extra dividend of \$16.67 per \$50 share was paid in stock of the company.

* An extra dividend of 40 per cent. was declared to enable stockholders to subscribe at par to \$6,000,000 new stock.

3½ per cent. to 3 per cent. the company says that owing to the corporation income tax it becomes necessary to slightly reduce an occasional dividend.

Argentina will probably have two more transcontinental railways by 1913. The San Antonio-Nahuel Huapi Line, which is making rapid progress, is expected to reach San Carlos de Bariloche, on Lake Nahuel Huapi, by January, 1912, whence it is only 70 miles to the present southern terminus of the Chilean railway system—Puerto Montt. The Buenos Aires Great Southern, to keep up with the Buenos Aires & Pacific's transcontinental line, is pushing work on its lines in the Neuquen Territory; it has only 170 miles left to build to connect with the Chilean railways. Another proposed trans-Andean communication is from Chilcico, the present rail head in the Province of La Rioja, to Vallenar, Chile, which would involve about 200 miles of railway building through a country supposed to be rich in minerals.

	building.	1910.	building.	1909.
Alabama	1	78.96	5	137.47
Alaska	1	61.00	4	41.92
Arizona	3	199.85	5	94.44
Arkansas	1	41.79	3	7.59
California	1	44.41	9	247.45
Colorado	3	76.08	3	92.13
Connecticut	1	10.00	1	3.81
Delaware	6	3.44	7	160.81
Florida	6	65.07	7	146.30
Georgia	13	274.71	3	10.00
Idaho	1	64.89	1	17.74
Illinois	3	46.17	1	7.68
Indiana	1	15.00	1	87.44
Iowa	4	41.00	1	108.02
Kansas	3	71.45	1	102.09
Kentucky	2	32.75	1	78.00
Louisiana	3	4.00	1	4.68
Maine	1	72.86	1	72.86
Massachusetts	6	244.53	6	85.27
Michigan	3	21.65	2	36.60
Minnesota	4	24.20	2	11.25
Mississippi	4	115.47	4	118.70
Missouri	1	13.12	2	13.12
Montana	1	12.25	2	303.00
Nevada	1	1.55	2	1.55
New Hampshire	1	33.95	3	33.95
New Jersey	1	6.00	1	35.90
New Mexico	2	5.99	4	45.51
New York	4	105.97	10	111.92
North Carolina	3	300.96	1	300.96
North Dakota	4	171.00	6	144.00
Ohio	10	244.09	9	134.30
Oklahoma	4	28.26	8	104.27
Oregon	4	19.64	3	54.00
Pennsylvania	4	205.58	1	205.58
Rhode Island	4	39.86	3	54.69
South Carolina	28	756.35	23	666.43
South Dakota	1	18.00	1	18.00
Tennessee	1	0.94	1	0.94
Texas	4	67.19	4	67.19
Utah	9	369.50	6	162.58
Vermont	6	52.90	8	120.26
Virginia	6	90.63	4	31.18
Washington	1	0.48	1	15.00
West Virginia	189	4,121.58	190	3,748.28
Wisconsin	16	1,843.80	10	1,487.69
Wyoming	3	138.27	3	281.26
Total	1	9.50	1	9.50

UNITED STATES.

ALABAMA.

	Miles.
Alabama, Tennessee & Northern—Noxumba river, south to York..	31.00
Atlanta, Birmingham & Atlantic—Between Pelham and Mulga and Birmingham	1.60
Birmingham Southern—Wylam to Bayview, 6.42 miles; Ensley to Corey Junction, 2.50 miles; Corey Junction to Corey, 2.09 miles; Corey Junction to Bessemer, 4.95 miles; total.....	15.96
Dixie Route—Between Lockhart and Gallagher.....	10.00
Washington & Choctaw—Red Creek to Mathews.....	10.00
	78.96

ALASKA.

Alaska Northern—Mile 70 to Mile 72.....	2.00
Copper River & Northwestern—Tiekel to a point beyond Gilhina river	59.00
	<hr/> 61.00

ARIZONA.

Arizona & Swansea—Bouse to Swansea.....	21.10
Arizona Eastern—Phoenix to Hassayampa, 39.22 miles; Winkel-	
man to Christmas, 7.72 miles; Globe to Arizona Commercial	
Copper Co.'s (Amstar station) mine, 4.88 miles; McGaw spur	
line, 0.48 mile; total	52.30
Southern Pacific—Between Morales and Calabasas.....	27.42

ARKANSAS.

St. Louis & San Francisco—Marion, south to Hulbert.....	5.49
St. Louis, Kennett & Southeastern—Extension to Piggot.....	9.30
St. Louis Southwestern—Between England and Stuttgart and Hazen	22.00
Warren, Johnsville & Saline River—Fullerton to Goepel.....	5.00
	<hr/> 41.79

CALIFORNIA.

Arizona & California (A., T. & S. F.)—Parker, west to Bengal.....	74.14
Atchiso, Truckee, Santa Fe Coast Lines—Fullerton to Richfield.....	5.10
Central California (So. Pac.)—Between Niles and Redwood City.....	3.62
Fresno County (A., T. & S. F.)—Kings river extension.....	10.28
Inter-California (So. Pac.)—Between Algodones and Araz.....	2.42
Kings River (A., T. & S. F.)—Wahtoke to Piedra.....	10.71
Nevada & California (So. Pac.)—Between Haiwee and Owensby.....	37.00
Northern California (Oregon)—Altura, north.....	15.00
Northwestern Pacific—Willits toward Shively, 6.2 miles; Shively towards Willits, 3.2 miles; total.....	9.40
Pacific Coast—Sesame to Sissique.....	5.50
Porterville Northeastern—Between Porterville and Springville.....	5.20
Sacramento Southern (So. Pac.)—At Freepoot.....	0.15
Stockton Terminal & Eastern—Stockton, northeast to Linden.....	13.00
	191.61

COLORADO.

Denver, Laramie & Northwestern—Near Fort St. Vrain to north of Greeley	21.00
San Luis Southern—Plasma to Jaroso	32.00
Union Pacific—Grant mine to La Salle	23.08
	76.08

FLORIDA.

Apalachicola Northern—Between Apalachicola and Port St. Joe	3.00
Mobile & Baytown—Altha to Old Blountstown	13.00
Seaboard Air Line—Nichols to Mulberry; Early Bird to Herndon; Edison Junction to Agricola	44.38
South Georgia-West Coast—Perry, southwest to Hampton Springs	5.00
Tampa & Gulf Coast—Gulf Pine to Tarpon Springs	11.50
Tampa & Jacksonville—Between Fairfield and Dunellon	7.50
	84.38

GEORGIA.

Bowdon Railway—Bowdon Junction to Bowdon	12.00
Georgia & Florida—Swainsboro Junction to Normantown Junction	20.90
Georgia, Florida & Alabama—Kimberly to Richland	6.67
Pelham & Havana—Cranford to Calvary	8.50
Savannah, Augusta & Northern—Not specified	7.00
Waycross & Southern—Waycross, south	10.00
	65.07

IDAHO.

Chicago, Milwaukee & Puget Sound—St. Maries to Elk River	72.00
Craig Mountain—Craig Junction, south to Winchester	5.50
Gilmore & Pittsburgh—Montana state line, west via Salmon City	83.00
Idaho Northern Railroad—Murray, east to Monarch	4.40
Lake Creek & Coeur d'Alene (Ore. R. R. & Nav. Co.)—Mile Post 12.5 to Lake Point	1.70
Milner & Northside—Milner to Oakley	22.00
Minidoka & Northwestern (Ore. Short Line)—Bliss to Malad river, 5.93 miles; At Burley, 0.67 mile; Rupert to Eden, 28.93 miles; total	35.58
Pacific & Idaho Northern—Evergreen to Lamotah	6.50
Payette Valley—New Plymouth to Emmett	17.59
Salmon River (Ore. Short Line)—Moreland to Aberdeen	28.44
	276.71

ILLINOIS.

Cairo & Thebes (L. & N.)—Cairo to Thebes	24.29
Chicago, Burlington & Quincy—Herrin to Metropolis	38.60
Peoria Railway & Terminal Co.—In the city of Peoria	2.00
	64.89

IOWA.

Charles City & Western—Between Charles City and Marble Rock	5.00
Muscatine North & South—Elrick Junction to Kingston	13.00
Sioux City, Dakota & Northwestern (C. & N. W.)—Wren Junction to near Hawarden	28.17
	46.17

KANSAS.

Garden City, Gulf & Northern—Not specified	15.00
--	-------

KENTUCKY.

Kentucky Highlands (L. & N.)—Millville to Versailles	1.50
Kentucky Midland—In Central City, and between Midland and Earls	2.50
Lexington & Eastern (L. & N.)—Jackson, east	3.00
Wasioto & Black Mountain (L. & N.)—Dorothy to Baxter, 29 miles; Pongo towards Amon, 5 miles; total	34.00
	41.00

LOUISIANA.

Black Bayou—Myrtis to Texas state line	6.00
Franklin & Abbeville—Davids to Milton	17.40
Kentwood & Eastern—Seanton to Foley	7.00
Kinder & Northwestern—From Kinder	3.00
Louisiana & Pine Bluff (logging road)—Farmerville to Monroe	8.00
Louisiana Western—Eunice to Mamou	0.99
Morgan's Louisiana & Texas—Between Lafayette and Baton Rouge	7.47
New Orleans, Texas & Mexico (St. L. & S. F.)—Erwinville to Ingleside	6.50
Tioga & South Eastern—Tioga, northwest to Violet	15.00
	71.45

MAINE.

Bangor & Arundel—Grand Isle to Fort Kent	28.50
Sandy River & Rangeley Lakes—From Madrid branch, through Madrid village	4.25
	32.75

MICHIGAN.

An Sable & North Western—Flat lake to McCollom, 6 miles, branch, 1 mile total	7.00
Lake Superior & Ishpeming—Ishpeming to North Lake	4.60
Manistee & Northeastern—Sigma to Grayling	17.28
	28.88

MINNESOTA.

Chicago Great Western—Goodhue, east to Bellechester	6.43
Duluth & Iron Range—Spar Lake	21.04
Duluth & Northern—Not specified	3.21
Duluth, Minn. & Northern—Sherwood to Woodbridge mine, 5.40 miles; Woodbridge spur to Helmer mine, 2.22 miles; Helmer spur to Wadena mine, 1.7 miles; Silver spur to Alpena mine, 1.76 miles; total	10.85
Duluth, Winnipeg & Pacific—Victoria to Pale River	24.00
Montevideo, St. Paul & north St. Marys—Monte Lake to Plum mer, 10.8 miles; Lander to Coady, and Ironbush to Deerwood, 8.45 miles; total	127.00
	244.51

MISSISSIPPI.

Fernwood & Gulf—Tylertown to Kokomo	11.00
New Orleans, Mobile & Chicago—Pontotoc Junction to Pontotoc	2.77
Pascagoula Northern—Scranton to Moss Point, 3.93 miles; end of steel to Evanston, 3.95 miles; total	7.88
	21.65

MISSOURI.

Deering Southwestern—Between Deering and Caruthersville	10.00
Kansas City Terminal—Sheffield to Coburg	1.20
Union Terminal Railway Co.—In St. Joseph	2.00
Williamsville, Greenville & St. Louis—Hiram, north to Cascade	11.00
	24.20

MONTANA.

Gilmore & Pittsburgh—Armstead, west to Idaho state line	37.00
Great Northern—Bainville to Plentywood	53.19
Northern Pacific—Darby to Mile 65.50	2.28
White Sulphur Springs & Yellowstone Park—Ringling, north to White Sulphur Springs	23.00
	115.47

NEVADA.

Nevada Copper Belt—Mason to Wilson, 9 miles; Wabaska to Smelter, 3.25 miles; total	12.25
--	-------

NEW JERSEY.

Pennsylvania Tunnel & Terminal (Penn. R. R.)—From Harrison to middle of Hudson river	6.90
--	------

NEW MEXICO.

Tucumcari & Memphis (C. R. I. & G.)—Between Texas state line and Tucumcari	6.00
--	------

NEW YORK.

New York, Westchester & Boston (N. Y., N. H. & H.)—In borough of the Bronx, New York City	1.00
Pennsylvania Tunnel & Terminal (Penn. R. R.)—From middle of Hudson river to Long Island City	4.99
	5.99

NORTH CAROLINA.

Randolph & Cumberland—Hallison to Deep River	2.00
Seaboard Air Line—Junction to Patterson cotton mills	0.97
Virginia & Carolina Southern—St. Paul to Tar Heel	14.00
Winston-Salem Southbound—Winston-Salem to Wadesboro	89.00
	105.97

NORTH DAKOTA.

Chicago, Milwaukee & Puget Sound—South Dakota state line, northeast to New England	124.00
Great Northern—Surrey south	17.59
Northern Pacific—Mandan, south to Mile 43.50, 40.30 miles; Cannon Ball Junction to Mott, 91.33 miles; Mandan, north to Sanger, 27.74 miles; total	159.37
	300.96

OKLAHOMA.

Missouri, Oklahoma & Gulf—Wapanucka to Red River	45.00
Oklahoma City Junction—Near Oklahoma City	4.00
Texas, Oklahoma & Eastern—Valliant to Bismark, 7.50 miles; Bismark to Lukfata, 16.50 miles; total	24.00
Wichita Falls Route—Mangum to Elk City, 40 miles; Elk City to Hanover, 16 miles; Altus to Texas-Oklahoma state line, 42 miles; total	98.00
	171.00

OREGON.

Beaverton & Willsburg (So. Pac.)—Between Oswego and Willsburg	3.05
California Northeastern (So. Pac.)—At Klamath Falls	0.03
Carlton & Coast—Between Carlton and Fairdale	12.00
Des Chutes Railroad (Ore. R. R. & Nav. Co.)—Mile Post 5 to Mile Post 71	66.00
Malheur Valley (Ore. Short Line)—Vale to Brogan	23.74
Northwestern Railroad (Ore. Short Line)—Copperfield to Homestead	3.73
Oregon Eastern (So. Pac.)—Klamath Falls, northerly, 9.45 miles; Natron, southerly, 5.09 miles; total	14.54
Oregon Trunk Railway—Between Celilo and Klamath Falls	75.00
Pacific & Eastern—Between Eagle Point and Butte Falls	17.00
Pacific Railway & Navigation Co. (So. Pac.)—Not specified	29.00
	244.09

PENNSYLVANIA.

Baltimore & Ohio—Quemahoning branch—Between Acosta and Somerset	3.52
Pennsylvania Railroad—South of Yukon station to terminus, 0.89 mile; New Alexandria station to Dundale, 1.92 miles; east of Export station to New York & Cleveland Gas Coal Co.'s works, 0.64 mile. Inler to Brooks Mills, 10.81 miles; total	14.26
Pittsburg & Shawmut—Between Mahoning and Knoxville	9.23
Western Allegheny—East New Castle to West Pittsburg	1.25
	28.26

SOUTH CAROLINA.

Greenville & Knoxville—Cleveland, north to Riverview	2.00
North & South Carolina—Dillon to Mullins	17.00
Seaboard Air Line—Junction to Republic cotton mills	0.64
	19.64

SOUTH DAKOTA.

Belle Fourche Valley (C. & N. W.)—Near Belle Fourche to Newell	23.52
Chicago & North Western—Tripp County extension, Dallas to Colome	10.51

CHARLES H. MARKHAM.

It is not hard to divine the chief motive that caused the directors of the Illinois Central to elect Charles H. Markham president of this road. The operating department of the Illinois Central already has a very capable head in W. L. Park, vice-president and general manager. The traffic department already has a very capable head in F. B. Bowes, general traffic manager. The road did not need as president so much either an extraordinarily strong operating man or traffic man as it did one who, while at once a good operating and traffic man, possessed the qualities necessary to harmonize the relations of the Illinois Central with the public and especially with the people and government of the city of Chicago. J. T. Harahan, the retiring president, is both a capable operating and traffic man. He has not been a conspicuously good diplomat.

The Illinois Central has a peculiar relation to the city of Chicago and to the state of Illinois. It is an Illinois corporation and is required by its charter to pay 7 per cent. of its gross earnings to the state. The governor of Illinois is ex-officio a member of its directorate. Its tracks run for miles parallel to the shore of Lake Michigan, and from the Park Row station in Chicago north to Randolph street they run right through the heart of Grant park and parallel to and not very distant from Michigan Boulevard, the principal boulevard of Chicago. Immediately adjacent to and west of this part of Michigan boulevard lies the great, congested down-town business district of Chicago. Below the Park Row station the tracks turn through some of the principal residence districts of the city. The people of Chicago within recent years have grown very anxious to beautify their city. They are giving the most care to that particular part of it between the Park Row station and Randolph street through which the Illinois Central runs. The Illinois Central burns soft coal in its locomotives, and in recent years there has been a perfect avalanche of complaints about the smoke from its engines and a loud demand for the electrification of its terminals. It has been accused by the state of not having paid its full 7 per cent. of gross earnings tax. Out of these rather delicate relations between the railway and the city and state there was a good chance for friction to develop, and it has developed to a marked degree.

It cannot be said that the management has been blameless. It has not always met the situation tactfully. To get the relations between the road and the city and state on the right basis a man who combined the qualities of a capable railway executive with those of a skilled railway diplomat was needed. Mr. Markham possesses these qualities. He has come up from the bottom, having entered railway service as a section laborer on the Santa Fe. He subsequently entered station service on the Southern Pacific, and at Fresno, Cal., where he was agent, because of the

successful way he handled the company's business he was made district freight and passenger agent. His work there was so successful that he attracted the attention of J. C. Stubbs, who sent him to Portland, where he served four years on the Oregon lines of the Southern Pacific. He was afterwards made assistant freight traffic manager of the Southern Pacific at San Francisco. A bad situation affecting the relations of the public and the railways in Texas existed in 1901 and he was made vice-president of the Houston & Texas Central. Despite the fact that he had not been an operating man, he was made vice-president and general manager of the Southern Pacific in 1904, an office in which he succeeded Julius Kruttschnitt. In all his railway offices he showed exceptional skill in establishing improved relations between the railway and its patrons, the commissions and legislatures. He got results both because he sought to give the

public what it was entitled to and because he did it in a way that made the public appreciate what it was getting. What has been said would naturally indicate, and truly, that Mr. Markham is a man of pleasing personality. His characteristic, however is not a noisy fulsomeness, but a quiet geniality. On the whole, he seems extremely well equipped to improve the public relations of the Illinois Central and give it generally the sort of administration needed to enable it to keep its high rank among leading American railways.

He was born May 22, 1861, and began railway work in 1881 as a section laborer on the Atchison, Topeka & Santa Fe. From that road he went to the Southern Pacific, holding various positions in station service until 1887. In the latter year he was made agent at Lordsburg, N. M.; he was afterward transferred to Benson, Ariz., then to Reno, Nev., and for six years from 1891 he was at Fresno, Cal., first as agent and later as district freight and passenger agent. He was then for four years with the Oregon lines of the Southern Pacific, and in 1891 became assistant freight traffic manager at San Francisco. He was elected vice-president of



Charles H. Markham.

the Houston & Texas Central in the latter part of 1901, and during 1904 was general manager and then vice-president and general manager of the Southern Pacific Company. In November, 1904, he resigned his railway office to become general manager of the Guffey Petroleum Company of Beaumont, Tex., and has been engaged in the oil business for the past six years. At the time of his election as president of the Illinois Central he was president of the Gulf Refining Company, at Pittsburgh, Pa.

The Bolivian government has approved the proposal submitted by J. Simpson Whitton for the construction of a railway from Yacuiba to Santa Cruz. It is said that the proposed line is a most advantageous one. Starting from Yacuiba it will reach Santa Cruz, thence extended to Cochabamba, and, connecting with the railway system now under construction, will establish communication between La Paz and Buenos Aires.

MILEAGE OF RAILWAYS BLOCK SIGNALLED.

The increase during the past year in the length of railways in the United States worked by the block system has been almost entirely in automatic signaling, and on a number of roads it appears that this year, as last year, the mileage worked by the manual system has decreased, automatic signals having been substituted for manual. In the column headed "Increase" we have made comparisons, not with our preliminary table published December 31, 1909, page 1,288, but with the later and fuller table which was published by the government and was reprinted in the *Railway Age Gazette* of June 3, 1910. Making this comparison, the totals appear as follows:

	Jan. 1, 1910.	Jan. 1, 1911.
Automatic signals, miles of road	14,338	17,366
Manual	31,330	51,966
Total	65,758	69,331

In the table the letter "y" indicates those companies which did not respond to our circular in time for this issue. In these cases the mileage is given the same as it was shown in the table published last June.

Following are notes explanatory of some of the items in the table. A number of items concerning new work proposed for the coming year will be found in our news columns. Some items of this kind have been published in preceding issues.

ATLANTIC COAST LINE.—While the net increase is only two miles, it will be observed that the increase in automatic signaling is 15 miles, indicating that 13 miles of non-automatic has been abandoned.

BESSEMER & LAKE ERIE.—The mileage here shown includes 4.5 miles on which the electric train staff is used. The item of 194 miles includes nine miles used exclusively for freight trains.

CHICAGO & EASTERN ILLINOIS.—The total mileage, 329 miles, is nine miles less than the sum of the items in the preceding columns, because on that length of road both automatic and manual signals are used.

CHICAGO GREAT WESTERN.—The figures giving length of road signaled include 45 miles operated jointly with other companies, namely: with the Great Northern, between St. Paul and Minneapolis, 10 miles; with the Missouri Pacific, between Beverly,

Missouri and Kansas City, 30 miles; and with the Union Pacific, between Omaha and South Omaha, 1 mile.

IRON.—The mileage of automatic, double track, includes 32 miles on which no passenger trains are run.

IRON MOUNTAIN.—The mileage of road signaled includes 44 miles of line on which no passenger trains are run. The single-track non-automatic mileage includes 17 miles worked by train staff.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—On the nine miles of road equipped with automatic block signals controlled manual apparatus is in use also; this for the control of opposing movements.

NEW YORK CENTRAL.—On the Boston & Albany the signals on 61 miles of line have been changed during the past year, from lower quadrant to upper quadrant, three-position normal-danger; and storage batteries have been substituted for potash batteries and for gravity track batteries. During the coming year signals on 74 miles, some of which are disks, enclosed or unenclosed, will be changed in the same manner. During the coming year new electric interlocking will be put in at tower 28, Worcester, 43 levers; tower 29, Worcester, 53 levers; and new mechanical interlocking at tower 26, Worcester, 48 levers. At nine mechanical interlockings between Boston and Pittsfield, power-operated signals will be substituted for mechanical during the coming year; detector bars will be taken out and approach and route locking will be introduced; and all electric circuits will be supplied with storage batteries. These stations are the following: Tower 8, Brookline Junction; Tower 9, Beacon Park; Tower 12, Newtonville; Tower 31, Webster Junction; Tower 40, Springfield; Tower 41, Springfield; Tower 50, Chester; Tower 52, Washington, and Tower 55, North Adams Junction.

NEW YORK, NEW HAVEN & HARTFORD.—Non-automatic mileage on single track includes four miles worked by the electric train staff.

UNION PACIFIC.—The total mileage signaled, 1,435 miles, is 11 miles less than the sum of the items in the preceding columns, this being the length of a section of road on which the electric train staff is used, in addition to automatic block signals.

OREGON SHORT LINE.—On 11 miles of this company's lines semaphore signals have been installed in place of enclosed disk signals.

LENGTH OF RAILWAYS WORKED BY THE BLOCK SYSTEM JANUARY 1, 1911.

Name of Railway.	Miles of road—										Percentage operated under block system.	Increase, miles.
	Automatic block signals			Non-automatic block signals			Total, both kinds.	Total passenger lines operated.				
	Single track.	Two or more tracks	Total.	Single track.	Two or more tracks.	Total.						
Atchison, Topeka & Santa Fe—												
Eastern Lines	6	73	79	362	488	850	929	2,519	37	...	...
Western Lines	33	3	36	542	24	566	602	2,799	22	...	...
Coast Lines	19	1	20	4	...	4	24	1,835	1	...	6	
Gulf, Colorado & Santa Fe	11	...	11	2	...	2	13	1,540	1	...	...
Atlanta & West Point .....	...	...	...	81	6	87	87	87	100	...	...
Atlantic Coast Line	2	15	17	384	91	475	492	3,826	13	...	2	
Baltimore & Ohio	16	173	189	305	698	1,003	1,192	3,143	...	...	...
Baltimore & Southwestern .....	...	...	...	923	31	954	974	...	...	...	...
Baltimore & Ohio Chicago Terminal .....	...	10	10	...	...	...	10	46	22	...	...
Baltimore & Sparrows Point .....	...	...	...	2	3	5	5	5	100	...	2
Bessemer & Lake Erie .....	...	...	...	65	130	195	195	191	97	...	...
Boston & Maine	125	573	698	...	5	5	703	2,239	31	149	...	
Boston Elevated (Elevated Lines) .....	...	11	11	...	...	...	11	11	100	...	...
Boston, Revere Beach & Lynn .....	...	14	14	...	...	...	14	14	100	...	...
Buffalo, Rochester & Pittsburgh .....	...	...	...	301	129	430	430	430	100	...	...
Butte, Anaconda & Pacific	8	...	8	...	...	...	8	26	31	...	...
Caldwell & Northern (Car. & N. W.) .....	...	...	...	2	...	2	2	...	...	...	...
Central of Georgia .....	...	...	...	52	8	60	60	...	...	...	...
Central of New Jersey	13	199	212	...	...	...	212	460	46	...	...
Central Vermont .....	...	...	...	1	...	1	1	...	...	...	...
Chesapeake & Ohio .....	...	48	48	1,278	256	1,534	1,582	1,597	...	...	...
Chicago & Alton	416	145	561	142	...	142	703	2,999	70	...	...
Chicago & Eastern Illinois	4	103	107	174	57	231	329	693	46	9	...	
Chicago & North Western .....	...	722	722	2,416	115	2,531	3,253	6,875	...	...	...
Chicago & Western Indiana .....	...	18	18	...	9	9	27	27	100	...	...
Chicago, Burlington & Quincy .....	...	30	30	8,149	602	8,751	8,781	9,092	97	78	...
Chicago, Great Western	64	72	136	890	23	913	1,049	1,477	71	750	...	
Chicago, Indianapolis & Louisville .....	...	...	...	538	...	538	538	578	93	...	...
Chicago, Milwaukee & St. Paul	6	104	110	3,368	439	3,807	3,917	7,266	54	...	...
Chicago, Milwaukee & Puget Sound .....	...	...	...	1,400	...	1,400	1,400	1,400	100	324	...
Chicago, Peoria & St. Louis Railway of Illinois	1	...	1	...	...	...	1	227	...	...	...
Chicago, Rock Island & Gulf .....	...	33	33	...	...	...	33	476	...	...	...
Chicago, Rock Island & Pacific	659	280	939	780	...	780	1,719	7,396	23	...	...
Chicago, St. Paul, Minneapolis & Omaha .....	...	6	6	592	64	656	662	1,487	44	6	...
Chicago Terminal Transfer.—See B. & O. C. T. ....	...	...	...	...	...	...	...	...	...	...	...

(Continued on the following page.)

LENGTH OF RAILWAYS WORKED BY THE BLOCK SYSTEM JANUARY 1, 1911—(Continued).

	<div>Miles of road.</div> <div>Automatic block signals</div>			<div>Miles of road.</div> <div>Non-automatic block signals</div>			Total, both kinds.	Total passenger lines operated.	Percentage operated under block system.	Increase, miles.
Name of Railway.	Single track.	Two or more tracks.	Total.	Single track.	Two or more tracks.	Total.				
Cincinnati, Hamilton & Dayton.....	28	14	44	129	14	143	177	969	18	76
Columbus, Marion & Springfield.....	..	..	..	..	..	..	..	255	..	..
Detroit & Lake Huron.....	..	..	..	8	14	22	22	22	100	..
Cumberland & Pennsylvania.....	..	..	..	..	..	..	..	31	..	..
Delaware & Maryland.....	..	..	..	..	..	..	..	162	17	..
Davenport, Rock Island & Northwestern.....	163	247	410	41	1	42	410	744	100	..
Delaware, Lackawanna & Western.....	111	480	591	4	..	4	595	922	65	57
Duluth & Iron Range y.....	..	..	..	15	2	17	17	168	..	..
Duluth, South Shore & Atlantic.....	..	..	..	..	..	..	..	60	100	4
Hartford & Southern.....	..	..	..	60	..	60	60	60	100	..
Elgin, Joliet & Eastern.....	8	..	8	..	..	..	8	..	..	..
Erie, and controlled lines.....	..	280	280	938	469	1,407	1,687	2,237	78	..
Great Northern.....	..	2	2	..	..	..	..	687	..	..
Great Northern y.....	8	62	70	260	..	260	330	7,100	..	..
Harrisburg Valley.....	..	..	..	139	..	139	139	334	40	64
Hudson & Manhattan.....	..	..	..	..	..	..	..	7	100	..
Illinois Central.....	..	247	277	6	10	16	293	4,546	6	12
Yazoo & Mississippi Valley.....	7	..	7	..	..	..	7	1,371	..	..
Iowa Central.....	..	..	..	11	..	11	11	503	2	..
Kansas City & Missouri.....	..	..	..	1	..	1	1	163	..	..
Kansas City, Clinton & Springfield.....	..	..	..	..	..	..	..	157	..	..
Kentucky & Indiana Bridge & Railroad Co.....	..	..	..	..	..	..	..	10	100	..
Laramie & Wyoming Valley.....	..	..	..	..	..	..	..	23	15	..
Lehigh & New England.....	1	..	1	..	..	..	1	157	..	..
Lehigh Valley.....	14	487	501	682	62	744	1,215	1,171	100	..
Long Island.....	4	109	113	..	23	23	136	392	34	22
Louisville & Nashville.....	..	20	71	190	49	239	310	4,266	7	41
Maine Central.....	407	57	464	..	..	..	464	904	51	44
Manassas & Southwestern.....	..	..	..	..	..	..	..	127	..	..
Minneapolis, St. Paul & Sault Ste. Marie.....	..	..	..	2,181	4	2,185	2,185	3,095	71	..
Mississippi Central.....	..	..	..	150	..	150	150	150	100	..
Missouri, Kansas & Texas.....	..	..	..	..	..	..	..	3,072	..	..
Missouri Pacific y.....	128	26	154	34	8	42	196	6,213	..	..
Mobile & Ohio.....	..	5	5	48	..	48	53	..	..	6
Monongahela b.....	..	..	..	..	..	..	..	..	..	..
Nashville, Chattanooga & St. Louis.....	9	..	9	84	10	94	103	1,230	8	..
Newburgh & South Shore.....	1	6	7	..	..	..	..	..	..	..
New York & Long Branch.....	..	38	38	..	..	..	38	38	100	..
New York Central Lines—										
Boston & Albany.....	..	207	207	..	2	2	209	377	56	..
Chicago, Indiana & Southern.....	..	5	5	144	60	204	209	309	68	187
Cincinnati Northern y.....	..	..	..	206	..	206	206	206	..	..
Cleveland, Cincinnati, Chicago & St. Louis.....	..	..	..	553	320	873	873	2,100	..	..
Lake Erie & Western y.....	..	..	..	863	9	872	872	832	..	..
Lake Shore & Michigan Southern y.....	7	513	520	1,211	21	1,232	1,752	1,628	..	

CARS AND LOCOMOTIVES ORDERED IN 1910.

The following tables show the new freight cars, passenger cars and locomotives ordered by American railways in 1910. The collection of this data involves a large amount of time and labor, and the compilation is necessarily subject to some slight omissions, but it is sufficiently accurate to meet the general purpose for which these statistics have been prepared. Practically all the data is derived from official sources, but in a few instances where no replies have been made to inquiries figures from our regularly weekly records have been used. Attention is called to the fact that these statistics refer to cars and locomotives ordered during the year; statistics of equipment built during the year are given elsewhere in this issue.

The decline in orders for freight cars is heavy. The year closes with the orders on the books of the manufacturers in a very unsatisfactory state.

The tables show that during the year there were ordered 141,204 freight cars, 3,881 passenger cars and 3,787 locomotives. Of the freight cars 46,347 are all wood, 39,173 have steel underframes, and 35,523 are all steel. Of the passenger cars, 1,303 are all wood; 723 have steel underframes, and 1,855 are all steel. Of the locomotives, 3,532 are simple and 255 are compound; of the latter 237 are Mallets. The figures of orders for cars and locomotives during the past ten years, as compiled by this paper, are as follows:

Year	Freight Cars	Passenger Cars	Locomotives	Year	Freight Cars	Passenger Cars	Locomotives
1901	4,340	2,279	19,419	1906	5,642	3,400	310,315
1902	4,665	4,479	19,418	1907	5,474	1,791	151,711
1903	3,283	2,310	16,556	1908	1,182	1,416	62,669
1904	2,538	2,413	16,561	1909	3,350	1,161	189,360
1905	6,265	3,280	14,115	1910	3,787	1,204	141,204

FREIGHT CARS ORDERED IN 1910.

Purchaser.	No.	Kind.	Capacity.	Builder.
Aetna Powder Co.....	6	Tank	8,000 g.	Chicago Steel Car.
Allis-Chalmers Bullock..	1	Flat	60,000	Canadian Car & Fdy.
Anglo-American Packing..	10	Tank	100,000	Am. Car & Fdy.
American Conduit	1	Tank	60,000	Am. Car & Fdy.
American Smelting	1	Ore	60,000	Am. Car & Fdy.
American Rys.	12	Box	60,000	Am. Car & Fdy.
Ann Arbor	500	Gondola	100,000	Standard Steel.
Arizona Eastern	160	Box	80,000	Am. Car & Fdy.
	116	Flat	100,000	Bettendorf.
	3	Caboose	.....	Am. Car & Fdy.
Arizona & New Mexico..	1	Stock	60,000	Am. Car & Fdy.
Armour Car Lines.....	200	Refrig.	.....	Company shops.
Ashland Coal & Iron....	15	Gondola	50,000	Company shops.
	15	Flat	50,000	Company shops.
Atch., Top. & Santa Fe..	1,500	Refrig.	60,000	Am. Car & Fdy.
Atl., Birm. & Atlantic..	25	Stock	60,000	Am. Car & Fdy.
Atlanta & West Point....	100	Flat	80,000	Am. Car & Fdy.
Atlantic Seab. Desp....	3	Tank	8,000 g.	Chicago Steel Car.
	2	Tank	80,000	Erie Car Works.
	2	Tank	100,000	Erie Car Works.
Atlas Coke	76	Flat	100,000	Pressed Steel.
Au Sable & No. West....	3	Logging	.....	Company shops.
	3	Gondola	50,000	Company shops.
Alexander Baldwin	61	Flat	60,000	Am. Car & Fdy.
Baltimore & Ohio.....	11,000	Box	80,000	Standard Steel.
	1,000	Coke	100,000	Pressed Steel.
	1,000	Hopper	100,000	Cambria Steel.
	1,000	Gondola	100,000	Pressed Steel.
	1,000	Gondola	100,000	Standard Steel.
	500	Refrig.	71,000	Whipple Car.
	500	Vent. box	80,000	Ralston Steel.
	1,000	Hopper	80,000	Standard Steel.
	1,000	Box	80,000	Am. Car & Fdy.
	1,000	Box	80,000	Standard Steel.
	1,000	Coke	100,000	Standard Steel.
	1,000	Coke	100,000	Cambria Steel.
	1,000	Box	80,000	Standard Steel.
	1,000	Coke	100,000	Cambria Steel.
Bangor & Arnoostook....	73	Tank	100,000	Am. Car & Fdy.
Barrett Mfg. Co.....	10	Flat	70,000	Company shops.
Bellingham B. & Br. Col.	2	Box	.....	Hicks. Loco. & Car.
Benton Harbor & St. J..	1	Flat	80,000	Hicks. Loco. & Car.
Bernhisel Constr. Co....	110	Flat	80,000	Pressed Steel.
Berwind Lumber Co.....	80	Hopper	100,000	Cambria Steel.
Berwind-White C. M. Co.	15	Coal	80,000	Mt. Vernon Car Mfg.
Borough Developm. Co..	2	Box	80,000	.....
Boston & Albany.....	25	Box	60,000	.....
	25	Box	80,000	.....
	4	Box	60,000	.....
	4	Box	80,000	.....
Boston & Maine.....	1,050	Box	60,000	Laconia Car.
	250	Refrig.	60,000	Laconia Car.
	200	Auto.	60,000	Laconia Car.
	100	Dump	12 yd.	Standard Steel.
	132	Caboose	.....	Laconia Car.
Brinson Ry.	42	Box	60,000	Georgia Car.
	30	Flat	60,000	Georgia Car.
	13	Box	60,000	So. Atlantic Car & M.
British Columb. Elec....	12	Stock	60,000	Canadian Car & Fdy.
Buff Motor Co.....	6	Box	50,000	Hicks Loco. & Car.
Burns & Co., R. M.....	7	Tank	8,000 g.	Chicago Steel Car.
Cal. Westn R. R. & Nav.	20	Flat	80,000	W. L. Holman.
Calumet & Hecla	76	Ore	100,000	Pressed Steel.
Canada Cement Co.....	1	Hopper	100,000	Canadian Car & Fdy.
Canada Iron Corpor....	60	Coal	100,000	Canadian Car & Fdy.
Canada Shipping Co....	2	Box	80,000	Canadian Car & Fdy.
Canadian Bridge Co....	42	Flat	80,000	Canadian Car & Fdy.
Canadian Copper Co....	2	Otis ore.	100,000	Hart-Otis Co.
Canadian Malting & Br..	1	Refrig.	60,000	Canadian Car & Fdy.
Canadian Northern	1,600	Box	60,000	Canadian Car & Fdy.
	250	Box	60,000	Canadian Car & Fdy.
	300	Box	60,000	Crossen Car.
	500	Stock	60,000	Crossen Car.
	500	Flat	60,000	Crossen Car.
	50	Refrig.	60,000	Crossen Car.
	250	Hart conv.	80,000	Hart-Otis Co.
	250	Flat	80,000	Canadian Car & Fdy.
Canadian No. Ont.....	50	Caboose	.....	.....
	50	Auto	60,000	Canadian Car & Fdy.
	100	Ore	100,000	Canadian Car & Fdy.
Canadian Pacific.....	218	Refrig.	60,000	Company shops.

Purchaser.	No.	Kind.	Capacity.	Builder.
Canadian Pacific.....	1,600	Box	60,000	Company shops.
	50	Horse	60,000	Company shops.
	111	Stock	60,000	Company shops.
	174	Flat	60,000	Company shops.
	85	Vans	.....	Company shops.
	50	Ballast	.....	Canadian Car & Fdy.
	219	Otis coal	100,000	Hart-Otis.
	20	Tank	100,000	Canadian Car & Fdy.
	60	Tank	100,000	Pressed Steel.
	1100	Auto	80,000	Canadian Car & Fdy.
	1,000	Box	80,000	Canadian Car & Fdy.
	1750	Flat	80,000	Canadian Car & Fdy.
	25	Ore	100,000	Canadian Car & Fdy.
Canadian Western Lumb.	75	Flat	80,000	Seattle Car & Mfg.
Carnegie Steel	12	Flat	100,000	Pressed Steel.
Caro., Clinchfield & Ohio.	1,000	Hopper	.....	Pressed Steel.
Cavichii & Pagano.....	10	Flat	60,000	Canadian Car & Fdy.
	1	Dump	60,000	Canadian Car & Fdy.
Central Calif. Tract....	10	Flat	80,000	W. L. Holman.
	2	Box	80,000	W. L. Holman.
Central Pacific	1300	Box	100,000	Am. Car & Fdy.
	1200	Auto	100,000	Am. Car & Fdy.
	80	Stock	80,000	Am. Car & Fdy.
	144	Flat	100,000	Bettendorf.
	1300	Hart conv.	100,000	Rodger Ballast.
Cent. Ont.	1	Flat	60,000	Canadian Car & Fdy.
Charlotte Har. & Nor...	90	Phosphate	80,000	Barney & Smith.
	25	Box	60,000	Barney & Smith.
	125	Flat	60,000	Barney & Smith.
	2	Caboose	.....	Georgia Car.
	1	Caboose	.....	Company shops.
Chelsea Refining Co....	15	Tank	80,000	Am. Car & Fdy.
Chesapeake & Ohio.....	1,500	Box	.....	Standard Steel.
	1,000	Box	80,000	Am. Car & Fdy.
	19	Flat	.....	Am. Car & Fdy.
	19	Stock	30,000	Am. Car & Fdy.
	110	Coke	100,000	Am. Car & Fdy.
	50	Caboose	.....	Company shops.
	25	Caboose	.....	Hocking Valley.
Chicago & Eastern Ill...	4200	Auto	80,000	Am. Car & Fdy.
Chicago & Northwestern.	4200	Milk	80,000	Am. Car & Fdy.
	100	Stan. cab.	.....	Am. Car & Fdy.
	25	Drov. cab.	.....	Am. Car & Fdy.
Chic., Burl. & Quincy...	2,000	Box	80,000	Haskell & Barker.
	1,000	Gondola	100,000	Pressed Steel.
	500	Auto	80,000	Haskell & Barker.
	100	Box	80,000	Company shops.
	450	Caboose	.....	Company shops.
Chicago Great Western..	200	Refrig.	60,000	Am. Car & Fdy.
	4200	Box	80,000	Am. Car & Fdy.
	4200	Hart conv.	100,000	Am. Car & Fdy.
	4200	Flat	80,000	Am. Car & Fdy.
	250	Stock	60,000	Am. Car & Fdy.
	200	Gondola	100,000	Am. Car & Fdy.
	200	Gondola	80,000	Am. Car & Fdy.
Chic., Mil. & Gary.....	6	Caboose	.....	Am. Car & Fdy.
Chic., Mil. & Puget S...	250	Logging	80,000	Company shops.
	15	Box	80,000	Company shops.
	11200	Auto	80,000	Company shops.
Chic., Mil. & St. Paul...	110	Caboose	.....	Company shops.
	2	Flat	100,000	Company shops.
	110	Box	80,000	Am. Car & Fdy.
Chic., Rock I. & Pac....	4400	Hart conv.	100,000	Rodger Ballast.
	4225	Box	80,000	Washington St. Car & Fdy.
	4500	Furn.	80,000	Am. Car & Fdy.
	25	Caboose	.....	Mr. Vernon Car M.
	450	Refrig.	60,000	Milwaukee Car.
	4200	Refrig.	60,000	Am. Car & Fdy.
	800	Box	80,000	Pullman.
	4200	Ballast	100,000	Rodger Ballast.
	4500	Furn.	80,000	Am. Car & Fdy.
	4500	Furn.	80,000	Am. Car & Fdy.
Chic., St. P., M. & Om..	600	Box	80,000	Haskell & Barker.
	4200	Gondola	100,000	Am. Car & Fdy.
	4200	Flat	100,000	Company shops.
Chicago Short Line.....	5	Dump	40,000	Goodwin Car.
Chicago Southern	4242	Coal	100,000	Haskell & Barker.
	1	Caboose	.....	Haskell & Barker.
Cincinnati Abattoir	475	Refrig.	.....	Am. Car & Fdy.
Cin., Ham. & Dayton...	500	Gondola	100,000	Pressed Steel.
	500	Gondola	100,000	Cambria Steel.
	500	Gondola	100,000	Ralston Steel.
	1,000	Box	80,000	Am. Car & Fdy.
Cincinnati Traction	8	Dump	6 yd.	Wohlan, Sanger & Bates.

*Asterisk indicates all steel cars. †Indicates steel underframe cars.

Clarendon & Pittsf.	15	Flat	80,000	Am. Car & Fdy.	Halifax & S. W.	20	Hart hop. 60,000	Hart-Otis Co.
Clev., Akron & Colum.	120	Box	100,000	Pressed Steel.	Hamilton Powder.	50	Flat	50,000 Silliker.
C., C. & St. Louis.	10	Flat	100,000	Pressed Steel.	Haney, Quin, & Robinson	748	Dump	6 yd. Kilbourne & Jacobs.
Coal & Coke.	590	Caboose	Company shops.		Hocking Valley.	10	Caboose	Company shops.
Cochrane Chemical.	4	Coal	100,000	Cambria Steel.	Holmes-Eureka Lum. Co.	3	Flat	60,000 W. L. Holman.
Cold Blast Transp.	400	Tank	100,000	Am. Car & Fdy.	Houston & Texas Central	100	Stock	80,000 Am. Car & Fdy.
Colima Lumber Co.	500	Beef	60,000	Haskell & Barker.	Houston, E. & W. Texas.	100	Box	100,000 Am. Car & Fdy.
Colo. & So.	400	Tank	100,000	Pressed Steel.	Idaho & Wash. No.	100	Flat	80,000 Haskell & Barker.
	200	Box	80,000	Mt. Vernon Car M.		100	Box	80,000 Haskell & Barker.
	200	Stock	60,000	Mt. Vernon Car M.		6	Refrig.	60,000 Haskell & Barker.
	153	Coal	50,000	Company shops.		1	Tank	60,000 Am. Car & Fdy.
	50	Coal	50,000	Company shops.		50	Caboose	Company shops.
	150	Stock	50,000	Company shops.		40	Cinder	50,000 Company shops.
	15	Caboose	Company shops.			50	Coal	Haskell & Barker.
	280	Dump	Company shops.			10	Ballast	100,000 Am. Car & Fdy.
Columbia & Puget S.	135	Coal	80,000	Company shops.		5	Box	Haskell & Barker.
	15	Gondola. 100,000	Haskell & Barker.			4	Caboose	Hicks Loco. & Car.
Consumers Mutual Oil.	1	Tank	8,000 g.	Chicago Steel Car.	Illinois Tunnel.	500	Tram	20,000 Kilbourne & Jacobs.
Copper Range.	4	Refrig.	60,000	Am. Car & Fdy.	Independent Harvester.	1	Furniture. 60,000	Hicks Loco. & Car.
	10	Gondola. 80,000	Am. Car & Fdy.		Indian Refining.	69	Tank	Canadian Car & Fdy.
Corrigan, McKinney.	70	Gondola. 100,000	Pressed Steel.		Intercolumbian.	1	Stores	80,000 Company shops.
Cornwall & Lebanon.	150	Gondola. 80,000	Am. Car & Fdy.			6	Caboose	Company shops.
	20	Box	60,000	Pressed Steel.		715	Tank	8,000 g. Canadian Car & Fdy.
	20	Sum. ore. 100,000	Pressed Steel.			1	Tank 1,724 cu. ft.	Company shops.
	1	Tank	80,000	Am. Car & Fdy.		5	Box	80,000 Am. Car & Fdy.
Crighton Pine.	100	Tank	8,000 g.		Interstate Railroad.	3	Cinder	40,000 Company shops.
Crystal Car Line.	10	Tank	8,000 g.	German-American Car.	Iowa Central.	4	Caboose	Company shops.
Cudahy Oil Tank Line.	93	Refrig.	60,000	Company shops.		400	Hopper. 100,000	Standard Steel.
Cumberland Valley.	29	Box	100,000	R. R.	Jamison Coal & Coke.	1	Box	80,000 Hicks Loco. & Car.
	115	Flat	100,000	Penna. R. R.	Kanawha & West Va.	13	Tank	80,000 Am. Car & Fdy.
Davis, M. P. & J. T.	45	Hart. con. 80,000	Hart-Otis.		Kansas Coop. Rep.	123	Tank	10,000 Am. Car & Fdy.
Del. & Hudson.	200	Box	60,000	Am. Car & Fdy.	Kellogg, Spencer S.	13	Hart conv. 80,000	Hart-Otis Co.
Del. Riv. & Union.	40	Tank	100,000	Am. Car & Fdy.	Kennedy & McDonald.	6	Flat	30,000 Company shops.
Del. Lack. & West.	250	Gondola. 80,000	Am. Car & Fdy.		Kentwood & East.	78	Tank	100,000 Am. Car & Fdy.
	50	Box	80,000	Am. Car & Fdy.	Kettle River Quarries.	73	Beef	60,000 Am. Car & Fdy.
	250	Hopper. 80,000	Pressed Steel.		Kingman Refrigerator Co.	1	Dump	12 yd. Wm. J. Oliver Mfg.
	70	Box	80,000	Am. Car & Fdy.	LaFollette Iron Co.	5	Flat	50,000 Interstate Car.
Denv., Laramie & N. W.	20	Stock	60,000	Am. Car & Fdy.	Lake Champl. & Moriah.	76	Tank	100,000 Am. Car & Fdy.
	20	Hart conv. 100,000	Rodger Ballast.			100	Ore	100,000 Claik Car Co.
	40	Nat. dump. 100,000	National Dump Car.		Lake Sup. Iron & Steel.	750	Hart conv. 100,000	Rodger Ballast.
	2	Caboose	Am. Car & Fdy.		Lake Sup. & Ishp.	1,000	Hopper. 100,000	Am. Car & Fdy.
	375	Coal	100,000	Pullman.	Lake Superior Mich. So.	1,000	Gondola. 100,000	Pressed Steel.
Denv., N. W. & Pacific.	150	Box	60,000	Pullman.		1,000	Box	80,000 Mer. Desp. Trans.
	150	Stock	60,000	Pullman.	Lane & Co., C. W.	32	Dump	Wm. J. Oliver Mfg.
	225	Flat	80,000	Pullman.	Lange Soap.	6	Tank	80,000 Am. Car & Fdy.
	40	Refrig.	60,000	Pullman.	Laurinb. & So.	5	Box	60,000 Hicks Loco. & Car.
	110	Caboose	Pullman.		Lehigh Valley.	15	Milk	Standard Steel.
Dold Packing Co.	150	Refrig.	60,000	Am. Car & Fdy.	Lemp Refrigerator.	125	Refrig.	Milwaukee Car.
Dominion Atlantic.	1	Van	Company shops.		Litch & Madison.	400	Gondola. 100,000	Am. Car & Fdy.
	1	Coal	60,000	Company shops.	Long Island.	100	Gondola. 100,000	Pressed Steel.
Dominion Coal.	12	Otis dump. 100,000	Canadian Car & Fdy.		Los Angeles Aqueduct.	1	Flat	60,000 W. L. Holman.
Dominion Equip. & Sup.	50	Hopper. 100,000	Canadian Car & Fdy.		Louisiana West.	200	Box	100,000 Am. Car & Fdy.
Duluth, Missabe & No.	100	Ore	100,000	Am. Car & Fdy.	Louisville & Nashville.	100	Ballast	100,000 Rodger Ballast.
	150	Ore	100,000	Western St. Car & Fdy.		100	Stock	65,000 Company shops.
	750	Sum's ore 100,000	Standard Steel.			400	Gondola. 100,000	Company shops.
	25	Refrig.	60,000	Peter Car.		760	Gondola. 100,000	Company shops.
Duluth, Rainy L. & Win.	100	Logging. 60,000	Russel Wh. & Fdy.			200	Coke	80,000 Company shops.
Duluth, So. Shore & Atl.	300	Ore	100,000	Am. Car & Fdy.		1,000	Box	80,000 Company shops.
	1	Box	60,000	Am. Car & Fdy.		100	Beer	65,000 Company shops.
	1	Box	80,000	Am. Car & Fdy.	Louisv. Hend. & St. L.	15	Rallast	80,000 Rodger Ballast.
Duluth & Iron Range.	150	Ore	100,000	Western St. Car & Fdy.	MacArthur Bro. & Winst.	4	Hopper. 100,000	Am. Car & Fdy.
Dunn Bros.	2	Flat	60,000	Canadian Car & Fdy.	Maine Central.	500	Heater	Laconia Car.
Dyersburg No.	20	Box	60,000	Hicks Loco. & Car.		7675	Box	60,000 Keith Car & Mfg.
Elgin, Jol. & East.	50	Hopper. 100,000	Standard Steel.			25	Dairy	60,000 Keith Car & Mfg.
Enterprise R. E. Co.	1	Hopper. 100,000	Cambria Steel.			6	Caboose	Laconia Car.
Erie.	110	Furn.	80,000	Pressed Steel.	Major Co., Guy C.	10	Tank	10,500 g. Chicago Steel Car.
	250	Gondola. 60,000	Company shops.		Maryland & Penna.	21	Box	100,000 Western St. Car.
	110	Box	80,000	Company shops.	Massachusetts Elect.	4	Express	Laconia Car.
	750	Gondola. 70,000	Company shops.		McCloud River.	50	Logging.	60,000 Company shops.
Escanaba & L. Superior.	25	Flat	80,000	FitzHugh, Luther.	Merchants Despatch.	1,000	Box	80,000 Company shops.
Esquimalt & Nanaimo.	20	Flat	80,000	Canadian Pacific.		110	Refrig.	Company shops.
	2	Van	Canadian Pacific.			2	Tank	100,000 Am. Car & Fdy.
Fauquier, E. F. & G. E.	15	Hart conv. 80,000	Hart-Otis.		Merrymac Chemical.	200	Box	80,000 Pullman.
Ft. Dodge, Des. M. & So.	150	Coal	80,000	Haskell & Barker.	Mexico N. W.	760	Stock	80,000 Pullman.
	30	Ballast	100,000	Haskell & Barker.		12	Tank	100,000 Am. Car & Fdy.
	150	Box	60,000	Haskell & Barker.	Michigan Alkali.	5	Tank	8,000 g. Chicago Steel Car.
Ft. Worth & Denv. City.	20	Stock	80,000	Mt. Vernon Car M.	Michigan Ammonia Wks.	100	Box	80,000 Pullman.
Fraser Riv. Lumber Co.	50	Box	100,000	Canadian Car & Fdy.	Minneapolis Central.	1,000	Box	80,000 Peter Car.
Galt, Hart & Hart. A.	200	Stock	80,000	Am. Car & Fdy.	Midland Valley.	6	Tank	80,000 Mt. Vernon Car Mfg.
	100	Tank	60,000	Am. Car & Fdy.		5	Coal	80,000 Mt. Vernon Car Mfg.
Germania Refining.	65	Box	60,000	Company shops.	Milwaukee Refrig. Tran.	43	Refrig.	80,000 Am. Car & Fdy.
Georgian R.R.	100	Stock	100,000	Company shops.	Mineral Range.	100	Ore	80,000 Am. Car & Fdy.
	40	Flat	60,000	So. Atlantic Car.	Minneapolis & St. Louis.	14	Caboose	Company shops.
Georgia & Florida.	100	Stock	80,000	So. Atlantic Car.		300	Stock	60,000 Am. Car & Fdy.
	30	Flat	60,000	Standard Steel.	Minn., St. P. & S. S. M.	200	Ore	100,000 Am. Car & Fdy.
Gt. Sta. & Montreal.	100	Vent. box 60,000	Standard Steel.			200	Ore	100,000 Standard Steel.
Gt. Sta. & Montreal.	100	Flat	80,000	Standard Steel.		400	Box	60,000 Am. Car & Fdy.
Guthrie & Portland.	100	Box	60,000	Haskell & Barker.		100	Auto.	60,000 Am. Car & Fdy.
Gulf Const. Min.	1	Hopper. 100,000	Pressed Steel.		Minneapolis Steel.	10	Flat	100,000 Am. Car & Fdy.
Gulf Harb. & Ind.	100	Box	60,000	Am. Car & Fdy.	Mo. & North Ark.	20	Furn.	60,000 Am. Car & Fdy.
Gulf Harb. & Ind.	100	Box	60,000	Am. Car & Fdy.		20	Ballast	60,000 Am. Car & Fdy.
Gulf Harb. & Ind.	100	Box	60,000	Am. Car & Fdy.	Mo., Kan. & Tex.	1,000	Box	60,000 Am. Car & Fdy.
	1,000	Hopper. 100,000	Standard Steel.			200	Auto.	60,000 Am. Car & Fdy.
	1,000	Hopper. 100,000	Standard Steel.			100	Gondola. 100,000	Am. Car & Fdy.
	100	Box	60,000	Am. Car & Fdy.		100	Flat	100,000 Am. Car & Fdy.
	100	Box	60,000	Am. Car & Fdy.		100	Furn.	60,000 Mt. Vernon Car Mfg.
	100	Box	60,000	Am. Car & Fdy.		125	Coal	80,000 Mt. Vernon Car Mfg.
	100	Box	60,000	Am. Car & Fdy.		60	Caboose	1 yd. Wm. J. Oliver Mfg.
	100	Box	60,000	Am. Car & Fdy.		200	Auto.	60,000 Am. Car & Fdy.
	100	Box	60,000	Am. Car & Fdy.		100	Flat	100,000 Am. Car & Fdy.
	100	Box	60,000	Am. Car & Fdy.		100	Gondola. 100,000	Am. Car & Fdy.
	100	Box	60,000	Am. Car & Fdy.		100	Coal	80,000 Am. Car & Fdy.
	100	Box	60,000	Am. Car & Fdy.		100	Gondola. 100,000	Am. Car & Fdy.
	100	Box	60,000	Am. Car & Fdy.		100	Caboose	Company shops.
	100	Box	60,000	Am. Car & Fdy.		1	Hay	30,000 Company shops.
	100	Box	60,000	Am. Car & Fdy.		1	Tank	40,000 Company shops.
	100	Box	60,000	Am. Car & Fdy.		50	Box	80,000 Mt. Vernon Car Mfg.
	100	Box	60,000	Am. Car & Fdy.		50	Dump	60,000 Canadian Car & Fdy.
	100	Box	60,000	Am. Car & Fdy.		4	Box	60,000 Interstate Car.

* Automobile indicates all steel cars.
 Indicates steel underframe cars.

* Asterisk indicates compound.

Tidewater & Western..	11 14x20	67,000	4-6-0	Baldwin.
Toledo, Peoria & West..	2 21x28	170,000	2-8-0	Baldwin.
Trenton Hamlet & Buf.	3 21x28	195,000	2-8-0	Montreal Loco.
Tremont Lumber Co....	1 16x24	101,000	2-6-2	American.
Union Ry.....	1 14x18	55,000	2-8-0	Baldwin.
Union R. R.	5 24x32	224,300	2-8-0	Baldwin.
	10 24x32	224,300	2-8-0	American.
Union Pacific	10 22x28	222,000	4-6-2	Baldwin.
Union St & Yds. Omaha	1 19x24	120,000	0-6-0	Baldwin.
United Eng. & Cont....	1 10x16	52,000	Geared	Heisl.
United Steel	1 15x24	36,000	0-4-0	American.
Upson Nut Co.....	1 16x24	85,000	0-4-0	American.
Utah Copper Co.	10 16x24			H. K. Porter.
Valdosta Mould. & West.	1 18x26	130,000	4-6-0	Baldwin.
Vandalia	4 24x36	256,000	4-6-2	American.
	7 24x28	233,766	2-8-0	American.
	2 21x26	189,000	4-4-2	American.
	2 22x24	169,050	0-6-0	Penna. R. R.
Virginia Ry	8 24x36x32	388,320	Mallet	Baldwin.
	11 24x32	254,000	2-8-2	Baldwin.
	1 22x28	181,750	0-8-0	Baldwin.
	1 24x32	254,000	2-8-2	Baldwin.
Wash., Idaho & Mont...	1 17x22	120,000	2-6-0	American.
	1 22x30	201,000	2-8-0	American.
West. Maryland.....	6 24x30	222,000	2-8-0	Baldwin.
	*2 23&35x32	254,000	Mallet	Baldwin.
Wichita Falls Route....	4 17x26	104,000	4-4-0	Baldwin.
	5 20x26	147,800	2-8-0	Baldwin.
	3		2-8-0	Baldwin.
	1		4-4-0	Baldwin.
Willard Case Lumb....	1	84,000	Geared	Heisl.
Winifrede R.R.....	1 20x26	145,600	2-6-0	Baldwin.
Winston-Dear	5 17x24	90,000	0-6-0	Baldwin.
	2 18x24	112,000	0-6-0	American.
Winston-Salem Southbd..	4 21x30	200,000	4-8-0	Baldwin.
Wis. Log & Timber....	1	120,000	Geared	Heisl.
Wrightsv. & Tonnille...	1 18x26	128,500	4-6-0	Baldwin.
Youngstown & Ohio R.R.	1 21x24	170,000	2-8-2	Baldwin.

*Asterisk indicates compound.

REPORT OF THE INTERSTATE COMMERCE COMMISSION.

The annual report of the Interstate Commerce Commission is in part as follows:

Immediately following the passage of the Mann-Elkins law the commission was called upon to exercise what is perhaps the most far-reaching and fundamentally important power conferred on it by that act, namely, the authority to suspend proposed advances in rates pending investigation of their propriety. It will be recalled that in the first half of 1910 numerous carriers had given notice of general advances in rates, and it was commonly understood that other carriers would shortly take similar action. As a result of conferences between the Government authorities and representatives of the carriers, the dates on which the proposed advances were to become effective were postponed pending the passage of the bill then under consideration by the Congress, and section 12 of that bill was made effective on its passage in order that the commission might at once institute investigations thereunder. Thereupon two general investigations were instituted, one relating to the general advances in rates proposed by eastern carriers and the other to those proposed by western carriers. In both proceedings organizations of shippers asked for and were given leave to intervene. Appreciating the importance to the general public, as well as to the interested carriers, of an early determination of the issues presented by these cases, every effort has been made to expedite the proceedings. As a result of the hearings, which closed November 30, a stupendous record is now before the commission. Hundreds of tariffs naming the increased rates were voluntarily postponed by the carriers until November 1, 1910, and again postponed until February 1, 1911. The cases have been assigned for argument on January 9 and succeeding days, and the commission intends to announce its decision at the earliest practicable date thereafter.

WORK OF THE COMMISSION.

Since our last annual report the commission has announced decisions in 692 proceedings instituted by formal complaints or by the commission on its own motion, and 125 similar cases have been disposed of by stipulation of the parties for dismissal or motion of complainants for discontinuance. It will thus be seen that 817 formal cases have been removed from the commission's docket during the year. The present docket shows a marked improvement over that of previous years in the number of pend-

ing cases, and the entire work of the commission is in a fairly satisfactory condition.

During the same period 660 formal complaints have been filed and 11 proceedings instituted by the commission. In addition to this, 25 proceedings involving suspension of tariffs under the act of June 18, 1910, have been instituted. The number of formal proceedings shows a marked decrease as compared with the number filed during the previous year, due mainly to the consolidation of complaints involving the same or substantially the same principle, subject or state of facts.

The number of informal complaints made the subject of correspondence between the commission and interested carriers shows a decrease for 1910 as compared with 1909, 3,840 having been filed during the year 1910, as against 4,436 in the previous year.

Seven hundred and thirty-seven hearings and investigations respecting alleged violations of the act have been held at sessions of the commission in Washington and various places throughout the country, at which more than 65,190 pages of testimony, exclusive of voluminous exhibits, have been taken.

RATE SCHEDULES AND APPLICATION OF RATES.

No change of importance or of public interest has been made in policy or methods in this branch of the work. Further and substantial progress has been made and is being made in the clarification and simplification of carriers' rate schedules.

The work of the rate division of the Bureau of Tariffs increases and grows in importance. It is sometimes found desirable and necessary to have a check made by employees of the commission as to the effect of contemplated orders in important contested rate cases. An instance of this is found in the so-called Intermountain cases, in which practically all of the rates to the intermountain territory from points on and east of the Missouri river and from distributing centers on the Pacific coast are involved.

UNIFORM CLASSIFICATION.

In our twenty-first annual report reference was made to the understood status of the work which had been undertaken by the carriers looking to the establishment of a standard or uniform freight classification to take the place of existing separate classifications. The commission was at that time advised that the carriers operating in the several classification territories had created a central committee consisting of persons especially qualified to engage in the highly technical work involved in the unification of these classifications.

The important features which it is sought to unify are the rules and regulations, descriptions of articles, minimum weights for carload shipments, and the number of classes which shall govern rate assignments.

Opportunity has been afforded the commission from time to time to be informed of the progress made by the central committee, from which it appears that much has been accomplished toward the general purpose in view. Substantially all of the rules and regulations of the existing separate classifications have been reviewed, revised and brought together in a unified form. Upward of one-third of the articles in the different classifications have been assigned a uniform description, and uniform minimum carload weights have been prescribed for a proportionate number.

From the progress of the work it appears that the carriers are making a sincere effort to harmonize as far as possible the conflicting features of the various classifications, but the stimulus of requirement should be applied unless satisfactory results at an early day indicate that the desired uniformity will be brought about by voluntary action.

DIVISION OF PROSECUTIONS.

Since December 1, 1909, 44 indictments for criminal violation of the act to regulate commerce have been returned. Six of these indictments are joint, two defendants being included in each case.

Since December 1, 1909, 43 prosecutions have been concluded. Thirty-one pleas of guilty were received. The penalties assessed have ranged in amount from \$100 to \$20,000, the aggregate being \$63,500. In the same period 8 verdicts of guilty have been rendered, upon 6 of which, containing 361 counts, penalties have not yet been imposed. Two verdicts of acquittal have been rendered.

Of the 44 indictments returned during the year, 25 have been against carriers or carriers' agents and 19 against shippers or passengers. Of the 43 prosecutions concluded during the year, 21 have been against carriers and carriers' agents and 22 against shippers or passengers.

The policy adopted by the commission on the formation of the division of prosecutions has been followed during the year, in that indictments generally have contained comparatively few counts and large penalties have not been sought except in cases showing very unusual conditions. The fight against discrimination is by no means won. Those practices still remaining are more insidious and more difficult of extirpation than open-rebating, by reason of the fact that they are hidden in contractual arrangements entirely legal except for the effect produced. To speak generally, these arrangements depend for their vice upon some unification of shipper and carrier, by which shippers secure an interest in carriers' profits. Certain divisions with terminal railroads, payments for the use of plant facilities, payments to shippers for performing for themselves services not incumbent upon the carrier, arrangements with private car lines and the ownership of industrial corporations by carrier corporations and of carrier corporations by industrial corporations are the more prominent and baneful examples of the abuses now continuing.

SUITS TO ANNUL ORDERS OF COMMISSION.

Since our last annual report the Supreme Court of the United States has handed down decisions in six cases in which the validity of orders of the commission was involved.

In the coal car distribution case and the Burnham-Hanna-Munger case the orders of the commission were upheld and in the Portland Gateway case the commission was over-ruled.

During the year final decisions have been rendered by the circuit courts in nine cases, of which the following may be specifically referred to:

In the cattle raisers' case, after a hearing occupying 63 days, the master filed a voluminous report sustaining the commission upon nearly all points, and this report was accepted by the circuit court and the petition dismissed. This decision was rendered at St. Paul, November 4, 1910, no opinion being delivered.

The lumber cases were referred to a master with instructions to hear the evidence and report his conclusions of fact and of law. The report of this master found that the rates established by the order of the commission at points upon and west of the Pembina-Port Arthur line were reasonable, but that most of the rates named to points east of that line were unreasonably low. He found that the rate of 45 cents which the commission had established to St. Paul was unreasonably low and recommended that the order of the commission should be enjoined. The report of the master was sustained by the court, which entered a decree permanently enjoining the order of the commission.

This case was decided at St. Paul at about the same time with the Cattle Raisers' case above referred to. No written opinion was handed down by the court.

Both these cases were of very great importance, involving large amounts of money and vast commercial considerations. Both cases received most careful attention at the hands of the commission. In both the decision of the commission was reviewed by a single master in chancery. The court did not hear the testimony and could not have examined the record before rendering its decision.

The existence of the new commerce court will provide a tribunal for the hearing of these questions, which will avoid, at least, the absurdity involved in the above proceedings.

In the Omaha Street Railway case the circuit court sustained the contention of the railway, holding that an urban street rail-

way was not within the purview of the act to regulate commerce.

This case will be taken to the Supreme Court of the United States and the extent of the jurisdiction of this commission over street railways finally determined.

Interstate Commerce Commission et al. v. Delaware, Lackawanna & Western et al. This suit involves the right to consolidate in carloads at the carload rate shipments owned by different persons. The court below enjoined the order of the commission.

Northern Pacific et al. v. Interstate Commerce Commission. The order of the commission required the defendants to desist from certain discrimination in the use of wharfage privileges at Galveston. The court below sustained the order of the commission.

Interstate Commerce Commission v. Peavey & Co. et al. The order of the commission required the defendants to desist from the payment of elevation allowances. The court below enjoined the order of the commission.

Interstate Commerce Commission v. Dittenbaugh et al. The question here is the same as in the one next preceding. The order of the commission was enjoined by the circuit court.

United States v. Chicago, Indianapolis & Louisville. This proceeding was brought at the instance of the commission to prevent the defendant from accepting newspaper advertising as payment for transportation. The circuit court granted the injunction prayed for by the commission.

Southern Pacific et al. v. Interstate Commerce Commission. In this case the order of the commission required the establishment of certain rates on lumber from the Willamette valley to San Francisco bay points. The court below sustained the commission's order.

Interstate Commerce Commission v. Union Pacific et al.; Interstate Commerce Commission v. Northern Pacific et al.; Interstate Commerce Commission v. Great Northern et al. These are the three cases referred to under the head of circuit court decisions involving rates on lumber from the Pacific coast to eastern destinations. The circuit court enjoined the orders of the commission, and an appeal has been taken to the Supreme Court of the United States.

Advance summary of operating revenues, operating expenses and taxes for the first quarter of the years ending June 30, 1911 and 1910.

ITEM.	July, Aug., Sept., 1910.		July, Aug., Sept., 1909.	
	Amount.	Average per mile of line. ¹	Amount.	Average per mile of line. ²
Freight revenue	\$494,829,261	\$2,054	\$467,023,955	\$1,968
Passenger revenue	193,295,517	802	184,407,823	777
Other transportation revenue ..	49,945,282	207	46,050,105	194
Non-transportation revenue ..	7,064,142	29	6,218,129	26
Total operating revenues..	\$745,134,204	\$3,093	\$703,700,014	\$2,966
Less total operating expenses ..	489,699,378	2,032	439,244,497	1,851
Rail operations: Net revenue.	\$255,434,826	\$1,060	\$264,455,516	\$1,114
Outside operations: Net revenue	1,432,074	5	1,991,968	8
Total net operating revenue.	\$256,866,900	\$1,066	\$266,447,485	\$1,123
Taxes	26,815,072	111	24,367,510	102
Operating income	\$230,051,828	\$954	\$242,079,975	\$1,020

¹ On basis of average mileage operated, 240,907.95 miles.

² On basis of average mileage operated, 237,190.46 miles.

In the twenty-third annual report of the commission will be found a comparative summary of the operating revenues and operating expenses of commercial railways for the fiscal years 1908 and 1909; in the summary which immediately follows will be found a corresponding summary for the fiscal years 1909 and 1910.

*Summary of operating revenues, operating expenses, and taxes
for the years ending June 30, 1910 and 1909.*

ITEM.	Year ending June 30, '10.		Year ending June 30, '09.	
	Amount.	Average per mile of line.	Amount.	Average per mile of line.
Freight revenue	\$1,935,882,873	\$8,098	\$1,683,484,236	\$7,207
Passenger revenue	631,772,131	2,642	564,718,617	2,417
Other transportation revenue ..	192,702,563	806	173,891,817	744
Non-transportation revenue ..	26,908,568	112	22,599,996	96
Total operating revenue.....	\$2,787,266,136	\$11,659	\$2,444,694,668	\$10,466
Less total operating expenses..	1,847,189,773	7,727	1,616,571,846	6,920
Rail operations: Net revenue ..	\$940,076,363	\$3,932	\$828,122,821	\$3,545
Other operations: Net revenue ..	2,684,892	11	4,404,796	18
Total net operating revenue	\$942,761,256	\$3,943	\$832,527,618	\$3,564
Taxes	104,144,076	435	90,979,696	389
Operating income.....	\$838,617,180	\$3,508	\$741,547,922	\$3,174

¹ On basis of average mileage operated during the year, 239,052.28 miles; mileage operated at end of year, 239,652.05 miles.
² On basis of average mileage operated during the year, 233,563.72 miles; mileage operated at end of year, 233,902.12 miles.

STATISTICS OF EXPRESS COMPANIES.

The amended act of 1906 brought express companies under the jurisdiction of the commission. A system of accounts has been prescribed for express companies and a form of annual and of monthly reports, adjusted to the peculiar needs of this class of carriers, has been worked out. There also has been compiled and published the first statistical report covering the financial conditions and the operations of express companies, made in accordance with the accounting rules promulgated.

The character of the business transacted by the express companies is indicated by the following statement, which shows for the months of April, August and December, 1909, the number of pieces carried, their aggregate weight, the average weight per piece, the total revenue, the average revenue per piece, and the average revenue per pound. The expense incident to the compilation of the information by the express companies deterred the commission from requiring such a compilation for all the months of the year, but the combined results for the months selected may be accepted as typical of the business for the year.

Summary of traffic for April, August, and December, 1909.

Number of pieces.....	71,013,205
Aggregate weight, lbs.....	2,329,342,192
Average weight per piece, lbs.....	32.80
Revenue	\$35,856,551.56
Average revenue per piece, cents.....	50.49
Average revenue per lb.....	1.54

ELECTRIC RAILWAYS.

The administrative difficulty in dealing with this class of carriers arises from the fact that only a limited number of the electric railways of the country are engaged in interstate traffic. It was, however, recognized that whatever policy should be finally adopted to secure comprehensive compilations of the operations of electric lines a uniform system of accounts would be essential for this class of carriers. As a matter of fact, the application of the system of accounts promulgated by the commission, which became effective for interstate electric lines on January 1, 1909, has been extended to a very large number of electric railway companies, regardless of jurisdiction. This was done partly through the adoption by certain of the state railway commissions of the system of accounts promulgated by the commission and partly through the co-operation of American Street & Interurban Railway Accountants' Association. A form of annual report, also, has been issued, and a special section has been organized for handling these reports in the same way as the reports of other carriers are handled. The reports now on hand cover the fiscal years, 1908, 1909 and 1910. They have been examined but not compiled.

PIPE LINES.

Operating accounts for pipe lines have been issued to take effect January 1, 1911, and a form of special report has been issued calling for the usual information from this class of carriers.

WATER-LINE CARRIERS.

Section 1 of the act to regulate commerce defines jurisdiction over water-line carriers as extending to carriers engaged in transportation "partly by railroad and partly by water when both are used under a common control, management or arrangement for a continuous carriage or shipment." The policy adopted has been to deal in the first instance only with such carriers by water as come manifestly within the rule of jurisdiction.

TELEGRAPH AND TELEPHONE COMPANIES.

By the act of June 18, 1910, telegraph and telephone companies doing an interstate business were placed under the jurisdiction of the commission. Steps have already been taken for the formulation of a system of operating accounts for these companies, and it is expected that this system will become effective on July 1, 1911. The administration of the twentieth section of the act to regulate commerce, so far as telegraph companies are concerned, give rise to no very serious difficulty. With regard to telephone companies, however, the situation is somewhat different.

There are from 25,000 to 30,000 telephone companies which make provision for interstate communication, and the commission is in doubt as to whether it was the intent of Congress to place all these companies under its supervision and control. No opinion is expressed at this time as to the administrative interpretation which should be placed upon the law in this regard.

INDUSTRIAL RAILWAYS.

The Bureau of Statistics and Accounts has brought to a conclusion an extended investigation into the operating and financial conditions of industrial railways. An industrial railway may be defined as an incorporated or unincorporated railway controlled by some manufacturing or mining industry, the major portion of whose traffic is furnished by the controlling company. Such a road is distinguished from a commercial road in that it is not primarily for the sale of transportation; it is distinguished from a purely private track or siding in that the operation of its property gives rise to a service to which some definite payment or allowance may be assigned.

Of the 2,410 industrial railways covered by the investigation referred to, it was found that, on June 30, 1909, 202 had suspended operations; 1,395 derived no revenue whatever from operations, that is to say, these were purely transportation agencies to the manufacturing or mining operations concerned; 364 derived revenue from local rates or from contributions by the controlling industries, and 449 derived revenue from division of through rates or allowances by carriers with which they had physical connection or some sort of an understanding. It is this last-named class that is of especial significance to the commission when it is recognized how easily discriminations may be practiced by carriers through the agency of industrial railways which connect them with large shippers.

CHARACTER OF THE SERVICE RENDERED BY THE BUREAU OF STATISTICS AND ACCOUNTS.

It is the duty of the Bureau of Statistics and Accounts, among other things, to maintain a current compilation of all significant facts bearing upon the construction of railways and upon their operating, financial and contractual relations. The bureau thus becomes the repository of a fund of classified information of which the commission or Congress may avail itself as occasion arises. Comprehensive statistical investigations are likely to require months, if not years, for their completion, and in order that the commission may have pertinent information on hand at the time it is needed such information must be kept up to date and in such form as to make it readily available. The extent of this service is only limited by the funds placed at the disposal of the commission.

Another consideration is suggested by the fact that the commission, in rendering an opinion in a given case, can not safely place exclusive reliance upon the information submitted by the

plaintiff and the defendant. Every opinion rendered tends to fix operating conditions. It partakes, to some extent, of the nature of general instructions. Danger always attends the formulation of general principles on the basis of incomplete knowledge of the situation to which those principles pertain, and one of the highest services which the bureau of statistics and accounts can render to the commission is to gather information supplemental to that derived from the examination of witnesses in particular cases, to the end that each particular case may be decided in view of the general situation out of which it springs. During the past year the commission has in several cases deferred arriving at final conclusions until it makes an independent investigation of the alleged facts submitted in evidence and of the commercial conditions to which particular cases pertain. It is the desire of the commission to extend and perfect this branch of the service.

A third service which the bureau of statistics and accounts can render to the commission lies in the determination of normal units or attested averages of which the commission may avail itself when considering the evidence of witnesses in particular cases. The only safeguard which the commission has against misleading evidence based on averages improperly compiled is to have in its possession a fund of information by which these averages may be easily tested.

TRAFFIC STATISTICS.

Statistics of transportation fall under the three general heads—financial statistics, operating statistics and statistics of traffic movement. The first and the second of the above-named classes of statistics are fairly well covered by the reports of the carriers as at present rendered; these reports do not, however, adequately cover the statistics of traffic movement for internal commerce. That such statistics are needed is evidenced by the frequent requests made for statements of traffic movement. The National Waterways Commission has several times asked for information of this sort. The commission undoubtedly has the authority, under the twentieth section of the act to regulate commerce, to call for such reports from interstate carriers as will enable it to determine the amount of traffic between selected points, or indeed to enter upon investigations leading to the publication of a special report on traffic conditions and traffic movements. Such investigations, however, could not be undertaken with the funds now at the disposal of the commission. The matter is brought to the attention of Congress for such action as it may deem wise.

CONTROL OF SECURITIES.

We have set forth in previous reports the reasons which have actuated us in recommending reasonable control of railway capitalization, and without here repeating the same we deem it proper to add that subsequent observation and experience confirm our conviction as to the wisdom and urgent need of proper legislation for this purpose.

The commission's system of accounts has been drawn in full recognition of the possibility that it may be used in the administration of a law which shall give to some federal body supervisory control of capitalization.

The commission still urges valuation of railway property.

WORK OF THE BOARD OF EXAMINERS.

While this board was organized primarily for the purpose of the examination of the accounts of carriers, it in reality now forms the Division of Accounts, and, in addition to field work connected with examinations, has done a great deal of constructive work in the formulation of the classifications of accounts prescribed by the commission for the various classes of carriers. Representatives have examined the accounts of 24 railways with 37,000 miles of line.

(An abstract of the remainder of the report will be printed next week.)

The Central Uruguay Railway has applied to the minister of public works for leave to inaugurate the first section of the line from Nico Perez to Treinta y Tres.

TRANSPORTATION AND TRAFFIC IN ENGLAND.*

BY LOUIS C. MERRIFIELD.

III.

INTERNAL TRAFFIC.

No place in England is farther away than 90 miles from the sea. If a place in the interior be 90 miles from the sea on one side, it is therefore but 90 miles from the sea on the other side. This emphasizes the fact that all transportation must be for short distances, the average haul throughout the kingdom for minerals being probably not more than 30 and for merchandise probably not more than 50 miles. The proximity of nearly every place in England to two or more ports and the desire of the railways serving each port to increase the traffic therefrom, naturally caused rivalry between the different railroads in the interest of the respective ports. This was intense a generation ago, leading to a development which has materially modified the distribution of merchandise in England.

A large incoming vessel naturally brings cargoes of greater quantity than the manufacturers or merchants can conveniently absorb at one time. To accommodate the traders of the interior the railroad companies have erected warehouses and gained control of docks at the ports in which they store for the importers at a nominal charge, and at places often for a considerable time without any charge at all, inbound cargoes, from which shipments are made from time to time to the traders in such quantities as they desire. Similar storage is also made in other docks and warehouses not controlled by the railways. The result has been the practical abolition of the immediate keeping of stocks by the merchants and in large measure the doing away with the reception of raw materials in large quantities by the manufacturers. This development has been furthered by the increasing use of the telegraph and of the telephone. A merchant in the interior, for example, at Birmingham or Leeds, who until so recently as a dozen years ago kept a large or fairly large stock of merchandise at his place of business, now keeps but a small stock, frequently replenishing it by orders made often by telegraph or by telephone. These are forwarded by the railway company overnight, it being possible to reach from any seaport the greater number of towns in England between the close of business on one day and its opening on the next, or perhaps within twenty-four hours at the utmost. This development has forced the railways to the greatest speed in their deliveries and has necessitated their continuing to use small cars, or trucks, as they are called, a trainload of which presents an incomprehensible spectacle to an American who sees them for the first time after having been accustomed to the tremendous cars and great trains of his own country. By actual counting it has been found that of 4,000 or more shipments made from a London freight station in a single night over three-fourths did not exceed three hundredweight each.

This change in the distribution of imported merchandise is paralleled by the change in the distribution of products from the factories. For example, a factory in the interior that once maintained in London a stock of leather goods or a stock of woollen goods or of this or that product, with a staff of bookkeepers and shipping clerks, now has in London but an agent with an outfit of samples from which a customer makes selection. The agent telegraphs the factory at once and the goods are at the customer's place of business in any town in England the next day. This method of distribution has so advanced that with the exception perhaps of coal and bricks large stocks are not kept anywhere in England except at the ports where imports are received, and at places of manufacture. Even at places of manufacture the stocks of finished goods are often not considerable, the manufacturer keeping his production down very close to the level of his orders. He will also manufacture especially even a small order for goods not ordinarily and generally staple. The grain

* From a preliminary report to the National Waterways Commission of the United States.

warehouses of England do not serve as storehouses between one harvest and another, that function being performed by the elevators in the countries of production. Grain for English consumption is ordered from these countries of production all the year round in quantities necessary to keep up the supply in local warehouses.

The railways also maintain warehouses in the interior at their principal stations in which is stored raw material from which the manufacturers obtain supplies as they need them. It is thus with wool and cotton, the bases of the great textile industries. Even of coal, about one-half of the quantity consumed in London, 8,345,094 tons in 1907, comes by rail, being distributed to the 144 coal depots established by the railways throughout the city, to which the local dealers come for their supplies. Of the remainder 8,202,771 tons came by sea, principally from Newcastle, Hull and Goole, and but 24,992 tons by canal.

It naturally follows that this retail system of distribution over short distances, the development of which has been unusually rapid during the last decade, is having an effect upon the industries. It has become a question with many a manufacturer who once found it profitable to operate his plant in the vicinity of the interior coal supply, where he worked up raw material from the large quantities held in stock, whether it were not better for him to remove his plant to the seashore, thus eliminating the transportation charge on his raw material to the interior. This question especially confronts the manufacturers of heavy goods and those which enter largely into the export trade, and some of them have decided it by removing their plants to the coast. Here are now nearly all of the furnaces in which the imported ore is wrought into pig iron, and plants of other kinds are migrating to the water in such number as seriously to disturb the interior towns which they are leaving.

FREIGHT RATES.

The workmen engaged in the plants on the coast and their families are also relieved of the rail charge on their foodstuffs, by far the greater proportion of which now comes by sea. The discrimination which the railroads have made in their tariffs on imported foodstuffs and those of local origin has been a fruitful source of complaint on the part of the English farmers and producers. These claim that it is a manifest outrage that grain from other countries, bacon and eggs from Denmark, fruits and vegetables from France and Holland, should be carried by the railways from the ports to the places of consumption at rates far lower than are charged for similar foodstuffs of English production. The railways retort that the imported foodstuffs come in large quantities and can be carried in truckloads that run through to the markets, whereas the English farmers and dairymen persist in sending small and scattered shipments which have to be picked up from one place after another by the railways, which seldom obtain a full truckload, even after a stop is made at several stations. They also state that the imported foodstuffs are carefully and securely packed, whereas the English producers persist in bringing their shipments either without any packing whatever or in insecure bundles loosely put together. They claim that even the offer of lower rates for traffic, to be shipped under conditions that even approximate those of the imported articles, has been ineffective to bring about marked improvement in these heedless practices.

The high capitalization of the English railway, which averages about \$314,000 a mile—including the high cost of land, the initial parliamentary expenses, the multiple tracks, the great stone stations, the bridges over or tunnels under road crossings, which has increased because of the charges of many improvements to capital account that in the United States would have been paid out of earnings, none of which has even from the beginning been written down because of reorganization or other reasons, but which was increased by the issue of ordinary or "nominal" shares, a few years ago manifestly compels the charging of high rates. Another factor is the short average haul, the terminal expenses being as great for short haul as for long haul

traffic, and the cartage on high class traffic adds to the expense of service. It would seem that the charges on this short traffic—that which moves twenty or twenty-five miles or even in some cases for somewhat greater distances—are less than those for similar distances in the United States, especially if comparison be made with the rates of the express companies, who carry much of that which corresponds to the short distance rail traffic of England. For greater distances the rates per ton per mile of the English railways are probably something like three times those of the United States, where the essential traffic is in great quantities carried for long distances at exceedingly low rates per ton per mile. Even bituminous coal pays a rate of about one cent per ton per mile in the channels of greatest movement. When comparison is made with higher class articles, the difference is markedly in favor of the United States. A shipment of malleable iron castings from Springfield, Ohio, to Bradford paid a higher transportation charge from Liverpool to Bradford than from Springfield to Liverpool. A shipment of household furniture paid a transportation charge of \$35.35 for the 202 miles from Liverpool to London, while it had paid but \$57.50 for the 815 miles from Indianapolis to New York. The average receipts per ton per mile of the principal railway in England for 1900 have been estimated as from general merchandise four cents, from livestock seven cents, from minerals one and four-tenths cents. A comparison by the same authority of the traffic of this principal English railway and one of the foremost American railways for the year 1900 shows that the average receipt per ton per mile by the American railroad was fifty-four one-hundredths of a cent, while by the English railroad it amounted to over two and one-third cents.

It is estimated by Mr. Acworth that the charge for rail transportation in England on the commerce of that country is not more than one-half the transportation charge by rail on the corresponding commerce of the United States. It must be borne in mind, however, that a large part of English consumption is of imported articles and that on these articles the consumer pays not only the English rail freight, but the water freight and the rail freight in the country of production. In the United States by far the greater consumption is of domestic origin, which is moved principally by rail, the rail freight in the United States being the only transportation charge which it has to bear, and the average haul is three times greater than in England.

The report of the Board of Trade shows that in 1908 were 15,861 miles of steam railways in England and Wales whose total gross receipts during that year were \$499,624,470. The total freight carried amounted to 416,488,885 tons, of which 330,894,917 were of minerals and 85,543,968 of general merchandise. Neither ton mile nor passenger mile statistics are available. Their total capital was \$4,981,220,000, an average of over \$314,000 per mile. The return on this capital averages but 3.5 per cent. This return would average about 3.9 per cent. if the "nominal" shares issued a few years ago were excluded. This means that the average return to capital per mile is \$11,000, an amount greater than the gross earnings per mile of many an American railway.

PASSENGER TRAFFIC.

A comparison of the passenger traffic of the principal English railway and a leading American railway for 1900 shows the average receipt per passenger per mile on the American line to have been 1.98 cents and on the English line 1.74 cents. Another English railway of large passenger traffic reports 1.1 cents as its average receipt per passenger per mile. The English railway, with 35 per cent. less miles of line, carried 49 per cent. more passengers, its density of passenger traffic therefore being 128 per cent. greater than that of the American railway. In the average rate per mile are of course included the third class passengers—to which there is no corresponding class in the United States—who in 1908 constituted 95 per cent. of the whole and from whom on all the railways was derived 74.9 per cent. of the entire pas-

senger revenue, and the season passengers from whom was obtained 10.9 per cent of the passenger revenue.

CONCLUSIONS.

In recent years there has been much discussion in England as to the industrial and commercial prestige of that country, which many think is not being fully maintained. An English writer puts the situation as follows:

"No one can ignore the fact that the nation has arrived at a crisis in its existence. We have to face the fact that great competitors have arisen, with whom we shall, in the future, have to share trade which until the last few years was ours alone. No one who has watched the growth of the cotton manufacturing history in the United States, on the Continent, in India, and in Japan, can for one moment doubt that we shall never again supply the large proportion of the population of the world with cotton cloth as hitherto, and that we shall have to work hard to retain our fair proportion of the world's cotton trade. Those who mark the development of the iron and steel industries of the United States, of Germany, and of Belgium, cannot hide from themselves the unpleasant fact that we shall have great difficulties in maintaining our position in the iron trade. Those able to appreciate the wonderful progress of the United States in the production of machinery of all descriptions are certainly justified in their anxiety lest the engineering industry of the country has been eclipsed. The tinplate trade, of which at one time we had a monopoly, has already received a blow from the extension of the industry in the United States. Those in touch with our woollen and worsted trade are certainly uneasy lest France and the United States should take the position we formerly held, if they have not already done so. In the boot and shoe trade we are now apparently outdistanced by the Americans and the French. Our chemical trade has had a most uncomfortable experience in recent years, both from the growth of the industry in the States and in Germany. So far as the production of cereals and of farm produce is concerned, we have long been outdistanced by the enterprise, the scientific methods, and the soil of other countries."

This view is now, however, universally accepted, there being men of affairs who claim that England's industry and commerce on the whole have increased, although the percentage of increase is not so large as that of some other countries that practically had not entered the field until England had substantially attained her full growth.

It cannot be doubted that whatever change may have taken place is largely due to economic causes over which England has no control, nor can it be doubted that it is in part due to international conditions over which England can exert a measure of control. In the middle of the nineteenth century, when the industrial and commercial supremacy of the country was at its zenith, England had profited by long years of immunity from war within her immediate confines. The sturdiness and intelligence of the main population and the variety of the natural resources led to the attainment of great industrial advance while Europe was torn and weakened with conflict, and the United States was yet at the beginning of manufacturing. In two generations the nations of the continent have become more clearly outlined, and although heavily burdened with militarism, have not for nearly forty years known the ravages of actual war. This had led to a growth of industry which naturally has entered into competition with that of England. It is needless to recount the progress made in two generations by the United States, which has aggressively entered the markets of other countries. This development of the industries of other lands has worked to the disadvantage of English manufacture in more ways than one. Not very long ago her artisans wrought practically all of the wooden work used in her buildings from lumber brought from other lands. Now her contractors find it less expensive to import doors, sashes and blinds which are made into these finished forms in the countries where the logs are cut. Until very recently a prominent builder kept a force of boys at work making

some of the smaller and simpler things at hand used in every household. But one day a shipment of these things made in another land arrived at an English port and were offered to the builder at a lower price, freight included, than they cost when made in his own shop. He bought the cargo and discharged the boys. This is but one example in one line of industry. It could be multiplied.

It would be ungracious for a citizen of another country, even so closely allied as is the United States, to point out the maladjustments in the internal affairs of England, were they also not known of all men. The aristocratic and landed interest may not be so much of a burden as in previous generations, but the military establishment weighs more heavily; the shortsightedness of trade unions has forced up wages and levelled down the artisan's output; the clinging of business men to oldtime methods, comfortable and satisfying as they are to those who can afford to pay good prices for good things, has enabled their more adaptable competitors of other nations to cater to the wants of the masses of people of various lands. In the United States the best brains and energy have gone into the fields of transportation and industry and the courses of the universities and colleges have been modified in order to qualify for entering upon such careers. In England the tradition that young men attending the universities should receive the education that was originally intended to train candidates for the clergy has continued with little diminution until within recent years and the graduates still flock to public life and the professions. An offset to this which is just beginning to be felt is the scientific and industrial training given by the universities at Birmingham and other places in the interior.

In the survey of those factors of English life which enter into industry and commerce and which need a better adaptation of means to end, if that industry and commerce shall continue to buttress England's claim to a foremost rank among the nations, there is no need for wonder that her interior transportation agencies have met with critical consideration.

To the casual observer, familiar with American methods, it would seem that distribution by rail in trucks of eight and ten tons must necessarily be lacking in economy, especially when very many trains are run each composed of cars below the drawing power of the engine. It is easy to understand that the small area of the country, its excess of imports and its long coastline should have made it an easy matter for the railways and the merchants to fall into this retail system of distribution, but that it conduces to economy of manufacture would seem open to question, as well as that the system has been carried too far in certain lines of commercial distribution for the best interests of the country.

These doubts do not need to rest as impressions of a casual observer, for they have been expressed by George Paish, one of the editors of the *Statist*, who for many years has given close attention to the minutiae of railway management both in England and in the United States. In a book entitled "The British Railway Position," published by the *Statist* in 1902, and consisting in the main of articles published in that paper during that and the previous year, Mr. Paish draws a comparison between the methods of conducting transportation on the American and the English railways that is distinctly unfavorable to the latter. The comparisons of England and American passenger and freight receipts used in the preceding pages have been taken from this book as well as the quoted passage in regard to the impairment of England's progress in industry.

While making full allowance for the different conditions under which the traffic of the two countries is moved, Mr. Paish argues that the English railway managers have been wasteful in their methods. From such published data as were available he makes the following deductions: The passenger mileage of the foremost railway of England increased 73 per cent. from 1880 to 1900, and the increase in train mileage was nearly 60 per cent. There was an increase of but four passengers per train notwithstanding the tremendous increase in the total passenger traffic. The increase

in the total ton mileage for the twenty years was 29.8 per cent., while the increase in the freight train mileage was 24.1 per cent., the average train load increasing but three tons in the twenty years, while the rate per ton per mile fell off one-five-hundredth of a cent. This increase in mileage means that the cost of moving a ton of goods on the principal English railway increased 24 per cent. in twenty years, while on a leading American railway it was reduced 33 per cent. On the American railway the net earnings per ton per mile decreased 52.9 per cent., while on the English railway they decreased but 20.9 per cent. Yet the receipts per freight train mile of the American railway in 1900 were \$2.60, while those of the English railway were but \$1.62, and this notwithstanding that the average freight rate of the English railway was nearly four and a half times greater than that of the American. The American railway reduced its cost of carrying a passenger by 13 per cent., while the English railway increased its cost by 11½ per cent. The receipts per passenger train mile were \$1.31, while those of the English railway were \$1.08. On the cost of carrying a passenger one mile in 1880 the English railway had an advantage of 42.7 per cent., but in 1900 the difference in its favor was only 26.7 per cent., notwithstanding that the density of its traffic was 128.1 per cent. greater.

These figures in the case of the English railway, it must be remembered, are not the definite outcome of exact statistics, but deductions from available data and they are not without challenge by English railway authorities. Inasmuch as the showing of no other English railway would be as favorable as that of its foremost line, these deductions if correct incontestably prove that the criticism of English operating methods as wasteful has large foundation. The remedy evidently is to increase the load per train, whether of passenger or freight. In the way of this achievement are many difficulties. The railways own but about 55 per cent. of the total number of freight cars and it will not be easy to induce private owners to substitute larger cars for those which they can control. The use of larger cars will necessitate the enlargement of scales, turntables, loading and unloading appliances and other structures that have been built in adaptation to the smaller cars. It will undoubtedly, however, be to the advantage of the manufacturers and the traders to assist the railways in moving larger train loads. In this way can be attained the economy of operation which will make possible that reduction in rates which will contribute to a diminution in the cost of production which would seem to be the *sine qua non* of English industrial existence.

That the English railways have been very defective in preparing statistics of operation necessary for the information of the managers in guiding their operations has been called to attention throughout many years. It would seem, however, that in this respect the railways may be at the beginning of a new era if they accept and take action along the lines of a very complete report embodying the forms desirable for the provision of necessary data for future information which has just been made by a committee on statistics composed of representatives of both the railways and the Board of Trade.

It should also be said that in recent years many of the railways have proceeded vigorously toward increasing their train load and the attainment of economy of operation in other directions. As a result the average receipts per freight train mile have increased year by year for each of the last ten years. Many cars of fifteen and twenty tons and some of thirty tons capacity have been placed in service. The railway managers say that except for the carriage of coal, brick, stone and similar material it is not economical to use a car of more than fifteen tons capacity. This is because large shipments of merchandise are seldom offered from one place of consignment to one place of destination, that the demand for speedy transportation forbids the holding of cars and trains for full loads of such general merchandise, and that moreover as trains move with trucks consigned to a number of different stations it is more economical to load a truck

light for a particular station that it may be quickly detached from the train at that station than it would be to put the consignments for two or more stations in the same truck and hold the entire train at the various stations for the unloading of the particular consignments destined to each. It will be perceived that these considerations have their root in the existent system of commercial distribution, the traders preferring to pay the present high rates for the quick movement of small shipments than to obtain larger quantities, which would necessitate the use of larger capital and the increase of their storage facilities. Another difficulty of the railways in the way of increasing their train loads and decreasing speed is the growing competition in carrying small freight of the electric lines and motor car lines.

Dissatisfaction with the industrial and commercial condition has led in England to a revival of interest in the interior waterways, to a belief expressed by many that were the canals and navigations improved England's handicap in the markets of the world would be diminished.

In 1906 was appointed the Royal Commission on Canals and Waterways, composed of a number of able men, with Lord Shuttleworth as chairman. This commission at once set about a thorough and comprehensive study of the waterways, not only of England and Wales, Scotland and Ireland, but of the Continent. Their reports published at this writing, containing the evidence of two hundred and sixty witnesses, statistics as to the length, capacity, traffic and earnings of the waterways of the United Kingdom, with a number of maps and the reports of the assistant commissioner who conducted the investigation of the waterways of Belgium, France and Germany, are comprised in six large volumes, aggregating nearly 3,000 pages.

They set forth that in England and Wales are 4,053 miles of canals and navigations. Of these 965 miles belong to railways, 219 miles are controlled by railways, while 2,869 miles are independent. The traffic returns show that during 1905 the railway owned and controlled canals carried 12,645,030 tons, and the independent canals exclusive of the Manchester Ship Canal 19,695,234 tons, the independent canals having gained a half million tons and the railway canals having lost two million tons since 1898. The average haul as far as calculable was about 17.5 miles, and upon the waterways for which exact figures were obtainable coal constituted 45 per cent of the tonnage. The gross revenue of the railway canals was \$3,217,615, the net, revenue \$641,525; the gross revenue of the independent canals was \$7,934,480, the net revenue \$1,682,125. The capital expended on the English canals and navigations is reported as \$150,000,000, an average of \$37,000 per mile.

Of the 32,340,264 tons carried by the interior waterways of England and Wales during 1905, 21,042,049 tons were carried on ten waterways comprising 984 of the total 4,053 miles, and the larger part of this tonnage was carried over a relatively small portion of these waterways. About 1,400,000 tons were borne by the Thames Navigation and 1,000,000 tons by the Regents Canal, both of which are engaged in the immediate service of the City of London, but neither of which can be considered as profitable, the working expenditure of the Thames Navigation for 1905 having exceeded the revenue by over \$30,000, while the revenue of the Regents Canal & Dock Company, which sustains a capital of nearly \$9,000,000, exceeded the working expenditure by but \$315,000, over one-third of the revenue being derived from the docks. The Grand Junction Canal, which sustains a capital of over \$10,000,000, carried 1,800,000 tons, yielding an excess of revenue over working expenditures of about \$305,000. The Leeds and Liverpool Canal, which sustains a capital of almost \$9,000,000, carried nearly 2,500,000 tons, yielding an excess of revenue over working expenditure of about \$190,000. The Aire & Calder Navigation, which sustains a capital of a little over \$15,000,000, carried 2,800,000 tons, which yielded an excess of revenue above working expenditure of over \$500,000. The Weaver Navigation, with a capital of over \$6,700,000, carried over 1,000,000 tons, yielding an excess of revenue above working expenditure of about

\$11,000. The Birmingham Canal, to which the London & North-western Railway makes an annual appropriation under the terms of its guarantee, carried over 7,300,000 tons. The canal is practically the same in extent as at the beginning of the railway era and for the most part equipped as then with small boats towed by horses. The traffic of many of them has so fallen off that they are cumbered by debris, grown with weeds, and in various stages of decay.

Of the most profitable of the navigations is the independent Aire & Calder with main line extending about 20 miles from Leeds through prolific coal fields to Goole on the Humber, which is improved from that point to where the river becomes an estuary of the North Sea. This navigation carries coal in large quantities to Goole, where it is loaded in vessels that take it to different ports of England as well as to other countries. This coal is loaded at the mines in receptacles termed compartments, which are hauled to the mine mouths on trolleys, and thence likewise, when filled, to the navigation, where they float off the trolley into the water. Then they are hauled into line, a number, sometimes as many as thirty, forming practically one barge, which is drawn by a tug to Goole, no unloading and reloading being necessary between the mine mouth and that port. This arrangement is here practicable because of the easy approach from the mine to the navigation, the very gradual slope of the navigation to the not far distant port, the plentiful supply of water, and the few locks, the hauling of large quantities at one time therefore being practicable. Even with these great natural advantages in favor of the waterway, the railways carry just about as much coal as the canal from the mines to Goole, and the railways carry all of the coal from these mines that goes to the farther port of Hull. The navigation and the railway also compete for grain and other commodities, that move from the seaport towards Leeds, under a rate adjustment which allows the canal a slight advantage and is generally supposed to be agreed upon between the railway and the canal.

The returns contained in the preceding paragraphs do not include the Manchester Ship Canal. This was built to enhance the prosperity of Manchester, which her citizens believed to be waning. The capital subscriptions came mainly from them, even humble wage earners, carried away by the furore attending the launching of the project, investing their small savings. The canal has never paid a dividend, but has brought industries to its banks, business to Manchester and greatly enhanced the value of land in its vicinity.

The witnesses who gave evidence before the commission expressed widely different opinions. The proprietors of and the carriers over the independent canals are practically a unit in favor of their resuscitation, urging that the railway canals be taken from under the railway ownership and control, which they claim has strangled their traffic. The general proposition seems to be that the unification of the interior waterway system should be brought about by the government, that it should furnish the requisite capital and perform the necessary work. A few of the witnesses, however, were of the opinion that separate trusts should be formed for the administration of the canals of each district. There was no one to venture the opinion that the required capital could be obtained by private subscription and but few thought that municipal or other local governments would make any considerable subscription.

The managers of the railways were a unit in saying that the interior waterways could never be made profitable in competition with the railways; that such canals as the railways controlled had not been sought by them, but had been forced upon them by the canal proprietors at the time their charters were obtained; that in accordance with the provisions of their taking over they had been maintained in good condition; that instead of strangling their traffic the railways would be only too glad to have them carry enough traffic to make them remunerative instead of being compelled to operate them mainly at a loss; that furthermore the railways would be very glad to be relieved of the canals and

the attendant burdens and would welcome any reasonable proposition to that end.

But few of the witnesses were of the opinion that even a resuscitated waterway system would be of any particular benefit to agriculture, the farmers desiring more speedy transportation; and that moreover they would not be able to furnish traffic in sufficient quantities to give the barges adequate loads. It was also generally stated that a waterway system would be of little use in the distribution of the merchandise which is so rapidly conveyed by the railways.

It was generally agreed, even by those who favored the unification of the interior waterway system, that it could not be made profitable except by the use of barges with a capacity far greater than those at present in use, which do not carry on the average more than 25 or 50, or with exceptions on one or two waterways, not more than 100 tons; and that therefore the canals and navigations would have to be made uniform, which in most cases would mean a considerably increased depth, and that locks and other structures would have to be reconstructed to permit the passage of larger boats, which as a rule would have to be propelled by steam instead of by horsepower as at present. In opposition to this it was pointed out that large barges would not be profitable unless they were fully loaded and that the waiting for a full load would usually entail a loss of time that would handicap them in competition with the railway. It was pointed out that even were it attempted to improve the Grand Junction Canal in order that it might supply London with a large proportion of its coal, this coal would still have to be conveyed by rail from the mine mouths, which are at greatly differing levels, to the canal and that it would need to be redistributed from the canal to the coal depots in London, whereas the railways now carry coal directly from the mine mouths to the depots. This lack of susceptibility to the ramifications necessary to reach numerous and widely distributed places of destination is advanced as one of the principal arguments against any attempt at the extended improvement of the canals. It is also pointed out that in any event navigation would be very slow because of the numerous locks, which on many of the canals average more than one to a mile; that while it is difficult at present to keep the canals that traverse the watersheds adequately supplied with water, this difficulty would be greatly enhanced were the required quantity of water radically increased, and that the impairment of operation due to frost in the winter and drought in the summer would not be overcome.

Those favoring the resuscitation of the waterways admit that a great number of the canals are not worth improving, that any possible traffic that might come to them would not justify the expenditure. Plans were presented for a through system of waterways between London, Birmingham and Liverpool, Bristol, Birmingham and Hull. These plans differ in the provisions as to depth and width of the channels and locks and capacity of the boats that are to be transported. The estimates have been variously attacked and the conclusions challenged.

Those opposed to the resuscitation of the waterways contend that if the scheme were practicable, private subscriptions could readily be obtained to any necessary amount, and that it would be unfair for the government to appropriate money derived from the taxpayers as a whole for a purpose that would benefit but parts and not all of the country. It is furthermore contended that it is manifestly unjust for the government, which has chartered railways that have been constructed and are maintained by private capital, to invest public funds in channels that would enter into competition with the railways, that this policy would be confiscation, with the inevitable result that the government would be obliged to take over the railways themselves.

The Argentine Executive has approved the contract entered into with Messrs Domingo Salva & Co. for the construction of a railway line from Rosario to Mendoza and a port in San Lorenzo.

General News Section.

At Los Angeles, Cal., December 26, A. Hoxsey, in a Wright biplane rose to a height of 11,474 ft. He found the atmosphere very cold.

On the evening of December 22, about 7 o'clock, an express train of the Southern Pacific was robbed in the heart of the city of El Paso, Texas. The robber had boarded the observation car at the station, and he compelled the porter to walk ahead of him through the car. After getting about \$100, he commanded a brakeman to stop the train, and he got off and escaped.

A lone robber went through Missouri Pacific train 112 between Leavenworth and Kansas City on Christmas day, and at the point of a revolver held up the passengers, getting several watches and a good deal of money. He shot Captain H. L. Newbold, of the United States Army, because the latter did not put up his hands quickly enough, and knocked down one of the passengers who got up from his seat as if to resist him.

There is a wide discrepancy between the figures of the Texas Railroad Commission and H. G. Askew, statistician for the Texas lines, regarding the results of operation in the last fiscal year. The commission estimates the net income of the roads for the year at 6 per cent. Mr. Askew figures that the total sum available for betterments, additions and dividends in the fiscal year 1910 was but 39/100 of 1 per cent. on this value for taxation.

It is reported in Austin, Texas, that the law which was passed by the last legislature, directed specially against the International & Great Northern, is likely to be repealed. The effect of this law was to require the payment of all unsecured claims that were created during the receivership. Senator Hudspeth, of El Paso, proposes to introduce a bill for the repeal of the law. It is claimed that this piece of legislation has greatly retarded railway construction in Texas. The demand for repeal comes chiefly from the people of the Western and Southern portions of the State. It is understood that Governor-elect O. B. Colquitt is in favor of the proposed repealing measure.

Interesting Collection of Old Railway Passes.

The *Railway Age Gazette* has received a letter from B. S. Young, a son of Joseph A. Young, and a grandson of Brigham Young, formerly president of the Mormon church, offering for sale a very interesting collection of 58 railway passes, issued in 1871, to his father, Joseph A. Young, then president and general superintendent of the Utah Central Railway, now a part of the Oregon Short Line.

The passes, which were for transportation over railways in all parts of the United States, were signed by and bear the autographs of many railway officers then occupying operating positions, who subsequently rose to the highest offices. For instance, the pass from the Pennsylvania Railroad was signed by A. J. Cassatt, general superintendent; that from the Peoria & Rock Island by R. R. Cable, superintendent; that from the Burlington & Missouri River by C. E. Perkins, general superintendent; that from the Illinois Central and Leased Lines by Marvin Hughitt, general superintendent; that from the Chicago, Rock Island & Pacific by Hugh Riddle, general superintendent; that from the Hannibal & St. Joseph by George H. Nettleton, general superintendent; that from the Chicago & Southwestern by James N. Burnes, president. Mr. Burnes' name is not so familiar to railway men as the other names mentioned, all of which are those of men who subsequently became presidents of great railways. Mr. Burnes, however, subsequently became a very wealthy man at St. Joseph, Mo., and represented his district in Congress for many years, during which he attained great political prominence. A complete list of the passes with the names of the men who signed them is as follows:

Pennsylvania Railway, No. 1311. Signed by A. J. Cassatt, general superintendent.

Wilmington & Reading Railroad, No. 651. Signed by Hugh E. Steele, president.

Denver, Pacific Railway, No. 377. Signed by C. W. Fisher, superintendent.

Peoria, Pekin & Jacksonville Railway Company, No. (None). Ed. Hudson, superintendent.

Chicago & Illinois Southern Railroad, No. 28. J. B. Ayer, general superintendent.

Burlington, Cedar Rapids & Minnesota Railway, No. 702. Geo. Green, president.

Union Pacific Railroad, No. 326. T. E. Sickels, chief engineer and superintendent.

Kansas City, St. Joseph & Council Bluffs Railroad, No. 1279. A. S. Hopkins, general superintendent.

Boston & Providence Railroad, No. 412. A. A. Folsom, superintendent.

Kentucky Central Railroad. George H. Pendleton, president. Peoria & Rock Island Railway, No. 584. R. R. Cable, superintendent.

Galveston, Houston & Henderson Railroad, No. 775. Robert Colwell, manager.

Worcester & Nashua Railroad. C. S. Turner, superintendent. Toledo, Peoria & Warsaw Railway, No. 1306. W. H. Cruger, vice-president and general superintendent.

Burlington & Missouri River Railway, No. 11. C. E. Perkins, general superintendent. Illinois Central Railroad and Leased Lines, No. 6. M. Hughitt, general superintendent.

Hastings & Dakota Railway. W. G. Le Duo, vice-president. Sheboygan & Fond du Lac Railroad, No. 446. T. F. Stone, superintendent.

Chicago, Rock Island & Pacific Railroad, No. 969. Hugh Riddle, general superintendent.

Middleburgh & Schoharie Railroad. P. S. Danforth, superintendent.

Omaha & Southwestern Railroad. I. F. Young, assistant superintendent.

Alton & St. Louis Packet Company, No. 156. Richard Holmes, secretary.

Brunswick & Albany Railroad Co., No. 303. (?), president. St. Louis, Belleville & Southern Omaha Railway, No. 8. W. G. Broughton, general superintendent.

Midland Pacific Railway, Neb., No. 335. J. N. Converse, general superintendent.

Little Rock & Fort Smith Railroad, No. 653. D. W. C. Brown, general superintendent.

Michigan Central Railroad, No. 2. H. E. Sanger, general superintendent.

Peninsular Railway, No. 382. L. D. Dibble, president.

Lake Shore & Michigan Southern Railway. G. H. Devereaux, general manager.

Boston & Maine Railroad. W. Mendes, superintendent.

Great Western Railway of Canada. W. H. Nevins, (?) superintendent.

Union Pacific Transfer Co., No. 282. H. C. Nutt, superintendent.

Chicago, Burlington & Quincy Railroad, No. 1146. Robert Harris, general superintendent.

St. Paul & Sioux City Railway, No. 1382. E. F. Drake, president.

Kansas City Packet Company Steamers, No. 592. E. W. Gould, president.

Baltimore & Ohio Railway. John Alma, Jr., vice-president. Burlington & Missouri River Railroad in Neb. Thos. Doane, chief engineer and superintendent.

Chicago & Northwestern Railway, No. 0643. Jno. C. Gault, general superintendent.

Pittsburgh, Fort Wayne & Chicago Railway, No. 711. J. W. McCullough, general manager.

Florida Railroad, No. 743. W. N. Hood, general superintendent.

Colorado Central Railway, No. 140. J. B. Shepherd, superintendent.

N. Y. & Oswego Midland Railroad Company, No. 713. W. P. McKinley, superintendent.

Atlanta & West Point Railroad, No. 1182. L. P. Grant, superintendent.

Camden & Amboy Railroad. Wm. H. Gatzman, president.

Rutland, Vermont Valley & Montreal & Plattsburgh Rail-

road: and Burlington Steamboat Company, No. —. Geo. A. Merrill, general superintendent.

Allegheny Valley Railroad. J. J. Lawrence, general superintendent.

Omaha & Northwestern Railroad, No. 110. J. E. Boyd, president.

Mineral Point Railroad, No. 614. Geo. N. Cobb, superintendent.

Kansas Pacific Railway, No. 1240. A. Anderson, general superintendent.

Hannibal & St. Joseph Railroad Line, No. 1930. Geo. H. Nettleton, general superintendent.

Chicago & Southwestern Railway, No. 423. James N. Burnes, president.

Passenger Transfer Company. Geo. W. Homan, Jr.

St. Louis & Omaha Packet Company. D. H. Silver, president. N. Y., Providence & Boston Railroad Company. A. S. Mathews, superintendent.

Philadelphia & Baltimore Central Railroad, No. 984. J. F. Wood, president and superintendent.

Sioux City & Pacific Railroad. W. W. Walker, superintendent.

Memphis & St. Louis Packet Company, No. 387. John A. Scudder, president.

Pithole Valley Railway, No. 467. J. T. Blair, superintendent. Mr. Young's address is 163 Central street, Salt Lake City, Utah, and he would like to sell the entire collection of passes.

Western Locomotive Engineers' Pay Increase.

The controversy concerning wages between the locomotive engineers and the managers of 61 railways covering a territory west of a line drawn from Ft. William, Ont., to New Orleans, La., which has been pending at Chicago since September 26, was ended by an agreement reached on December 24 through mediation under the Erdman act by United States Commissioner of Labor Neill. The engineers were granted increases amounting in the aggregate to 10.1 per cent., effective on the date mentioned. This will amount to about \$4,000,000 a year.

The engineers on November 7 declined an offer made by the committee of railway managers, of which W. B. Scott was chairman, of increases amounting approximately to 9.5 per cent. This offer would have been increased to 10 per cent. if certain rules demanded by the employees, which would have been burdensome to the railways, had been eliminated from the employees' proposition. These rules, except the one concerning motor cars, having finally been withdrawn, it would appear that the men gained little or nothing by the alleged strike vote, which was taken, apparently, with the idea that if threatened with a strike the railway managers would accede to the demands made on them. On the contrary, feeling that they had met the situation in a fair and reasonable way, and that increases beyond those offered were not warranted, the managers refused to go further except to enlist the good offices of Messrs. Knapp and Neill, which was done on December 15.

Dr. Neill reached Chicago December 17, and held many conferences with both sides, covering a period of eight days, during which each made concessions. As has heretofore been noted in the *Railway Age Gazette*, the three principal points in the controversy related to wages for operating Mallet engines, pay for preparatory time and extension of the "jurisdiction" of the Brotherhood of Locomotive Engineers over motor cars. The employees also asked larger general advances in pay than those offered by the railways. With regard to wages on Mallet engines, the proposition made by the railways on November 7 provided for a differential of 75 cents a day for runners of Mallet engines. In the settlement finally reached Mallets weighing 275,000 lbs. or less on drivers will have a differential of 75 cents a day, and those above 275,000 lbs. \$1 a day. The demand of the men for payment for preparatory time was withdrawn. The motor car rule asked by the employees was agreed to. The agreement is discussed editorially elsewhere in this issue. The following is the memorandum of agreement:

CHICAGO AGREEMENT WITH ENGINEMEN.

Following is the substance of the wages agreement reached at Chicago, December 24, after long negotiations, between the general managers' committee and the officers of the Brotherhood of Locomotive Engineers. The general managers' committee

represented 61 roads, nearly all of the lines west of Chicago, though we do not see in the list the Chicago & Rock Island, the Western Pacific.

ARTICLE I.

Request.—Request a 10 per cent. increase in rates on passenger, freight and freight service.

(Except simple engines with cylinders 24 in. or over in diameter, compound engines, weighing 200,000 lbs. or over on drivers, and Mallet type.)

On simple engines having cylinders 24 in. or over in diameter and compound engines (except Mallet type engines) weighing 200,000 lbs. or more on drivers, the rate in all classes of service shall be \$6.50 per 100 miles or less, 10 hours or less; overtime pro rata.

On Mallet type the rate in all classes of service shall be double the maximum rate of the heaviest power having cylinders less than 24 in. in diameter, and on compound engines weighing less than 200,000 lbs. on drivers.

On local and way freight service the rate shall be 50 cents per 100 miles or less, 10 hours or less, in addition to the rates provided for in this article.

Freight rate provided for in this article shall apply to pusher, helper, work train, wreck, snow plow, transfer and mixed train service.

Agreement.—(a) For engineers in passenger service an increase of 40 cents per 100 miles or less, and for engineers in suburban passenger service an increase of 40 cents per day; no change to be made in present basis of paying for a day's work.

(b) For engineers in freight service an increase of 40 cents per 100 miles or less, 10 hours or less. (Except on engines weighing 215,000 lbs. and over on drivers, and on engines of the Mallet type.)

(c) For engineers in through freight or passenger service on engines (other than Mallet type) weighing 215,000 lbs. and over on drivers a differential of 25 cents per day higher than the next highest rate in the same class of service on each particular road.

(d) For engineers in all classes of service on Mallet type engines weighing 275,000 lbs. or less on drivers a differential of 75 cents per day higher than the highest rate paid on other classes of engines weighing less than 215,000 lbs. on drivers; and for engineers on Mallet type engines weighing over 275,000 lbs. on drivers a differential of \$1 per day over the highest rate paid on other types of engines weighing less than 215,000 lbs. on drivers in the same class of service on each particular road.

(e) For engineers in local or way freight service a differential of 25 cents per day over rates paid on same class of engines in through freight service. This not to apply on roads paying engineers on basis of 12½ miles per hour. Where a greater differential now prevails, same shall be maintained.

(f) For engineers in pusher, helper, wreck, work train, snow plow and mixed train service an increase of 40 cents per day, and differentials named above for engineers on engines weighing 215,000 lbs. and over on drivers, and on engines of Mallet type.

ARTICLE II.—REVENUE MOTOR CAR SERVICE.

Request.—Request that the minimum rate for motor car service be the minimum passenger rate on all roads where such power is used, and that schedule rules and regulations governing steam service will apply.

Agreement.—Whenever a sufficient number of engineers on any seniority division have qualified for motor car service, the engineers on that division will be given the right to operate same, and seniority will be interchangeable with steam. The superintendent or master mechanic to be the judge of when a sufficient number of men have qualified. Present rates of pay for engineers in motor car service to be increased 40 cents per day. Except as modified by this article present rules and working conditions governing this service to continue. Engineers making application for motor car service and those qualifying as motormen will retain their rights in the steam service, with the understanding that having accepted motor car service they will remain in such service until they can be relieved by engineers qualified for such service.

ARTICLE III.

Request.—Request that the rate in switching service shall be \$5 per day, 10 hours or less to constitute a day, overtime pro rata. Time to be computed continuously and that 30 minutes

be given for meal between the hours of 11:30 and 1 o'clock a. m. and p. m.

Agreement.—For engineers in switching and transfer service an increase of 50 cents per day, except that where transfer service now carries road rates, an increase of 40 cents per day will apply. No change to be made in the present rules or hours of service. These increases not to apply where pay has been increased since May 1, 1910.

ARTICLE IV.

Request.—That engineers be paid 30 minutes at schedule rate as per class of engine for preparing all engines before leaving engine terminals; this in addition to mileage of run or hours in service, and that all time be paid for after arrival at the terminal until relieved from duty at designated place.

Agreement.—Withdrawn.

ARTICLE V.

Request.—That overtime in passenger service be computed on the basis of 20 miles per hour, except on roads where a higher basis prevails under the various schedules, and that engineers in freight service on roads having a basis of 12½ miles per hour will be paid overtime pro rata; that all overtime be computed on the minute basis and paid for pro rata.

Agreement.—Withdrawn.

ARTICLE VI.

Request.—That main line rates apply on all branches.

Agreement.—For engineers in branch line service an increase of 40 cents per day. No change to be made in the present rules of classification.

ARTICLE VII.

Request.—Fifteen per cent. increase in hostlers' pay on roads where the B. of L. E. negotiate such rates.

Agreement.—For hostlers on roads where the B. of L. E. negotiate such rates an increase of twenty-five (25) cents per day. This increase not to apply where pay has been increased since May 1, 1910.

ARTICLE VIII.

Request.—That we endeavor to decide with the management what constitutes a local or way freight train.

Agreement.—Withdrawn without prejudice on the ground that it is a matter to be adjusted with the individual roads.

ARTICLE IX.

Request.—That the smoke question be taken up with the general managers and that they define what the engineers' duties are to avoid the emitting of black smoke, and that the engineers be relieved from responsibility after having complied with instructions.

Agreement.—Withdrawn.

ARTICLE X.

Request.—It is understood that where any road has better rates of pay or conditions they shall not be reduced by the rates or rules hereby agreed upon, nor shall general committee of adjustment be debarred from taking up with their respective managements matters not agreed upon at this conference.

Agreement.—It is understood that existing rates of pay or better working conditions shall not be reduced by the rates or rules hereby agreed upon, nor shall general committees of adjustment be debarred from taking up with their respective managements matters not decided at this conference.

Railway Development in Asia.

That the continent which embraces within its limits more than half the inhabitants of the world should be crossed by but one railway must be reckoned remarkable at the present stage of human progress. Had commercial considerations dominated the construction of the Trans-Asiatic Railway, the Southern route would necessarily have been preferred. Here there are both trade and population, and the distance of two thousand miles across the Indian Peninsula is already traversed by railways. To complete a Southern route there remains to be supplied the Western link, from the Mediterranean to the Indian frontier—twenty-four hundred miles—and the Eastern, from the Chinese frontier at Kunkong Ferry to Shanghai—about sixteen hundred miles. The so-called Bagdad railway which the Germans are building across Asia

Minor would, if extended to Koweit, on the Persian Gulf, reduce the missing Western connection by one thousand miles; but the interests to be served by a Southern Trans-Asiatic railway being largely British, dependence on a German line for part of the transit is not regarded with favor. It has, therefore, been proposed to dispense with the Bagdad connection and construct under British auspices a railway across Arabia to the Persian Gulf as the first section of the short cut of the land route to India. Of this road the Western section would start from Port Said or Ismailia, where it would join the Egyptian railway system—the last section of the Cape to Cairo lines—and traverse Arabia Petraea in a southeasterly direction to the head of the Gulf of Akabah. Thence the line would ascend one of the lateral gorges leading up to the plateau of Northern Arabia. Across the neck of the Arabian Peninsula the line would pass due east for eight hundred miles to Bassorah, a short branch diverging to the port of Koweit, which the Germans have earmarked as the southern terminus of their system. At Bassorah the proposed railway would cross the Shat-el-Arab on its way to the East and the Karun River further on. Circling around the head of the Persian Gulf, the railway would traverse Persia by whatever route might be considered feasible, either passing through Shiraz, with a branch to Bushire, Kerman and Nushki, or by a more southern line through Beloochistan as far as Kbrachi, where it would close with the Indian systems.—*New York Journal of Commerce.*

Railway Business Association.

The executive members of the Railway Business Association, including recent appointments, now consist of the following:

Term expiring 1911:

W. E. Clow, Chicago, Ill.; Pres., James B. Clow & Sons.
E. B. Leigh, Chicago, Ill.; Pres., Chicago Ry. Equipment Co.
James Viles, Chicago, Ill.; Pres., The Road Company.
A. M. Kittredge, Dayton, Ohio; Pres., Barney & Smith Car Co.
W. H. Whiteside, Milwaukee, Wis.; Pres., Allis-Chalmers Co.
J. H. Schwacke, Philadelphia, Pa.; William Sellers & Co., Inc.

Term expiring 1912:

H. G. Prout, Swissvale, Pa.; V. P., Union Switch & Signal Co.
W. B. Leach, Boston, Mass.; G. M. & Treas., Hunt-Spiller Manfg. Corpn.
T. S. Coffin, New York; Pres., Franklin Ry. Supply Co.
E. L. Adreon, St. Louis; V. P., American Brake Co.
Alba B. Johnson, Philadelphia; V. P., Baldwin Locomotive Works.
Walter H. Cottingham, Cleveland; Pres., Sherwin-Williams Co.

Term expiring 1913:

William C. Dodd, Newark, N. J.; Pres., National Lock Washer Co.
Henry Elliot, East St. Louis, Ill.; Pres., Elliot Frog & Switch Co.
W. H. Miner, Chicago; Pres., W. H. Miner Co.
Rudolph Ortman, Chicago; Pres., Ajax Forge Co.
W. G. Pearce, New York; V. P., Edgar Allen Amer. Manganese Steel Co.
W. P. Worth, Coatesville, Pa.; Treas., Worth Brothers Co.

The general executive committee of the association consists of the elective officers, chosen annually (president, vice-presidents and treasurer), and the 18 executive members.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.
AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Scranton, Pa.; next meeting, June 22, 1911; Niagara Falls, N. Y.
AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn., 1911.
AMERICAN ASSOCIATION OF LOCAL FREIGHT AGENTS' ASSOCIATION.—G. W. Dennison, Pennsylvania Co., Toledo, Ohio.
AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—O. G. Fetter, Carew building, Cincinnati, Ohio.
AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 24 Park Place, New York.
AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago; Sept. 17-19, 1911; St. Louis, Mo.
AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION.—E. H. Fritch, Monadnock building, Chicago; March 21-23, 1911, Chicago.
AMERICAN RAILWAY INDUSTRIAL ASSOCIATION.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; May 6, 1911, Detroit, Mich.
AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; June 14-16, 1911, Atlantic City, N. J.
AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—O. T. Hartoun, Bloomington, Ill.
AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wednesdays, except July and August, annual, 1911-1912, New York.
AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—D. J. Haner, 13 Park Row, New York.

Traffic News.

The Los Angeles & Tidewater announced a general reduction in freight rates from Los Angeles to Nevada points. Where the present first class rate is \$2.50, it will be made \$2.00, and the other changes will be in proportion.

The Southern Railway, on Monday next, will put on its new "Carolina special," a limited express between Charlotte, S. C., and Cincinnati, Ohio, running through in 26 hours each way. The cars will be electrically lighted, and within a couple of weeks the company expects to put on observation sleeping cars.

After December 31 the Canadian Pacific will run but one through train each way daily between Montreal and Winnipeg, Nos. 1 and 2 being taken off. These trains will continue to run between Winnipeg and the Pacific coast, and trains Nos. 96 and 97 will continue to run between Montreal and the Pacific coast. Trains Nos. 94 and 95 between Toronto and Winnipeg will also be continued.

In a suit in the Federal Court at New York, following the recent strike of express wagon drivers in that city, in which the city authorities delayed a settlement of the strike by suddenly enforcing an old law requiring express wagon drivers to have a license from the city, Judge Lacombe, December 22, decided in favor of the city, rejecting the claims of the large express companies, that, as their men were engaged in interstate commerce, the city could not rightfully exercise this police power over them.

The reduction in the Mississippi-Missouri River proportions of the freight rates from the Atlantic seaboard to the Missouri river increased the differentials against Lincoln, Neb., as compared with Omaha from 5 cents (first-class) to 14 cents. At a conference in Chicago on December 21 the railways agreed to make reductions to Lincoln corresponding to those to Omaha, which will restore the differential in the first-class rate to 5 cents and the differential in other class rates to the same basis they were on before the decisions in the Missouri river rate case.

The Cunard steamship Mauretania, which left Liverpool Saturday evening, December 10 in an attempt to make a record voyage to New York and return in twelve days, arrived at Fishguard, Wales, at 10:22 p. m., December 22. The quick voyages and the rapid taking on of cargo at New York, enabled the Continental passengers to reach their destinations before Christmas. It was the first disembarkation at night by a big liner at Fishguard, and the harbor was ablaze with searchlights and rockets. By the aid of four tenders about 600 passengers and the mails were landed with great expedition, and the first special train left for London at 10:55. The Eastward passage of the Mauretania occupied 4 days, 15 hours and 57 minutes. She maintained an average speed of 25.07 knots. The company in honor of the occasion gave the entire crew two days' extra pay. All the special trains with passengers and mails had left Fishguard by 1:22 a. m.

Traffic Club of Chicago.

The board of governors of the Traffic Club of Chicago has the constitutional authority to limit the club's membership, and the board has sent out notice to members saying that the time has about been reached when the limitation will have to be imposed, as very few more can be accommodated at noon-day luncheons and evening functions. The board adds that there are still some officers in the passenger and operating departments of the railways and in industrial concerns who would be desirable members, and members are advised that if they have any friends whom they would like to have join they should get in their applications quickly while it is still possible to increase the membership.

INTERSTATE COMMERCE COMMISSION.

Hearings and Suspensions of Tariff.

When the case of the Crescent Coal & Mining Company against the Baltimore & Ohio came up for hearing before Commissioner Clark of the Interstate Commerce Commission at Chicago on December 21, an interesting question about responsibility for demurrage was raised. The coal company asked the commission

- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 7th St., New York.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—J. G. Philpott, 115 Dearborn St., Chicago; April 26, 1911, New Orleans, La.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & L. L. Chicago, Ill., 1911, Montreal, Can.
- ASSOCIATION OF RAILWAY TELEGRAPH ENGINEERS.—G. B. Colquhoun, 1 C. R. R., Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Deeks, 145 Adams St., Chicago; June 19, 1911, Boston, Mass.
- ASSOCIATION OF TRANSPORTATION AND SANITARIAN ENGINEERS.—P. Corbett, 23 Park Place, New York; June 20-21, 1911, Cape May City, N. J.
- CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tuesday in month, except June, July and Aug.; Montreal.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 411 Dufferin St., Montreal, Que.; Thursdays; Montreal; annual, last week January.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Anton Klime, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.
- CENTRAL RAILWAY CLUB.—H. D. Aughton, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo, N. Y.
- CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—D. L. Jorckeson, 116 Walter St., St. Paul, Minn.; 2d Monday, except June, July and Aug.; St. Paul.
- ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Miles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday; annual, Jan. 17, 1911, Pittsburgh.
- FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Rich., Fred. & Pot. R.R., Richmond, Va.; 20th annual, June 21, 1911; St. Paul, Minn.
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—H. D. Johnson, 209 East Adams St., Chicago, Wednesday preceding 3d Thursday, Chicago.
- INDIANAPOLIS RAILWAY AND MECHANICAL CLUB.—B. S. Downey, C., H. & D., Indianapolis, Ind.
- INTERNATIONAL MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York; next convention, Omaha, Neb.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.—D. B. Sebastian, La Salle St. Station, Chicago; May 15-18, 1911; Chattanooga, Tenn.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, D. & L. R. Ry., Two Harbors, Minn.; next convention July 25-27, Chicago.
- INTERNATIONAL RAILWAY MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio.
- INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.
- IOWA RAILWAY CLUB.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
- MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago; June 19-21, 1911, Atlantic City, N. J.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION, OF UNITED STATES AND CANADA.—A. P. Danc, B. & M., Reading, Mass.
- NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept.; Boston.
- NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
- NORTH-WEST RAILROAD CLUB.—T. W. Flannagan, Soo Line, Minn.; 1st Tues. after 2d Mon., except June, July, August; alternately at St. Paul and Minneapolis, Minn.
- NORTHERN RAILWAY CLUB.—C. L. Kennedy, C., M. & St. P.; 4th Saturday; Duluth, Minn.
- OMAHA RAILWAY CLUB.—A. H. Christiansen, Barker Bldg.; second Wed.
- RAILWAY CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City; 3d Friday in month; Kansas City.
- RAILWAY CLUB OF PITTSBURGH.—C. W. Allen, P. & L. E., Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
- RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.
- RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio; annual, May 22-24, 1911; Milwaukee, Wis.
- RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Oct., 1911; St. Louis.
- ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.
- SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Prudential bldg., Atlanta, Ga.; 3d Thurs.; Jan., April, August and Nov.; Atlanta.
- TOLEDO TRANSPORTATION CLUB.—L. G. Macomber, Woolson Spice Co., Toledo; 1st Sat.; annual, May 6, 1911; Toledo.
- TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; 1st Sat. after 1st Wed.
- TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York; Jan. 17.
- TRAFFIC CLUB OF PITTSBURGH.—T. J. Walters, Oliver building, Pittsburgh, Pa.; meetings monthly; Pittsburgh.
- TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 20, 1911; Baltimore, Md.
- TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.
- WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August; Winnipeg.
- WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.
- WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, First National Bank bldg., Chicago; annual, Jan. 17-19, 1911; Chicago.

to give it reparation against the Baltimore & Ohio for \$300,000 alleged overcharges. It claimed that the Baltimore & Ohio had hauled coal for it to Chicago for delivery to the Chicago, Milwaukee & St. Paul; that, owing to the St. Paul's rule that it would not allow delivery of coal to it by eastern connections without its written consent, the coal had been sold on the Baltimore & Ohio's tracks in Chicago; and that during the time it was thus detained the Baltimore & Ohio had assessed against it demurrage charges to the amount named. Commissioner Clark refused to hear testimony under the pleadings as they stood. He said it was obvious that the Chicago, Milwaukee & St. Paul was properly a party to the proceeding and that it must be brought in before the hearing could continue for the commission to decide whether the Baltimore & Ohio had the right to charge demurrage under the conditions existing would cause more contention and confusion regarding the handling and shipping of coal in the Chicago district than anything else he could imagine, because it would be a license to every road in the Chicago district and elsewhere to do what it might be determined could be done under these incomplete pleadings. The hearing was postponed to January 3, and meantime the Chicago, Milwaukee & St. Paul is to be brought into the case.

Charles C. McChord, who was appointed the second new member of the Interstate Commerce Commission, as previously announced in these columns, was formerly chairman of the Kentucky State Railway Commission, having been appointed a member of the commission in May, 1892. He was elected chairman of the board. He resigned in 1895, and was elected to the Kentucky State Senate, where he served four years. While in the legislature he introduced and secured the passage of an act popularly known as the McChord railroad law. He subsequently again became a member of the commission in 1899, and was again its chairman. He was re-elected commissioner and chairman in 1903 and retired in 1907, since which time he has been engaged in the practice of law. He was born on December 3, 1859, at Springfield, Ky., and was educated at Center College, at Danville, Ky.



C. C. McChord.

Demurrage on Private Cars.

Procter & Gamble Co. v. Cincinnati, Hamilton & Dayton et al. Opinion by Commissioner Clark:

Complainant objects to defendants' rule as to demurrage charges in so far as it provides for demurrage on private cars while standing on private tracks, and particularly to the provision that if private cars are returned under load the railway service is not at an end until the lading is removed. It is held that defendants are within their lawful rights in establishing and maintaining the rule complained of. (19 I. C. C. Rep.)

Joint Rates Denied.

Gulf Coast Navigation v. Kansas City Southern et al. Opinion by Commissioner Harlan:

A company engaged in the sale and distribution of oils and fuel transferred its barges and tugboats to the complainant company, incorporated by it for the purpose, and the stock of which it now owns. On complaint by the latter company asking for through routes and joint rates to certain landings on the Neches and Sabine rivers, to which it does not appear that it carries any substantial traffic for other shippers. It is held that the service performed by the complainant for the oil com-

pany by which it is owned is not a service of transportation, and the mere fact that the complainant has been incorporated as a common carrier and is able to pick up some traffic for other interests gives it no right to demand joint through rates with the defendants, and thus to compel the defendants to contribute to the expense of its operation. (19 I. C. C. 544.)

Reduced Pullman Rates Approved.

State of Oklahoma; State of Iowa et al v. Pullman Co. et al. Opinion by Commissioner Lane:

The commission has fixed the charge for upper Pullman berths at 80 per cent. of the charge made for lower berths, and has given tentative approval to a new schedule of rates filed by the Pullman Company to go into effect throughout the entire United States on or before the 20th of January next. The Pullman Company has accepted, as shown in this schedule, the conclusions of the Commission in what are known as the Loftus cases, that the rates for long distances on lower berths should be reduced. It is estimated that the reduction which will be made upon all of the lines over which Pullman cars are operated in the United States, which include all of the main line railways of the United States excepting the New Haven, the Great Northern, and the Milwaukee, will effect a net reduction of nearly \$1,500,000 annually. The new rates for the lower berths appear to be based upon a charge of \$2 for a 12-hour run, excepting on some of the fastest trains. The upper berth rate is 20 per cent. lower than the newly established rate for lower berths. (20 I. C. C. 25.)

A Specific Advance in Coal Rate Upheld.

Brese-Trenton Mining Co. et al. v. Wabash et al. Opinion by Commissioner Clements:

A carrier may for competitive reasons establish a rate lower than it could justly be compelled by the commission to establish, and when it has done so the maintenance of such rate under former and different conditions (not altered by any illegal act of its own) than those existing when the rate is later advanced has not the same weight and force as proof in the nature of an admission of the reasonableness of the former rate as ordinarily attaches to the long continuance of a rate voluntarily established and maintained under other conditions.

Defendants' rate on bituminous coal from East St. Louis, Ill., to Omaha and South Omaha, Neb., not found to be unreasonable. Complaint dismissed. (19 I. C. C. 598.)

No Discrimination in Coke Rates.

Anaconda Copper Mining Company v. Chicago & Erie Railroad Company et al, and 8 other cases disposed of. Opinion by Commissioner Cockrell:

Complainants, who smelt copper at Anaconda and Black Eagle, Mont., shipped coke on the separately established or joint rates from the West Virginia-Pennsylvania ovens to Chicago, plus the rates beyond to the smelters. At the time covered by these complaints the defendants maintained two rates upon coke from the ovens to Chicago, a rate of \$2.65 per net ton on coke and a rate of \$2.35 per net ton "on coke for use in blast furnaces for smelting iron from the ores." There were no joint through rates in effect from the ovens to Montana. No complaint was made of the rates from Chicago to Montana, but complainants asked reparation upon the ground that the maintenance of the two separate rates upon the same commodity at the same time from the ovens to Chicago was a discrimination that was undue and that the higher rate was unjust and unreasonable. Reparation was demanded in the amount of the difference between the two rates. Complainants also asked that the commission find "that the charging to complainants the excessive and illegal or unreasonable rate on coke for five years next preceding the filing of this petition be declared unjust, unreasonable, and illegal;" Held:

That following the spirit, as well as the letter, of the limitation clause contained in section 16 of the act, the commission believes it is without jurisdiction over shipments or the rates and charges assessed thereon for a period exceeding that named in the statute.

That the rate of \$2.65 per net ton applying on coke was and is a low rate for the services performed and that the maintenance

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF OCTOBER, 1910. (SEE ALSO ISSUES DECEMBER 9, 16 AND 23.)

Name of road.	Mileage operated at end of period.	Operating revenues			Maintenance of way and structures		Operating expenses			Net operating revenue (per mile)	Operating (per mile)	Increase (or decrease) last year.
		Freight.	Passenger.	Total.	Trains and equipment.	Other.	Traffic.	Transportation.	General.			
Arizona Eastern	347*	\$90,733	\$32,846	\$123,579	\$25,329	\$10,925	\$36,254	\$9,847	\$3,788	\$46,103	\$44,316	\$1,787
Atlantic City	166	64,961	61,555	126,516	36,664	9,297	45,961	17,100	1,710	63,671	61,961	1,710
Carolina, Clinchfield & Ohio	236†	1,543	14,403	15,946	11,909	1,339	13,248	7,878	6,370	19,618	18,288	1,330
Carolina, Clinchfield & Ohio of S. C.	278	24,654	3,539	28,193	20,282	46	20,328	2,880	2,880	23,208	22,428	780
Central New England	341	131,704	32,104	163,808	17,338	2,598	19,936	58,914	1,897	74,750	72,853	1,897
Charlotte & Ohio of Indiana	284	99,248	26,511	125,759	35,305	24,613	59,918	17,100	4,872	77,090	72,218	4,872
Chicago, Indiana & Southern	329	293,992	34,210	328,202	45,106	6,869	51,975	125,103	7,887	139,862	131,975	7,887
Chicago, Peoria & St. Louis	255	136,916	38,987	175,903	30,153	30,153	60,306	125,103	6,123	141,429	135,306	6,123
Chicago, Rock Island & Gulf	471‡	175,377	16,958	192,335	30,823	8,919	39,742	8,919	8,716	48,458	47,542	916
Cincinnati Northern	238	94,817	117,580	212,397	33,571	3,571	37,142	45,347	3,180	60,322	59,162	1,160
Cleveland, Akron & Columbus	212	188,748	59,297	248,045	33,571	3,571	37,142	45,347	3,180	60,322	59,162	1,160
Dumfries & Valley	215	77,750	20,721	98,471	28,218	3,462	31,680	33,346	3,105	44,785	43,575	1,210
Evansville & Terre Haute	310	147,952	57,292	205,244	32,996	32,996	65,992	75,163	3,105	101,157	97,987	3,170
Gulf & Ship Island	307	128,134	40,510	168,644	20,059	20,059	40,118	49,327	7,903	107,445	104,888	2,557
Long Island	390	289,813	564,261	854,074	83,591	126,071	169,662	412,107	23,284	292,883	269,623	23,260
Louisiana & Arkansas	255§	93,297	15,701	108,998	22,612	17,777	40,389	41,107	4,706	45,095	40,383	4,712
Louisiana Ry. & Nav. Co.	350	114,761	20,880	135,641	25,239	65,285	90,524	61,378	2,836	113,360	110,542	2,818
Louisiana Western	262	184,553	33,071	217,624	31,095	21,095	52,190	33,706	4,703	85,896	81,186	4,710
Mobile & Ohio	292	123,847	29,244	153,091	30,255	16,449	46,704	44,102	8,505	55,206	52,697	2,509
New York, Philadelphia & Norfolk	404	123,847	29,244	153,091	30,255	16,449	46,704	44,102	8,505	55,206	52,697	2,509
Norfolk & Western	112	226,555	35,355	261,910	32,557	56,820	89,377	67,800	10,801	100,177	99,377	800
Oregon & Washington	581§	433,484	1,637,891	2,071,375	881,054	711,795	1,592,849	1,978,700	87,886	2,670,649	2,582,849	87,800
Peoria & Eastern	231	254,015	66,363	320,378	40,613	49,832	90,445	135,509	5,380	195,834	190,429	5,405
Philadelphia & Reading	1,022	3,088,278	616,800	3,705,078	316,297	73,291	390,588	1,366,583	67,648	2,478,281	2,331,693	146,588
Pittsburg, Shawmut & Northern	468	189,939	107,194	297,133	30,339	46,907	77,246	100,192	7,108	177,348	170,240	7,108
St. Joseph & Grand Island	319	126,543	44,443	170,986	37,199	18,982	56,181	68,140	6,744	134,321	127,439	6,882
St. Louis, Brownsville & Mexico	501‡	101,605	45,166	146,771	47,665	9,876	57,541	56,173	8,113	105,654	103,531	2,123
Santa Fe, Prescott & Phoenix	364‡	107,161	34,820	141,981	21,898	13,918	35,816	46,419	4,382	100,235	95,837	4,398
Southern Indiana	236	129,373	17,987	147,360	19,104	37,485	56,589	114,440	4,382	160,929	156,547	4,382
Spokane, Portland & Seattle	433	317,184	87,172	404,356	41,048	22,128	63,176	114,440	13,375	176,551	163,176	13,375
Tennessee Central	294	92,811	35,912	128,723	12,010	2,510	14,520	37,407	4,489	51,927	50,438	1,489
Tennessee Shreveport & Pacific	171	81,129	41,247	122,376	19,466	21,510	40,976	37,407	4,489	78,383	73,944	4,439
Virginia	347*	\$386,007	\$130,666	\$516,673	\$101,408	\$50,352	\$151,760	\$76,777	\$154,584	\$361,177	\$355,793	\$5,384
Arizona Eastern	166	272,670	67,014	339,684	88,554	41,809	130,363	40,733	6,656	177,017	170,361	6,656
Carolina, Clinchfield & Ohio	236†	404,790	67,014	471,804	46,772	72,107	118,879	104,368	32,447	151,326	148,921	2,405
Central New England	18	20,742	5,722	26,464	2,460	222	2,682	8,831	2,168	10,013	9,843	170
Charleston & Western Carolina	277	867,447	142,255	1,009,702	245,793	87,967	333,760	314,697	11,094	445,854	434,756	11,098
Chesapeake & Ohio of Indiana	341	402,235	125,914	528,149	111,814	80,243	192,057	186,906	15,132	308,163	293,031	15,132
Chicago, Indiana & Southern	284	402,148	127,484	529,632	128,56	85,363	213,923	254,216	18,965	332,888	313,921	18,967
Chicago, Peoria & St. Louis	255	281,351	129,298	410,649	101,680	121,326	223,006	260,329	32,213	355,219	323,016	32,203
Chicago, Rock Island & Gulf	471‡	631,707	249,919	881,626	169,983	69,640	239,623	343,339	31,492	471,121	439,847	31,274
Cincinnati Northern	248	363,212	98,051	461,263	103,989	13,914	117,903	171,118	12,143	300,021	287,875	12,146
Cleveland, Akron & Columbus	212	692,383	226,052	918,435	193,118	12,947	206,065	375,444	15,467	421,531	406,068	15,463
Cumberland Valley	162	411,646	253,336	664,982	135,592	136,663	272,254	324,791	13,332	407,045	393,713	13,332
Denver, Northwestern & Pacific	215	242,465	190,950	433,415	52,904	55,619	108,523	127,514	14,311	223,034	208,713	14,321
Evansville & Terre Haute	310	62,421	23,740	86,161	18,136	11,750	29,886	30,636	3,008	40,894	37,828	3,066
Gulf & Ship Island	300	105,944	28,216	134,160	40,137	45,980	86,117	100,192	8,152	124,269	118,047	6,222
Louisiana & Arkansas	255§	394,326	81,360	475,686	87,342	67,228	154,570	163,686	17,147	271,717	254,539	17,178
Louisiana Ry. & Nav. Co.	350	410,612	181,360	591,972	102,491	67,401	169,892	218,881	33,369	303,261	270,512	32,749
Louisiana Western	207	432,784	206,451	639,235	63,518	103,193	166,711	191,795	17,580	358,296	340,715	17,581
New Orleans Great Northern	282	390,038	133,372	523,410	83,127	80,290	163,417	149,491	17,340	280,808	263,151	17,657
New Orleans, Mobile & Chicago	404	419,917	115,859	535,776	152,431	64,853	217,284	173,434	11,059	330,338	319,375	10,963
New York, Philadelphia & Norfolk	581§	1,676,066	718,923	2,394,989	370,566	256,530	627,100	736,633	38,492	1,413,592	1,375,100	38,492
Norfolk & Western	351	953,962	312,601	1,266,563	173,424	19,685	193,109	260,788	16,094	453,902	437,694	16,208
Peoria & Eastern	1,022	11,258,617	2,556,573	13,815,190	1,480,022	2,638,963	4,119,000	4,838,016	7,607	18,657,016	18,173,093	4,842
Pittsburg, Shawmut & Northern	240	437,810	41,404	479,214	48,655	120,991	169,646	164,591	18,131	287,777	269,566	18,211
Rutland	468	662,270	489,635	1,151,905	193,687	167,748	361,435	442,435	16,844	603,282	586,447	16,835
St. Joseph & Grand Island	319	411,497	129,254	540,751	144,806	20,401	165,207	185,607	13,375	278,582	265,232	13,344
St. Louis, Brownsville & Mexico	501‡	364,700	143,191	507,891	54,575	101,404	156,079	175,490	19,957	275,031	255,134	19,897
Southern Indiana	236	339,197	57,238	396,435	75,689	151,998	191,687	218,681	18,103	310,790	292,587	18,203
Spokane, Portland & Seattle	433	1,366,703	368,058	1,734,761	192,376	116,581	308,957	447,438	38,600	656,437	617,837	38,600
Tennessee Central	294	336,403	151,052	487,455	70,372	44,629	115,001	116,438	31,816	146,817	135,005	11,812
Tennessee Shreveport & Pacific	171	309,079	164,860	473,939	69,387	89,103	158,490	152,078	17,874	210,364	192,614	17,750

Mileage operated on October 31, 1910.—* 408 miles; † 211 miles; ‡ 529 miles; § 225 miles; ¶ 569 miles; † 16 miles; a 455 miles; b 257 miles; c 420 miles; d 430 miles; e 430 miles; f 430 miles; g 430 miles; h 430 miles; i 430 miles; j 430 miles; k 430 miles; l 430 miles; m 430 miles; n 430 miles; o 430 miles; p 430 miles; q 430 miles; r 430 miles; s 430 miles; t 430 miles; u 430 miles; v 430 miles; w 430 miles; x 430 miles; y 430 miles; z 430 miles.

of a lower rate "on coke for use in blast furnaces for smelting iron from the ores" while improper did not subject the complainants to undue discrimination and is not the basis for awards of damage in these cases.

The smelters of copper and of iron do not compete in any proper or ordinary sense of the term and complainants have suffered no damage. (19 I. C. C. 592.)

STATE COMMISSIONS.

J. M. Scott, hitherto trainmaster of the Kansas City Southern, at Heavener, Okla., has been appointed chief inspector of the Railroad Commission of Indiana, succeeding D. E. Matthews. Mr. Scott was formerly superintendent of a division of the Cincinnati, Hamilton & Dayton, on which road he began his railway service as telegrapher. He will take his new place on January 1.

The Texas Commission has ordered reductions in rates on cast iron pipes and steel rails and fastenings, effective January 10. The rate on cast iron piping between Texas common points is reduced from 16½ to 13½ cents per 100 lbs., and from Galveston to Texas common points from 19½ to 16¼. The reductions on steel rails and fastenings is from \$2.70 to \$2.10. In voting for these reductions, Commissioner Williams called attention to the fact that the railways have made a voluntary reduction in interstate shipments of these commodities from Birmingham to Texas common points of more than 20 per cent., while raising rates on less favored articles 10 per cent.

The New York State Public Service Commission, Second District, has appointed Miss A. J. Conneely, of Jamestown, and Miss Lillian A. Vavasour, of Albany, as telephone traffic inspectors. Both of these young women have had extended experience in telephone work, commencing as exchange operators, graduating to the position of chief operators, and because of exceptional ability and merit, have been employed by the telephone companies as traveling chief operators. They have acquired a fine experience in various types of apparatus used in most of the cities and towns of the state, and have made their work a study of the best methods and practices which are calculated to give the highest grade of telephone service. It will be the duty of these inspectors to enter the operating rooms of all telephone companies within the jurisdiction of the commission, determine the faults that may exist, offering suggestions or corrections on the ground, and making a report of the same to the commission in order that it may follow up, and, if necessary, issue an order enforcing an improvement in operating practices and methods. This work, it is expected, will tend toward giving more uniform practice and generally improving the telephone system throughout the State. The salary of these inspectors is \$1,200 yearly. The same commission has appointed Edward W. Leaning, of Albany, assistant chief of the division of statistics and accounts. Mr. Leaning has been for thirty years an employee of the Delaware & Hudson Company, rising to be chief clerk in the office of the auditor of disbursements. The salary of the position is \$2,400 yearly.

FOREIGN RAILWAY NOTES.

Plans for a proposed new Yorkshire Dales Railway were laid before the Richmond Rural District Council a short time ago. The line would run from Grassington, 35 miles to Scorton Station, near Richmond. It would pass through a district rich in agriculture and minerals, and would meet the North Eastern Railway at Scorton Station. It is proposed to lodge the bill in the next session in parliament.

The Eastern Railway Company has completed its extension to Maldonado, Uruguay, a growing seaside summer resort which is now brought into direct communication with Monte Video. From Maldonado it is proposed to extend this line some 70 miles in a northeasterly direction to Rocha, the capital of a department. On the western side of the main line a branch, about 24 miles in length, is projected from Mansavillagra, 100 miles distant from Monte Video, northwards to Sarandobé, where a pastoral and agricultural colony is to be founded.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

T. S. Glenn has been appointed general claim agent of the Atlanta, Birmingham & Atlantic, with office at Atlanta, Ga.

E. A. Howard, real estate agent of the Chicago, Burlington & Quincy at Chicago, has been appointed real estate and industrial commissioner, with office at Chicago.

W. J. Dickinson has been elected second vice-president of the Louisville & Nashville, with office at New York, succeeding A. W. Morris, retired to devote his time to private interests.

F. J. Cox, auditor of passenger accounts of the Galveston, Harrisburg & San Antonio and the Texas & New Orleans at Houston, Texas, has been appointed assistant auditor, with office at Houston, and his former office has been abolished.

H. W. Seman has been elected president of the Groveton, Lufkin & Northern, with office in the Rookery building, Chicago, succeeding D. J. Batchelder, resigned. E. Ford has been appointed auditor and car accountant, with office at Groveton, Texas, succeeding W. P. Smith, auditor and general freight and passenger agent, resigned.

Burton Hanson, general solicitor of the Chicago, Milwaukee & St. Paul, at Chicago, has been appointed general counsel, with office at Chicago, succeeding George R. Peck, retired, effective January 1. Mr. Hanson was born August 27, 1853, at Rushford, Wis. He received his education at Wisconsin State Normal School, at Whitewater, Wis., and began railway work in 1879 as a solicitor for the Milwaukee, Lake Shore & Western. He remained in that office for four years, when he became assistant general solicitor of the Chicago, Milwaukee & St. Paul. In 1895 he was appointed general solicitor of the same road, which position he held at the time of his promotion as general counsel.



Burton Hanson.

Operating Officers.

J. A. Kauffman has been appointed superintendent of the Tombigbee Valley, with office at Calvert, Ala., succeeding A. R. Craddock, transferred.

P. L. McManus, whose resignation as superintendent of terminals of the Chicago & Alton at St. Louis, Mo., has been announced in these columns, has been assigned to special service in the operating department of the Chicago, Indianapolis & Louisville, with office at Chicago.

C. R. Westcott, superintendent of the Illinois Central at Clinton, Ill., has been appointed general superintendent of the Chicago, Peoria & St. Louis, with office at Springfield, Ill. He will have jurisdiction over transportation, mechanical and maintenance of way departments.

H. M. Modisett, superintendent and general freight and passenger agent of the St. Louis & Hannibal, at Hannibal, Mo., has been appointed general manager, succeeding J. A. Jordan, vice-president and general manager, who resigned as general manager, and continues as vice-president.

E. B. Seymour, general superintendent of the Amper & West ern, the Green Bay & Western, the Keweenaw, Green Bay & Western, and the Tola & Northern at Green Bay, Wis., has been appointed general manager, succeeding J. A. Jordan, vice president and general manager, who resigned as general manager and continues as vice-president.

Effective January 1, the lines of the Rock Island system will be operated as two grand divisions, as follows: Line north of Caldwell, Kan., in charge of W. S. Tinsman, now general manager of the Chicago, Rock Island & Pacific, with office at Chicago. W. M. Whitten, vice president and general manager of the Chicago, Rock Island & Gulf, at Fort Worth, Tex., has been appointed general manager of the lines south of Caldwell, with office at Fort Worth. Both these officers report to F. O. Melcher, second vice-president, Chicago.

W. S. Williams, whose appointment as superintendent of the Illinois Central at Clinton, Ill., has been announced in these columns, was born November 6, 1866, at Quincy, Ill. He received a high school education and began railway work in 1887 as a switchman and brakeman on the Amboy division of the Illinois Central. Soon afterward he was made a yardmaster at Decatur, Ill., and then conductor at Jackson, Tenn. In 1891 he went to Chicago as a brakeman and returned to the Amboy division the next year. From May, 1904, to December, 1910, he was trainmaster, with office at Clinton, from which position he has been promoted to superintendent at the same place.

Jacob H. Pelyea, trainmaster of the Boston & Albany at Rensselaer, N. Y., will have charge of the section of the Albany division west of Stateline, Mass., and Thomas G. Welch, trainmaster at Pittsfield, will have charge of the section of the Albany division between Stateline and Hinsdale, including the North Adams branch. Frank L. Sample has been appointed acting trainmaster, with office at West Springfield, in charge of the section of the Albany division between Hinsdale and Athol Junction, including the Athol branch. Charles A. O'Connor has been appointed acting day chief dispatcher, and William B. Marshall has been appointed acting night train dispatcher, at Springfield.

Everett E. Cain, whose appointment as superintendent of the Cincinnati, Hamilton & Dayton, with office at Wellston, Ohio, has been announced in these columns, was born February 14, 1867, at Dublin, Ind. He received a high school education and began railway work with the Wabash in 1887 as a telegraph operator, and from that year until 1903 was at different times operator for the Missouri Pacific, the St. Louis Southwestern and the Denver & Rio Grande. He then went with the St. Louis, Iron Mountain & Southern as a brakeman, and was promoted to train dispatcher at Van Buren, Ark., in 1896. He was transferred to Little Rock, Ark., as chief dispatcher in 1900, where he remained for a year. He was then out of service for two years, and in March, 1903, became chief clerk to the superintendent of transportation of the Missouri Pacific-Iron Mountain system. From December, 1904, until the time of his recent appointment as superintendent he was trainmaster of the Pere Marquette, with office at Detroit, Mich.

For maintenance, operation and construction purposes, the lines of the Oregon-Washington Railroad & Navigation Company will be segregated into three districts, known as the First, Second and Third districts, respectively, each to be under the jurisdiction of a vice-president and general manager. The First district will embrace the lines south and east of Columbia river, except as hereinafter provided, the line from Megler via Ilwaco to Nahcotta, and the boat lines, and will be in charge of J. P. O'Brien, vice-president and general manager, with headquarters at Portland, Ore. The Second district will embrace the lines north of Columbia river and west of Cascade mountains, and will be in charge of J. D. Farrell, vice-president and general manager, with headquarters at Seattle, Wash. The Third district will embrace the lines of the company: (a) east of Cascade mountains to connection with the lines in First district, at Attalia, Wash.; (b) the projected new freight and passenger terminals in Spokane, and line under construction from Spokane to Ayer, and such other lines and branches springing therefrom, the construction of which may, from time to time, be authorized, and will be in charge of Robert E. Strahorn, vice-president and general manager, with headquarters at Spokane, Wash. No

change will be made in the management of the lines of this company now under the jurisdiction of W. H. Barnhart, its president and general manager at Salt Lake City, Utah.

Traffic Officers.

Harold Hobbbs has been appointed a traveling passenger agent of the Cincinnati, New Orleans & Texas Pacific, with office at Cincinnati, Ohio.

Percy L. Sinclair has been appointed a traveling agent of the Lackawanna Line, with office at Seattle, Wash., succeeding F. H. Montgomery, transferred.

Thomas J. Murray has been appointed a commercial agent of the Rock Island Lines, with office at Rock Island, Ill., succeeding E. L. Goff, promoted.

B. P. Miller has been appointed a commercial agent of the Georgia, Southern & Florida, with office at Valdosta, Ga., succeeding W. D. Webster, resigned.

L. H. Geller has been appointed division freight agent of the Erie Railroad for lines at Buffalo, N. Y., Salamanca and the West, with office at Chicago, and the office of commercial agent has been abolished.

W. P. Smith, auditor and general freight and passenger agent of the Groveton, Lufkin & Northern at Groveton, Texas, having resigned, the traffic department will hereafter be handled by W. J. Helmick, general manager. See item in Executive, Financial and Legal Officers.

L. W. Landman, general passenger, ticket and baggage agent of the Lake Erie & Western, at Indianapolis, Ind., has been appointed general passenger and ticket agent of the Michigan Central, with office at Chicago, succeeding O. W. Ruggles, assigned to other duties on account of ill health.

J. B. Martin, traveling passenger agent of the New York Central & Hudson River, at Buffalo, N. Y., has been appointed general agent, at Rochester, succeeding J. C. Kalbfleisch, district passenger agent, resigned. O. E. Jenkins, district passenger agent at Syracuse, has been appointed general agent, at Syracuse, and E. W. Lane has been appointed a traveling passenger agent, with office at Rochester, succeeding Mr. Martin.

George W. Hibbard, assistant general passenger agent of the Chicago, Milwaukee & Puget Sound at Seattle, Wash., has been appointed general passenger agent, with office at Seattle. R. M. Boyd, commercial agent at Seattle, has been appointed a general agent, with office in Seattle. He will have charge of traffic in Seattle and suburbs, on Puget Sound north of Seattle, and in Alaska.

Engineering and Rolling Stock Officers.

R. Collett has been appointed superintendent of locomotive and fuel service of the St. Louis & San Francisco, with office at St. Louis, Mo.

F. A. Torrey, superintendent of motive power of the Chicago, Burlington & Quincy lines east of the Missouri River at Chicago, has been appointed general superintendent of motive power of the entire Burlington system, with office at Chicago, succeeding F. H. Clark, resigned to go to the Baltimore & Ohio. J. W. Cyr, division master mechanic at Hannibal, Mo., has been appointed superintendent of motive power at Chicago, succeeding Mr. Torrey, and W. C. Walz succeeds Mr. Cyr.

David D. Robertson, whose appointment as master mechanic of the Lehigh Valley, at Buffalo, N. Y., has been announced in these columns, was born February 16, 1868, in Scotland. He received his education in the public schools of Scotland and began railway work September 1, 1883, with the Minneapolis & St. Louis, as a machinist's apprentice, at Minneapolis, Minn., remaining with that company until February, 1890, when he went to the Chicago, Rock Island & Pacific as a machinist. He was promoted to roundhouse foreman in August, 1892, at Pratt, Kan., and then served in the same capacity at various places until March, 1899, when he was promoted to master mechanic of the Southern division, at Herington, remaining in that position until September 1, 1904. The same month he was appointed division foreman of the Atchison, Topeka & Santa Fe, at La Junta,

Colo., and the following May he left that company to go to the Fort Worth & Denver City as general master mechanic at Childress, Tex., remaining in that position until May, 1907. The following month he went to the Lehigh Valley as master mechanic at Sayre, Pa., and in October, 1908, was transferred to Wilkesbarre, as master mechanic of the Wyoming division, which position he held at the time of his recent appointment as master mechanic of the Buffalo division.

Frank H. Clark, general superintendent of motive power of the Chicago, Burlington & Quincy, at Chicago, has been appointed general superintendent of motive power of the Baltimore & Ohio, and the Baltimore & Ohio Southwestern, with office at Baltimore, Md., succeeding J. D. Harris, resigned. Mr. Clark was born at Pecatonica, Ill., July 23, 1865. He graduated from the University of Illinois in 1890, and began railway work with the Chicago, Burlington & Quincy, as chief draftsman, in 1894. Five years later he was promoted to mechanical engineer, and in 1902 he was made superintendent of motive power of the lines east of the Missouri river. He has been general superintendent of motive power of the entire Burlington system since April, 1905, which office he now resigns to go to the Baltimore & Ohio. From the time he graduated until he went to the Burlington he was engaged in consulting engineering work. He has done much work for the Master Car Builders' Association and the American Railway Master Mechanics' Association, and during the year 1909-1910 was president of the former.



Frank H. Clark.

Purchasing Officers.

W. A. Hammel has been appointed purchasing agent of the Atlanta, Birmingham & Atlantic, with office at Atlanta, Ga., succeeding W. D. Knott, granted leave of absence on account of ill health.

Harry F. Lowther, who was appointed assistant purchasing agent of the Delaware, Lackawanna & Western, with office at New York, as previously announced in these columns, was born May 20, 1868, at Zanesville, Ohio. He was educated in the public schools at Newark, and began railway work August 29, 1881, as a clerk and stenographer on the Baltimore & Ohio, remaining in the service of that company until 1889. From 1890 to 1893 he was clerk and stenographer on the Louisville & Nashville, and then went to the Chicago, Rock Island & Pacific as chief clerk in the motive power and car department of lines west of the Missouri river, remaining in that position until 1899. The same year he was appointed chief clerk in the motive power and car departments of the Delaware & Western, and since that time has been in the continuous service of that company. He was appointed chief clerk

in the purchasing department at New York in 1906, which position he held at the time of his recent appointment as assistant purchasing agent.

OBITUARY.

W. F. Lee, roadmaster on the Northern district of the Chicago, Rock Island & Pacific, with office at Des Moines, Iowa, died at Des Moines on December 19.

Henry C. Short, for over 30 years general traveling auditor of the Atchison, Topeka & Santa Fe, died November 21 at his home in Topeka, Kan., after an illness of two months. Mr. Short was in railway work for over 55 years, and during that time held many positions of trust and responsibility. His ability and fine personal character endeared him to a wide circle of friends.

Alexander James Clinton, formerly a civil engineer, who assisted in the construction of the Hudson River Railroad, died December 27, at his home, in New York, at the age of 85 years. Mr. Clinton was born in Canterbury, Orange county, N. Y., and for a long time was treasurer of the New York State Society of the Cincinnati and a member of the Society of Sons of the Revolution. He received the decoration of the Order of Bolivar, the Liberator, for distinguished engineering feats which he performed while engaged in the construction of a railway in South America.

South African Railways.

The railway committee of the Cape Town Chamber of Commerce submitted the following report on October 16, 1910: Your committee has considered the great desirability of the further development of agricultural districts in the western Province, and more particularly the natural hinterland of Cape Town—the northwestern districts. Your committee is of opinion that the agricultural areas in Clanwilliam, Calvinia, Van Rhyn's Dorp, and adjacent districts, including Namaqualand, have been too long neglected, while there is also much necessity for greater exploitation of the southwestern districts. In regard to the Calvinia district, the railway line is now under construction to Graaf Water, 48 miles from Eende Kuil and 177 miles from Cape Town. From Graaf Water to Van Rhyn's Dorp is a distance of 50 miles and from Van Rhyn's Dorp to Calvinia 87 miles, or, in other words, 137 miles will have to be constructed to complete the railway via Eende Kuil to Calvinia. During many years past of railway construction in the Cape Colony by successive governments, it will be seen from a simple reference to the map that the greater part of this fertile northwest district has been ignored, and with the projected schemes of irrigation there is every possibility that it will develop into a large grain and stock producing country. The government survey shows that the line from Graaf Water will proceed across the Oliphant's river a few miles south of Van Rhyn's Dorp, passing through Van Rhyn's Dorp, and then on to Nieuwoudtville by way of the Bokkeveld mountains, over Rhyn's Pass, thence in a southeasterly direction to Calvinia. The total distance from Calvinia to Cape Town is 311 miles. In regard to the Namaqualand Railway, this chamber has made frequent representations to previous Cape governments to exercise the powers they possess of expropriating this line of railway. Some few years ago negotiations actually took place with the London office of the company, but nothing further transpired. It is exceedingly desirable in the interests of the development of Namaqualand that this line should be taken over by the Cape government as soon as possible. Your committee regards the extension of the Caledon line eastward as most important. Here again is a district which is capable of much agricultural development, and this would be assisted materially by the extension of this line. Your committee therefore recommends, with a view to the development of all these districts, that the line from Graaf Water should be extended to Calvinia; that the government should expropriate the Namaqualand Railway, and continue the Caledon line in an easterly direction. Your committee considers it absolutely necessary that these works should be taken in hand at the earliest possible moment, and recommends that strong representations be made to the minister for railways and harbors forthwith.



H. F. Lowther.

Railway Construction.

New Incorporations, Surveys, Etc.

ARROSTOCK VALLEY (Electric).—This company is planning to build an extension from Washburn, Me., via Woodland and Caribou to Limestone.

BUCKLEANNON & NORTHERN. An officer writes that bids for grading will be asked for early in 1911, and contracts will probably be let about February 1, to build from the Pennsylvania-West Virginia state line, up the west side of the Monongahela river to Rivesville, Marion county, W. Va. The principal commodities to be carried by the line will be coal and coke. S. D. Brady, chief engineer, Morgantown. (November 25, p. 1022.)

CANADIAN PACIFIC.—Work is now under way by the Toronto Construction Company, Toronto, Ont., from Coldwater to Brechin, 27.6 miles.

CARLTON & COAST.—This company has work under way from Pike Crossing, Ore., to Fairdale, four miles. W. B. Dennis, vice-president and general manager, Carlton. (August 5, p. 262.)

COPPER RIVER & NORTHWESTERN.—On October 31 this company had in operation 149.5 miles from tidewater at Cordova, Alaska, northeast to the crossing of the Kuskulana river, where a high cantilever bridge is being built, and it is expected to have work finished on the line to a point 160 miles from Cordova by the end of 1910. The roadbed has been graded through to the Kennecott mines on the river of that name, 196.50 miles from Cordova. M. J. Heney was the contractor. The work now under way consists of putting up a steel bridge and about 20 timber trestles, as well as laying the track on the remaining section of 47 miles to the mines.

DEERING SOUTHWESTERN.—An officer writes that work is now under way on the extension between Deering, Mo., and Caruthersville. It is expected to have the work finished by February 1, and the line open for traffic by March 1.

DELAWARE, LACKAWANNA & WESTERN.—An officer writes that the company is getting ready to lay track on the cut-off between Slateford, Pa., and Port Morris, N. J., 28 miles. (September 23, p. 558.)

FARMERS' ELECTRIC RAILWAY.—This company has been incorporated by residents of Vale, Ore., to build a 25-mile line south from Vale.

GRAND RIVER, MEEKER & SALT LAKE.—An officer writes that this company was organized to build from Grand river, Garfield county, Colo., at a point between the towns of New Castle and Silt on the joint track of the Denver & Rio Grande and the Colorado Midland railways, at which place a town to be known as Chapman will be located. The proposed route is north from Chapman to Meeker in Rio Blanco county, thence west following the White River valley via towns of White River City and Rangely, to the Utah state line. From this point the exact route northwest to Salt Lake City is to be determined later. The plans call for building about 300 miles. Actual construction work has been started on the Grand river, and grading work is now being carried out. Contracts for the entire line have been let to the Meeker-Rangely Construction Company, Denver. The work will be light, with a small amount of tunnel work and a few fills and cuts. The principal commodities to be carried will be coal, coke, live stock, farm products, lumber, stone and ore, asphaltum, oil and general merchandise. Wm. J. Barendse, chief engineer, Rifle, Colo.

INDIANA ROADS (Electric).—According to press reports, plans are being made to build an interurban line to connect South Bend, Ind., with Buchanan, Mich. S. Murdock, Lafayette, Ind., of the Southern Michigan Railway, is said to be back of the project.

KENTUCKY HIGHLANDS RAILWAY.—See Louisville & Nashville.

LOUISVILLE & NASHVILLE.—An officer writes that work is now under way on the Wasioto & Black Mountain, from Baxter, Ky.,

to Bentons, 28 miles, and from Baxter to Italian, 247 miles, also on the Toms Creek branch, 120 miles, and on the Yellow Creek branch, 24 miles, a total of 417 miles. The Louisville Construction Company, Knoxville, Tenn., has the contract.

Work is now under way on the Kentucky Highlands Railway from Millville to Versailles, 8.50 miles. The Vaughan Construction Company, Roanoke, Va., has the contract.

The Madison & Goodletts is building from Jackson, Ky., to Croftsville, 97 miles. Contracts are let to the Lane Brothers Company, Alta Vista, Va.; Madison & Hanger, Richmond, Ky.; Jones Brothers, Columbus, Ohio; W. J. Oliver, Knoxville, Tenn.; the Luck Construction Company, Roanoke, Va., and Winston & Co., Richmond.

On the Straight Creek branch work is under way from Straight Creek, Ky., to Kettle island, five miles.

LORAIN & ASHLAND.—This company has projected a line from Huntington, Ohio, to Ashland, 20 miles. N. P. Ramsey, vice-president and general manager, Ashland.

LOS ANGELES PACIFIC (Electric).—A contract has been given to Palmer, McBride & Quayle, Los Angeles, Cal., for building a 10-mile extension from Hollywood to Lankershim.

MADISON & GOODLETTS.—See Louisville & Nashville.

MIDLAND CONTINENTAL.—This company, which was organized to build from Pembina, N. D., southwest to Edgerly, about 212 miles, has completed grading on the first 50 miles between Edgerly, on the Chicago, Milwaukee & St. Paul, and Jamestown, on the Northern Pacific. The work has been suspended. An officer is quoted as saying that the company proposes to push the work next year, and if possible complete the entire line during 1911. F. K. Bull, president, Racine, Wis. (April 15, p. 1016.)

MONTEREY & PACIFIC GROVE (Electric).—This road is to be extended at once to Salinas, Cal., 20 miles. It is understood that the present line to Monterey will be reconstructed to make it a double-track broad gage line, from Pacific Grove, via Monterey to Del Monte.

NORTHERN PACIFIC.—On the Dakota division a new branch has been opened for business from Mandan, N. D., west to Mott, 129 miles. Train service on the Roslyn branch of the Seattle division has been extended from Beekman, Wash., to Lakedale, one mile. The Connell-Northern branch of the Pasco division has been opened for business from Connell, Wash., to Adco, 60.8 miles.

PECOS VALLEY & SOUTHERN.—An officer writes that an extension is to be built from Balmorhea, Texas, through Fort Davis to Marfa on the Southern Pacific, or from a point on the present line near Saragosa to Alpine. T. H. Brigrance, Pecos, has a contract for some work on the line. The principal commodities to be carried include cattle and alfalfa.

PORTERVILLE NORTHEASTERN.—An officer writes that work is now under way by the Utah Construction Company, Ogden, Utah, from Porterville, Cal., to Springville, Tulare county, 16 miles. Maximum grades will be 1.4 per cent. Track has been laid on 5.2 miles. F. U. Nofziger, president, and C. S. Freeland, chief engineer, Porterville.

ST. LOUIS & OKLAHOMA.—An officer writes that grading has been finished between Dougherty, Okla., and Belton, on 26 miles. A line will also be built from Bromide to Coalgate, 18 miles. E. T. Brown, chief engineer, Coalgate.

TAMPA & JACKSONVILLE.—Surveys have been made for a line from Sampson, Fla., to Jacksonville, 42 miles, also to Brooksville, an additional 40 miles.

WASIOTO & BLACK MOUNTAIN.—See Louisville & Nashville.

The projected railway from Caiman to Paseo de los Indios, in the Chubut, will probably not be begun until 1911. Meanwhile the wool industry of this territory is rapidly developing, and it is stated that representatives of United States mining companies are to investigate the mineral possibilities of this little-known part of South America.

Railway Financial News.

Late News.

ALBIA & CENTERVILLE.—Judge McPherson, on the petition of the Iowa Central, has appointed William Bird temporary receiver. The road runs from Albia, Iowa, to Centerville, 24 miles. The Southern Iowa Traction Co. claims to have become owner on February 9. The Iowa Central operated the road until November 26.

ANN ARBOR.—E. R. Lyon, of Strong, Sturgis & Co., New York; Frederick Hertenstein, of Cincinnati, and J. N. Thompson, of Wilkes-Barre, have been elected directors of the Ann Arbor to fill two vacancies and to succeed B. S. Warren.

CHICAGO, MILWAUKEE & ST. PAUL.—This company's 4 per cent. debenture bonds of 1910-1925 have been listed on the "parquet" of the Paris Bourse.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—This company's 4 per cent. debenture bonds of 1910-1930 have been listed on the "parquet" of the Paris Bourse.

IOWA CENTRAL.—See Albia & Centerville.

NEW YORK, WESTCHESTER & BOSTON.—It is understood that the Interborough Rapid Transit is negotiating with the New York, Westchester & Boston for a traffic agreement which will permit the New York, Westchester & Boston to exchange passengers with the elevated line (extension of the Lenox avenue West Farms subway) now ending at West Farms. The plan is to extend the elevated road further through the Bronx.

OREGON SHORT LINE.—A press despatch says that a report filed with the Oregon state railway commission showed that the Oregon Short Line had declared 50 per cent. dividends for the year 1910. This would amount to \$13,675,530. The Union Pacific is the owner of all the stock of the Oregon Short Line except director shares.

PITTSBURGH, BINGHAMTON & EASTERN.—The circuit court has ordered the sale of this property under foreclosure.

SOUTHERN RAILWAY.—The court of common pleas of South Carolina has decided that the taking over in 1902 by the Southern Railway of the South Carolina & Georgia, the South Carolina & Georgia Extension, the Asheville & Spartanburg and the Carolina Midland was not a violation of the constitutional provision of South Carolina against merging competitive lines.

ST. LOUIS & SAN FRANCISCO.—This company's general lien 15-20 year 5 per cent. bonds have been listed on the "parquet" of the Paris Bourse.

TONOPAH & TIDEWATER.—*The Commercial & Financial Chronicle* says that an officer of the Tonopah & Tidewater denies the report that the company is about to secure a lease of the Tonopah & Goldfield.

TONOPAH & GOLDFIELD.—See Tonopah & Tidewater.

UNION PACIFIC.—See Oregon Short Line.

FOREIGN RAILWAY NOTES.

Of the railways from Puerto Deseado, Argentina, to Nahuel Huapi, 40 miles were completed on August 22. Puerto Deseado has now over 1,000 people. A large schoolhouse is soon to be erected there, and other establishments are planned to meet the growing needs of this Patagonian center.

It is reported that a railway is to be built from Prince Rupert, British Columbia, to Port Simpson, a point to the north of the Grand Trunk Pacific terminus on the way towards Stewart, the scene of recent gold discoveries. The Grand Trunk Pacific engineers and surveyors are engaged in locating a route for a branch line from Fort George, on the main line of the National Transcontinental to Vancouver. Thus, though the Grand Trunk Pacific will run to Prince Rupert, passengers from the East will be able to get to points in southern British Columbia without difficulty.

The items in this column were received after the classified departments were closed.

The Pennsylvania is reported to be in the market for 800 cars for its western lines.

W. J. McGee, master mechanic of the Tampa Northern, at Tampa, Fla., has been appointed master mechanic of the International & Great Northern, with office at Mart, Texas.

The Harriman lines have decided to build 196 locomotives of various types. The Iowa Central is said to have bought 24 first-class locomotives for passenger and freight service.

W. B. Denham, general manager of the Tampa Northern, at Tampa, Fla., has been appointed general manager of the Gainesville Midland, with office at Gainesville, Ga., succeeding E. B. Eppes, resigned.

The Louisiana Railway & Navigation Company has ordered 1,000 tons of rails from the Tennessee Coal & Iron Company. The Kansas City Southern Railway has ordered 1,000 tons of rails from the Tennessee Coal & Iron Company.

Frederick O. Becker, chairman of the Western Classification Committee, superintendent of the Western Railway Inspection Bureau, and superintendent of the Western Railway Weighing Association, with office at Chicago, died in Chicago on December 27.

J. H. Hillhouse, traffic manager of the Gulf Line Railway, at Sylvester, Ga., has been elected vice-president, and S. Y. Henderson, commercial agent at Hawkinsville, has been appointed traffic manager. The entire clerical force of the traffic and claim departments will be moved from Sylvester to Hawkinsville.

The New York State Public Service Commission, Second district, has called a conference of the general managers, district superintendents, train despatchers and master mechanics of the interurban roads in the state to be held at Syracuse, January 19, to discuss all questions relative to the safety of operation of these railway companies. The occasion of the call is the number of serious accidents which have occurred recently on interurban roads (mostly outside of the state of New York), which accidents were caused by defective methods of operation, deficient block signaling or violations of rules.

The New England Demurrage Commission has opened its office at 294 Washington street, Boston. This office has been established apparently by and at the expense of the railways, on the recommendation of the Interstate Commerce Commission, with a view to providing a convenient authority for arbitrating questions which may arise between railways and shippers concerning demurrage under the new regulations for New England, which were recently ordered by the Interstate Commerce Commission. Under these regulations the free time for unloading freight cars is reduced from four days to two. The announcement is signed by A. G. Thomason, commissioner. Mr. Thomason heretofore was commissioner of the Northeastern Pennsylvania Demurrage Bureau at Scranton, Pa.

The Pennsylvania Company has declared a semi-annual dividend of 4 per cent. A year ago 5 per cent. was declared. The dividends are usually declared 3 per cent. in June and 5 per cent. in December. The dividend is payable December 31. The Pennsylvania Company declared a semi-annual dividend of 5 per cent. in December, 1909, placing the stock on an 8 per cent. per annum basis, 3 per cent. having been declared in June last year. In January, 1910, a stock dividend of \$16.67 per share was declared. The regular semi-annual dividend of 3 per cent. was declared in June, so that the dividend of 4 per cent. just declared restores the stock to the 7 per cent. basis which prevailed in 1907 and 1908. The stock dividend declared in January increased the amount of stock outstanding from \$60,000,000 to \$80,000,000, all owned by the Pennsylvania Railroad Company. As this year's dividend is 7 per cent. on \$80,000,000 of stock, while the dividend of last year was 8 per cent. on \$60,000,000, the Pennsylvania Railroad, therefore, receives in dividends from the Pennsylvania Company this year \$5,600,000 on the 7 per cent. basis, as compared with \$4,800,000 on the 8 per cent. basis of 1909.

Supply Trade Section.

William Taylor, formerly in charge of the Southern branch of the Galena Signal Oil Company, Franklin, Pa., has been made Southern representative of the Nathan Manufacturing Company, New York.

The Railway Safety Equipment Company, Chicago, has been incorporated to manufacture an automatic stop device and other railway supplies. The incorporators are Clyde A. Mann, James J. Sheridan and C. F. Ross. The capital at present is nominal, but will amount to \$250,000 shortly. The automatic stop will be made under the Collord-Rohe patents, which include patents on switch connections and semaphore equipment.

The Hill-Evans Rail Chair & Coupling Company, Belfast, Maine, has been incorporated with \$50,000 capital. The company will make railway supplies and appliances, especially the Hill-Evans coupling and joint, patent No. 958,241, May 17, 1910, and owned by Jesse C. Evans, Palmer G. Hill, Shelton M. White and William J. Alexander, of Lumberton, N. C. The directors are Austin W. Keating, president; Ralph O'Connell, treasurer; Maurice W. Lord, clerk, all of Belfast. The stockholders are the four men from Lumberton and the three from Belfast.

W. J. McBride, whose election as president of the Haskell & Barker Car Company, Michigan City, Ind., was announced in the *Railway Age Gazette* of December 23, has been in the car building business 27 years. He first served the Peninsular Car Company, which was afterwards consolidated with the Michigan Car Company under the name of the Michigan-Peninsular Car Company, Detroit, Mich. When the American Car & Foundry Company was formed he became assistant to the president, with office in St. Louis. He was later made general manager, and a little later first vice-president and general manager. He held this position until early in 1907, when he resigned to become connected with the Haskell & Barker Co., of which he was general manager at the time of his recent election.

Frederick G. Ely, a director of the Pressed Steel Car Company, who died in New York, December 12, 1910, was born in Watertown, N. Y., August 2, 1838. His father was Adriel Ely, a well-known business man of Watertown, who also held a number of public offices of trust. His mother was a daughter of Judge Foster, a well-known judge in the early days of Watertown. Mr. Ely's early life was spent in Watertown. When a young man he embarked in a mercantile business, but after a few years sold out, and about 1870 went to Chicago, where he was connected with the Chicago office of the Davis Sewing Machine Company. About ten years later he became interested in several railway specialties, among them the McGuire freight car door and the National hollow brake beam. He became connected with C. T. Schoen about 1895, and went into the Pressed Steel Car Company upon the absorption of the Schoen Company, becoming a director and continuing as such until the time of his death.



F. G. Ely.

TRADE PUBLICATIONS.

Rock Drills.—The Ingersoll-Rand Company, New York, has devoted its bulletin 4109 to the description and advantages of the electric air rock drills.

Southern Pacific.—This company has issued a well illustrated booklet on the Hood River district, Oregon, describing the lucrative occupation of fruit growing in that locality.

Blowermakers' Supply Catalogue No. 27 of the J. F. Blower Manufacturing Company, Moberly, Mo., describes roller flue expanders, sectional heading expanders, flue cutters, patch bolt countersinking tools, etc., made by that company. The catalogue is illustrated and contains 30 pages.

Graphite Paint.—The Detroit Graphite Company, Detroit, Mich., has issued a booklet containing interesting facts about the making and use of Superior Graphite paint. The illustrations include 32 views of notable structures on which this paint was used, and also some scenes of its manufacture.

Ditch Digging.—The E. I. Du Pont de Nemours Powder Company, Wilmington, Del., has published three small booklets on ditch digging with dynamite. One of the claims is that with 150 lbs. of dynamite and an iron bar two men can dig 600 ft. of ditch 4 ft. deep and 5 ft. wide at the top, through thicket covered swamps. Full information and instructions are included in these booklets.

RAILWAY STRUCTURES.

AUGUSTA, ME.—Plans have been made by the Maine Central for putting up a new passenger station in Augusta. Plans are also being made for improvement work, to include strengthening the bridge over the Kennebec river at Augusta, or building a new bridge.

BALFOUR, B. C.—A contract is said to have been given to C. W. Sharp, Winnipeg, Man., for putting up a hotel for the Canadian Pacific at Balfour, near Nelson. The structure will be three stories high, 205 ft. x 105 ft., with a foundation of cement and stone.

FULLERTON, CAL.—The Atchison, Topeka & Santa Fe is making improvements at Fullerton, including a new bridge and putting in new sidings for switching purposes. The cost of the work will be about \$25,000.

MARSHALL, TEX.—The Texas & Pacific, it is understood, will put up a new passenger station at Marshall during 1911, also some new stations at various other places on the line.

QUEBEC, QUE.—Bids are wanted up to January 9, by the Quebec Harbor Commissioners for the construction, erection and finishing complete of a Strauss bascule single-track railway bridge. Raoul Renault, secretary and treasurer, Quebec.

TACOMA, WASH.—The Northern Pacific is preparing plans for a drawbridge, it is said, to replace the present bridge over the city waterway. The estimated cost of a new bridge is \$150,000. Temporary repairs, to cost \$6,000, are to be made to the present structure.

An indication of the interest taken by the central government in the future of railways in China is afforded by the establishment in September, 1909, in connection with the Ministry of Communications at Peking, of a school for training railway officials. The school is built for 600 students, but the number is at present limited to 350, who come from all parts of the Empire and vary in age from 18 to 25. There are about 30 teachers, including 1 British, 1 American (a drill sergeant), 2 French, and 2 German. Most of the teachers are Chinese students returned from abroad, and they are well paid. The full course is three years, and the students are divided into three sections according to the foreign language, English, French, or German, taught them in addition to other subjects. The curriculum includes the Chinese language, drill, geography, history of Chinese railways, mathematics, drawing, chemistry, physics, traffic management, railway bookkeeping, elements of engineering, steam and electrical, workshop administration, and railway company law.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

Items to the following effect were published in the *Railway Age Gazette* of December 23, but not in the Advance Sheet of December 21:

Kentucky & Indiana Bridge Company in market, 2 locomotives.
Nevada Copper Belt, in market, 1 consolidation locomotive.

The Canadian Pacific is said to have ordered 75 heavy locomotives from its Angus shops at Montreal and the Montreal Locomotive Works.

CAR BUILDING.

Items to the following effect were published in the *Railway Age Gazette* of December 23, but not in the Advance Sheet of December 21:

Atlanta & West Point, in market, 2 coaches and 2 postal cars.
Pennsylvania Equipment Company, in market, 25 to 50 second hand hopper coal cars.

Pittsburgh & Lake Erie, said to have ordered 10 coaches and 2 combination passenger and baggage cars, American Car & Foundry Company.

Great Northern, ordered 500 50-ton ore cars, American Car & Foundry Company.

The Great Northern has ordered 75 50-ton tank cars from the American Car & Foundry Company.

The New York, Ontario & Western has ordered 450 coal cars from the American Car & Foundry Company.

The Louisville & Nashville, it is said, will build 200 steel frame fruit cars and 400 box cars at its New Decatur shops.

The Algoma Central & Hudson Bay is considering an order for 392 40-ton steel underframe flat cars, 67 40-ton steel underframe box cars and 55 50-ton all steel ore cars.

The Canadian Pacific is said to have ordered 2,000 freight cars and 200 coaches from its Angus shops at Montreal. This company is also said to have ordered 500 stock cars and 800 flat cars from other firms.

The Atchison, Topeka & Santa Fe has ordered 500 refrigerator cars from the American Car & Foundry Company in addition to the 1,000 reported in the *Railway Age Gazette* of September 16. The cars will be built to the same specifications as the previous lot.

The St. Louis Southwestern is in the market for 500 refrigerator cars in addition to 1,500 box cars and 500 furniture cars. The box cars and 500 flat cars were mentioned in the *Railway Age Gazette* of December 16; the flat cars should have read furniture cars.

The Nashville, Chattanooga & St. Louis, as reported in the *Railway Age Gazette* of December 16, has ordered 100 40-ton box cars from the American Car & Foundry Company, to be built at Madison, Ill. They will weigh 40,000 lbs. The inside measurements will be 36 ft. long, 8 ft. 6 in. wide and 8 ft. high. The over-all measurements will be 36 ft. 11½ in. long, 9 ft. 7 in. wide and 14 ft. high. The bodies will be of wood and the underframes steel. The following special equipment will be used:

Acetylene	A. C. & F. Co.
Ball bearings, heavy	American Steel Foundries
Ball bearings, light	American Steel Foundries
Bolts	American Steel Foundries
Brake blocks	A. C. & F. Co.
Brake shoes	A. C. & F. Co.
Brakes	National Malleable Co.
Capstans	Conrad Co.
Chairs	Wagonhouse and Sonneton
Draw springs	A. C. & F. Co.
Journal boxes	A. C. & F. Co.
Paint	A. C. & F. Co.
Reeds	Chicago Cleveland
Tires	A. C. & F. Co.
Wheels	A. C. & F. Co.

IRON AND STEEL.

The Philadelphia & Reading will probably place an order shortly for 20,000 tons of rails.

The Delaware & Hudson is said to have bought 7,500 tons of rails from the Cambria Steel Company.

The Grand Trunk Pacific is in the market for 61,200 tons of 80-lb. rails and the necessary rail fastenings.

The Norfolk & Western is reported to have ordered 8,700 tons of rails from the Maryland Steel Company.

The New York, Ontario & Western has ordered 5,500 tons of rails from the Bethlehem Steel Corporation and the Pennsylvania Steel Company.

General Conditions in Steel.—The exceptional dullness in the steel trade is due to the holiday and inventory period. Buying during the last week has been at the lowest point of the year. Wherever possible, furnaces are being banked for ten days or two weeks, until the demand of the finishing mills shall warrant their resuming operation. Steel men hope to maintain their present prices and are doing their utmost to avoid making the reduction which was expected.

SIGNALING.

The Long Island road plans to install automatic block signals during the coming year on nine miles of its road, double track.

The plans of the New York, New Haven & Hartford for the coming year include the installation of the block system on 137 miles of the road.

The Union Pacific is putting up mechanical interlocking plants at South Omaha, Neb., and Quimby, Colo., each machine to have ten working levers.

The Cumberland Valley has let a contract for the installation of automatic block signals during the coming year on 44 miles of its line, double track.

The Boston & Maine proposes during the coming year to install automatic block signals on 423 miles of its lines. On 324 miles of this, the work is already half done.

The Northern Pacific has electric block signals under construction on about 200 miles of its line, double track. The manual block system is now in operation on these lines.

The plans of the Chicago & Eastern Illinois for the coming year provide for the installation of a mechanical interlocking plant at Huggins Junction, Ill., and one at West Vienna, Ill., each to have 14 working levers.

The Oregon Railroad & Navigation Company expects to erect automatic block signals on 55 miles of its line during the coming year. There is a length of 14 miles of single track road which will be made double track, necessitating a corresponding change in signals.

The Great Northern plans during the coming year to install automatic block signals on 56 miles of its road, double track, and manual signals on 57 miles, single track. Three mechanical interlocking plants are planned for; namely, Everett, Wash.; Summit, Mont., and Java, Mont., each 16 levers.

The Chicago, Burlington & Quincy expects within the coming year to install instruments for controlled manual block signaling on the lines from Hastings, Neb., to Denver, Colo., 368 miles; Napier, Mo., to Lincoln, Neb., 112 miles; and from Lincoln, Neb., to Huntley, Mont., 825 miles. At present the simple telegraph block system is in use on these lines.

The Southern Pacific (Pacific System), expects to install automatic block signals during the coming year on 107 miles of its line. Electric interlocking will be installed at Sacramento, 20 levers; at Elvas, 52 levers; at Dolgeville, 20 levers; at Alameda, 2 machines, one of 24 levers and one of 17 levers; at Fruitvale, 80 levers; at Berkeley, 2 machines, one of 20 levers and one of 28 levers, and at Albany one of 24 levers. Electro-pneumatic interlocking will be installed at Los Angeles, 59 levers, and at Oakland, 3 plants of 71 levers, 17 levers and 15 levers, respectively.





TF
1
R2
v.49
Engin.

Railway age

ENGINE STORAGE

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY
